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CARIBBEAN
PRODUCTION AND CONSUMPTION
OF
ENERGY

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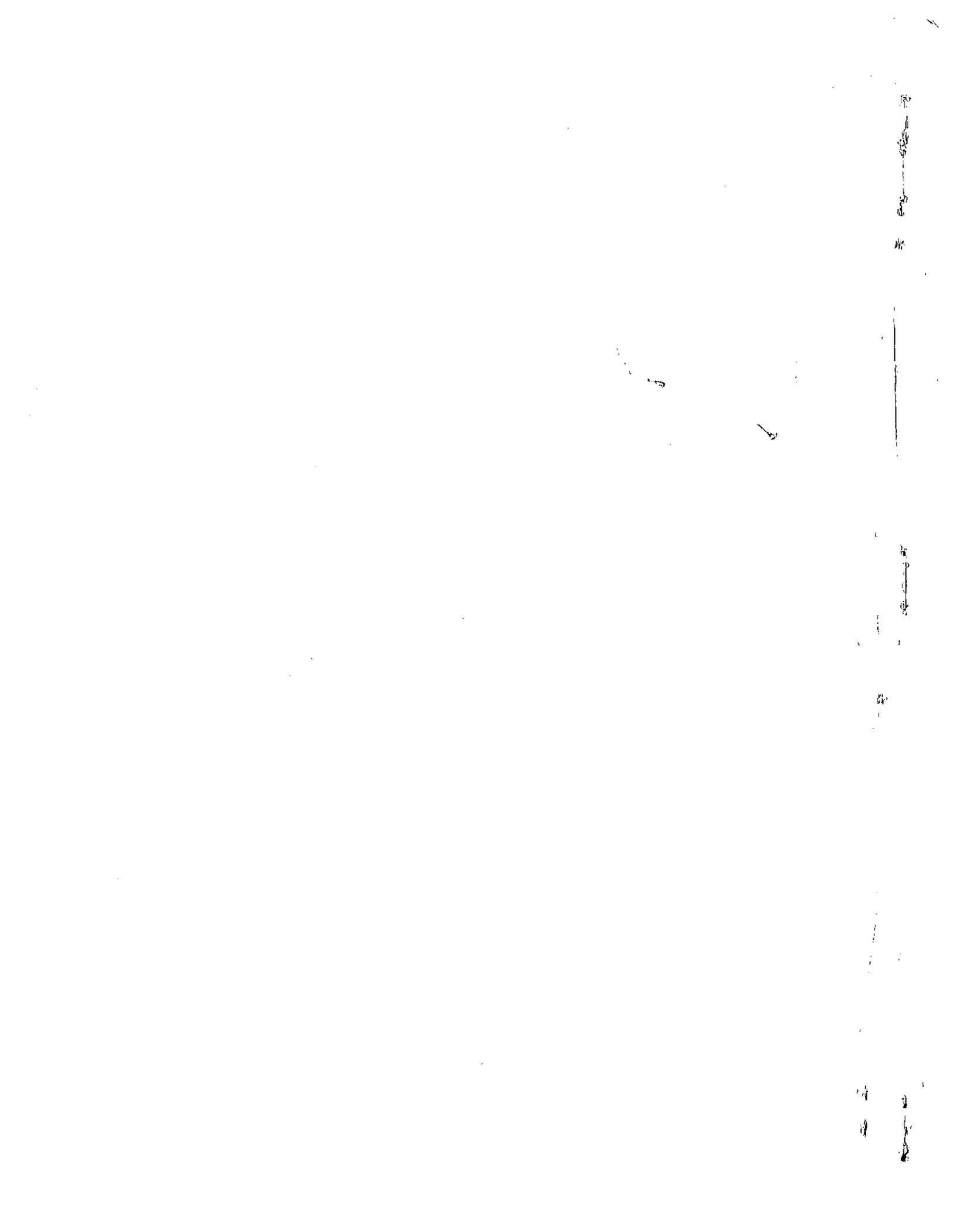


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LIST OF ABBREVIATIONS AND SYMBOLS

CDCC	Caribbean Development and Cooperation Committee
CEPAL	The Spanish acronym for the "Economic Commission for Latin America
...	Not available
-	Nil or negligible
*	United Nations estimate
E	CEPAL estimate
NK	No data available but not known whether there is consumption.

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INTRODUCTION

This is the first in a series of papers which it is proposed to prepare on the general topic of energy in the Caribbean Development and Co-operation Committee (CDCC) area. The ultimate objective is "formulation of a sub-regional energy programme" as stated in the formal Work Programme of the CDCC agreed at the First Session Meeting, 31 October to 4 November 1975. ^{1/} This short paper has a much more limited objective and that is to quantify the level, trend and historical pattern of energy production and consumption in the region from 1950. Priority was accorded to this aspect on two grounds: firstly, data on production and consumption of commercial energy, by country, are the most readily available; secondly, it is necessary to understand clearly the characteristics and behaviour of these two basic aspects of the energy situation before attempting to make decisions and/or recommendations.

Follow-up work will include study of the energy resources and the current uses of energy in CDCC countries. These studies, it is hoped, will help to provide the background for the formulation of a Caribbean co-operation programme in the field of energy.

The geographical coverage of the paper includes, first of all, countries which fall within the responsibility of the ECLA Office for the Caribbean, that is, Caribbean Development and Co-operation Committee Countries. ^{2/} In addition, most other Caribbean island countries have been included in statistical data aggregations. The focus, however, is intended to be mainly on the CDCC countries.

^{1/} See E/CEPAL/1010 (E/CEPAL/CDCC/8 Rev. 1), 27 February 1976.

^{2/} The Bahamas, Barbados, Cuba, Dominican Republic, Grenada, Guyana, Haiti, Jamaica, Suriname, Trinidad and Tobago, Belize and the West Indies Associated States - Antigua, Dominica, Montserrat, St. Kitts-Nevis-Anguilla, St. Lucia and St. Vincent. Data are included for the Netherlands Antilles, which enjoys observer status in the CDCC.

As defined here, energy refers to commercial forms of energy and excludes the vegetable fuels for which data are unavailable. It is known that wood, charcoal and bagasse, etc. are widely used as fuel in the Caribbean. However, taking the region as a whole, it appears that the use of wood has decreased over time with the depletion of forests and the growth of large urban centers.

The main source of energy data is the series of publications: World Energy Supplies published by the United Nations Statistical Office. ^{3/} In general, definitions of energy commodities conform to those specified in the United Nations Classifications schemes. ^{4/} It should be noted that some detailed statistics are not available for some countries, especially for the earlier years. In these cases, the aggregate figures for the Caribbean may in fact understate the actual magnitude, but it appears that these cases are few and do not seriously affect totals.

Consumption figures refer to "apparent inland" consumption or "gross availability" derived from "Production plus Imports minus Exports minus Bunkers plus or minus Changes in stocks." Problems occur because stock change data are unavailable for some countries, especially in those cases where stocks and stock changes are large relative to local consumption. Such a situation appears to exist in some smaller countries with refineries and/or those which carry on also large bunker trade. A special caution is necessary with respect to per capita consumption figures. Comparisons from year-to-year for one country will not be subjected in general, to many errors since by and large, the differences would not vary greatly. Errors of course, would tend to be greater the further apart are periods which are being compared. Inter-country comparisons, however, may be subject to greater error, deriving from incompleteness of the energy data.

^{3/} See, for example, Publication Sales, Nos. E.76.XVII.5 and E.77.XVII.4

^{4/} Publication Sales Nos. E.68 XVII.8 for production and E.75.XVII.6 for external trade.

The Caribbean area suffers from a relative dearth of conventional energy resources and although non-conventional energy resources do exist, technological and economic constraints presently stand in the way of their utilization. Consequently, Caribbean countries, as a group, have an enormous annual net foreign exchange bill totalling over US\$1,000 million currently in order to maintain the relatively high levels of energy consumption. It should be noted however, that not all countries are equally affected and Trinidad and Tobago stands out at present as the only energy surplus country in the group.

The trend in energy production is more erratic than the trend in consumption; and the latter grew at a somewhat faster rate between 1950 and 1976. The gap between production and consumption widened considerably between 1968 and 1972 when production declined fairly sharply, but has narrowed since then as production expanded while consumption levels were restrained. The central problem however, has been the high oil price increases since 1973 which has swollen the costs to importing countries. This problem derives from the high dependence of the region on imported liquid fuels. In quantity terms, the share of liquid fuels in total consumption of commercial energy is around 82 per cent.

Energy is a necessary concomitant of development. The impact of general world-wide economic problems of the 1970's and the additional burden of the steep increases in the prices of petroleum and petroleum products have seriously retarded the pace of economic development in the Caribbean. Satisfactory solutions for coping with such problems must be found soon to head-off imminent social crises. A regional approach to finding solutions to the problems appears to be a possibility worth investigating, and is indeed mandated by the CDCC itself.

PRODUCTION OF PRIMARY ENERGY

In 1950, world production of primary commercial energy in terms of coal equivalent was estimated at 2,664 million metric tons, and at the end of 1976, this figure had risen to 8,950 million metric tons. Between 1950 and 1976, the average annual growth rate was approximately 4.8 per cent. The decade 1950-1960 showed the highest growth rate, 5.3 per cent and the period since 1970 has been one of generally slow growth especially during 1974 and 1975.

Table 1
Production of Primary Energy, World and
Caribbean - Selected Years
(Million Metric Tons of Coal Equivalent)

Year	World		Caribbean Area	
	Total	Period Difference	Total	Period Difference
1950	2,664	760	5.0	0.9
1955	3,424	1,054	5.9	4.0
1960	4,478	1,104	9.9	2.0
1965	5,582	1,768	11.9	1.6
1970	7,350	1,132	13.5	5.5
1975	8,482	469	19.0	-0.1
1976	8,951		18.9	

Source: World Energy Supplies, 1950-1974, 1971-1975 and 1972-1976; United Nations, New York.

Levels and Trends in Caribbean Energy Production

Production of primary commercial energy in the Caribbean area, as defined, stood at about 18.9 millions of metric tons of coal equivalent in 1976. By way of comparison, the total in 1950 was just under 5 million metric tons. This historical series indicates a growth rate of approximately 5.5 per cent over the 26 year period. That is to say, that production of primary energy in the Caribbean area grew at a faster rate than for the world as a whole during 1950-1976.

The period of most sustained growth in production of primary energy in the Caribbean was the decade of 1950-1960 when the average annual rate of growth exceeded 7 per cent. Most of the growth during this decade occurred in the second half when the average annual rate of increase was approximately 13 per cent. Growth in the 1960's overall averaged only 3.2 per cent per year and production declined after 1968. There has been fairly rapid growth again in the 1970's, around 7 per cent per year, on average up to 1976, but this represents, to a large extent, a resurgence of output which began only in 1972, and the 1968 level of production was not attained again until 1974.

Comparison Between World and Caribbean Production

Despite the relatively more rapid growth of Caribbean production than world production of primary energy between 1950 and 1976, the share of the Caribbean in the total has increased only by a small amount. As of 1976, the proportion was only 0.21 per cent compared with about 0.18 per cent in 1950.

For the world as a whole, natural gas production has experienced the fastest growth of all primary energy sources since 1950 but crude petroleum and natural gas liquids still constitute around 49 per cent of the total. Natural gas accounts for less than 20 per cent, hydro and nuclear electricity, less than 3 per cent and coal and lignite the other 27-28 per cent.

Crude petroleum dominates the commercial energy scene in the Caribbean to a far greater extent than in the major regions of the world. During the 1970's, the share of crude has averaged around 86 per cent, natural gas 12 per cent and hydro-electricity less than 2 per cent of Caribbean primary energy production.

It is clear that with the small shares in production of energy, the Caribbean is in the position of being greatly influenced by whatever developments occur at the world level.

Country Shares

The production of primary energy in the region is dominated by one country, Trinidad and Tobago. This statement is true for crude petroleum and natural gas liquids as well as for natural gas itself. There is no commercial production of coal, hydro-electricity or nuclear energy in Trinidad and Tobago and it will be recalled that vegetable fuel is excluded from the data in the tables. Next in order of size of production is Cuba with a share of only 1.5 to 2 per cent of the Caribbean total in the last five years. The shares of all the other countries combined in production of primary energy is therefore very negligible. In 1975 and 1976, Trinidad and Tobago's share exceeded 97 per cent of the total for the Caribbean as a whole. Illustrated here is the fact that most countries depend on imports for their requirements of both primary and secondary energy sources.

Crude petroleum and natural gas liquids are produced mainly in Trinidad and Tobago and Cuba and in recent years Barbados has also been extracting crude petroleum. Natural gas is also captured in association with crude petroleum extraction in these three countries. Hydro-electricity production is somewhat more widespread than crude oil or natural gas in terms of its exploitation in a larger number of countries. However, hydro-electricity production is still small except for Suriname with over 64 per cent of the area total.

Table 2
Relative Shares in Hydro-electricity Generation
Percentage

<u>Country</u>	<u>1969</u>	<u>1976</u>
Cuba	6.4	3.3
Dominican Republic	5.0	10.2
Haiti	-	9.3
Jamaica	9.9	8.4
Suriname	77.3	67.4
Others ^{1/}	<u>1.4</u>	<u>1.4</u>
	100.0	100.0

^{1/} Dominica and St. Vincent

Source: Calculated from data in the Statistical Appendix

Given the geographical pattern of production outlined above, developments in Trinidad and Tobago almost completely determine the state of Caribbean production. Thus, the Caribbean and Trinidad and Tobago's production of crude petroleum declined by about 30 per cent between 1968 and 1971. Similarly, when production in Trinidad and Tobago recovered, increasing by 66 per cent between 1971 and 1976, total Caribbean production increased at approximately the same rate.

PRODUCTION OF SECONDARY ENERGY FUELS

The Caribbean region (really Trinidad) exports a large share of its production of crude while it imports significant quantities (often six to ten times the level of production in the last 10 years and even more in earlier years). ^{5/} It may be noted here that while only three countries of the area ^{6/} extract crude petroleum, nine countries have had petroleum refining capacity since 1973 and earlier, and as of late 1978, a tenth country, St. Lucia, had a refinery under construction.

Refinery Capacity

Refinery capacity was estimated at about 100 million metric tons in 1976, which is about 116 per cent higher than the level existing in 1950. By its very nature, high level of capital per production unit and the long gestation period for construction of plants, additions to capacity is a relatively slow process. Normally, a long run annual rate of increase of between 3 and 3.5 per cent could be considered reasonable, however, for the world as

^{5/} A significant part of the production and trade in Trinidad and Tobago relates to a Petroleum Processing Agreement whereby crude petroleum enters the country to be processed specifically for a "client" and then is "exported".

^{6/} Reports have come to hand recently, that crude petroleum is being produced in the Dominican Republic since 1977.

a whole (developed and developing countries about the same) the growth in refinery capacity has been around 7.25 per cent per year during the period since 1950. In any case, petroleum refinery capacity in the Caribbean area far exceeds the size that is necessary to supply present local consumption of petroleum products. Indeed, existing capacity can supply much more than the total current domestic final consumption of energy. This situation has existed throughout the period covered in this paper. For example, in 1950 the ratio of refinery capacity to consumption of energy petroleum products was 11 to 1; this ratio has decreased to around 5:1 in the 1970's. On the other hand, the relationship between refinery capacity and production of energy petroleum products has followed the opposite trend as refinery capacity has grown faster than production ^{7/} especially since 1970. These facts further demonstrate the export-oriented nature of energy production in the region as with so many other commodities.

Table 3
Selected Data on Petroleum Production
(Million Metric Tons)

Year	Production of Crude Petroleum	Production of Energy Petroleum Products	Exports of Energy Petroleum Products	Consumption of Energy Petroleum Products	Estimated Refinery Capacity
1950	2.934	46.225	46.488	4.218	56,550
1960	6.008	48.024	45.523	7.796	56,950
1970	7.382	75.761	64.586	17.638	84,950
1973	8.944	81.477	71.473	21.234	103.150
1975	11.390	53.803	47.884	19.719	102.550
1976	11.154	62.191	52.912	20.532	100.300
1977	11.980	...	...	...	...

Source: Calculations from data in World Energy Supplies, 1950-1974 and 1972-1976

^{7/} These remarks apply equally when non-energy petroleum products are taken into account.

Table 4

Percentage Shares of Production, Refinery Capacity
and Dates of Establishment

Country	Production		Refinery Capacity			Dates of Establishment
	1976	1975	1976	1975	1950	
Antigua	... ^{1/}	0.27	... ^{1/}	0.88	-	1966
Bahamas	12.52	17.04	26.67	25.45	-	1970
Barbados	0.22	0.26	0.15	0.15	0.1	Prior to 1950
Cuba	9.08	10.00	6.33	5.85	1.1	1950 or earlier
Dominican Republic	2.26	2.15	1.50	1.46	-	1973
Jamaica	2.15	2.70	1.84	1.80	-	1964
Martinique	0.75	0.83	0.55	0.54	-	1971
Netherlands Antilles	48.54	44.56	39.98	41.39	85.9	1950 or earlier
Trinidad and Tobago	<u>24.48</u>	<u>22.19</u>	<u>22.98</u>	<u>22.48</u>	<u>12.9</u>	Prior to 1950
	<u>100.00</u>	<u>100.00</u>	<u>100.00</u>	<u>100.00</u>	<u>100.0</u>	

^{1/} Refinery out of production

Source: Calculations from data in World Energy Supplies, 1950-1974, 1972-1976. United Nations New York.

Data on petroleum refinery capacity are given in Table 4 above. Four countries only had refinery capacity at the beginning of the period under study. Refineries were established in two countries (although of relatively low capacity) in the 1960's and so far in the 1970's three have been established and a fourth may come on stream before the decade ends.

Most countries have been increasing their refining capacity to meet domestic demand but also to supply increased requirements for bunkering and exports. Capacity in Cuba though still relatively small has increased more than ten fold since 1950. The refining capacity of Trinidad in 1976 was nearly four times the

1950 figure. In the Bahamas, capacity increased by 25 per cent during the second year of establishment (1971) and further doubled two years later.

Levels and Trends in Production of Energy Petroleum Products

Production of energy petroleum products amounted to 46.2 million metric tons in 1950. By 1973 the level had reached 81.5 million metric tons but has since declined. ^{8/} Up to 1974, the average annual rate of increase has been around 2 per cent, about the same as the average growth rate of population but lower than the growth of GDP. It should be noted however, that domestic consumption of these products has grown much faster than exports.

Though the trend of production has been mainly upward in the last twenty-six years, there were nine years when production declined and a few years when the increase was negligible. During 1950-1955 and 1970-1975, growth was negative; a very small increase occurred in the 1955-1960 period. On the other hand, the decade of the 1960's was a period of almost continuous growth especially during the first half. These fluctuations may be related to international conditions; for example, the post-Korean War slump affected energy demand during the early 1950's and the monetary and petroleum crises of the 1970's are being reflected in the one per cent average annual growth rate of production of energy petroleum products in the Caribbean up to 1976. In addition, data for the 1970's show an apparent shift of certain activities by transnationals from some Caribbean countries. It is noted that, production of energy petroleum products grew faster in both the developed countries and non-Caribbean developing countries as a group. Furthermore, imports of these products into developed countries, notably in North America, declined during the period. Unlike most of the region, Cuba's output continued to increase during the petroleum crisis years 1973-1975, though the rate of increase slackened. This exceptional position may be due to the

^{8/} Data are given in Tables 3 and 5

pattern of economic organization and the tendency for closer relatedness of national requirements and industry actions.

Needless to say, the level of production has generally followed the level of capacity, so that the Netherlands Antilles is the largest producer of petroleum products followed by Trinidad and Tobago and the Bahamas. Significant increases in production during the next 2-3 years should come from the Bahamas and the Dominican Republic.

Type of Products

The petroleum energy products with which we are concerned are liquified petroleum gases, gasolenes (aviation and motor),

Table 5

Production of Selected Energy Petroleum
Products in Selected Years
(Million Metric Tons)

<u>Year</u>	<u>Total</u>	<u>Gasolenes</u>	<u>Kerosene and Jet Fuels</u>	<u>Fuel Oils</u>	<u>Other</u>
1950	46.2	5.9	1.8	38.5	-
1960	48.0	5.2	3.7	39.1	-
1965	59.8	6.8	5.5	47.5	-
1970	74.9	7.6	7.1	60.0	0.2
1971	74.0	7.6	7.1	59.0	0.3
1972	72.4	7.0	6.9	58.3	0.2
1973	80.7	6.8	7.3	66.2	0.4
1974	73.0	6.0	6.1	61.4	0.4
1975	53.3	4.7	4.6	43.8	0.2
1976	61.6	4.8	5.5	50.9	0.4

Source: World Energy Supplies, 1950-1974, 1971-1975 and 1972-1976, United Nations, New York.

kerosenes, jet fuels and distillate and residual fuel oils. ^{9/} The major characteristic is that residual fuel oils have dominated production throughout the period varying between 62 and 70 per cent of the total. ^{10/} Distillate fuel oils, including gas oil and diesel oils, is the second largest sub-category but has declined in relative importance, averaging about 12 per cent in the 1970's. Motor gasoline is next in importance with just under 10 per cent.

Analysis of production data for the major countries shows that generally the pattern is the same as for total production. That is, residual fuel oils dominate the picture followed by distillate fuel oils, gasolenes, jet fuels and other products of minor significance including kerosene and liquified petroleum gases. There are, however, a few important country variations to the pattern that should be noted.

Up to 1975, the Bahamas did not produce gasolenes and Cuba did not produce jet fuels. The Bahamas and the Netherlands Antilles have concentrated more on residual fuel oils than the other countries; this item accounting for more than 75 per cent of their total production in some years. In the more important producer countries, production of gasoline tends to be higher than production of distillate fuel oils in recent years, while in the smaller countries, gasoline and kerosene are of relatively more importance than in the larger producing countries. Liquified petroleum gases and kerosene are relatively more important in the total energy production of Cuba than in any of the other important producers.

In addition, to energy petroleum products there is a relatively small amount of gas forming a part of the secondary production of energy in the Caribbean area. Both gas from gas works and refinery

^{9/} United Nations data are used. For precise definitions, see International Standard Industrial Classification of All Economic Activities (ISIC); Statistical Papers, Series M. No.4 Rev 2 (E.68.XVII.8) 1968.

^{10/} See Table 5

gas are included; the former being produced mainly in Cuba with small quantities also produced in Suriname. Refinery gas for use in refineries is produced in Jamaica, Trinidad and Tobago and possibly also in the Netherlands Antilles but the latter's figures are not available.

ELECTRICITY PRODUCTION

Commercial electricity produced in the Caribbean is of two types: namely, thermal electricity and hydro-electricity. Thermal generation of electricity has been the main type in the Caribbean during the period under consideration. Most of the generation used to be done by industrial establishments primarily for their own use but the situation changed in the late 1950's when public utility companies were expanded to meet the increased demand for electricity.

Installed Capacity

In 1950 the total installed capacity of electric generating plants was 700 thousand kilowatts of which 98 per cent represented thermal generating capacity. By 1976 total capacity of all plants had increased nearly seven times, thermal generating plants accounted for over 92 per cent of the total of 5.1 million kilowatts. Between 1950-1976, installed capacity of hydro-electricity plants rose at a faster rate than that of thermal electricity. Because of the fact

Table 6

Installed Capacity of Industrial and Public Generating
Plants by Type
('000 kilowatts)

<u>Year</u>	<u>Total</u>	<u>Thermal</u>	<u>Hydro</u>
1950	700	686	14
1960	1,660	1,618	42
1965	2,366	2,128	238
1970	3,458	3,194	264
1971	3,642	3,376	266
1972	4,047	3,749	298
1973	4,433	4,055	378
1974	4,793	4,401	392
1975	4,840	4,453	387
1976	5,073	4,686	387

Source: World Energy Supplies, United Nations, New York.

that most of the countries of the region are small islands, the prospects for hydro-electricity are not extremely encouraging. Much higher rises in petroleum prices could however, change the situation.

On account of gaps in the available data, it is not possible to make any meaningful analysis of the earlier years of the period under review. However, it will be observed that installed capacity was concentrated in a few countries. In 1956, four countries, namely: Cuba, Jamaica, the Netherlands Antilles and Trinidad and Tobago accounted for 84 per cent of total installed capacity. Cuba alone accounted for 56 per cent.

With the installation of new generating capacity in some countries as well as expansion in others, the shares of the various countries have experienced significant shifts. These are shown in Table 7 below.

Table 7
Country Shares of Installed Electricity Generating Capacity
(Percentage)

Country	1956	1965	1970	1975	1976
Guyana	2.6	4.1	4.6	3.5	3.5
Suriname	2.2	9.8	7.5	6.2	7.1
Bahamas	1.1	1.4	5.0	5.3	5.0
Cuba	56.2	41.3	40.2	34.7	33.6
Dominican Republic	5.9	7.5	7.4	14.5	14.6
Jamaica	8.4	8.7	11.6	14.2	13.5
Netherlands Antilles	11.9	10.9	8.2	6.0	5.7
Trinidad and Tobago	7.5	11.6	9.6	8.4	8.9
Other	4.1	6.1	5.9	7.2	8.1
TOTAL	100.0	100.0	100.0	100.0	100.0
Total Installed Capacity '000 kilowatts:	1,211	2,366	3,458	4,840	5,073

Source: Calculated from data in World Energy Supplies, United Nations, New York.

Although data for 1950 is incomplete, it will be observed that installed capacity of industrial establishments represented over 60 per cent of the total. By 1960 however, the capacity of public establishments ^{11/} had forged ahead and in 1976, nearly two-thirds of total capacity were accounted for by public generating plants. Over the review period 1950-1976, the capacity of industrial plants grew at an average annual rate of about 6 per cent compared to a 10 per cent growth rate for public plants.

Table 8
Installed Capacity of Industrial and Public
Generating Plants for Selected Years
('000 kilowatts)

Year	Total	Industrial	Public
1950	700	445	255
1960	1,660	754	906
1970	3,458	1,204	2,254
1975	4,840	1,745	3,095
1976	5,073	1,843	3,230

Source: Compiled from data in World Energy Supplies, United Nations, New York.

The tendency for installed capacity in public plants to exceed that of industrial plants is common to almost all the individual countries. One notable deviation from this pattern is Suriname where capacity in public plants increased from 11 thousand kilowatts in 1960 to 36 thousand in 1976 while industrial capacity, on the other hand, rose from 18 thousand kilowatts to 325 thousand during the same period.

^{11/} Public establishments are those utilities whether publicly or privately owned but generating primarily for public use. By contrast, industrial establishments refer to those generating primarily for own use.

Trends in Electricity Production

During the period 1950-1976, production of electricity in the Caribbean increased from a modest 2.4 thousand million kilowatt hours (kWh) to 18.6 thousand million kWh, an average annual rate of growth of 8.2 per cent. This increase in production has been spread fairly evenly over the years 1950-1970 but the growth rate has slowed down since 1970. Despite the substantial rise in electricity production, per capita production at 733 kWh is still considerably below the average world levels of more than 1700 kWh.

Cuba and the Netherlands Antilles were the main producers of electricity in the area in 1950 and together accounted for 77 per cent of Caribbean production, but generation in both countries has declined in relative importance as shown in Table 12. With the expansion of installed capacity in the area, the levels of electricity generated have risen in all countries and the shares of some countries in total generation have undergone marked changes.

Table 9

Caribbean Production of Electricity by Type of Producer
(Thousand Million Kilowatt Hours)

Year	Total	Industrial	Public
1950 ^{1/}	2.412	1.314	1.098
1960	5.586	2.129	3.457
1965	7.638	2.561	5.077
1970	12.609	4.464	8.145
1971	13.337	4.574	8.763
1972	15.000	5.155	9.845
1973	16.319	5.867	10.452
1974	17.171	5.992	11.179
1975	17.370	5.371	11.999
1976	18.663	5.779	12.884

^{1/} Coverage incomplete, data unavailable for some smaller countries.

Source: Compiled from data in World Energy Supplies, United Nations, New York.

Between 1950 and 1955, industrial establishments produced more electricity than public establishments. In 1956, this trend was reversed and public production has since continued to increase faster accounting for 65 per cent of the total in 1970 and 69 per cent in 1976. Production by public establishments grew at an average annual rate of 10 per cent between 1950 and 1976 while for industrial establishments the growth rate was 5.9 per cent.

Table 10
Caribbean Production of Electricity by Type
of Generating Source
('000 Million Kilowatt Hours)

Year	Total	Thermal	Hydro
1950 ^{1/}	2.412	2.346	0.066
1960	5.586	5.374	0.212
1965	7.638	7.296	0.342
1970	12.609	11.313	1.296
1971	13.337	11.963	1.374
1972	15.000	13.466	1.534
1973	16.319	14.972	1.347
1974	17.171	15.632	1.539
1975	17.370	15.827	1.543
1976	18.663	16.932	1.731

^{1/} Coverage incomplete, data unavailable for some smaller countries.

Source: Compiled from data in World Energy Supplies, United Nations, New York.

Table 11
Average Annual Rate of Growth in
Caribbean Electricity Production

Year	Total	Thermal	Hydro
1950-1975	8.2	8.0	12.5
1950-1960	8.8	8.6	12.4
1960-1970	8.5	7.7	19.8
1970-1975	6.5	6.5	3.6
1975-1976	7.4	7.0	12.2

Source: Compiled from data in World Energy Supplies, United Nations, New York.

Thermal Electricity

Thermal generation of electricity is the most common form of generation in the Caribbean. The data indicate that during 1950, electricity generated by thermal means (fired by bunker "C" or other grade fuel oil or natural gas) amounted to 2.3 thousand million kWh, excluding data for some of the smaller islands. By 1960, the level of generation had more than doubled, amounting to 5.4 thousand million kWh. It should be noted that most of the countries of the Caribbean had embarked on industrialization programmes during this decade, thereby stimulating the increased demand for electricity.

Between 1960 and 1970, generation of thermal electricity more than doubled again although the rate of increase was slightly less than during the previous decade. Since 1970, thermal generation has increased by another 50 per cent.

Nearly all Caribbean countries have shared in the sharp rise in thermal electricity generation. One major exception is Suriname where the increase in electricity production resulted from the establishment of hydro-electric facilities. Data on country shares in total thermal generation of electricity in the Caribbean are given in the following Table.

Table 12
Percentage Contribution of Countries to Total
Generation of Thermal Energy for Selected Years

Countries	1950	1960	1970	1973	1975	1976
Guyana	1.4	1.7	3.0	2.4	2.4	2.4
Suriname	1.4	1.5	2.8	3.6	1.1	0.9
Antigua	-	0.1	0.3	0.3	0.3	0.3
Bahamas	0.7	1.4	4.3	4.3	4.1	3.5
Barbados	0.4	0.7	1.3	1.4	1.4	1.4
Belize	-	0.1	0.2	0.2	0.2	0.2
British Virgin Islands	-	-	0.1	0.1	0.1	0.1
Cayman Islands	-	-	0.1	0.1	0.2	0.2
Cuba	50.6	55.1	42.5	37.7	41.2	42.2
Dominica	-	-	-	-	-	-
Dominican Republic	3.4	5.4	7.4	14.7	15.5	14.9
Grenada	-	0.1	0.1	0.2	0.2	0.2
Guadeloupe	0.1	0.4	0.9	1.0	1.1	1.0
Haiti	0.9	1.7	1.0	0.2	0.2	0.3
Jamaica	4.9	7.1	12.6	13.9	13.9	13.2
Martinique	0.5	0.4	0.9	1.1	1.1	1.2
Montserrat	-	-	-	-	0.1	0.1
Netherlands Antilles	28.1	15.4	11.4	10.3	8.9	9.4
St. Kitts-Nevis-Anguilla	-	0.1	0.1	0.1	0.1	0.1
St. Lucia	0.1	-	0.2	0.2	0.3	0.3
St. Vincent	-	-	-	0.1	-	-
Trinidad and Tobago	7.2	8.7	10.6	8.1	7.6	8.1
Total Caribbean	100.0	100.0	100.0	100.0	100.0	100.0
<u>Production</u> ('000 Million kWh)	2.346	5.374	11.313	14.972	15.827	16.932

Source: Calculated from data in World Energy Supplies, 1950-1974 and 1972-1976, United Nations, New York.

Hydro-electricity

Hydro-electricity has played a comparatively minor role in the satisfaction of sub-regional energy needs during the period 1950 to 1976. Available data indicate that out of the twenty-two countries under consideration, only five generated hydro-electricity in 1950 and seven of them, twenty-six years later. During the same period, generation of hydro-electricity increased from 66 million kWh in 1950 to 1,731 million kWh in 1976. The share of hydro-electricity in total generation increased from about 2.7 per cent in 1950 to around 10 per cent in the 1970's.

The lower level of hydro-electricity generation compared with thermal electricity in the sub-region can be explained mainly by the geophysical situation, the availability, until recently, of relatively cheap petroleum and the high initial capital costs associated with hydro-electricity generation. Most of the countries under survey are small islands, lacking the advantage of large rivers with natural rapids, which can be employed in electricity generation. With the high cost of petroleum, more countries are looking at hydro-electric generation, and electricity from this source is likely to increase in the near future.

Production of hydro-electricity between 1950 and 1960 was almost entirely confined to Cuba, the Dominican Republic and Jamaica. In 1966, hydro-electricity generation showed a 100 per cent increase over the 1965 figure. This was due to the construction of a dam on the Suriname River in 1964 and the subsequent inauguration of a hydro-electric power plant with a capacity of 150,000 kilowatts. As a result of this activity, Suriname became the Caribbean's most important producer of hydro-power and now accounts for almost 68 per cent of the total. Haiti is also a newcomer, commencing production of hydro-electricity in 1972 in which year the country generated 4 per cent of the Caribbean total. This country is looking to hydro-power to supply more of its energy needs.

Table 13
Percentage Shares of
Hydro-electricity Production

Country	1950	1960	1966	1970	1975	1976
Cuba	19.7	9.4	16.7	5.8	4.0	3.1
Dominican Republic	-	27.4	5.7	6.3	12.0	10.1
Jamaica	75.8	59.4	16.6	9.4	8.5	8.4
Suriname	-	-	59.1	77.2	66.1	67.9
Haiti	-	-	-	-	7.9	9.2
Other	4.5	3.8	1.9	1.3	1.5	1.3
Total Caribbean	100.0	100.0	100.0	100.0	100.0	100.0
Caribbean Production ('000 million kWh)	0.066	0.212	0.785	1.296	1.543	1.731

Source: Compiled from data in World Energy Supplies, United Nations New York.

ENERGY CONSUMPTION

World consumption of commercial energy has been given as 8,318 million metric tons of coal equivalent for 1976. Comparison with the 1950 figure of 2,490 million metric tons, shows that world consumption increased more than three-fold; an average annual growth rate of 4.8 per cent for the twenty-six year period. Per capita consumption has grown at a slower rate of 2.9 per cent per year during this period. Aggregate consumption grew fastest in the first decade of the period under review, showing an average annual increase of almost 8 per cent. This was partly due to the rapid expansion of capacity to replace facilities destroyed during the war years. Since 1970, the average annual growth rate has been approximately 3.5 per cent.

Levels and Trends in Caribbean Energy Consumption

Aggregate consumption of commercial energy in the Caribbean has grown substantially from 10.9 to 33.8 million metric tons between 1950 and 1976. By 1967, the figure had more than doubled to 24.5, and in 1973 Caribbean consumption was recorded at its highest level of 35 million metric tons. Since then, consumption declined consistently until 1976 when an increase over the previous year was noted. It would appear that consumption levels are on the increase again.

In general, the growth rates of energy consumption in the Caribbean are much the same as for the world as a whole. For the entire twenty-six year period, the average annual rate of growth in consumption of commercial energy in the Caribbean was 4.4 per cent, as shown in Table 14. The 6.7 per cent per year increase between 1965 and 1970 coincided with a period of fairly rapid expansion in Caribbean Gross Domestic Product. The 2 per cent growth rate in energy consumption between 1970-1975 reflects the effects of the oil crisis and the efforts of countries to economize on their consumption of energy to minimize balance of payments problems.

Table 14
Average Annual Rates of Growth in World
and Caribbean Consumption of Commercial Energy - 1950-1975

Period	WORLD		CARIBBEAN		LATIN AMERICA ^{1/}	
	Aggregate	Per Capita	Aggregate	Per Capita	Aggregate	Per Capita
1950-1975	4.8	2.8	4.4	2.0	6.5	3.7
1950-1960	7.9	3.5	3.8	2.0	6.8	4.3
1960-1965	4.0	2.3	5.6	2.7	5.9	3.1
1965-1970	5.7	3.8	6.7	3.9	7.6	4.7
1970-1975	3.1	1.2	2.0	-1.4	5.5	2.7
1975-1976	5.6	3.7	4.7	4.3	7.2	3.0

^{1/} Including the Caribbean

Source: Calculated from data in World Energy Supplies, 1950-1974, 1971-1975 and 1972-1976, United Nations, New York.

Comparison with the Rest of the World

As of 1976, the population of the Caribbean area as defined in this paper was estimated at just in excess of 25 million. This is equivalent to only 0.6 per cent of the world population in the same year. The region's share in world consumption of commercial energy is around 0.41 per cent. ^{12/} On a per capita basis, the consumption in the Caribbean area of over 1,330 kgms of coal equivalent of commercial energy per annum in 1976 exceeds that of the developing countries of the world as a whole and for the regions of Africa, Asia and Latin America. This relatively high level of per capita consumption is related to degrees of industrialization and also to styles of living in the Caribbean. The favourable position vis-a-vis some developing areas should be modified by the considerations that:

- i) Consumption in developing countries as a whole has been growing more rapidly than in the Caribbean since 1970; and

^{12/} See Tables II-2 and II-3 of the Statistical Appendix.

- ii) As of 1976, per capita consumption in the Caribbean was only about 21 per cent of the level in the developed market economies as a whole.

Country Shares and Trends in Consumption

The composition of the Caribbean, ranging in land area from Guyana and Cuba, the largest, to the British Virgin Islands and Cayman Islands, the smallest, and in levels of economic development and size of population results in great disparity in consumption levels. ^{13/} Country data are shown in Tables II-4 to II-7 of the Statistical Appendix and also in the following Table.

As of 1976, six countries with a total estimated consumption of approximately 30.6 million metric tons of coal equivalent accounted for more than 90 per cent of total energy consumption in the Caribbean area. Four countries: Cuba, the Netherlands Antilles, Trinidad and Tobago and Jamaica, in this order, are the largest consumers (according to the data) and accounted for over 76 per cent of the 1976 total. The Bahamas more than doubled its consumption between 1969 and 1973; and in the Dominican Republic, consumption doubled between 1968 and 1976. Both these countries have established petroleum refineries only in recent years. Refinery consumption of energy is quite a high percentage of total consumption and would thus partly account for the fact that countries with refineries dominate the energy consumption picture in the Caribbean.

^{13/} It should be recalled that (as explained in the Introduction) consumption figures are "apparent inland" consumption and that time series data on stocks are unavailable for many Caribbean countries. Consequently, levels of consumption should be regarded as approximate only and care should therefore be taken in making inter-country comparisons. This caution is particularly important in the case of per capita consumption since the levels are relatively low for many countries and the population small; actual stock changes, especially where bunkering is important, could significantly alter the figures.

Table 15

Consumption of Commercial Energy - Selected
Caribbean Countries

Country	1950		1969		1976	
	Aggre- gate (mt ⁶)	Per Capita (kgms)	Aggre- gate (mt ⁶)	Per Capita (kgms)	Aggre- gate (mt ⁶)	Per Capita (kgms)
Bahamas	-	354	0.7	4,149	1.5	7,286
Cuba	2.7	480	8.5	1,023	11.6	1,225
Dominican Republic	0.2	69	1.2	314	3.3	683
Jamaica	0.1	94	1.9	1,038	4.0	1,937
Trinidad and Tobago	1.1	1,741	4.4	4,292	4.7	4,272
Netherlands Antilles	6.5	40,395	6.6	30,436	5.5	22,836
Other	0.3	...	2.8	...	3.3	...
Total Caribbean	10.9	753	26.1	1,177	33.9	1,330

Source: World Energy Supplies, 1950-1974, 1972-1976; United Nations, New York, and data supplied CEPAL.

Needless to say, all countries have shown growth rates of multiples of one hundred per cent between 1950 and 1970. Countries such as the Bahamas, the Dominican Republic, Jamaica and Grenada, show the highest rates with more than ten-fold increases during this period. Suriname, Belize, Guyana and Barbados show increases between five and ten-fold, while other countries experienced relatively more moderate increases. It should be noted however, that Trinidad and Tobago and the Netherlands Antilles already had significantly high levels of consumption (for the region) in 1950.

Between 1970 and 1975, growth rates of energy consumption dropped significantly for most countries; notable exceptions being the Bahamas and the Dominican Republic. Countries showing declines in the absolute levels of consumption during this period include Haiti, Suriname and

the Netherlands Antilles.

For most countries, consumption resumed an upward trend in 1976 but at least one half of them were still below the 1973 level. During 1973, imports, production of primary energy and aggregate consumption of energy for the region as a whole increased appreciably and of the twenty-two countries, aggregate consumption of energy declined in fourteen of them during the year 1974, the first full calendar year of the "energy crisis".

Table 15 gives countries with high per capita "apparent inland" consumption of energy levels (for the region) in 1950, 1969 and 1976. Other countries with relatively high levels of per capita consumption are the Cayman Islands, Antigua, Suriname, the British Virgin Islands, Guyana and Martinique. The Netherlands Antilles data show a pattern contrary to the general upward trend in per capita consumption of energy, a peak in per capita consumption was reached in 1951 after which the trend has been downward. It is observed that refineries are located in Antigua, Bahamas, Barbados, Cuba, Dominican Republic, Jamaica, Martinique, Netherlands Antilles and Trinidad and Tobago. Nearly all of these countries rank very high on the scale of per capita consumption. The Dominican Republic is a notable exception, but it should be noted that this country only established petroleum refinery capacity in 1973.

Types of Energy Products Consumed

Table 16 shows data on consumption of commercial energy by type in the Caribbean. The most obvious feature is the predominance of liquid fuels. As of 1976, of the 33.9 million metric tons of coal equivalent of energy consumed, some 31.2 million metric tons were in the form of liquid fuels - a share of 92 per cent, just slightly above the share for the period 1950-1976 as a whole.

Natural gas, hydro-electricity and solid fuels, in that order, comprise the rest of energy consumption. In absolute terms, total consumption of natural gas peaked between 1970 and 1972 with an average exceeding 2.5 million metric tons, at which point its share averaged around 8 per cent of total consumption, but

thereafter has declined steadily. However, judging from 1976 data, it would appear that natural gas consumption may be on the rise. Consumption of solid fuels, mainly coal, has declined in relative importance, while hydro-electric power consumption almost infinitesimal in 1950, has slowly been gaining ground in relative importance, especially in the last decade. Consumption of hydro-electricity now is only slightly above 200,000 metric tons of coal equivalent. As the hydro-electricity potential of the area appears to be relatively limited, consumption of this type of energy will apparently remain at a low level in most countries.

Table 16
Consumption of Commercial Energy by Type
Caribbean and Percentage Shares in Selected Periods

Period		Solid Fuels	Liquid Fuels	Natural Gas	Hydro- Electricity	Aggregate
<u>Millions of Metric Tons of Coal Equivalent</u>						
1950-1954	Absolute	0.406	54.853	3.271	0.056	58.586
	% Shares	(0.69)	(93.63)	(5.58)	(0.10)	(100.00)
1955-1959	Absolute	0.550	67.636	4.048	0.096	72.331
	% Shares	(0.76)	(93.51)	(5.60)	(0.13)	(100.00)
1960-1964	Absolute	0.553	81.970	5.840	0.146	88.510
	% Shares	(0.63)	(92.61)	(6.60)	(0.16)	(100.00)
1965-1969	Absolute	0.682	106.473	9.713	0.518	117.388
	% Shares	(0.58)	(90.70)	(8.27)	(0.44)	(100.00)
1970-1974	Absolute	0.729	146.31	12.104	0.877	160.022
	% Shares	(0.46)	(91.43)	(7.56)	(0.55)	(100.00)
1975	Absolute	0.137	30.012	2.038	0.190	32.377
	% Shares	(0.42)	(92.69)	(6.30)	(0.59)	(100.00)
1976	Absolute	0.146	31.238	2.287	0.214	33.886
	% Shares	(0.43)	(92.19)	(6.75)	(0.63)	(100.00)

Source: Calculated from data in World Energy Supplies, United Nations, New York.

The main consumers (and producers) of hydro-electricity in the Caribbean area are Suriname, Dominica Republic, Jamaica, Haiti and Cuba, accounting for about 98 per cent of the total. Suriname, with a total consumption of more than 145,000 metric tons of coal equivalent in 1976, has accounted for more than 60 per cent of regional consumption in the last five years.

Very few countries still consume solid fuels: these are Cuba, Suriname, the Bahamas, the Dominican Republic and Jamaica. In earlier years, up to the late 1950's, Guyana, Guadeloupe and Martinique were coal consumers so also were Barbados and Trinidad and Tobago up to the mid 1960's. The Bahamas did not consume coal in the years covered by this paper until 1971. Cuba, which has been the major consumer throughout the period, accounted for about 81 per cent of total consumption in 1976. Suriname with 18 per cent in the same year is the next largest consumer.

Only three countries produce and consume natural gas: Trinidad and Tobago, Cuba and Barbados. Trinidad's consumption dominates the picture with about 98 per cent in 1976 and even larger shares in earlier years. Data on Cuba's consumption of natural gas are available only since 1972, but its growth has been fairly rapid. Barbados' share in Caribbean consumption currently is less than one-fifth of one per cent.

Total consumption of liquid fuels in the Caribbean area in 1976 in terms of weight, was approximately 21 million metric tons. In general, the trends in consumption of liquid fuels mirror the trends in total consumption because of the large share of liquid fuels in the total consumption of all the countries of the area. The major consumers are: Cuba, the Netherlands Antilles, Jamaica, the Dominican Republic, Trinidad and Tobago, the Bahamas, Guyana and Suriname. In 1976, these eight countries accounted for 95 per cent of total consumption; Cuba alone accounted for 37 per cent (see Table 17 below). Countries experiencing highest rates of growth in consumption of liquid fuels since 1950 are the Bahamas, Antigua, Jamaica, Grenada and Trinidad and Tobago; some of the smaller islands have also experienced substantial growth rates.

It appears that liquid fuels will remain the major source of energy in the Caribbean for the foreseeable future.

Trinidad and Tobago showed an unique consumption pattern during the period 1950-1976. Up to 1969, natural gas accounted for a larger share (nearly 60 per cent in 1969) of its consumption of energy than liquid fuels. Since 1970, the pattern has been reversed and liquid fuels now account for the larger share.

Table 17

Consumption of Liquid Fuels in 1975 and 1976

Countries	Coal Equivalent Million Metric Tons		Percentage Share	
	1975	1976	1975	1976
Cuba	11.017	11.444	36.7	36.6
Jamaica	3.957	3.966	13.2	12.7
Dominican Republic	3.269	3.278	10.9	10.5
Trinidad and Tobago	2.201	2.403	7.3	7.7
Bahamas	1.472	1.537	4.9	4.9
Guyana	0.884	0.839	3.0	2.7
Suriname	0.935	0.876	3.1	2.8
Netherlands Antilles	4.934	5.503	16.4	17.6
Others	1.343	1.392	4.5	4.5
Total	30.012	31.238	100.0	100.0

Source: World Energy Supplies, 1971-1975, 1972-1976, United Nations, New York.

Table 18

Main Consumers of Hydro-electricity, Selected Years

(Million metric tons of coal equivalent)

Countries	1955	1960	1965	1970	1975	1976
Suriname	-	-	0.010	0.123	0.125	0.145
Cuba	0.002	0.002	0.007	0.011	0.008	0.007
Dominica	-	-	0.001	0.001	0.001	0.002
Dominican Republic	0.006	0.007	0.007	0.010	0.023	0.022
Haiti	NK	NK	NK	NK	0.015	0.020
Jamaica	0.010	0.015	0.016	0.015	0.016	0.018
St. Vincent	-	-	0.001	0.001	0.001	0.001
Total Caribbean	0.018	0.026	0.042	0.161	0.189	0.215

NK = No data, but not known whether there was any consumption

Source: World Energy Supplies, 1950-1974 and 1972-1976,
United Nations, New York.

THE ENERGY GAP

Caribbean production and consumption of energy have been discussed in some detail above. It may be useful at this stage to compare levels of consumption and production to get a picture of the degree of regional self-sufficiency.

An energy gap or energy deficiency may be said to exist when in quantity terms, current consumption of commercial energy exceeds current production of primary energy. The chart number I of the Statistical Appendix shows production of primary energy for the region and aggregate consumption of commercial energy (excluding vegetable fuels) in terms of units of coal equivalent from 1950-1976. The level of consumption is significantly higher than the level of production, showing that the region is a net importer of energy. ^{14/}

This energy gap was made up by importing and/or drawing down on previously accumulated stocks. In 1976, the energy gap estimated at nearly 15 million metric tons (coal equivalent), of commercial energy was somewhat lower than in the previous five years.

In quantitative terms, the level of imports for the Caribbean as a whole reached more than 112 million metric tons (coal equivalent) in 1976 while exports and bunkers amounted to more than 90 million metric tons, showing the region as a net importer of some 22 million metric tons of energy products in that year. This implies an addition to stocks of nearly 7 million metric tons.

At the CDCC level, total consumption of commercial energy amounted to approximately 28 million metric tons of coal equivalent

^{14/} It will be observed that primary energy excludes the production of energy fuel products. The fact is that production of these secondary sources of energy is based on crude petroleum, some coal and coke, manufactured gas, petroleum products etc., which are already included in the primary energy products.

in 1976 while production of primary energy amounted to nearly 19 million metric tons ^{15/} leaving a gap of some 9 million metric tons.

Table 19
Energy Gap - CDCC Countries

Year	Consumption mill mt	Production mill mt	Net Imports and Stock ^{1/} Change	Actual Net Imports	Implied Stock Changes
1970	21.3	13.5	7.8	8.5	+ 0.7
1971	22.6	12.6	10.0	15.2	+ 5.2
1972	24.7	13.5	11.2	9.9	- 1.3
1973	26.9	15.8	11.1	10.8	- 0.3
1974	25.9	16.9	9.0	8.1	- 0.9
1975	26.8	19.0	7.8	8.1	+ 0.3
1976	27.7	18.9	8.8	5.0	- 3.8

^{1/} Includes stock changes. This column is the difference between consumption and production.

Source: World Energy Supplies, 1972-1976, United Nations New York.

While the CDCC region as a whole is a net importer of petroleum products, Trinidad and Tobago was the only net exporter of energy in 1976. The Bahamas, with its very large refinery and relatively small economy, exports a considerable part of its production of energy petroleum products. Cuba and the Dominican Republic produce only a small part of their own domestic requirements of energy and do not produce for export while Jamaica and Barbados export some energy products. The present CDCC observer country, the Netherlands Antilles, also exports a major

^{15/} It should be noted that at present, there is little production of primary commercial energy products in the countries of the Caribbean covered in this report outside of CDCC member countries.

part of its total energy production.

The energy gap is estimated now to cost the Caribbean over US\$1,000 million per year for net fuel imports, taking the average for 1976 and 1977. The establishment of additional refining capacity in recent years, and the emphasis on increasing production of primary energy products will tend toward reducing the energy gap in value terms more so if surplus energy products are available for exports. By way of comparison, in the years 1972 and 1973 (just before the significant price increases of petroleum products) the energy gap stood at just over one quarter million US dollars. The increased cost over the four-year period is therefore about four-fold.

For the CDCC member countries, the energy gap cost on average, about US\$580 million in 1976-1977, compared with about US\$276 million in 1972-1973. This relatively smaller increase, for the CDCC area (just a little more than two-fold) reflects the high level of imports in 1973 as countries managed to build up inventories in advance of the price rises of late 1973 and 1974 and efforts to hold down consumption and imports in the latter years. More importantly, there is reflected also the increased petroleum production and exports of Trinidad and Tobago. For most CDCC countries, the increase in cost for the four-year period exceeded three-fold, notably the Bahamas, Haiti, Jamaica (where increases were four-fold or more), and the Dominican Republic, Guyana and Belize.

The impact of increased energy costs may be seen by comparing net imports of mineral fuels with other aggregates such as total earnings from exports, the level of foreign exchange reserves or Gross Domestic Product. See Table III-2. The net mineral fuels imports of CDCC countries, excluding Trinidad and Tobago, averaged US\$385 million in 1972-1973 and increased by over 300 per cent to more than US\$1,544 million by 1976-1977. ^{16/} During this period, the

^{16/} Trinidad and Tobago is excluded from the discussion on this point since it is the only energy surplus country in the CDCC area and in fact its position has improved since 1972-1973 mainly as a result of the fuel price increases. When Trinidad and Tobago is included, net imports averaged US\$276 million and US\$580 million in 1972-1973 and 1976-1977 respectively.

value of total export earnings (excluding Trinidad and Tobago) increased by a relatively low 120 per cent by comparison. Consequently, the cost of net imports of energy fuels as a percentage of total export earnings increased from less than 14 per cent to nearly 25 per cent between 1972-1973 and 1976-1977. The position varies from country to country but it may be noted that in purchasing their net import requirements of energy, the Bahamas currently (1976-1977) expends about 24 per cent of export earnings on mineral fuels imports, the Dominican Republic 38 per cent and Jamaica 30 per cent. Smaller percentages are expended in other countries.

In the case of the Bahamas and the Dominican Republic, the increases are associated with increases in petroleum refinery capacity and output, particularly in the former country which has become now a relatively large exporter of petroleum products.

A major consequence of the energy gap has been the severe decline in foreign reserves in many countries especially when net foreign assets are taken into account. The picture becomes even gloomier not only for the prospects of development, but more so for the prospects of survival when energy fuel prices' increase of 1979 are taken into account.

Production of primary energy is expected to continue to increase up to 1980, but indications are that production should taper off between 1980 and 1985 unless significant new finds of crude petroleum and/or natural gas are made. In the meantime, consumption requirements are expected to increase. One preliminary estimate for the CDCC region (including conservative estimates of production, moderate growth rates for energy demand and the GDP aggregates) and utilizing a 5 per cent per year increase in import prices shows that in 1980 net imports of mineral fuels could cost around US\$1,300 million accelerating to US\$2,800 million by 1985. ^{17/}

^{17/} The rise in prices announced in late December 1978 to take effect from the beginning of 1979 will increase the figures shown here.

Some countries may improve their position by 1980 and 1985, ^{18/} but this means that the position will be that much worse in the other countries. It is recognized that the development of refineries based on imports of crude can ease the net foreign exchange cost for energy especially if surpluses of manufactured energy products are available for export. However, significant improvement can only come from development of local energy resources. It would therefore be to each country's advantage to develop local energy resources, including non-conventional sources, as far as possible since the financial resources of most will not be able to meet the potential cost of imports.

^{18/} Dominican Republic, Guyana, Suriname and Trinidad and Tobago.

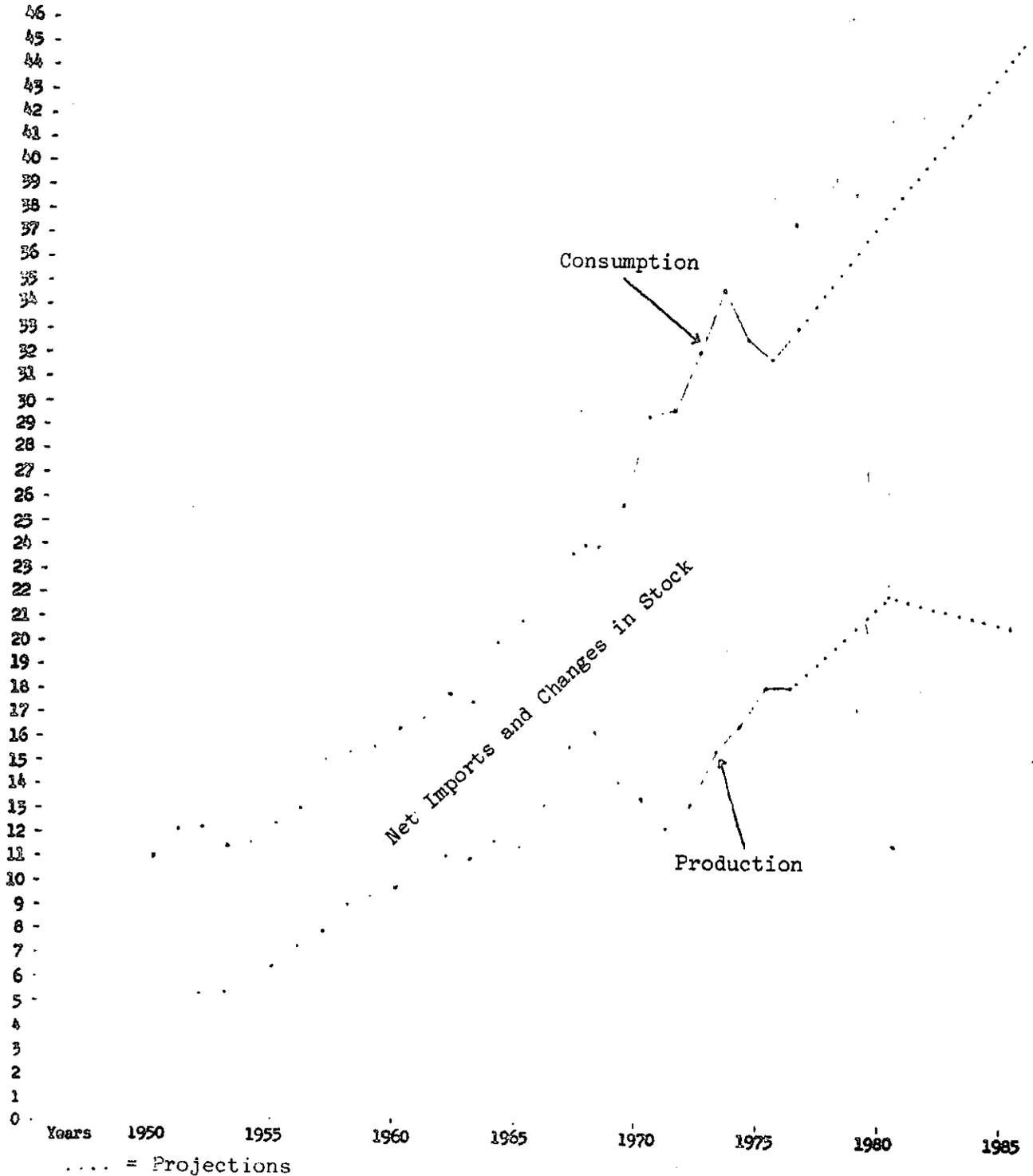
STATISTICAL APPENDIX

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CHART I

Production of Primary Energy and
Consumption of Commercial Energy -
Caribbean Countries

Quantity - Million Metric Tons Coal Equivalent



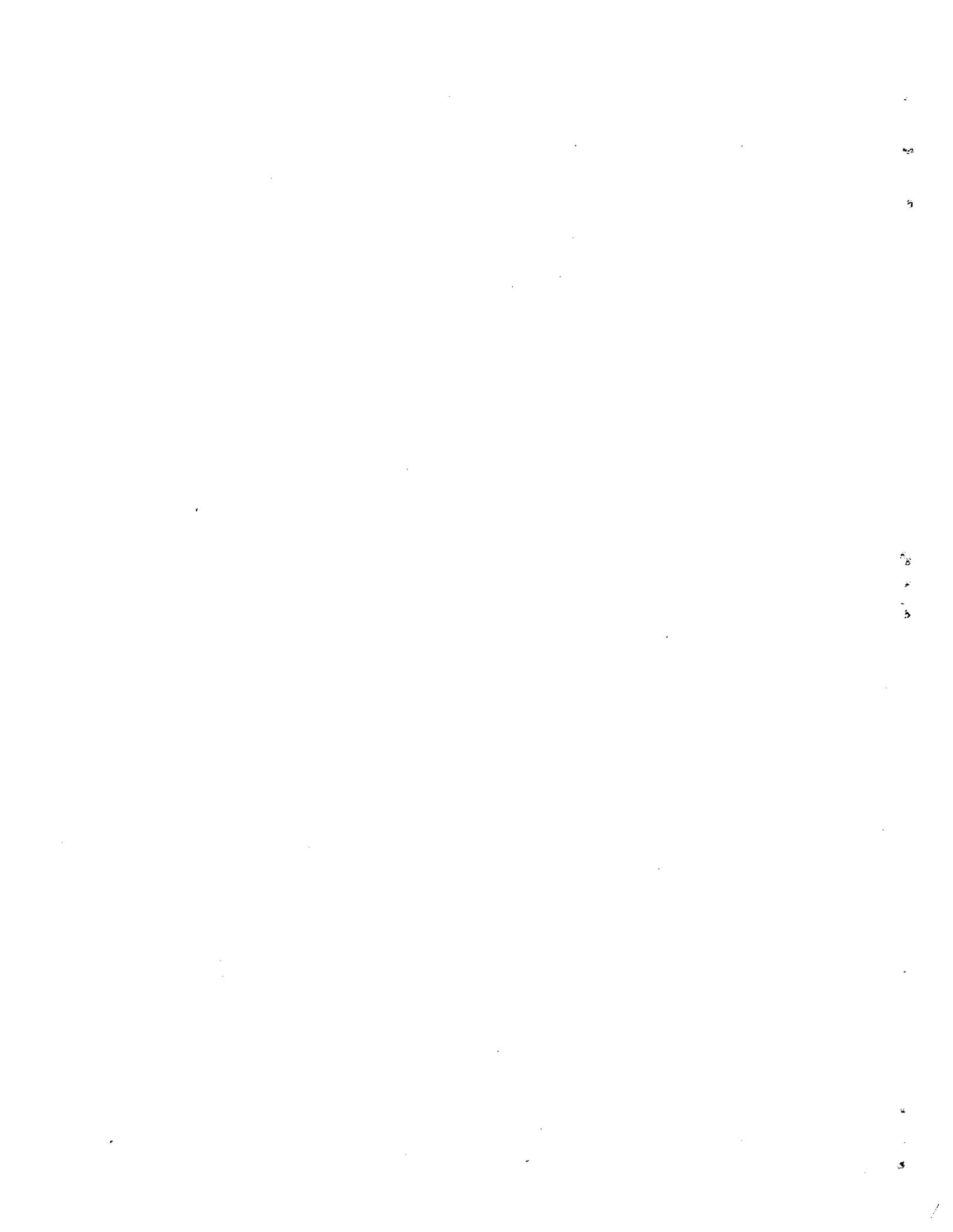
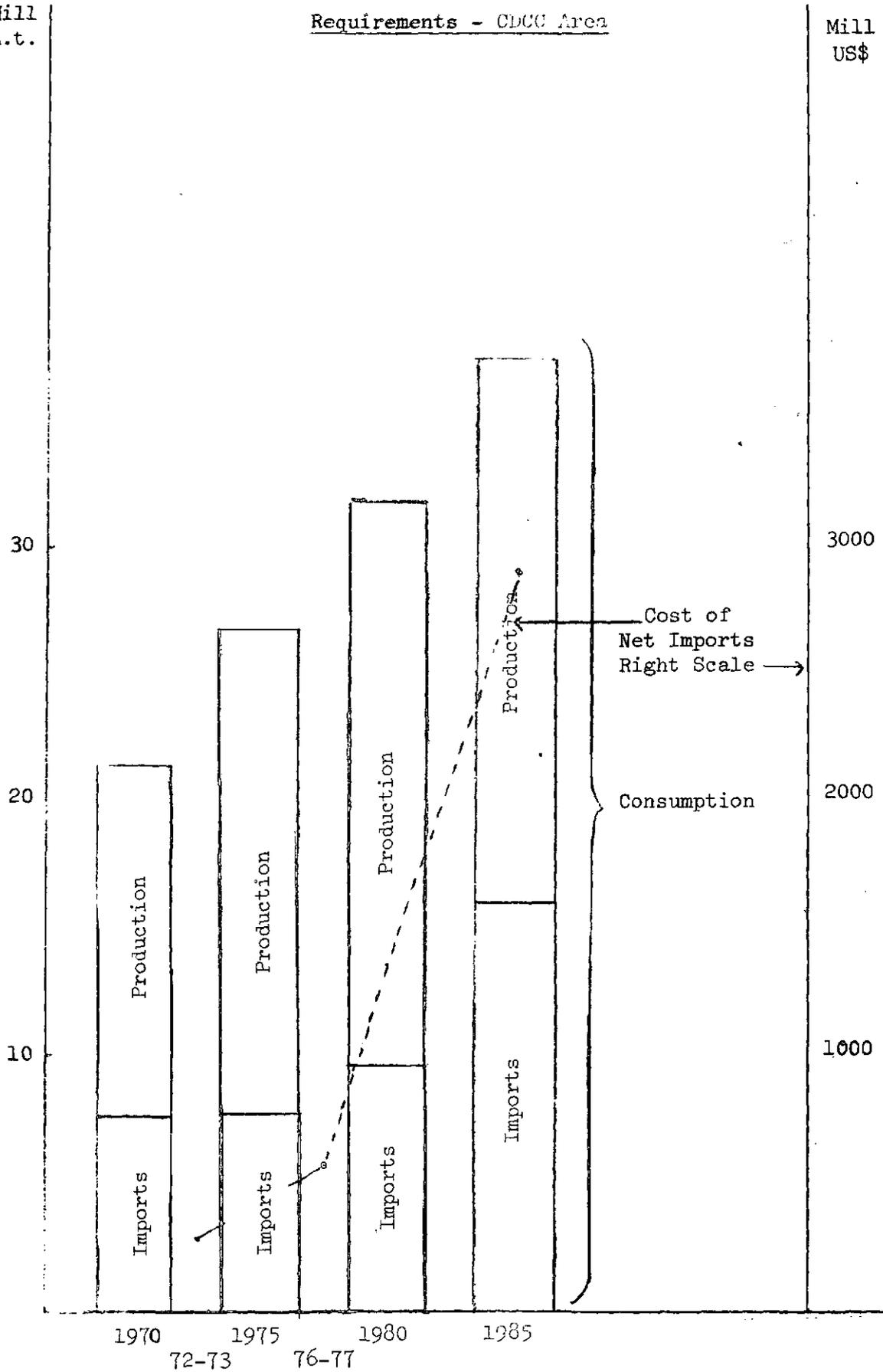


CHART II
Production of Primary Energy Consumption of
Commercial Energy and Cost of Net Imports
Requirements - CDCU Area

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m.t.

Mill
US\$



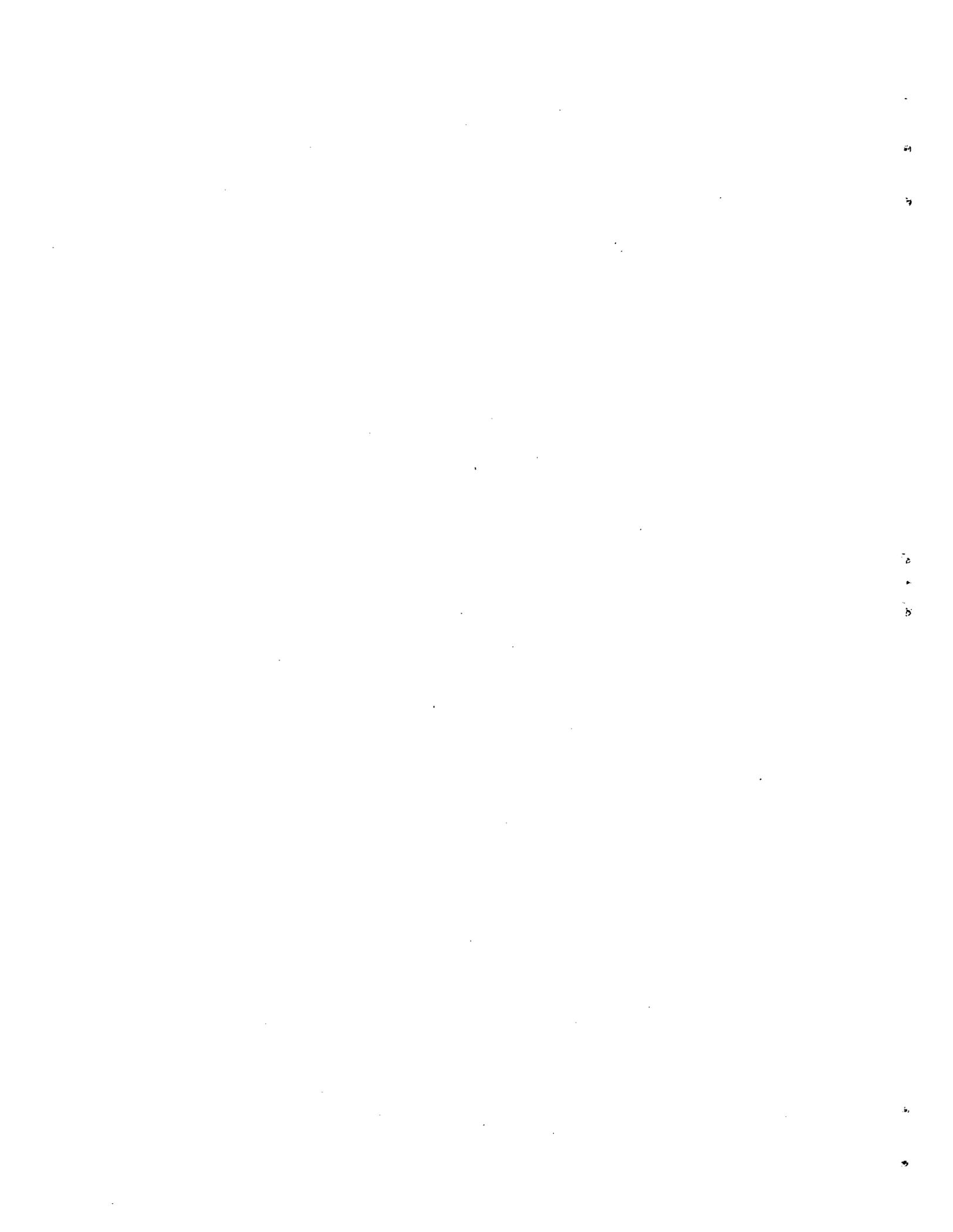


TABLE I-1 Continued

Year	C A R I B B E A N				OF WHICH TRINIDAD AND TOBAGO			
	Total Primary Energy	o/w Crude Petroleum and Natural Gas Liquids	Natural Gas	Hydro-Electricity	Total Primary Energy	o/w Crude Petroleum and Natural Gas Liquids	Natural Gas	Hydro Electricity
1964	11.924	10.431	1.455	0.039	11.827	10.376	1.451	
1965	11.889	10.279	1.568	0.042	11.759	10.195	1.564	
1966	13.429	11.492	1.841	0.097	13.227	11.390	1.837	
1967	15.868	13.726	2.031	0.110	15.580	13.553	2.027	
1968	16.495	14.236	2.131	0.128	16.070	13.943	2.127	
1969	14.556	12.273	2.142	0.141	14.107	11.969	2.138	
1970	13.525	10.878	2.488	0.159	13.128	10.644	2.484	
1971	12.604	10.004	2.428	0.172	12.249	9.828	2.421	
1972	13.543	10.836	2.519	0.188	13.176	10.670	2.506	
1973	15.760	13.159	2.435	0.166	15.365	12.953	2.411	
1974	16.863	14.439	2.234	0.190	16.386	14.181	2.206	
1975	18.981	16.753	2.038	0.190	18.510	16.497	2.013	
1976	18.907	16.406	2.287	0.214	18.149	16.165	2.254	
1977	...	17.621	2.288	...	19.632	17.378	2.254	

Source: World Energy Supplies, 1950-1974, 1971-1975 and 1972-1976.
United Nations, New York.

TABLE I-1

Production of Primary Energy - Caribbean
and Trinidad and Tobago 1950-1976
(Million Metric Tons of Coal Equivalent)

Year	<u>C A R I B B E A N</u>				<u>OF WHICH TRINIDAD AND TOBAGO</u>			
	Total Primary Energy	o/w Crude Petroleum and Natural Gas Liquids	Natural Gas	Hydro-Electricity	Total Primary Energy	o/w Crude Petroleum and Natural Gas Liquids	Natural Gas	Hydro-Electricity
1950	4.991	4.348	0.635	0.008	4.955	4.322	0.633	
1951	5.095	4.455	0.631	0.008	5.060	4.433	0.627	
1952	5.196	4.543	0.642	0.010	5.156	4.520	0.637	
1953	5.410	4.724	0.673	0.014	5.359	4.691	0.667	
1954	5.692	4.986	0.690	0.016	5.650	4.964	0.686	
1955	5.987	5.300	0.669	0.018	5.887	5.224	0.663	
1956	6.916	6.163	0.734	0.020	6.787	6.058	0.729	
1957	8.034	7.212	0.803	0.018	7.928	7.129	0.799	
1958	8.783	7.876	0.887	0.020	8.692	7.809	0.883	
1959	9.570	8.595	0.955	0.020	9.508	8.557	0.951	
1960	9.914	8.865	1.023	0.026	9.865	8.844	1.020	
1961	10.703	9.568	1.112	0.023	10.661	9.553	1.108	
1962	11.380	10.217	1.136	0.027	11.332	10.200	1.132	
1963	11.344	10.199	1.114	0.031	11.262	10.154	1.108	

TABLE I-2

Production of Primary Energy

by Country

1950

(Million Metric Tons of Coal Equivalent)

Country	Crude Petroleum and Natural Gas Liquids	Natural Gas	Hydro- Electricity	Total
Barbados	-	0.003	-	0.003
Cuba	0.025	-	0.002	0.027
Jamaica	-	-	0.006	0.006
Trinidad and Tobago	4.322	0.633	-	4.955
TOTAL	4.348	0.635	0.008	4.991

Source: See Table I-1

TABLE I-3

Production of Primary Energy by Country, 1969

(Million Metric Tons of Coal Equivalent)

Country	Crude Petroleum and Natural Gas Liquids	Natural Gas	Hydro- Electricity	Total Primary Energy
Suriname	-	-	0.109	0.109
Barbados	0.001	0.004	-	0.005
Cuba	0.303	-	0.009	0.312
Dominica	-	-	0.001	0.001
Dominican Republic	-	-	0.007	0.007
Jamaica	-	-	0.014	0.014
St Vincent	-	-	0.001	0.001
Trinidad and Tobago	11.969	2.138	-	14.107
TOTAL CARIBBEAN	12.273	2.142	0.141	14.556

Source: See Table I-1

TABLE I-4

Production of Primary Energy by Country, 1974
(Million Metric Tons of Coal Equivalent)

Country	Crude Petro- leum + Natural Gas Liquids	Natural Gas	Hydro- Electricity	Total Primary Energy
Suriname	-	-	0.124	0.124
Barbados	0.012	0.003	-	0.015
Cuba	0.247	0.026	0.011	0.284
Dominica	-	-	0.001	0.001
Dominican Republic	-	-	0.023	0.023
Haiti	-	-	0.014	0.014
Jamaica	-	-	0.015	0.015
St. Vincent	-	-	0.001	0.001
Trinidad and Tobago	14.181	2.206	-	16.386
Total Caribbean	14.440	2.235	0.189	16.863

Source: See Table I-1.

TABLE I-5

Production of Primary Energy by Country, 1976
(Million Metric Tons of Coal Equivalent)

Country	Crude Petro- leum + Natural Gas Liquids	Natural Gas	Hydro- Electricity	Total Primary Energy
Suriname	-	-	0.145	0.145
Barbados	0.029	0.005	-	0.035
Cuba	0.212	0.028	0.007	0.246
Dominica	-	-	0.002	0.002
Dominican Republic	-	-	0.022	0.022
Haiti	-	-	0.020	0.020
Jamaica	-	-	0.018	0.018
St. Vincent	-	-	0.001	0.001
Trinidad and Tobago	16.165	2.254	-	18.419
Total Caribbean	16.406	2.287	0.215	18.908

Source: See Table I-1.

TABLE I-6

Shares of Socio-Economic Groups of Countries
in World Energy Production, 1950 and 1974 and 1975

(In percent, World = 100)

	Year	Coal and Lignite	Crude Pet- roleum and Natural Gas Liquids	Natural Gas	Hydro and Nuclear Electricity	Total Primary Energy
<u>Developed Market Economies</u>	<u>1950</u>	69.3	54.5	92.8	89.6	67.4
	<u>1974</u>	41.4	22.0	67.6	74.4	37.4
<u>Centrally Planned Economies</u>	<u>1950</u>	27.5	8.2	5.2	4.5	19.3
	<u>1974</u>	53.3	19.0	23.5	12.6	29.7
Europe	<u>1950</u>	24.8	8.1	5.2	4.3	17.7
	<u>1974</u>	33.6	16.7	23.3	9.7	22.7
Asia	<u>1950</u>	2.7	0.1	-	0.2	1.6
	<u>1974</u>	19.7	2.3	0.2	2.9	7.0
<u>Developing Countries</u>	<u>1950</u>	3.2	37.3	2.0	5.9	13.3
	<u>1974</u>	5.3	59.0	8.8	13.0	32.9
Africa	<u>1950</u>	0.2	0.5	-	0.5	0.3
	<u>1974</u>	0.2	9.3	0.8	1.9	4.9
Asia	<u>1950</u>	2.6	18.0	0.4	1.4	6.9
	<u>1974</u>	4.5	40.9	4.7	3.9	22.6
Latin America	<u>1950</u>	0.4	18.8	1.6	4.0	6.1
	<u>1974</u>	0.6	8.9	3.3	7.2	5.4
o/w Caribbean	<u>1950</u>	-	0.54	0.3	0.02	0.2
	<u>1974</u>	-	0.34	0.1	0.1	0.2
	<u>1975</u>	-	0.41	0.1	0.09	0.22

Source: An Extract of Global Energy Statistics, United Nations, March 1976; World Energy Supplies 1972-1976, United Nations, New York.

TABLE I-7
Average Annual Rate of Growth in Production
of Primary Energy - Selected Years

Period	World	Centrally Planned Economies	Developed Market Economies	All	DEVELOPING COUNTRIES			
					African	Asian	Latin American	Carib- bean
1950-75	4.8	6.8	2.4	8.3	11.1	8.7	3.0	5.5
1950-60	5.3	10.7	2.1	9.1	6.7	10.5	6.7	7.1
1960-70	5.1	3.8	1.3	9.9	22.7	8.9	2.7	3.2
1971/70	4.2	6.3	0.8	6.9	-4.0	13.8	-2.4	-6.8
1972/71	4.2	3.7	2.9	6.9	1.2	10.8	-2.6	7.4
1973/72	5.9	5.3	1.0	12.7	4.9	15.4	7.2	16.4
1974/73	1.0	5.4	-1.8	0.6	-5.7	3.3	-3.4	7.0
1975/74	-0.7	6.0	0.1	-6.9	-4.4	-8.3	-8.7	12.6
1976/75	5.5	5.4	1.0	11.2	16.5	11.4	1.9	-0.4

Source: Calculated from World Energy Supplies, 1950-74; 1971-75 and 1972-76, United Nations, N.Y.

TABLE I-8

Crude Petroleum Production - Caribbean: Selected Years
(Quantities in Million Metric Tons)

Year	Total Crude Petroleum Production	Of which from Off-Shore drilling	Off-shore as a percentage of Total Production	Index of Total Crude Production(1967=100)	Index of Off-shore Production (1967=100)
1950	2.934	-	-	31.5	-
1955	3.574	-	-	38.4	-
1960	6.008	-	-	64.5	-
1965	6.970	-	-	74.8	-
1966	7.796	-	-	83.7	-
1967	9.315	3.574	38.4	100	100
1968	9.666	4.109	42.5	103.8	110.7
1969	8.332	4.022	48.3	89.4	125.8
1970	7.382	3.635	49.2	79.2	128.1
1971	6.791	3.245	47.8	72.9	124.5
1972	7.359	4.143	56.3	79.0	146.6
1973	8.944	5.731	64.1	96.0	166.9
1974	9.817	6.982	71.1	105.4	185.2
1975	11.390	8.989	78.9	122.3	205.5
1976	11.154	8.777	78.7	119.7	204.9
1977	11.980	...	...	128.6	...

Source: See Table I-1.

TABLE I-9

Installed Capacity of Industrial and Public Electricity
Generating Plants - 1960
('000 Kilowatts)

Country	Total	Industrial		Public	
			% Share		% Share
Guyana	52	35	67.3	17	32.7
Suriname	29	18	62.1	11	37.9
Bahamas	22	-	-	22	100.0
Barbados	12	-	-	12	100.0
Belize	3	-	-	3	
Cuba	944	399	42.3	545	57.7
Dominica	1	-	-	1	100.0
Dominican Republic	108	40	37.0	68	63.0
Grenada	2	-	-	2	100.0
Haiti	28	10	35.7	18	64.3
Guadeloupe	8	-	-	8	100.0
Jamaica	142	73	51.4	69	48.6
Martinique	10	-	-	10	100.0
Netherlands Antilles	164	130	79.3	34	20.7
St. Kitts - Nevis - Anguilla	4	1	25.0	3	75.0
St. Lucia	1	-	-	1	100.0
St. Vincent	1	-	-	1	100.0
Trinidad and Tobago	129	48	37.2	81	62.8
Total:	1,660	754	45.4	906	54.6

NB - Data not available for Antigua, British Virgin Islands, Cayman Islands and Montserrat.

Source: See Table 1.

TABLE I-10

Installed Capacity of Industrial and Public Electricity
Generating Plants - 1976
('000 Kilowatts)

Country	Total	Industrial	Public
Guyana	180*	85*	95*
Suriname	361	325	36
Antigua*	22*	2*	20*
Bahamas	255	-	255
Barbados	99	-	99
Belize	12*	-	12*
Br. Virgin Islands	4*	-	4*
Cayman Islands	16	-	16
Cuba	1,705	690*	1,015*
Dominica	6*	-	6*
Dominican Republic	743	300*	443*
Grenada	7*	-	7*
Guadeloupe	50*	-	50*
Haiti	89*	18*	71*
Jamaica	685*	230*	455*
Martinique	55*	-	55*
Montserrat	4*	-	4*
Netherlands Antilles	290*	140*	150*
St. Kitts-Nevis-Anguilla	13*	3*	10*
St. Lucia	14*	-	14*
St. Vincent	9*	-	9*
Trinidad and Tobago	454	50	404
Total:	5,073	1,843	3,230

* UN Estimate

Source: See Table I-1.

TABLE I-11
Production of Electricity (by Type and Process), 1950
('000 Million Kilowatt hours)

Country	Total Production	Of which by Industry	Thermal	Hydro
Guyana	0.035	0.015	0.035	-
Suriname	0.035	0.027	0.035	-
Antigua	...	...	...	-
Bahamas	0.016	-	0.016	-
Barbados	0.011	-	0.011	-
Belize	0.001	-	0.001	-
Br. Virgin Islands	...	...	...	...
Cayman Islands	...	...	...	...
Cuba	1.200	0.442	1.187	0.013
Dominica	0.001	-	-	0.001
Dominican Republic	0.079	-	0.079	-
Grenada	0.001	-	0.001	-
Guadeloupe	0.004	-	0.003	0.001
Haiti	0.020	0.010	0.020	-
Jamaica	0.166	0.090	0.116	0.050
Martinique	0.012	-	0.012	-
Montserrat	...	...	...	...
Netherlands Antilles	0.660	0.610	0.660	-
St. Kitts-Nevis-Anguilla	...	...	...	...
St. Lucia	0.002	-	0.002	-
St. Vincent	0.001	-	-	0.001
Trinidad and Tobago	0.168	0.120	0.168	-
Total:	2.412	1.314	2.346	0.066

Source: See Table I-1.

TABLE I-12

Production of Electricity (By type and Process)
('000 Million Kilowatt Hours)
1960

Country	Total Production	Of which by Industry	Thermal	Hydro
Guyana	0.092	0.037	0.092	-
Suriname	0.079	0.040	0.079	-
Antigua	0.003	-	0.003	-
Bahamas	0.076	-	0.076	-
Barbados	0.038	-	0.038	-
Belize	0.006	-	0.006	-
British Virgin Islands	...	...	...	...
Cayman Islands	0.001	-	0.001	-
Cuba	2.981	0.748	2.961	0.020
Dominica	0.004	-	-	0.004
Dominican Republic	0.350	0.095	0.292	0.058
Grenada	0.004	-	0.004	-
Guadeloupe	0.021	-	0.020	0.001
Haiti	0.090	0.036	0.090	-
Jamaica	0.508	0.252	0.382	0.126
Martinique	0.023	-	0.023	-
Montserrat	0.001	-	0.001	-
Netherlands Antilles	0.825	0.715	0.825	-
St Kitts-Nevis-Anguilla	0.007	0.003	0.007	-
St Lucia	0.003	-	0.003	-
St Vincent	0.004	-	0.001	0.003
Trinidad and Tobago	0.470	0.209	0.470	-
TOTAL:	5.586	2.135	5.374	0.212

Source: See Table I-1

TABLE I-13

Production of Electricity (By type and Process)

('000 Million Kilowatt Hours)

1976

Country	Total Production	Of which by Industry	Thermal	Hydro
Guyana	0.398	0.186	0.398	-
Suriname	1.335	1.277	0.159	1.176
Antigua	0.047*	0.007*	0.047*	-
Bahamas	0.600*	-	0.600*	-
Barbados	0.228	-	0.228	-
Belize	0.043*	-	0.043*	-
British Virgin Islands	0.012*	-	0.012*	-
Cayman Islands	0.037	-	0.037	-
Cuba	7.198	1.205*	7.145*	0.053
Dominica	0.015*	-	0.002*	0.013*
Dominican Republic	2.690*	1.170*	2.515*	0.175*
Grenada	0.028*	-	0.028*	-
Guadeloupe	0.190	-	0.190	-
Haiti	0.209	0.025	0.050	0.159*
Jamaica	2.378	0.975*	2.233*	0.145*
Martinique	0.194	-	0.194	-
Montserrat	0.009	-	0.009	-
Netherlands Antilles	1.600*	0.850	1.600	-
St Kitts-Nevis-Anguilla	0.023*	0.004*	0.023*	-
St Lucia	0.045	-	0.045	-
St Vincent	0.017*	-	0.007*	0.010*
Trinidad and Tobago	1.367	0.080*	1.367	-
TOTAL:	18.663	5.779	16.932	1.731

Source: See Table I-1

* = UN Estimate

TABLE I-14

Caribbean Production of Electricity

('000 million kWh)

Countries	1950	1960	1970	1973	1975	1976
Guyana	0.035	0.092	0.344	0.361	0.383	0.398
Suriname	0.035	0.079	1.322	1.528	1.201	1.335
Antigua	...	0.003	0.030	0.038*	0.044*	0.047*
Bahamas	0.016	0.076	0.489	0.645	0.647	0.600*
Barbados	0.011	0.038	0.146	0.212	0.214	0.228
Belize	0.001	0.006	0.023	0.032*	0.039	0.043*
British Virgin Islands	...	...	0.006	0.013	0.012*	0.012*
Cayman Islands	...	0.001	0.010	0.022*	0.033*	0.037*
Cuba	1.200	2.981	4.888	5.703	6.583	7.198
Dominica	0.001	0.004	0.009	0.013	0.014	0.015*
Dominican Republic	0.079	0.350	1.003	2.254*	2.638*	2.690
Grenada	0.001	0.004	0.015	0.025*	0.025*	0.028*
Guadeloupe	0.004	0.021	0.099	0.140	0.170*	0.190
Haiti	0.020	0.090	0.118	0.141	0.158	0.209
Jamaica	0.166	0.508	1.542	2.187	2.331	2.378*
Martinique	0.012	0.023	0.103	0.161	0.182	0.194
Montserrat	...	0.001	0.006	0.008	0.009	0.009
Netherlands Antilles	0.660	0.825	1.289	1.550*	1.400*	1.600*
St Kitts-Nevis-Anguilla	...	0.007	0.016	0.022	0.023	0.023*
St Lucia	0.002	0.003	0.018	0.037	0.040	0.045
St Vincent	0.001	0.004	0.012	0.017	0.017	0.017*
Trinidad and Tobago	0.168	0.470	1.202	1.210	1.207	1.367
TOTAL:	2.412	5.586	12.690	16.319	17.370	18.663

* = UN Estimate

Source: World Energy Supplies, 1950-1974, 1972-1976, United Nations, New York and data supplied CEPAL.

TABLE II-1

Consumption of Commercial Energy - Caribbean, by Coal Equivalent (Million metric tons) and in kilograms per capita

Year	Aggregate	Per Capita	Solid Fuels	Liquid Fuels	Natural Gas	Hydro-Electricity
1950	10.980	753	0.079	10.257	0.635	0.008
1951	12.216	799	0.114	11.463	0.631	0.008
1952	12.238	785	0.089	11.497	0.642	0.010
1953	11.533	709	0.055	10.792	0.673	0.014
1954	11.619	738	0.069	10.844	0.690	0.016
1955	12.501	747	0.086	11.728	0.669	0.018
1956	13.259	813	0.063	12.442	0.734	0.020
1957	15.217	847	0.186	14.209	0.803	0.018
1958	15.575	867	0.090	14.578	0.887	0.020
1959	15.779	853	0.125	14.679	0.955	0.020
1960	16.175	871	0.067	15.059	1.023	0.026
1961	16.539	888	0.185	15.218	1.112	0.023
1962	17.921	974	0.075	16.683	1.136	0.027
1963	17.624	921	0.099	16.380	1.114	0.031
1964	20.251	991	0.127	18.630	1.455	0.039
1965	21.201	1,054	0.135	19.456	1.568	0.042
1966	21.547	1,012	0.122	19.487	1.841	0.097
1967	24.028	1,134	0.153	21.733	2.031	0.110
1968	24.485	1,103	0.128	22.097	2.131	0.128
1969	26.127	1,177	0.144	23.700	2.142	0.141
1970	29.629	1,292	0.150	26.828	2.488	0.161
1971	30.063	1,318	0.154	27.309	2.428	0.172
1972	31.958	1,352	0.165	29.086	2.519	0.188
1973	35.014	1,458	0.140	32.273	2.435	0.166
1974	33.358	1,376	0.120	30.814	2.234	0.190
1975	33.377	1,275	0.137	30.012	2.038	0.190
1976	33.886	1,330	0.146	31.238	2.287	0.214

NB - Figures for years prior to 1972 have been adjusted in the light of new data on refinery consumption for some countries.

Source: World Energy Supplies, 1950-74, 1971-75 and 1972-76;
United Nations, New York.

TABLE II-2

Per Capita Consumption of Commercial Energy - Selected Years
(Kilograms)

Period	World	Centrally Planned Economies	Developed Market Economies	Developing Countries				
				All	Africa	Asia	Latin America	o/w Caribbean
1950	1,004	604	3,223	127	189	82	413	753
1960	1,423	1,383	3,995	211	254	146	607	871
1970	1,881	1,641	5,921	331	309	259	888	1,292
1971	1,920	1,724	6,001	345	334	259	921	1,318
1972	1,977	1,761	6,240	362	344	269	950	1,352
1973	2,041	1,838	6,446	385	353	288	1,011	1,458
1974	2,017	1,889	6,279	397	364	298	1,033	1,376
1975	1,996	1,965	6,089	406	376	315	1,013	1,275
1976	2,069	2,030	6,388	426	397	333	1,045	1,330

1/ Includes Mid-East and Far East developing countries.

Source: World Energy Supplies, 1950-74, 1971-75 and 1972-76, United Nations
New York, USA (ST/ESA/STAT/SER.J/20)

TABLE II-3
Shares of Socio-Economic Groups of Countries
In World Energy Consumption 1950 and 1974
(In percent, World=100)

	Year	Solid Fuels	Liquid Fuels	Natural Gas	Hydro electricity	Total Commercial Energy
<u>Developed Market Economies</u>	<u>1950</u>	69.2	79.9	92.4	89.4	74.7
	<u>1974</u>	43.3	68.6	69.0	74.4	60.7
<u>Centrally Planned Economies</u>	<u>1950</u>	27.3	8.3	5.2	4.7	19.6
	<u>1974</u>	51.2	17.9	23.8	12.6	29.7
<u>Europe</u>	<u>1950</u>	24.5	8.3	5.2	4.5	17.9
	<u>1974</u>	31.7	15.5	23.6	9.7	22.2
<u>Asia</u>	<u>1950</u>	2.8	0.0	-	0.2	1.7
	<u>1974</u>	19.5	2.4	0.2	2.9	7.5
<u>Developing Countries</u>	<u>1950</u>	3.5	11.9	2.4	5.9	5.7
	<u>1974</u>	5.5	13.4	7.2	13.0	9.6
<u>Africa</u>	<u>1950</u>	0.3	1.5	0.0	0.5	0.6
	<u>1974</u>	0.2	1.4	0.3	1.9	0.8
<u>Asia</u>	<u>1950</u>	0.3	2.7	0.5	1.4	2.4
	<u>1974</u>	4.5	5.3	3.5	3.7	4.6
<u>Latin America</u>	<u>1950</u>	0.6	7.7	1.9	4.0	2.7
	<u>1974</u>	0.7	6.6	3.3	7.7	4.1
<u>O/w Caribbean</u>	<u>1950</u>	0.003	1.5	0.3	0.02	0.4
	<u>1974</u>	0.005	0.8	0.1	0.09	0.4

Source: World Energy Supplies; 1950-1974, 1972-1976 and data supplied by CEPAL.

- = negligible

TABLE II-4

Consumption of Commercial Energy
by Type, Caribbean Countries
by Coal Equivalent

(Million Metric Tons) - 1969

Country	Solid Fuels	Liquid Fuels	Natural Gas	Hydro-Electricity	<u>All Types</u>	
					Total	% Share
Guyana	-	0.676	-	-	0.676	2.6
Suriname	0.026	0.710	-	0.109	0.846	3.2
Antigua	-	0.307	-	-	0.307	1.2
Bahamas	-	0.664	-	-	0.664	2.5
Barbados	-	0.266	0.004	-	0.270	1.0
Belize	-	0.068	-	-	0.068	0.3
Cuba	0.116	8.411	-	0.009	8.536	32.7
Dominica	-	0.009	-	0.001	0.010	-
Dominican Republic	0.001	1.234	-	0.007	1.241	4.8
Grenada	-	0.024	-	-	0.024	0.1
Haiti	-	0.145	-	-	0.145	0.6
Jamaica	0.001	1.896	-	0.014	1.910	7.3
Montserrat	-	0.003	-	-	0.003	-
St Kitts	-	0.012	-	-	0.012	-
St Lucia	-	0.031	-	-	0.031	0.1
St Vincent	-	0.014	-	0.001	0.015	0.1
Trinidad and Tobago	-	1.847	2.566	-	4.413	16.9
TOTAL CDCC:	0.144	16.317	2.570	0.141	19.171	73.4
British Virgin Islands-	-	0.009	-	-	0.009	-
Cayman Islands	-	0.022	-	-	0.022	0.1
Guadeloupe	-	0.160	-	-	0.160	0.6
Martinique	-	0.167	-	-	0.167	0.6
Netherlands Antilles	-	6.596	-	-	6.596	25.3
TOTAL CARIBBEAN	0.144	23.271	2.570	0.141	26.125	100.0

Source: World Energy Supplies, 1950-1974, United Nations, New York, and data supplied by CEPAL.

TABLE II-5

Consumption of Commercial Energy by Type -
Caribbean Countries

(Million Metric Tons of Coal Equivalent)

1976

Country	Solid Fuels	Liquid Fuels	Natural Gas	Hydro-Electricity	Total	% Share
Guyana	-	0.839	-	-	0.839	2.48
Suriname	0.026	0.876	-	0.145	1.047	3.09
Antigua	-	0.173	-	-	0.173	0.51
Bahamas	.....	1.537	-	-	1.537	4.54
Barbados	-	0.235	0.005	-	0.241	0.71
Belize	-	0.087	-	-	0.087	0.26
Cuba	0.118	11.444	0.026	0.007	11.597	34.22
Dominica	-	0.014	-	0.002	0.016	0.05
Dominican Republic	-	0.001	3.278	0.022	3.301	9.74
Grenada	-	0.020	-	-	0.020	0.06
Haiti	-	0.113	-	0.020	0.133	0.39
Jamaica	0.001	3.966	-	0.018	3.984	11.76
Montserrat	-	0.014	-	-	0.014	0.04
St Kitts	-	0.019	-	-	0.019	0.06
St Lucia	-	0.040	-	-	0.040	0.12
St Vincent	-	0.019	-	0.001	0.020	0.06
Trinidad and Tobago	-	2.403	2.254	-	4.657	13.74
TOTAL CDCC:	0.145	21.800	5.563	0.215	27.725	81.82
British Virgin Islands	-	0.012	-	-	0.012	0.04
Cayman Islands	-	0.036	-	-	0.036	0.11
Guadeloupe	-	0.247	-	-	0.247	0.73
Martinique	-	0.363	-	-	0.363	1.07
Netherlands Antilles	-	5.503	-	-	5.503	16.24
TOTAL CARIBBEAN	0.145	27.961	5.563	0.215	33.886	100.00

Source: World Energy Supplies 1972-1976, United Nations, New York, 1978

TABLE II-6

Per Capita Consumption of Commercial Energy,
Caribbean by Countries, Kilograms Per Capita,
1970-1976

Countries	1970	1972	1973	1974	1975	1976
Bahamas	4,253	9,271	7,464	6,645	7,231	7,286
Barbados	802	919	953	938	1,019	974
Cuba	1,053	1,120	1,162	1,155	1,194	1,225
Dominican Republic	375	538	645	676	701	683
Grenada	236	263	296	195	193	211
Guyana	1,093	1,037	1,153	967	1,118	1,072
Haiti	34	31	33	29	30	28
Jamaica	1,290	1,571	2,016	1,828	1,945	1,937
Suriname	2,437	2,484	2,795	2,162	2,591	2,406
Trinidad & Tobago	5,089	4,946	5,044	4,569	3,894	4,272
Belize	485	582	528	534	586	602
Antigua	3,830	3,270	3,379	2,833	2,423	2,438
Dominica	181	191	190	209	208	207
Montserrat	782	776	776	1,167	1,078	1,078
St. Kitts-Nevis- Anguilla	194	216	216	285	258	282
St. Lucia	336	363	374	339	333	366
St. Vincent	165	209	217	184	184	200
Total CDCC	976	1,085	1,159	1,098	1,115	1,132
British Virgin Islands	933	1,083	1,233	1,233	1,233	1,027
Cayman Islands	2,220	2,348	2,402	2,298	2,115	2,558
Guadeloupe	464	562	598	550	564	685
Martinique	548	787	1,099	1,005	996	984
Netherlands Antilles	35,763	30,403	32,201	28,659	20,388	22,836
Total Caribbean	1,292	1,352	1,458	1,376	1,275	1,330

Source: World Energy Supplies, 1950-1974; 1971-1975 and 1972-1976
United Nations, New York.

TABLE II-7

Average Annual Rates of Growth - Aggregate
Consumption of Commercial Energy
(Percent)

Country	1950-1975	1950-1960	1960-1970	1970-1975	1975-1976
Bahamas	17.2	22.1	13.4	15.2	4.2
Cuba	7.1	8.9	4.2	4.1	4.0
Dominican Republic	13.0	11.9	12.1	8.5	0.2
Jamaica	14.7	18.2	13.3	10.5	0.3
Trinidad and Tobago	5.7	7.2	9.6	- 4.6	10.5
Netherlands Antilles	- 1.1	- 1.3	2.9	- 8.9	11.5
TOTAL CARIBBEAN	4.4	3.8	6.5	1.3	4.7

Source: World Energy Supplies, 1950-1974, 1971-1975 and 1972-1976

TABLE III-1

Production, Consumption and Net Imports of
Primary Energy in the Caribbean

(Million Metric Tons)

Year	Consumption of Commercial Energy	Production of Primary Energy	Net Imports ^{1/} Col 3 minus Col 2	Actual Net Imports	Implied Change in Stocks
1950	10.980	4.991	5.989	- 1.225	7.214
1951	12.216	5.095	7.121	0.728	6.393
1952	12.238	5.196	7.042	- 1.805	8.847
1953	11.533	5.410	6.123	- 1.481	7.604
1954	11.619	5.692	5.927	6.365	- 0.438
1955	12.501	5.987	6.514	5.945	0.569
1956	13.259	6.916	6.343	3.365	2.978
1957	15.217	8.034	7.183	7.149	0.034
1958	15.575	8.783	6.792	8.073	- 1.281
1959	15.779	9.570	6.209	7.976	- 1.767
1960	16.175	9.914	6.261	7.725	- 1.464
1961	16.539	10.703	5.836	7.779	- 1.943
1962	17.921	11.380	6.541	8.380	- 1.839
1963	17.624	11.344	6.280	5.405	0.875
1964	20.251	11.924	8.327	7.143	1.184
1965	21.201	11.889	9.312	8.162	1.150
1966	21.547	13.429	8.118	8.289	- 0.171
1967	24.028	15.868	8.160	7.519	0.641
1968	24.485	16.495	7.990	7.001	0.989
1969	26.127	14.456	11.671	10.339	1.332
1970	29.629	13.528	16.101	16.080	0.021
1971	30.063	12.604	17.459	21.871	- 4.412
1972	31.958	13.543	18.415	19.761	- 1.346
1973	35.014	15.760	19.254	25.410	- 6.156
1974	33.358	16.863	16.495	17.654	- 1.159
1975	32.377	18.981	13.396	16.033	- 2.637
1976	33.886	18.907	14.979	21.842	- 6.863

^{1/} Includes changes in Stocks.

Source: World Energy Supplies, 1950-1974, 1972-1976 and data supplied CEPAL

TABLE III-2

Mineral Fuel Imports and Other Selected Data

CDCC Countries

Country	<u>1972-1973</u>				<u>1976-1977</u>			
	Net Imports of Mineral Fuels	Total Exports Million US\$	Foreign Exchange Reserves	GDP	Net Imports of Mineral Fuels	Total Exports Million US\$	Foreign Exchange Reserves	GDP
Bahamas	19	437	40	425 ^{4/}	589	2408 ^{1/}	57	700 ^{2/}
Barbados	4	50	30	200	9	87	33	358
Cuba	172	1124	...	4595 ^{4/}	283	3573 ^{2/}	...	8120 ^{2/ 4/}
Dominican Republic	93	395	74	2150 ^{4/}	289	755	156	3750 ^{2/ 4/}
Grenada	1	7	...	33	1	14	...	37
Guyana	17	139	...	262	59	339	...	398
Haiti	4	46	18	560 ^{4/}	18	138 ^{3/}	31	930 ^{2/ 4/}
Jamaica	56	372	144	1796	216	705	40	3126
Suriname	17	175	...	325	62	303 ^{2/}	...	461 ^{2/}
Trinidad and Tobago	- 107	630	53	1171	- 966	2196	1249	2854
Belize	2	29	...	61	8	50 ^E	...	87 ^{2/}

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TABLE III-2

Continued

Country	1972-1973				1976-1977			
	Net Imports of Mineral Fuels	Total Exports Million US\$	Foreign Exchange Reserves	GDP	Net Imports of Mineral Fuels	Total Exports Million US\$	Foreign Exchange Reserves	GDP
Antigua	}	53	...	164	10	70 ^E	...	201
Dominica								
Montserrat								
St Kitts-Nevis-Anguilla								
St Lucia								
St Vincent								
TOTAL CDCC:	277	3450			578	8442		

Note: Foreign Exchange Reserves = IMF definition end of period

1/ Exclude Ship Stores and Bunkers

3/ Exclude Re-exports

2/ 1976 only

4/ GNP at Market Prices

Sources: Monthly Bulletin of Statistics, October 1978 United Nations, New York

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