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THE INDUSTRIAL SECTOR AND ITS ENERGY CONSUMPTION

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Between 1965 and 1979, the total energy consumption in Costa Rica rose from 838 to 1436 TOE, growing at a cumulative average annual rate of 4.56%, with an accelerated replacement of firewood by commercial fuels, which grew steadily and very strongly, at an average rate of 8.44%.

The rapid increase in the consumption of commercial energy sources is partly due to the substitution of firewood, but its principal causes must be sought in the country's overall economic growth, as reflected in a realtively high Gross National Product (6.56% cumulative annual average) and in the accelerated growth of consumption in certain economic sectors, principally transportation and the industrial sector, which grew during this period at average rates of 9.51% and 7.73%, respectively.

In the last few years, this outlook for steady growth of energy consumption has shifted, mainly beacuse of the country's presente economic crisis, which has hit the productive sector hard. For this reason, during the 1979-1980 period, total energy consumption remained practically stable; during 1980-1981, it dropped by 1.3%; and preliminary figures for 1981-1982 show a 7.5% reduction, as a consequence of an 11% decline in commercial energy consumption.

(As figure N°1 shows), comercial energy consumption has a relatively stable sectorial structure, and demostrates changes which are not very abrupt, but rather which occur gradually over time. Within this structures, the industrial sector maintains a share of some 36%, being-after transportation sector the second largest consumer.

Regarding firewood, the residential and commercial sector have consumed between 92 and 96%. The samall remaining portion has been consumed in the industrial sector, mostly in cofee cultivation, from 1976 onwards; before 1976, salt producers used the most firewood. In addition to salt-making and farming, smaller consumer of firewood include limekilnsand brickyards, as well a some sugar mills and crafts-leve ceramics industry.

If we analyze the industrial sector's commercial energy consumption structure (Figure N°2), we see a clear dependence of this sector on petroleum-based fuels, the participation of which has varied between 38 and 52%. Being consumed mostly by one single company, in the production of tiles, liquefied gas presents a very low percentage participation, although with a tendency toward growth. Kerosene has been consumed at a very low level during the last five years, maintaining a relatively stable share. Kerosene is consumed mainly by two firms, one manufacturing glass and glass products and the other, food products derived from corn.

The share of uel oil holds relatively stable, despite having fallen signficantly in 1982, mostly due to cutback in the cement industry's activity, since the three cement companies are the largest consumers of fuel oil.

Diesel oil consumption grew until 1973, later decreasing and staying around 10% in the last few years. Electricity has shown a steady and increasing growth throughout the entire period.

Plant residue use is very high, ranging from 31 to 51%, easing off slightly towards 1981, and rising sharply in 1982, mainly due to the waning participation of petroleum derivatives.

It is importan to note that plant residues (coffee husks and sugar cane bagasse) and fuel oil cover most of the industrial and farm sector's commercial energy consumption ranging from 83 to 79% during the first years of the series and 73 to 67% for the last few years. The rest of the sector's consumption is covered by electricity and diesel oil.

The present-day energy consumption of the industrial and farming sector is a high as 26% of national commercial and non-commercial energy consumption and 36% commercial energy comsuption. As already mentioned, this sector is heavily dependent on hydrocarbons, which currently account for 23% of the country's consumption of eptroleum derivatives, representing just over 40% of the sector's commercial energy consumption.

Analyses (6) of the sector's energy consumption, categorized by industrial areas (Table N.1) have shown that there are two groupings:

Manufature of Glass and Glass Products and Manufature of Other Non-Metallic Mineral Products (basically the manufature of cement, lime, gypsum, and clay products for building), which together accounted for 44.1% of petroleum derivatives consumption in industry and agroindustry. Another two groupings, Food Products (excluding animal feeds) and Beverage Industries, together consumed 25.9% completing 70% of the sector's total petroleum derivatives consumption.

It could be said, in broad terms, that Costa Rica's fuel oil consumption is concentrades in 18 companies, which account for 87% of the sector's total

consumption, while another 106 firms practically consume the remaining 13%(3).

Due to the great dependence on hydrocarbons in the nation's productive sector, and given that the country has no petroleum resources, there is a clear need to carry out measures that will enable this dependence to be decreased as soon as possible; such actions must be undertaken within the framework of the principal energy policy guidelines established by the Government of the Republic:

- Energy savings and conservation.
- Development of domestic sources.
- Substitution of domestic sources for petroleum and its derivatives.

In this context a series of studies has been carried out, both by foreing advisors and by qualified local personnel; and these demonstrate the feasibility of achieving appreciable energy savings and substitutions, in this sector, primarily by electricity and biomass.

The country has also been seen to need an efefective agency that can support the governmental institutions in formulating and executing programs of rational energy use and energy conservation in industriy and programs of petroleum derivatives substitution in addition to assisting the private sector with implementing the same kind of programs.

It is in this ligth that work has been conducted for the last several months on the creation of a "Cneter of Energy Studies for Industry" (C.E.S.I.), with the following fundamental objectives: (5)

a) To arrange the quantity and quality of the energy consumed in industrial systems so as to optimize the use of energy and facilities.

b) To train the industry personnel who deal with work related to energy use.

c) To collaborate in the formulation and implantation of national and/or regional energy policies; to lend support to industrial sector financing agencies by evaluating projects and the conclusions of energy audits.

It is hoped that the Inter-American Development Bank will contribute technical and financial assistance for the creation of this Center.

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FIGURA No I

ESTRUCTURA SECTORIAL DEL CONSUMO DE ENERGIA COMERCIAL

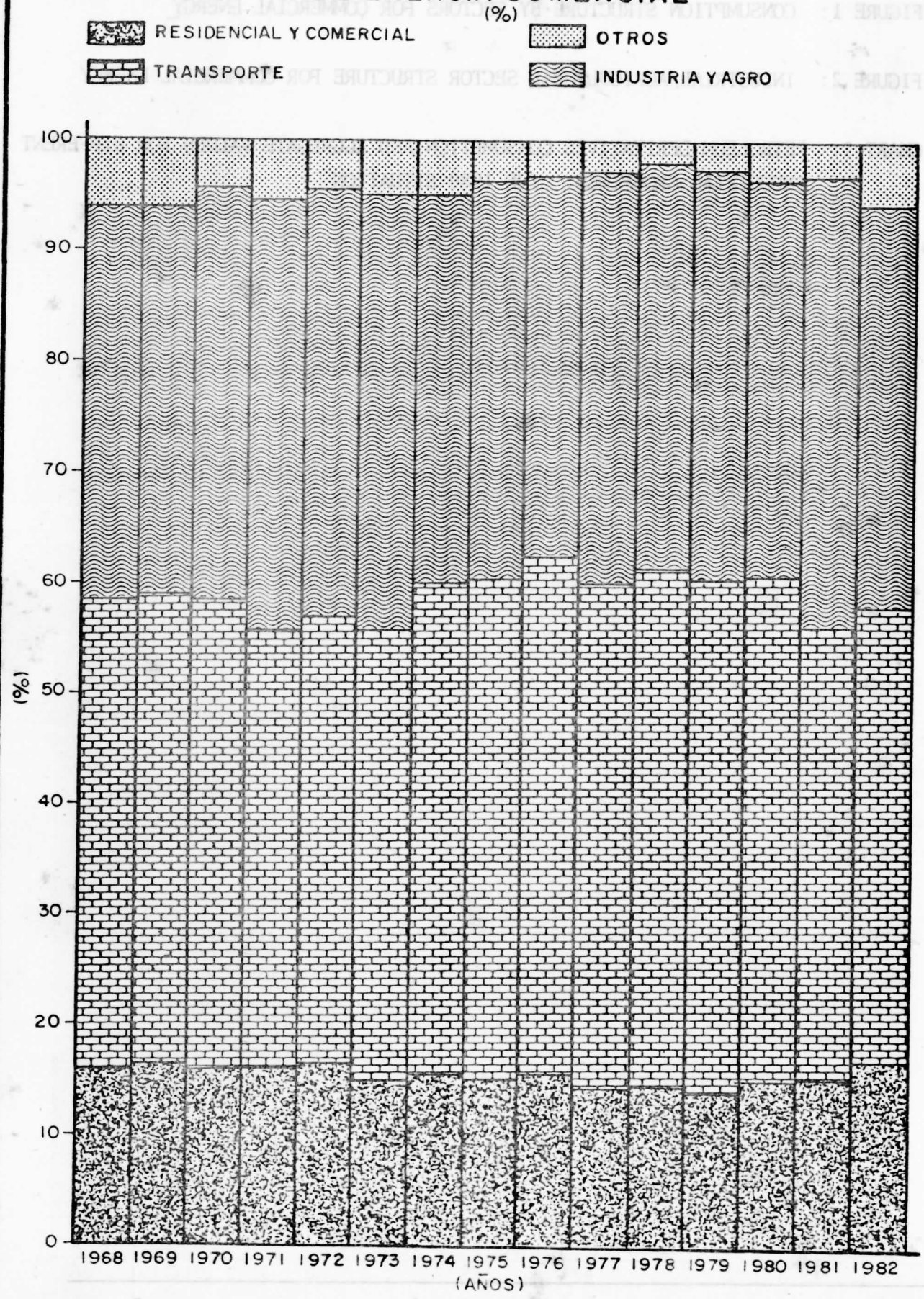
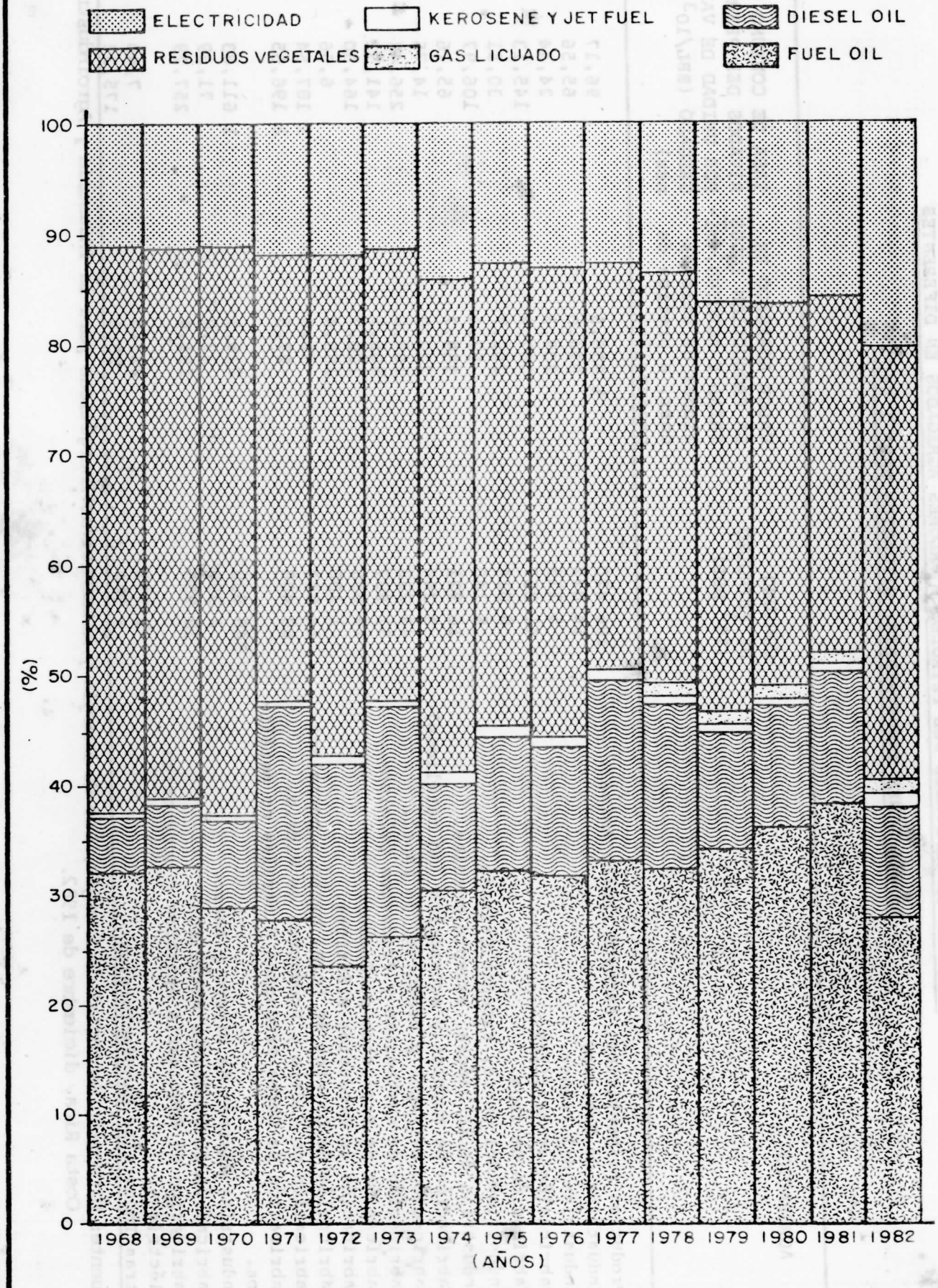


FIGURA No2

SECTOR INDUSTRIA Y AGRO
ESTRUCTURA DEL CONSUMO DE ENERGIA COMERCIAL



CUADRO No. 1

CONSUMOS DE DERIVADOS DEL PETROLEO Y VALORES AGREGADOS EN DIFERENTES AGRUPACIONES INDUSTRIALES; SITUACION PARA 1 980

AGRUPACION	CONSUMO DE PETROLEO (10^3 BBL)	VALOR AGREGADO EN LA PRODUCCION INDUSTRIAL Y AGROIND. (millones de colones corr. a precios de producción).	TASA DE CONSUMO DE DERIVADOS DEL PETROLEO POR UNIDAD DE VALOR AGREGADO (BBL/10^3 colones)
Productos Alimenticios, excepto Ración Animal.	186 420	1 938,5	96,17
Industrias de Bebidas.	54 022	824,0	65,56
Industrias del tabaco.	5 115	209,3	24,44
Fabricación de textiles.	41 057	282,9	145,13
Fabricación de ropa.	8 014	262,7	30,51
Industrias del Cuero, excepto Calzado.	6 140	57,4	106,97
Industrias de la Madera, excepto muebles.	16 921	259,7	65,16
Fabricación de muebles y accesorios (no metálicos).	3 244	220,0	14,75
Fabricación de Papel y Productos de papel.	43 233	168,6	256,42
Fabricación de sustancias y Productos Químicos.	71 537	505,5	141,52
Fabricación de Productos de Caucho.	19 855	120,7	164,50
Fabricación de Productos Plásticos.	1 108	166,4	6,66
Fabricación de Objetos de Loza, barro y porcelana.	14 963	12,6	1 187,54
Fabricación de Vidrio y Productos de Vidrio.	60 408	27,5	2 196,65
Fabricación de Otros Productos Minerales no metálicos.	348 639	216,3	1 611,83
Industrias Básicas de Hierro y Acero.	2 356	33,0	71,39
Fabricación de Productos Metálicos.	38 953	151,4	257,29
Fabricacion de Maquinaria Aparatos y accesorios eléctricos.	1 591	213,5	7,45
Otras Industrias Manufactureras	3 594	20,5	175,32

Fuente: Dirección Sectorial de Energía, Uso de Energía y Alternativas Energéticas para la Industria y Agroindustria de Costa Rica, diciembre de 1982.