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MINISTRY OF FUEL AND POWER

PETROLEUM PRODUCTS PRICING STUDY

Final Report

16541

CONTENTS

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ANNEXES

1. PRESENT SITUATION

1.1. INSTITUTIONAL STRUCTURE

Several institutions are involved in managing the petroleum sector and are interested in the setting up of petroleum products prices.

The Ministry of Fuel and Power supervises the state-owned corporations of the petroleum sector which are GNPC (Ghanaian National Petroleum Corporation), in charge of hydrocarbon exploration and production, oil and petroleum products imports, petroleum products re-exports, supply of petroleum products to the distribution companies, GHAIP, the petroleum refining company which operates under a processing agreement with the Government, GOIL (Ghana Oil Corporation) responsible for products distribution together with four other companies: BP, MOBIL, SHELL and TEXACO.

Recently, the Government has created the National Energy Board (NEB) which has responsibility for:

.   energy planning and policy analysis

.   reviewing investment proposals

.   monitoring manpower planning for the sector.

As regards petroleum product prices, a price build up establishing ex-refinery prices as well as distribution margins and taxes, is fixed by the Government for all products. Ex-pump prices are fixed for gasolines, gas oil and kerosene, while for industrial diesel oil and fuel oils only ex-refinery prices and taxes are fixed.

1.2. PETROLEUM PRODUCTS SUPPLY AND DISTRIBUTION

Supply

Most of the products sold in Ghana (about 700,000 tons in 1987) are supplied by the TEMA Refinery. Some products (premium gasoline, kerosene, gas oil) are imported. The refinery could supply more products: GHAIP processes about 0.9-1.0 MTPA of crude oil, less than the nominal capacity which is 1.25 MTPA (28,000 bpsd). However this would increase fuel oil excesses, which are already very high (200,000 TPA) and which have to be re-exported at a low price. Some LPG (1,500 tons) is also exported to Benin, Togo and Burkina Faso.

Distribution

Five companies (GOIL, BP, MOBIL, SHELL and TEXACO) have responsibility for petroleum products marketing and distribution.

Table 1.1.

Market shares and retailing outlets for petroleum products

	Market shares %	Retailing outlets Number	%
GOIL	26	352	41
BP	17	199	24
MOBIL	20	119	14
SHELL	17	84	10
Texaco	20	94	11
	100	848	100

Storage facilities exist in TEMA (GHAIP Refinery: 225,900 cu.m.), TAKORADI (GOIL, BP, TEXACO: 63,400 cu.m.) and KUMASI (GOIL, SHELL, MOBIL, BP: 7,900 cu.m.). Products are moved from TEMA to TAKORADI by small tankers (20,000 DWT). Products can be transported to KUMASI by rail. The remaining transportation is performed by road. The distribution companies own some trucks, but most of the business is in the hands of private companies. Transportation of products by barges over the Voita Lake is contemplated and should be implemented in the next years.

Distribution companies are responsible for construction and maintenance of filling stations, which they rent to independent retailers. The distribution network (storage, filling stations) as well as trucks are often in poor condition due to lack of maintenance and spare parts. The bad condition of roads, together with trucks deterioration prevents normal distribution of products in northern Ghana (although limitation of products availability is another reason for products shortage in this area). A rehabilitation programme, to be financed by the World Bank, should address this problem, by setting up small retailing outlets in rural areas.

Products sold by distribution companies are:

- Premium, regular, kerosene and gas oil, together called UPPF (Unified Petroleum Products Fund) products, for which ex-refinery prices, taxes (Excise duty, Road Fund, Energy Fund) and distribution margins (marketer's margin, transporter's margin, retailer's margin) add up to arrive at consumer price (ex-pump price). All taxes and margins are fixed (in Cedis per gallon),

- A.T.K. to be sold to Ghana Airforce and to domestic airlines, which does not bear any taxes and whose distribution margins are negotiated,

- Industrial diesel oil, inland fuel oil and residual fuel oil which are directly sold by distribution companies to their customers (industry/mining). They bear fixed taxes but distribution margins are negotiated. IDO and IFO are mixes of gas oil and residual fuel oil and are prepared according to customers' requirements. (Taxes on IDO and IFO are calculated assuming IDO is 60% gas oil-40% fuel oil, while IFO is supposed to be 10% gas oil-90% fuel oil).

LPG is sold in 28, 32 and 55 pound cylinders (32 is the standard cylinder). The distribution margins cover filling, transportation and marketing costs. This product is not considered as a UPPF one, although a fixed transportation margin is built into its price. Presently LPG is mainly sold in Accra, but following a World Bank financed project, the Government intends to develop LPG consumption in the other regions of Ghana (consumption is expected to increase up to 10,000 tpy).

Some ATK (sold to the foreign airlines) as well as some gas oil, IDO and fuel oil are considered as bunkers. These products have specific ex-refinery prices and bear specific taxes. Distribution margins are negotiated. Gas oil and fuel bunkers correspond to products sold to fishing boats and other vessels.

Products are obtained from GNPC (at refinery gate) and are paid for 30 days after loading for normal deliveries and 60 days for ocean transfer. Excise duty is collected by customs, Energy fund by the Ministry of Fuel and Power, Road fund by the Ministry of Roads and Transportation.

1.3. PETROLEUM PRODUCTS CONSUMPTION IN GHANA

Petroleum products consumption (table 1.2.) reached 850,000 tons in 1978 and then decreased to 750-800,000 tons per year from 1979 to 1982, due to the recession of the Ghanaian economy. In 1983 and 1984, the effects of the drought reinforced the economic difficulties and both energy supply and demand were considerably reduced; petroleum products consumption was only about 550,000 tpy.

Table 1.2.

Petroleum Products Consumption in Ghana - Thousand metric tons

	1980	1981	1982	1983	1984	1985	1986
LPG	6.9	6.4	6.4	3.1	3.7	4.1	4.7
REGULAR	74.7	85.8	80.6	51.5	55.6	48.5	53.3
PREMIUM	171.0	177.7	167.0	129.7	122.1	172.2	173.8
KEROSENE	119.5	137.4	128.3	87.4	83.3	113.9	121.8
A.T.K.	40.0	29.1	29.0	27.2	20.2	24.4	20.8
GAS OIL	282.2	295.6	255.6	231.8	222.6	282.7	284.4
I.D.O.	6.5	5.0	3.1	2.3	0.6	1.4	1.1
I.F.O.	26.4	27.2	36.5	19.9	22.4	12.0	23.9
R.F.O.	40.7	34.7	27.7	11.4	9.8	16.3	24.2
TOTAL	767.9	799.0	734.2	564.3	540.3	675.5	708.0

Source : GHAIP

Following the enforcement of the Economic Recovery Programme, consumption increased to 675,000 tons in 1985 and 708,000 tons in 1986. Gas oil account for the largest share (285,000 tpy or 40%), followed by gasolines (227,000 tpy, 32%) and kerosene (121,000 tpy, 17%). Fuel oil consumption is low, less than 50,000 tpy or 7% of total demand. Between 1980 and 1986, consumption of gas oil as well as of kerosene remained constant while gasolines consumption decreased by 20,000 tpy, ATK consumption by 20,000 tpy and fuel oil consumption (IDO + IFO + RFO) by 20,000 tpy.

Should availability of products increase, consumption would likely develop (at present product prices). The refinery is allocating quotas (in 1987, premium 940,000 imperial gallons per week or 170,000 tpy, regular 400,000 IG/week or 70,000 tpy, kerosene 650,000 IG/week or 150,000 tpy, gas oil 1,450,000 IG/week or 295,000 tpy). The distribution companies are often left short of products and they claim that they could sell larger volumes. This is due to the de facto limitation of crude oil imports which represent a large share (20%) of total Ghanaian imports and 25% of exports.

The "suppressed demand" is particularly important in the North of the country. In this area, the general shortage of products is worsened by the deterioration of the distribution network (rehabilitation of depots, tank cars and retail outlets is contemplated through World Bank assistance).

By region, Greater Accra consumes 45% of total products, Ashanti region 20%, Volta Region, Eastern Region and Western Region 8-10% each. The quantities of products sold North of Kumasi (i.e. in Upper East, Upper West, Northern and Brong Ahafo regions) represent less than 15% of total consumption. It can be assumed that most of the suppressed demand lies in this area.

By sector (table 1.3.) transportation accounts for 50% of total products consumption, industry and mining for 14%, agriculture and fishing for 14%, households for 16%, governmental and commercial activities for 6%.

Table 1.3.

Petroleum Products Consumption by Sector in Ghana
Year 1985 - Thousand tons

	Gasoline	Jet fuel	Kerosene	LPG	Gas oil	Fuel oil	Total	%
Transport	181.2	24.4	-	-	131.5	3.1	340.2	50.0
Industry/Mining	16.8	-	5.4	1.0	42.4	26.6	92.2	14.0
Agriculture/Fishing	9.7	-	1.6	-	80.9	-	92.2	14.0
Government/Commercial	13.0	-	2.2	-	27.9	-	43.1	6.0
Households	-	-	104.7	3.1	-	-	107.8	16.0
Total	**220.7**	**24.4**	**113.9**	**4.1**	**282.7**	**29.7**	**675.5**	**100.0**

Source : World Bank - Mission Estimates

Most of the gasoline and about 50% of the gas oil are used for transportation (this percentage is still more important if one considers that 35% of gas oil is used by fishing boats and tractors). Most of the kerosene is of course consumed by households.

1.4. OVERALL ENERGY CONSUMPTION IN GHANA

Ghana is well endowed with fuelwood and hydropower resources. There is however no known deposit of coal, neither of lignite or peat. Total energy consumption (table 1.4.) amounted to 3.1 million tons of oil equivalent in 1985, or 220 kg per capita. Biomass (fuelwood, charcoal and agricultural residues) accounted for 74% of total requirements and commercial energy (electricity plus petroleum products) for 26%. Commercial energy consumption is only 56 KOE (kilo of oil equivalent) per capita.

Table 1.4.

Ghana Domestic Consumption of Energy in 1985

(TOE '1000)

	Agric. Waste	Fuel Wood	Charcoal	Petroleum Products	Electricity	Total Non Com.	Energy Com.
Transport	-	-	-	345.8	-	-	345.8
Industry/Mining	-	59.9	-	91.1	52.3	59.9	143.4
Agriculture/Fishing	-	40.0	-	92.5	-	40.0	92.5
Government/ Commercial	-	99.9	6.8	43.5	13.8	106.7	57.3
Households	138.7	1617.2	306.0	109.0	37.2	2061.9	146.2
Total	**138.7**	**1817.0**	**312.8**	**681.9**	**103.3**	**2268.5**	**785.2**

Source : World Bank - Mission Estimates

Fuelwood is by far the most important energy source in Ghana: total fuelwood requirements in 1985 were 8.6 million tons, out of which 3.3 were transformed into charcoal. Fuelwood as such (5.3 million tons or 1.8 million TOE) is mainly used by the rural population for cooking and other domestic purposes (90% of total requirements). Some fuelwood is also used by small industries in the rural areas (about 5% of total requirements). Charcoal (0.5 million tons or 0.3 million TOE) is the preferred fuel for the urban population.

Fuelwood consumption (about 8.6 million tpy) plus wood requirements for building materials and timber exports (2.1 million tpy) are still less than annual natural forest growth (estimated 12.5 million tpy). However, due to the increase in fuelwood consumption and to various problems in forest resources management, the possibility of wood requirements exceeding forest growth in the 90's exists.

Electricity is mainly produced by VRA (Volta River Authority) from two hydro plants: Akosombo (912 MW of which 770 firm capacity) and Kpong (160 MW of which 136 firm capacity). Thermal generation (88 MW) is entirely diesel-based and consists of units in 19 isolated load centers (58 MW, of which the 28 MW Tema plant is the largest), operated by ECG (Electricity Corporation of Ghana) plus some units operated by self producers, mainly the saw mills. VRA sells electricity to bulk domestic consumers (ECG, Akosombo Township and textile factory and mining enterprises) and to foreign customers (VALCO, Volta Aluminium Company, by far the largest potential customer, considered as foreign although the plant is in TEMA, CEB, Communauté Electrique du Bénin, Benin-Togo, Togo Binational Electricity Authority, and EECI, Electricité Electrique de Côte o'Ivoire). Electricity production reached a peak of 5,341 GWh in 1981 but declined steeply to less than 2,000 GWh in 1984, in the wake of the drought-induced fall in generation, before increasing to about 3,000 GWh in 1985.

1.5. PETROLEUM PRODUCTS PRICE BUILD-UP

For all products, except LSFO and LPG which have to be exported at competitive international prices, prices are fixed by the Government.

Following the large Cedis devaluations from 1983 to February 1987 (the exchange rate was raised from ¢2.75/US$ to 30 in October 1983 and then progressively to ¢150/US$ in February 1987) product prices were increased from ¢10-25/IG in 1983 to ¢100-190/IG in 1987. (Annex 1).

In 1985, ex-refinery prices transformed into dollars at the official exchange rate were on average equivalent to landed prices (Annex 2). However, ex-refinery prices would have been much lower than landed prices, had a shadow exchange rate be used. In 1986, due to the increase (by more than 50%) of ex-refinery prices as well as the fall in international prices, ex-refinery prices generated a fair excess of money over products costs: ex-refinery prices were 85% higher than landed prices with the official exchange rate (90 ¢/$), about 15% higher with the shadow exchange rate (150¢/$).

Prices were increased again in February 1987 (table 1.5.). Prices were calculated by the Ministry of Finance and Economic Planning, taking into account the following constraints:

- ex-refinery prices should cover all expenses incurred when manufacturing the products (FOB crude oil price, transportation, handling, financial charges, refining costs in GHAIP) as well as GNPC expenses,

- ex-pump prices should be in line with the objectives of the Government: low kerosene price (to protect households' budgets), limited increases of gasoline price (in line with the raise of the GDP deflator for instance), etc...

Present ex-refinery prices allow to recover all costs incurred when manufacturing products. In March 1987, the cost of one ton of crude oil (including processing) was about 170 $/t, while products obtained from this ton of crude oil generated $170 revenues. On a yearly basis (1987 forecast figures) total revenues generated by products sales (with ex-refinery prices) were expected to be about Cedis 30 000 million, while crude oil costs, plus refining and GNPC costs, were expected to be the same (Annex 3).

In September 1987, due to depreciation of Cedi vis a vis dollar (1 US$ = 165 Cedis in September, 150 in March), and to crude oil price increase, ex-refining prices are slightly under the level required to cover costs.

Table 1.5.

PETROLEUM PRICE BUILD-UP

Effective 20.02.1987

1. DOMESTIC MARKET

Product	Unit	Ex-Refin.	Road Fund	Energy Fund	Ex-GNPC	Excise Duty	Dealer's Margin	Marketer's Margin	Transport. Margin	Ex-Pump per Gall.
Premium	Imp.gal.	144.30	5.00	1.00	150.30	21.00	2.60	5.60	10.50	190.00
Regular	Imp.gal.	139.30	5.00	1.00	145.30	16.00	2.60	5.60	10.50	180.00
Kerosene	Imp.gal.	89.30	1.00	1.00	91.30		2.60	5.60	10.50	110.00
Gas Oil	Imp.gal.	109.30	10.00	1.00	120.30	26.00	2.60	5.60	10.50	165.00
ATK*	Imp.gal.	170.00			170.00					170.00
UN Gasoline	Imp.gal.	142.30	5.00	1.00	148.30	19.00				
IDO	Imp.gal.	109.58	8.00	0.60	118.18	18.60				
IFO	Imp.gal.	109.93	5.50	0.10	115.53	7.10				
RFO	Imp.gal	110.00	5.00		115.00	5.00				120.00
LPG	Lb.	11.40	0.20		11.60	2.00	1.50	0.05	2.85	20.00

*   Ghana Airways, Ghana Airforce and Domestic Airlines only

2. EXPORTS (BUNKER)

Product	Ex-Refin.	Road Fund	Energy Fund	Excise Duty	Export Cedis/ gallon	Export Price US$
Gas oil	118.00	20.00	1.00	26.00	165.00	1.100
ATK	170.00	23.00		11.00	204.00	1.360
IFO	110.80	5.60	1.00	7.10	124.50	0.830
RFO	110.00	5.00		5.00	120.00	0.800

Source : N.E.B.

Ingénieur conseil

International comparison

Table 1.7. compares per capita energy consumption and GDP as well as energy intensity (energy consumption per unit of GDP produced) in Ghana and in other West African countries. Energy consumption per capita is much lower than in Nigeria, Côte d'Ivoire and Senegal. Energy intensity is close to energy intensity in most of the other countries, except Liberia and Senegal, the industrial structure of which include very intensive mining subectors: iron ore in Liberia and phosphates in Senegal.

Table 1.6.

Energy Consumption West Africa

	Population 1984 (millions)	GDP 1984 (billion US$)	Commercial Energy Consumption 1984 (10^3TOE)	GDP per capita 1984 (US$)	Energy consumption per capita 1984 (kgoe)	Energy Intensity (toe/million US$ GDP - 1984
Ghana	12.30	4.49	686	365	56	153
Benin	3.90	0.90	117	231	30	130
Burkina Faso	6.60	0.82	136	124	21	166
Côte d'Ivoire	9.90	6.69	1 336	676	135	200
Guinea	5.90	2.10	293	356	50	140
Liberia	2.10	0.98	525	467	250	536
Mali	7.30	0.98	161	134	22	164
Niger	6.20	1.34	231	216	37	172
Nigeria	96.50	73.45	14 607	761	151	199
Senegal	6.60	2.39	739	362	112	309
Togo	2.90	0.72	141	248	49	196
Total	**147.90**	**90.37**	**18 286**	**611**	**124**	**202**

Ex-pump prices are lower in Ghana than in many other African countries, because of lower distribution margins (marketer's margin and retailer's margin are 75% less than similar margins in other countries) and limited taxes.

Table 1.7.

Retail Prices (US cents/liter)

	Ghana	Ivory Coast	Togo	Senegal	Cameroon	Nigeria	Tanzania
Premium	27.9	114.8	68.0	114.8	57.4	10.0	119.0
Kerosene	16.1	65.5	45.0	60.6	25.9	2.5	45.5
Gas oil	24.1	83.6	59.0	68.9	47.2	7.5	51.8

Prices in Nigeria are very low (Premium US¢ 10/l, Kerosene 2.5, Gas oil 7.5). The effects of the structural adjustment program (SAP) and the second-tier foreign exchange market (SFEM) have increased subsidies on the prices of petroleum products to about 75 %.

When comparing products prices in Ghana and in other countries, attention should be paid to salaries. Salaries in Ghana are only a small fraction (10-40%) of salaries in other West African contries. In term of purchasing power, prices of the products are therefore much closer (working times required for buying a gallon of gasoline or gas oil are not very different).

Relative prices of products

Despite a recent sizeable increase in the price of kerosene (both ex-refinery and ex-pump), this product is still only sold for 67% of gas oil price. The Government wants to maintain kerosene price as low as possible for obvious social reasons (kerosene is assumed to be used by low income population, for lighting, cooking and for starting fires). However, whether kerosene actually reaches the targeted population at the "official" retail price is questionable.

Kerosene is very often sold by peddlers for ¢30/bottle or ¢210/gallon (almost twice the official retail price). Moreover the difference between kerosene and gas oil ex-pump prices is a strong incentive to substitute kerosene for gas oil in diesel engines. The distorsion between kerosene and gas oil ex-refinery prices can also affect the economic choices of the refinery, which should produce a maximum of gas oil, at the expense of kerosene, in order to maximize refining profit.

LPG is also sold at a low price (less than half the economic cost) but the high cost of a cylinder as well as stoves deprives the majority of the population from any access to this fuel, which is used by the high income class.

It is also worth mentioning that fuel oils are sold far above their opportunity cost (which is equal to the export price, i.e. about US$ 110/ton, mid-1987.

1.6. OTHER ENERGY PRICES

Fuelwood and charcoal

Prices vary largely, depending upon the quantity sold and upon the distance from the producing areas. For fuelwood, bulk prices are around 1 ¢/kg in the producing areas, but retail prices reach 10 ¢/kg in Accra. Charcoal prices vary from 3-5 ¢/kg (per bag of 45 kg) in the forest area up to 25 ¢/kg (per bag of 45 kg - Accra) or even 35 ¢/kg (retail price for small quantities in Accra). It is worth mentioning that these prices have quickly increased in recent months. This can be explained by a number of factors: deterioration of the supply/demand balance, increase in gas oil price which affects transportation costs, general inflation.

Electricity

Two groups of tariffs exist: one group for the sales of VRA to bulk domestic consumers (ECG, Akosombo, mining companies) and to foreign consumers (VALCO, CEB, EECI), another group for ECG's domestic customers.

VRA charges about US¢ 1/kWh to VALCO, and US¢ 4/kWh plus a $6.50 monthly demand charge per kW to CEB as well as EECI. Bulk domestic consumers are paying between ¢2 and ¢3/kWh plus a monthly demand charge between ¢300 and 400/kW. ECG's retail tariffs to residential customers are around cedis 3/kWh (US cents 2/kWh). Despite recent large increases, these tariffs are still low, by international standards. This is probably due to the largest part of electricity (98%) being generated from hydro sources. However, the cost of producing 1 kWh in one of the ECG diesel plants is much higher than the present tariff (producing 1 kWh requires about .3 liter of gas oil which makes -at Cedis 165/IG- Cedis 10/kWh; other costs - capital recovery, maintenance, personnel... are probably Cedis 5-10/kWh).

1.7. COMPARISON OF ENERGY COSTS

Households

Total fuel consumption by households is about 300,000 tons of oil equivalent or 20 KOE per capita.

Table 1.8.

Household Fuel Consumption - Ghana - 1985

	Total Consumption Thousand TOE	Household Consumption Thousand TOE	
		Total	Useful
Agricultural residues	139	139	14
Fuelwood	1 817	1 617	162
Charcoal	313	306	61
Electricity	104	37	24
LPG	4	3	2
Kerosene	116	106	37
TOTAL		2 208	300

Energy costs (table 1.9.) vary between Cedis 5/kWh for electricity and cedis 25/kWh for fuelwood (due to very low efficiency of fuelwood use). Total energy costs for a household was calculated with the following assumptions:

- total energy consumption per year 120 KOE (6 persons)
- cost of appliances (stoves):
  - fuelwood   no cost
  - charcoal   cedis 1000
  - kerosene   cedis 2000
  - electricity   cedis 15 000
  - LPG (2 burners)   cedis 20 000.

Kerosene and electricity reveal the least cost sources of household energy followed by LPG and charcoal. Fuelwood appears the most expensive fuel due to its very low efficiency.

The calculated costs should be cautiously considered:

Table 1.8.

Comparison of Household Energy Costs

1. COST OF ENERGY

	LPG	Kerosene	Fuelwood	Charcoal	Electricity
Average price ¢/kg	44.15	29.50	10.0	25.0	3.0/kWh
Gross calorific value Th.kcal/kg	10.85	10.33	3.50	6.90	-
Cost per Th.kcal Cedis	4.07	2.86	2.86	3.62	-
Utilization efficiency %	45.0	35.0	10.0	20.	65.
Cost per useful thousand calories	9.0	8.2	28.6	18.1	-
Cost per useful kWh	7.8	7.0	24.6	15.6	4.6

2. TOTAL COST PER HOUSEHOLD PER YEAR

	LPG	Kerosene	Fuelwood	Charcoal	Electricity
Stove cost: total Cedis per year*	20 000 5 500	2 000 560	-	1 000 420	15 000 3 300
Cost of energy **	10 850	9 840	34 300	21 700	6 420
Total cost: Cedis US$	16 350 109	10 400 70	34 300 229	22 120 148	9 720 65

* assuming life time of 5 years for LPG and kerosene, 3 years for charcoal, 7 years for electricity

** 6 persons in a household - Energy consumption 20 koe per capita

Source: Mission estimates

1 US$ = 150 Cedis

. Stove efficiencies are average ones, and any improvement in fuelwood and charcoal stoves could considerably reduce the cost of using these fuels, although we feel they would still be more expensive than kerosene,

. If a 210 ₵/IG kerosene price is retained (this is the price for kerosene sold in "beer bottles" by peddlers) and if charcoal stove efficiency is supposed to be 35% (instead of 20%), the cost of using kerosene is equivalent to the cost of using charcoal,

. The comparison was performed considering Accra prices. In Northern areas, the cost of using charcoal and fuelwood is less while the cost of using LPG and kerosene is certainly slightly more (despite the unified prices). In these areas, fuelwood and charcoal are likely to reveal the least cost source of household energy.

Industry

Energy consumption in industry consists of fuelwood (33%), electricity (29%), gas oil (25%) and fuel oil (13%).

The abundance of wood reserves account for the high share of fuelwood while electricity consumption was encouraged in the 70's by low tariffs. Fuel oil consumption is unexpectedly low, due to the previous factors and probably to more difficult utilization of fuel oil (compared to electricity or gas oil).

Table 1.10.

Comparative costs of industrial fuels

	Fuelwood	Electricity	Gas oil	Fuel oil
Cost per ton				
US$	-	-	180 (2)	110 (3)
Cedis	1 000 (1)	-	27 000	12 000
Cost per kWh	0.25	4 - 5	2.28	1.50

(1) Cost in production areas
(2) Opportunity cost, i.e. import parity price - mid 1987
(3) Opportunity cost i.e. export parity price - mid 1987

Outside the North of Ghana, where fuelwood is cheap, fuel oil is the least cost fuel for industry and every effort should be undertaken to encourage substitution of fuel oil for gas oil or electricity.

2. PETROLEUM PRODUCT PRICES FORMATION : ANALYSIS

Petroleum product prices are formed at two levels:

. ex-refinery prices

. consumer prices (ex-pump prices) which include ex-refinery prices, distribution margins and taxes.

EX-REFINERY PRICES

2.1. CRUDE OIL PROCUREMENT AND COST

Procurement

Crude oil is acquired by GNPC and then passed to GHAIP for processing. The manufactured products still belong to GNPC which sell them to the distribution companies: GOIL, BP, MOBIL, SHELL and TEXACO. Most crude oil requirements for manufacturing of products are acquired from Nigeria, on a Government-to-Government basis. The reference price for this contract was Government Official Selling Price (GOSP) up to 1986, and is again GOSP from 1.02.1987 (in 1986 netback prices were used). The arrangement with Nigeria provides some advantages to Ghana because of the credit terms offered by Nigeria to ECOWAS Countries: the payment is to be made 60 days after bill of loading (instead of 30 days for the other clients; this has been recently reduced from 90 to 60 days respectively). Nigerian crude oil has the advantage of lower transportation cost and of a refining yield structure well adapted to Ghana's domestic demand pattern. However, underlifting penalties can be applied if volumes lower than those agreed are acquired. Moreover, in recent years spot prices have very often been below GOSP: it is unlikely that GNPC can obtain any kind of rebate when such a situation occurs.

The choice of the crude oil and the schedule of delivery are determined by GHAIP and GNPC and agreed upon with Nigeria. Crude oil is occasionally purchased on the spot market, when for any reason (technical problems, reduction of Nigerian production when OPEC quotas are modified) the quantities obtained under the long term contract do not meet the refinery requirements. For this purpose a "Tender Committee" including representatives of GNPC, GHAIP, the Bank of Ghana, the Ministry of Fuel and Power and of the Attorney General's Department, has been formed. The qualification of companies invited to submit offers is based upon financial criteria (bank situation, payment of a tender registration fee). Then letters of invitation to tender are sent. The comparison of bids is made by the Tender Committee which makes recommendations to the PNDC Secretary for Fuel and Power. The same procedure applies for products imports.

The allocation of responsibility for petroleum procurement to GNPC (which was set up in 1983) resulted both from the mandate of that institution to secure petroleum supplies to the country but also from the need to provide GNPC with a revenue source to finance petroleum exploration and development.

Returning crude oil supply to GHAIP would provide fair advantages: better coordination between refinery operation and commercial activities; more rapid reaction to variations in crude oil and product markets and prices; probably reduced cost, since this activity could be managed by a team of only 5-10 persons (of which 2-3 engineers) in GHAIP. As an example, in Côte d'Ivoire, responsibility for crude oil procurement and for products exports has been recently returned from PETROCI to SIR; PETROCI was formed in the 70's to take over the exploration/production activities and was given a monopoly for crude oil and products import as well as products export. Following the restructuring of the SIR refinery (1985), this responsibility was returned to SIR in order to improve the refinery operation.

Costs

The following elements add up to arrive at TEMA landed price (see Annex 5).

.   **FOB price**

GOSP prices apply for the crude oil acquired under the long term Government-to-Government contract. Although this contract provides some guarantee of supply, spot prices are often cheaper than GOSP. Provided GNPC and/or the Government can

- provide the necessary financial guarantees
- properly organize the purchase

the spot market could prove to be a cheaper source of oil for part of crude requirements.

- **Port and wharfage dues - Loading port**

When loading crude oil, a number of charges have to be paid to the Nigerian Port Authorities. Part of these charges (those linked to the vessel) are to be paid by the owner's of the vessel, the remaining ones (those linked to the oil cargo) are to be paid by the charterer's, i.e. GNPC.

- **Freight**

Transportation is arranged by GNPC. The port of TEMA which accommodates all crude oil imports, some product imports as well as fuel oil exports and coastal shipping to Takoradi, can accept up to 65,000 DWT tankers. About 20 cargoes are needed each year. The vessel is chartered for a full year and a schedule of liftings is agreed upon during the year. According to the figures, the conditions are not very different from standard conditions prevailing on the transportation market. Each cargo is about 45,000 tons (Tema cannot accommodate fully loaded 65,000 DWT) which is a fair improvement upon the previous situation when oil was imported by 30/35,000 DWT vessels.

- **Demurrage**

For calculation of transportation costs (freights), a laytime allowance of 72 hours for loading and unloading is considered. However, a number of factors can increase this allowance; late establishment of the letter of credit for crude oil purchase, which makes for delay in crude oil loading, arrival in Tema at a time when the vessel (for tide problems for instance) cannot immediately get into the harbour. Then demurrage rates have to be added to the transportation costs. These demurrage rates are presently about 14 000 US$ per day for a 65,000 DWT vessel.

- **Financial charges**

GNPC has to pay several separate fees:

- negotiation and handling commission: equal to 1% flat on the maximum value of the letter or credit. The letter of credit is prepared for a maximum value of the cargo, which can be slightly higher than the actual loaded quantity of crude oil.

- for crude oil purchase, the Government of Ghana has arranged with the Standard Chartered Bank (London) a crude oil credit facility. When buying crude oil from Nigeria, this crude has to be paid 60 days after the bill of loading. At this date, the Government pays half the value of the cargo, while the SCB pays, under a $ 70 million facility, the remaining half (provided the total amount of credit is not over $70M). This sum is repaid by the Government one year later. For this facility, the Government pays a confirmation fee equal to 1% flat on the maximum amount of the SCB portion of the value of the letter of credit, and interests calculated at 1 3/8% over LIBOR (London Interbank Best Offered Rate).

. Ocean losses are not presently accounted for in crude oil costs determination. These ocean losses are about 0.3% of the cargo.

The following expenses are in Cedis:

. **Insurance:** about 0.2% of the C and F value.

. **Wharfage and port dues in TEMA:** these dues are paid in cedis, but calculated on the basis of a fee in US$/T, which is fixed by the Harbour Authorities. Wharfage dues are equivalent to $ 0.53/T, port dues to $ 0.46/T. Pipeline dues (¢ 0,45/T) are also to be paid.

. **Bank charges:** a 1% commission on the Cedi value of the bill amount and a 0.75% charge exchange on the Cedi value of the bill amount. Telex charges of ¢ 7,500 on each established letter or credit have also to be paid.

Detailed figures of crude oil imports in Ghana (1985 and 1986) are given in Annex 4.

2.2. PRODUCTS IMPORT

Products are imported through periodical invitations of suppliers to bid. Although detailed figures regarding import costs were considered as confidential and were not disclosed to the mission, we understood that the formation of actual landed costs is similar to the formation of crude oil landed costs.

Landed product prices consist of:

.   FOB price: North-West Europe or Italy spot prices

.   Harbour dues (loading port)

.   Freight: products are carried by 20-30,000 DWT vessels.

.   Demurrage

.   Ocean losses

.   Negotiation and handling commission

.   Confirmation fee

.   Interests

.   Insurance

.   Exchange and commission

.   Port and wharfage dues in Tema

.   Product losses in Tema storage tanks.

Estimated landed product prices are shown in Annex 6.

2.3. REFINING COSTS (GHAIP refinery)

GHAIP refinery was built in 1963 and consists of a simple hydroskimming scheme Its capacity is 28,000 bpsd (about 1.25 MTPA). This refinery was built in the framework of a joint venture between the Government of Ghana (25%) and AGIP plus ANIC (ENI). AGIP however withdrew from the venture a few years ago. The whole staff is Ghanaian.

Refinery consumption and losses - impact of rehabilitation

Refinery consumption (fuel) and losses are presently high (around 7%).

Table 2.1. - Refinery consumption and losses - GHAIP

	Minimum calculated	Test Run 1975	Actual 1985	1986
Fuel consumption	3.8	4.8	5.6	5.3
Process and flare losses	0.3 (1)	0.8	0.9	0.9
Evaporation losses	-	0.7	0.8	0.8

(1) if the refinery can sell all LPG production

Due to the insufficient maintenance as a result of lack of spare parts (in turn linked to foreign currency shortages), the refinery deteriorated at the end of the 70's. A rehabilitation phase 1 programme, financed by the IDA and the EIB is now underway and should be followed by a rehabilitation phase 2 (rehabilitation phase 2 will also cover rehabilitation of distribution outlets and LPG distribution).

Rehabilitation includes mainly replacement of the existing utility units (generation/distribution of steam and power) and repairs in product storage and shipment. A revamping project which would allow an increase of capacity up to 34,000 BPSD, rehabilitation of the process units and improvement of the energy balance of the refinery is also contemplated but is not yet firmly decided.

The rehabilitation will reduce evaporation losses and leakages which, according to GHAIP management, are presently substantial. Increase in LPG distribution will simultaneously reduce flaring of excess LPG production. Therefore after rehabilitation (phase 1 + phase 2) has been completed, refinery consumption and losses should return to around 6%. Further fuel savings could be achieved by improvement of the energy balance in the process units.

Refining costs ("Processing fee")

When processing crude oil, the following costs have to be accounted for:

- variable costs   catalysts and chemicals (mainly tetraethyl lead)
  utilities (mainly electricity bought from ECG)

- fixed costs   personnel
  maintenance
  overheads (administrative and general expenses)
  depreciation

- financial costs   loans reimbursement and interest on debt

- return on stated capital

- refinery consumption and losses.

At the beginning of each year, GHAIP prepares an operating budget on the basis of forecast crude oil processing. As a matter of fact, since variable costs are low, GHAIP expenses are not very much affected by actual crude throughput. This budget is discussed with the Government. The corresponding expenses ("GHAIP processing fee") are paid to GHAIP by GNPC on a monthly basis.

The "processing fee" now includes all expenses except refinery consumption and losses. However, consumption and losses are -and will be- built into ex-refinery prices since the cost of acquiring and processing 100 tons is allocated to only 93 or 94 tons of finished products.

GHAIP refining costs are preliminarily estimated at about 720 million Cedis plus 8.5 million US$. Personnel costs account for 75% of Cedis expenses while foreign exchange costs consist mainly of spare parts (40%), chemicals (28%) and reimbursement of IDA and EIB loans for rehabilitation.

Refining staff numbers about 700, which is very high, especially if one considers that this refinery is a simple hydroskimming one. In most similar African refineries (Senegal, Tanzania, Zambia) the staff is only 400 or less. The refinery insists that part of this over-employment was generated by the development of social services (canteen, medical care, etc..) within the refinery, when the Government could no longer provide these services. We recommend that the staff be reduced to lower levels.

Maintenance cost is estimated around $3.5 million in 1987 which is close to international standards (in $/T). However an import licence is to be obtained for acquisition of these parts, and in recent years GHAIP was not always in a position to obtain all the spare parts requested. In 1986, only $5 million import licenses were granded (vs. 7.5 million budgeted). The rehabilitation underway should reduce costs to routine maintenance and consequently release the corresponding foreign currency burden.

Processing fee includes **repayment and interest charges of the IDA-EIB loan** for rehabilitation. In addition to provision for these costs, we recommend that the processing fee allows GHAIP to generate some cash in order to undertake any long term investment programme required after rehabilitation. Therefore the processing fee should make room for a profit (difference between processing fee and all expenses, including loans charges) to be agreed upon with the Government (Cedis 150-300 million).

Working capital : working capital consists mainly of crude oil and products inventories as well as of accounts receivable (credit to the customers).

Working capital requirements
(BEICIP estimate according to standard figures)

Crude oil inventories	1 or 2 months of crude oil consumption
+ Products inventories	1 month of products deliveries
+ Accounts receivable	1 or 2 months of products deliveries
- Accounts payable	1.5 month of crude oil consumption*

Net working capital requirements: 2 or 3 months of crude oil

* crude oil is paid 60 days after loading intake or roughly 45 days after unloading in Tema.

These assets have normally to be covered by debt. However since GNPC owns crude oil and products and sells products to the marketing companies, the working capital cost is passed to GNPC.

S.C.B. credit provides on average 6 months additional credit for crude oil payment (12 months on 50% of crude). Thus this credit more than covers working capital requirements (the S.C.B. credit cost is included in crude oil landed cost).

However, should the Government get away from this credit, the landed crude oil cost would be reduced, but allowance should be incorporated in the GNPC or GHAIP costs to cover inventories and credit costs.

Return on stated capital : stated capital is reduced to a very low value due to the devaluation of the Cedi and to the corresponding inflation. As a matter of fact, capital charges are now taken into account ₃hrough repayment of rehabil'·ation loans and we have recommended that some additional cash is generated to enable GHAIP to undertake any needed new investment.

Total processing costs for 1987 are estimated at about Cedis 2080 million ($ 8.5m + Cedis 720m), excluding any profit. This is equivalent to $ 13 million. This figure is close to refining costs in similar refineries in Tanzania or Zambia, but much lower than in neighbouring countries (Senegal, Côte d'Ivoire, Cameroon).

2.4. GNPC EXPENSES

GNPC expenses are presently built into ₃x-refinery prices. These expenses are itemized as follows:

1. Accounts
2. Administration
3. Corporate planning
4. Internal audit
5. Legal
6. Marketing

7. Exploration/production
8. Keta
9. Saltpond
10. Tano
11. Negociations

12. Housing.

Items 7 to 11 are directly related to oil and gas exploration and production in Ghana (Keta, Saltpond and Tano are hydrocarbons fields, of which Saltpond was formerly producing oil but is now shut-down follcwing production decline and oil prices drop). Only marketing expenses are directly related to crude oil and products acquisition as well as to products (LPG and LSFO) reexports.

In the GNPC budget each item consists of operating and "capital" expenditures. Some contingencies are also allowed for. Total operating expenses are about 500 million Cedis, of which exploration expenses account for 330 million Cedis. Capital expenditures were not clearly established.

We propose that the expenses to be built into the ex-refinery prices be limited to marketing expenses (about Cedis 50 million). If the responsibility for crude oil and products procurement and supply is returned to GHAIP, then these marketing expenses will become part of GHAIP costs (marketing could be carried out in GHAIP by a team of 5-10 persons, 2 or 3 engineers plus secretaries).

All the other expenses should be recovered through an additional margin to be incorporated in ex-pump prices. Having the consumer pay for exploration expenses in the country is normal practice in a number of countries (such a duty is called "Fonds de soutien des Hydrocarbures" in France, "Fonds d'Action Pétrolière" in Côte d'Ivoire). Assuming current expenses equal to Cedis 450 million, and should this levy be put on gasolines and gas oil sales, the required level is:

$$450/165 = 2.7 \text{ (Cedis/I.Gall.)}$$

CONSUMER PRICES

Consumer prices consist of:

.   ex-refinery prices

.   distribution margins (marketer's margin, retailer's margin, transporter's margin)

.   taxes (excise duty, road fund, energy fund)

We present in Annex 8 a comparison of premium, kerosene and gas oil prices in Ghana and in other countries. The various figures indicate that marketer's margin and retailer's margin are much lower in Ghana than elsewhere. Regarding taxes, the situation is different from one country to another. Some countries (Côte d'Ivoire, Senegal, Tanzania) enforce very high ex-pump prices, particularly for gasolines, through taxes which represent 70-80% of retail prices.

2.5. MARKETER's MARGIN

For UPPF products (premium, regular, kerosene and gas oil) a fixed margin is decided by the Government. This margin is to cover all expenses related to UPPF products distribution (storage costs, filling stations amortization and maintenance, financial charges, overheads, product losses).

Present margin for UPPF products is 5.60 Cedis per Imperial Gallon. It was recently increased from 4.50 ¢/gal. There is also a fixed 2.05 ¢/lb margin for LPG.

Calculation of marketer's margin in Ghana

In September 1986 the distribution companies provided a document to justify their request of a price increase. The detail of this proposal is shown in Annex 9. The calculation takes into account the average costs (related to UPPF products) and the average quantities of UPPF products sold by one company in Ghana.

For a more comprehensive evaluation of the marketer's margin, we asked the distribution companies for a detailed breakdown of their expenses, between UPPF and non UPPF products on one hand, between the various expenses (storage, service stations, financial charges, overheads) on the other hand. To these expenses we added allowances for capital recovery (12% of capital employed -or net assets- as stated in the 1985 annual report of each company). (see Annex 10).

According to these calculations, the net margin (per Imperial Gallon) in 1986 should have been around Cedis 7 to cover current expenses (6.2) and allow for capital recovery (0.75).

Recommendation

Evaluation of expenses as well as comparison with margins in other countries justify an increase of marketer's margin. This is all the more important that rehabilitation of service stations, repair and/or replacement of pumps are urgently required. Presently, the bad state of many pumps can make the consumer pay for more than the quantity he actually gets.

2.6. TRANSPORTER's MARGINS: PRESENT SITUATION

In order to unify products prices all over the country, a fixed transportation margin is incorporated in the price build up and a compensation between transportation costs to the various consuming areas is carried out through the Unified Petroleum Products Fund. When products are sold in Accra, real transportation costs are lower than the transportation margin and the difference is paid by the distribution companies (which pay the actual transportation cost to the transporters) to the UPP Fund. Conversely when products are sold in remote areas (Tamale for instance), actual transportation costs are higher than the transportation margin and the difference is to be paid by the fund to the distribution companies. According to the oil companies, which manage the fund, financial situation of the fund is balanced. The fund allows also for equalization between products prices ex-Tema and ex-Takoradi. Since transportation costs between both harbours are paid in foreign currency, any variation in exchange rate of the Cedi may affect the situation of the fund.

Tranporter's margin was recently increased to 10.5 ¢/gallon. This margin corresponds to transportation cost between Tema and Kumasi (300 km).

Transportation costs

Various evaluations of transportation costs in the present Ghanaian economic conditions have been provided to BEICIP by the distribution companies and by the Ministry of Roads and Transportation. The resulting costs are:

.   distribution companies   19.25 ¢/ton mile or
                                               12.25 ¢/gallon Tema Kumasi

.   Ministry of Roads and Transportation   18 ¢/ton mile

These figures do not fully account for the capital costs of the truck or of the trailor. Our own calculations (Annex 11) give transportation costs between 22 and 32 Cedis/ton/mile (13 and 20 Cedis/t.km) depending upon the return on capital and the road conditions.

Transportation costs, for oil products, in various neighbouring countries are:

- Côte d'Ivoire   21 FCFA/m^3 x km   (bitumen road)
                   26 FCFA/m^3 x km   (earth road)

- Mali   27 FCFA/m^3 x km   (bitumen road)
                   41 FCFA/m^3 x km   (earth road)

- Niger   30-35 FCFA/m^3 x km

- Chad   35-60 FCFA/m^3 x km

We propose to retain 16 Cedis/T.km.

Average distance

The largest share of petroleum products is sold in Accra, Kumasi and Takoradi.

The average distance to be transported by a gallon before delivery to consumers was roughly evaluated at only 175 km (Annex 12). Moreover, the transportation to Takoradi is carried out by ship, and the transportation to Kumasi can be carried out by rail, at a lower cost than truck transportation. Finally, in the future, transportation by barge over the Volta Lake should reduce the cost of transporting products to the Northern Provinces.

Even assuming that products are transported by trucks and that the average distance is 200 Km, the transportation element should be around (assuming 300 IG/ton):

$$\frac{16 \times 200}{300} = 10.80 \text{ Cedis per gallon}$$

We recommend that before any revision of transportation margin, a detailed analysis of regional breakdown of sales and actual transportation costs be undertaken.

2.7. RETAILER'S MARGIN

Retailer's margin is now Cedis 2.60 per Imperial Gallon. The marketers and the retailers have recently claimed that this margin should be increased to 3.67 (Annex 13). This allows for a 30% inflation rate in 1987 but does not include any profit. Since the service stations equipment is provided by the distribution companies, the capital used by the retailers is likely to be low.

In many service stations, pumps are equipped with meters which only indicate the volume sold and do not show the corresponding price. In some cases, the pumps indicate liters (and not gallons). Moreover, due to the bad state of many pumps, discrepancies between the indicated and the actual volume are possible. Therefore room is left for actual quantities of products delivered being less than the quantities paid for. Even a 1% gap generates around 1.5 ¢/g or 50% of the present margin.

We recommend that priority be given to replacement or repair of the pumps and that regular inspection of pumps as well as checking of the delivered volumes be carried out.

2.8. TAXES

Taxes consist of:

.   **energy fund** for financing specific energy projects

.   **road fund** for financing part of roads maintenance and construction

.   **excise duty**, which is targeted for the Government's budget.

In 1987, taxes are expected to yield about Cedis 5 476 million.

Table 2.2. – Taxes – Expected Revenues in 1987

	Expected sales Th IG	Excise duty ¢/IG	Road fund ¢/IG	Energy Fund ¢/IG
Premium	63 400	21	5	1
Regular	13 300	16	5	1
Kerosene	40 200	-	1	1
Gas oil	86 800	26	0	1
Fuel oil	14 600	5	5	-
LPG (1)	19 800	2	-	-
Revenues (million Cedis)		3 910.6	1 361.7	203.7

(1) Pounds

3. PETROLEUM PRODUCT PRICING PRINCIPLES

BASES FOR THE COMPUTER MODEL

3.1. OBJECTIVES

The objective of the petroleum products pricing study is to recommend to the Government a price build-up which will:

- allow the various bodies (GNPC, GHAIP, distribution companies, transporters, retailers...) to recover the costs they incur in the supply and processing of crude oil, as well as in the distribution and marketing of petroleum products,

- encourage the distribution of products to all parts of the country

- allow the Government to generate sufficient revenues for the Energy Fund, Road Fund, National Budget and development projects,

- allow correct allocation of energy among consumers thus leading to the most efficient use of energy.

The first question is whether it is necessary to set up a petroleum product price build up. To meet the objectives, deregulation of prices could be envisaged. Deregulation has proven successful in several industrialized countries. However, this is only possible in the context of a large market, with several refineries and where product imports cover only a limited portion of domestic demand. This is not the case in Ghana where only one refinery is in operation and where all product imports are handled by GNPC. Deregulation of prices in Ghana would mean competition between GHAIP and overseas product imports to meet the domestic demand. Due to the limited size of the market, this could lead to serious disruptions in the oil supply and processing activities.

Therefore, we propose to set up a price build up which will ensure that:

- ex-refinery prices cover all the expenses incurred when procuring, supplying and processing crude oil

- ex-refinery prices reflect international prices (i.e. ex-refinery prices should be proportional to spot prices) in order to allow more efficient use of petroleum products

- marketers', transporters' and retailers' margins cover normal current and capital expenditures

- taxes be generated in line with the Government's objectives.

The first objective is already met by the present ex-refinery prices. The revenues which accrue from product sales cover crude oil and products import costs, crude oil processing costs and procurement expenses. However, present ex-refinery prices do not reflect international prices and this has some important drawbacks. If the present pattern of product demand vary from the forecast demand (e.g. sales of kerosene increase at the expense of gasolines), revenues will then fall short of costs (since ex-refinery price of kerosene is much lower than that of gasoline). Likewise, if more kerosene is to be imported, since ex-refinery price of this product is lower than import price, once again revenues will not cover costs. Last but not least, should the refinery be purely profit-orientated, and since ex-refinery price of kerosene is lower than that of gas oil, GHAIP should then minimize kerosene production at the expense of A.T.K. and gas oil, which of course is not the Government's objective.

The third objective necessitates an analysis of the various distribution margins. Bases for this analysis are shown in this chapter.

3.2. PRICES REVISION

Due to the possible rapid variations in crude oil and product prices, revision of ex-refinery prices at regular intervals is necessary. We recommend that quarterly revisions be carried out. Shorter intervals could be better suited to the changing international situation, but the administration involved in any price revision is likely to discourage more frequent revisions.

Revision of prices - adjustment. The price build-up must be recalculated at the beginning of every quarter. Should the newly calculated product prices (prices for the next coming quarter) differ by more than a given amount from the previous ones, then these new prices should be enforced. Due to variations in international crude oil and product prices and exchange rate of the Cedi during the quarter, crude oil prices and products prices used for ex-refinery prices calculation at the beginning of a quarter can be higher or lower than actual prices observed over the same period. An adjustment element allows for recovery of extra expenses or losses from one quarter to the next, ensuring that on average the various ex-refinery prices and ex-pump prices do not include any subsidy or hidden profit.

Responsibility for and schedule of prices revision. We propose that NEB be given responsibility for coordinating the preparation of new prices proposals. The work and decision process could be follows:

- by the 15th of December, March, June and September, NEB asks GNPC, GHAIP, the Ministry of Finances and Economic Planning and the Bank of Ghana, the information necessary to calculate forecast landed crude oil and product prices over the next quarter: crude oils to be processed, products to be imported, quantities, forecast prices, freight elements, financial charges.

- by the 20th, a new price build up should be calculated. This new structure, together with the necessary related information, should be transmitted to the Ministry of Fuel and Power, the Ministry of Finances and Economic Planning, and probably to GNPC and GHAIP.

- decisions concerning the implementation of new prices should be taken around the 30th of the same months, in order to allow new ex-pump prices to be effectively fixed in the first days of the quarter.

- under normal circumstances, the revisions of June, September and December should only affect crude oil prices. Processing costs, procurement costs and distribution costs should be considered as constant over a one-year period. These elements should be reviewed in March, once the budgets of the coming year have been approved.

For social and political reasons, the government may prefer less frequent prices revisions than quaterly ones. In the present context, due to rapid variation of the exchange rate of the cedi, there is a risk that prices calculated at any time fall short of the level required to cover costs a few months later. The adjustment element could then be used as a "buffer" to generate money at the beginning of the period and cover the gap between prices and costs at the end of the period.

In order tc calculate new ex-refinery and ex-pump prices, a computer model has been developed. In this model, crude oil and product landed prices are calculated, based on the latest available figures (recent FOB prices, transportation costs, financial charges...). Refining costs and adjustment (for the previous quarter) are added and export product value is deducted to arrive at total costs of products to be sold in Ghana. Totai costs are then allocated to the various products in proportion with international spot prices in order to arrive at ex-refinery prices. Afterwards various distribution margins and taxes are added.

EX-REFINERY PRICES CALCULATION

The overall cost of products to be sold in Ghana (domestic market) is the sum of:

- crude oil landed cost
- products import cost
- refining costs (including procurement costs)

minus value of reexport products (mainly LSFO).

Ex-refinery prices should be fixed in order to recover these expenses through the sales of products. Since these prices are fixed at the beginning of a quarter, they will be calculated on the **basis of forecast quantities and cost elements:** quantities of crude oil and product to be imported, quantities of products to be sold (both domestic and export), cost elements (FOB prices of crude oils and products, transportation costs, financial charges, processing costs).

3.3. MATERIAL BALANCE

Crude oil and product costs are crude oil and products quantities multiplied by prices. All the same calculated ex-refinery prices multiplied by sales must allow to recover costs. Therefore it is very important that import quantities and delivered quantities be in line. This means that the quantity of each product to be sold on the domestic market must be the quantity to be obtained by processing the forecast crude oil input (imported quantity) plus the quantity of this product imported as such, minus the exported quantity.

If the assumed sold quantities of products are not in line with the crude oil and product imports, ex-refinery prices will fall short of covering costs. Regarding refinery output, we recommend that the projected material balance be retained. Actual deliveries to the market can differ from this projected material balance, due to stock variations.

3.4. CRUDE OIL COSTS

Crude oil landed costs in Tema consist of the following elements:

.   FOB price: stated in US $/barrel

.   Conservancy dues (to be paid to the loading port Authorities), stated in US $/net registered ton (up to a certain limit)

.   Harbour dues (loading port): in US $/metric ton

.   Agency dues: lumpsum

Conservancy, Harbour and Agency dues will be input under the form of a sum in $/T.

.   Freight: freight cost is presently a lumpsum for each cargo of about 45,000 tons. Freight will be calculated as Worldscale 100 x AFRA rate (average Medium Range-Large Range 1). By adjusting the 'AFRA rate' it will be possible to build in actual freight cost.

.   Demurrage costs: demurrage costs correspond to costs of vessel immobilization over normal allowance for loading/unloading (36 hours each). They can be introduced in US $ per ton (about $ 0.43/t).

.   Losses: about 0.3% of CIF cost.

.   Negotiations and handling commission: 1% flat on the maximum value of the letter of credit; we retain 1% of FOB crude oil price.

.   Confirmation fee: 1% on the maximum amount of the Standard Chartered Bank portion of the value of the letter of credit. Since SCB credit amounts to 50% of crude oil FOB value, we retain 0.5% of FOB price.

. **Interests:** LIBOR + 1 3/8% on the portion of crude oil bill financed by the SCB loan (50% of crude oil cargo). This credit is for a 1 year period.

The above cost elements are paid in US Dollars.

. **Insurance:** 0.2% of C&F value (FOB & freight) in Cedis

. **Harbour dues in Tema:** in Cedis, equivalent to $ 0.46/MT

. **Wharfage dues in Tema:** in Cedis, equivalent to $ 0.53/MT

. **Pipeline dues (Tema):** Cedis 0.45/MT

. **Bank charges:** they consist of a **commission fee** (1% of the Cedi value of the bill amount) and of an **exchange fee** (0.75% of the Cedi value of the bill amount). Telex charges (7,500 Cedis per letter of credit established) are also to be paid.

3.5. IMPORT PRODUCTS COSTS

The same elements as for crude oil landed costs are to be taken into account:

. **FOB price** (Rotterdam or Italy spot prices)

. **Harbour dues** (Rotterdam or Italy)

. **Freight,** since products are transported by 20-30,000 DWT vessels, we propose to calculate freight as worldscale 100 x AFRA rate (average General Purpose-Medium Range). By adjusting the 'AFRA rate', actual freight costs can be built in.

. **Demurrage costs**

. **Ocean losses:** 0.5% of CIF cost for white products, 0.25% of CIF cost for fuel oil.

. **Negociation and handling commission:** same as for crude oil

. **Confirmation fee:** same as for crude oil

. **Interests:** same as for crude oil

. **Insurance:** same as for crude oil.

, **Harbour, wharfage and pipeline dues** in Tema

. **Bank charges:** same as for crude oil.

To these elements should be added:

.   Storage cost in Tema: these costs are normally included in the GHAIP budget.

.   Storage losses: 0.6% for gasolines, 0.3% for kerosene and gas oil, 0.1% for fuel oil.

3.6. PROCESSING COSTS

Processing costs will consist of GHAIP processing fees and marketing expenses (marketing expenses will normally be included in GHAIP budget if responsibility for crude oil and product imports is returned to this company).

Processing costs consist of:

Variable costs:

.   Production chemicals (ethyl fluid, dyes, other chemicals),   US $
.   Utilities   Cedis

Fixed costs:

.   Equipment and spare parts   US $
.   Personnel   Cedis
.   Administration expenses   Cedis
.   Payment of interests and payment of principal for EIB/IDA loans Cedis & US$
.   Other costs   Cedis
.   Insurance   Cedis
.   Return on stated capital   Cedis
.   Profit   Cedis

Profit should be agreed upon with the Government, and allow GHAIP to undertake any new investment after rehabilitation is completed.

We propose to introduce these costs as follows:

	Processing Costs	
	US $	**Cedis**
Variables	X	X
Fixed	X	X
Marketing		X

Marketing expenses are presently part of GNPC costs. The other GNPC costs should be recovered through a specific levy to be added to ex-refinery prices.

Note: Working capital (mainly crude oil and product inventories + accounts receivable - accounts payable), is presently passed to GNPC which owns crude oil and products. Working capital requirements are in fact covered by SCB credit (on average, crude oil is to be paid 6 months after loading date, while working capital corresponds to 2-3 months crude consumption). Should crude oil be paid cash, then a provision for working capital will have to be incorporated in GHAIP or GNPC budget.

3.7. ADJUSTMENT

Ex-refinery prices should cover crude oil and import products costs, plus processing costs. Since ex-refinery prices are calculated at the beginning of each quarter for the following three months, these prices will be calculated taking into account costs and volumes forecasts.

In normal economic conditions, products consumption should not be subject to large variations. Conversely, crude oils and products costs can incur substantial increases (decreases) in a context of highly fluctuating petroleum and products prices. If for instance, ex-refinery prices are calculated for the next period on the basis of a 18 $/bl crude oil, then, if the actual price during the same period is to increase for 20 $/bl, ex-refinery prices will fall short by 2 $/bl of the level required to cover actual expenses.

We propose to incorporate an adjustment in ex-refinery prices. Adjustment will be the difference between forecast and actual value of crude oils and products imports, weighted by the ratio between actual and forecast sales volumes. Forecast value is calculated at the beginning of the period, while actual value is to be calculated at the end of the same period. This actual value will be obtained by running the computer model with actual crude oils and products prices, as paid during the period (the other elements -volumes, processing costs- will be kept unchanged for the purpose of simplicity).

3.8. CALCULATION OF EX-REFINERY PRICES

We propose to set up ex-refinery prices proportional to international spot product prices (FOB Rotterdam price). Since these spot prices are only used as indicators, FOB prices can be retained.

Spot prices are affected by seasonal fluctuations of demand in industrialized countries (high demand and prices of fuel oil and gas oil in winter, high demand and prices of gasolines in summer). These fluctuations are meaningless to Ghana. Therefore, we recommend that yearly moving average prices be retained, in order to reflect the general evolution of international prices.

beicip

The calculation is as follows, let us call:

C   total cost of imported crude oil

P   total cost of imported products

R   refining costs

E   value of export products (mainly LSFO which is sold FOB Tema at current international prices = FOB US or Rotterdam - freight allowance)

d   adjustment

Qi   quantity of product i sold in Ghana

IPi   international price of product i

RPi   ex-refinery price of product i

Cost of products to be sold in Ghana is:

$$C + P + R - E + d = CT$$

As an hypothesis: $RPi = \tau\, IPi$ (τ = ratio)

We must have:

$$\sum RPi \times Qi = CT$$

or, $\tau \sum IPi \times Qi = CT$

Then τ can be calculated.

CONSUMER PRICES

To ex-refinery prices, distribution margins (for UPPF products only) and taxes are added to arrive at ex-pump (consumer) prices.

3.9. DISTRIBUTION MARGINS

Marketer's margin should cover marketer's expenses for gasolines, kerosene and gas oil marketing and distribution. Annual revision of these margins should be carried out. Annexe 10 provides an example of how this revision can be done. Marketers should provide a breakdown of their expenses between UPPF and non-UPPF products. Total UPPF expenses plus normal capital recovery, divided by total UPPF products sales give the marketer's margin.

Transporter's margin should result from multiplication of unit transportation cost (Cedis/mile x Imp. Gal.) by the average distance to be run by a gallon. Annual revision of this margin is recommended. Transportation costs should be obtained from the Ministry of Roads and Transportation (we provide also a methodology for this calculation - Annex 11). The average distance can be obtained from regional breakdown of product sales (Annexe 12).

Retailer's margin: accurate determination of this margin is more difficult; review of retailer's expenses and discussions with distribution companies should take place before decision.

3.10.   TAXES

The price build up is obtained on the proviso that suitable duties are levied on the products to yield given taxes amount.

To present taxes (excise duty, road fund, energy fud) we propose to add an "Exploration and production levy" in order to cover GNPC expenses (save for marketer's expenses which are built in ex-refinery prices). This levy could be applied to UPPF products, except kerosene in order to limit price increase of this product (see § 5). This levy should be about Cedis 2.7 per gallon, to yield Cedis 450 million per year.

The Government is contemplating setting up a specific levy to face strategic product storages. Presently, there is no legal obligation in this field, and crude oil and product inventories are determined by technical considerations. Product tanks capacities ($300,000 \text{ m}^3$) make possible to store up to 4 months products consumption. In the present situation, we do not feel very necessary to enforce large inventories obligation (e.g. 2 or 3 months of consumption). However, as already mentioned, we propose that financial charges which accrue from the existence of normal crude oil and product inventories, both in GHAIP and in TAKORADI/KUMASI are fairly taken into account in ex-refinery prices and distribution margins.

COMPUTER PROGRAM

Detailed description of the computer program is provided in the Operation Manual. This operating manual indicates from which bodies (Ministry of Finances and economic Planning, GNPC, GHAIP...) the various data to be collected by NEB should be obtained.

4. IMPACT OF PETROLEUM PRODUCTS PRICE VARIATIONS
ON THE GHANAIAN ECONOMY

4.1. INTRODUCTION

A study of the impact of petroleum products prices variations involves a large amount of macroeconomic data that are not yet altogether available in Ghana. Most of the time, this kind of study is based on the analysis of an input-output table describing industrial interchanges of commodities. Such a table was once used in the past, but it has not been updated, and this approach cannot be used in our study.

Nevertheless, some elements of a reply can be given using the data available at the Statistical Service Board :

. Summary report on households economic survey, 1974-1975

. the Statistical Newsletter (consumer price index numbers)

. Quarterly Digest of Industrial Statistics

Other elements, mainly on the transport sector, and qualitative elements were gathered through discussions and interviews at the Ministry of Fuel and Power and at the Ministry of Transport and Communications.

4.2. GHANAIAN ECONOMY IN THE EARLY 1980's (1980-1987)

For a long time, the Ghanaian economy has been working under financial and technical constraints. It is only with the implementation of an 'Economic Recovery Program' by the Government and the return of better climatic conditions that the economy reversed its downward trend in 1984/85, but the road to a fully 'normal' situation is still long.

The main features of the Ghanaian economy during the first half of the 1980's are as follows:

. sharp depreciation of the Cedi against all foreign currencies. Its rate of exchange with the U.S. Dollar depreciated from 2.75 Cedis per US Dollar in 1982 to 150 Cedis/US Dollar in 1987, as indicated in table 4.1 on the following page.

Table 4.1. – Average exchange rate of the Cedi to the US Dollar

	1980	1981	1982	1983	1984	1985	1986	1987*
Cedis/US $	2.75	2.75	2.75	30.0	37.125	54.375	90.0	150.0

*   1st quarter

.   harsh climatic conditions in 1983 which emptied the Akosombo dam and limited power generation. Power cuts affected the entire economy and crop failures squeezed foreign currency earnings.

.   steep inflation for all commodities and particularly for energy fuels. Between 1982 and 1987 petroleum products prices were multiplied by almost 16 fold.

Table 4.2 – Yearly Average Prices for Some Selected Commodities

	Unit	1980	1981	1982	1983	1984	1985	1986	1987*
Premium	¢/gal.	8	12	12	23	53	96	145	190
Kerosene	¢/gal.	4	5	5	12	29	51	81	110
Electricity	¢/kWh							4.3	
Charcoal	¢/bag	57	112	127	272	460	–	–	1100
Rice	¢/kg	19	21	–	196	111	–	–	–
Cocoa Beans	¢/kg	4	4	12	12	20	30	–	–

*   1st quarter

Table 4.3 – GDP Deflator (Percentage Change)

	1980	1981	1982	1983	1984	1985 (1)	1986 (2)	1987* (3)
GDP Deflator	+51.2	+75.6	+27.9	+123.0	+35.3	+31.0	+30	+30

(Source: CBS own estimate)

(1) provisional   (2) estimate   (3) forecast

In the meantime, the minimum wage was also increased, but at a slower pace than other prices.

Table 4.4. - Minimum Wage (Cedis per day)

	1980	1981	1982	1983	1984	1985	1986	1987
Min. wage	5.3	12.0	12.0	25.0	35.0	70.0	90.0	112.0

(Source: CBS)

Petroleum imports have been a constant burden on Ghana's foreign exchange earnings and limited the import of other commodities necessary to operate the economy properly. In these conditions, factories worked at low operating rates even when they had cash reserves, as they had no access to the lacking commodities or foreign currencies, and because quotas were fixed on petroleum products deliveries. In a context of ever-increasing costs, the necessary maintenance of equipment and infrastructure could not be carried out properly.

4.3. SECTORAL ENERGY CONSUMPTION

Table 1.4 (Chapter 1, p.6) shows the energy mix of the Ghanaian economy as in 1985. Petroleum products represented 85% of total commercial energy consumption, but they have penetrated the various sectors of the economy to different degrees.

- Petroleum products represent 100% of energy consumption in the transportation sector

- 70% of energy consumption in the agriculture/fishing sector,

- 65% of energy consumption in the industrial/mining sector.

Non-commercial energy sources still represent 74% of the country's total energy consumption. These are essentially consumed by households and some industries using agricultural wastes, such as saw mills, or the palm oil industry.

Whereas kerosene was mostly used by households, gasolines and diesel oil penetrated all sectors, whilst fuel oil was mainly consumed in industry/mining.

In any case, the transport sector was the biggest outlet for gasolines (82.1%), jet fuel (100%), gas oil (46.5%) and even fuel oil (10.2%). This sector alone used half of the petroleum products consumed in the country (50.7%). Households consumed 16%, agriculture fishing 14%, industry/mining 13%, and government/commercial 6%.

4.4. ECONOMIC SECTORS AND PRODUCTION COST BREAKDOWN

4.4.1. Classification

According to the available data, the economic sectors we were able to survey have been classified as follows:

(2)   Mining and quarrying

    (2a)   gold mining
    (2b)   manganese mining
    (2c)   diamond mining

(30)   Manufacturing industry

    (31)   agriculture and food industries
    (32)   textile industries
    (33)   wood and wood products
    (34)   paper and paper industries
    (35)   chemical and plastic industries, refining industry excepted
    (35b)   refining industries
    (36)   non-metal basic industries
    (37)   iron and steel industries (3710)
    (37b)   non-ferrous metal industries (3720)
    (38)   metallic products and equipment
    (39)   other industries.

Figures in brackets correspond to the industrial classification.

(41)   Electricity, lighting and power

(50)   Transport sector.   According to the available data, the cost of transportation has been surveyed for three categories:

    (50a)   passenger transport - intercity
    (50b)   passenger transport - urban
    (50c)   commodity transport - intercity.

Households: three categories of households have been distinguished according to the C.B.S. classification: rural, urban, large cities (Accra).

For mining and industry, a breakdown of product cost into four items based on the "Quarterly Digest of Industrial Statistics" of C.B.S., was suitable:

-   gross value added
-   fuel and lubricant used
-   electricity used
-   other inputs (derived from gross input less energy/fuel used and lubricant used plus electricity).

For the transport sector, a more detailed cost breakdown also includes capital cost, salaries and maintenance.

For households, the "consumption basket" has been established according to the results of the C.B.S. survey in 1974-75.

4.4.2. Energy Consumption

As a means of simplification, fuel and lubricants used in industry were all considered as petroleum products. This is reasonable for almost all industrial sectors except those actually using agricultural wastes as fuels. Such industries are limited in Ghana, and include for example the wood and paper industries.

Energy consumption in the households' budget includes two items:

(4)   rent, fuel and power

(7)   transport and communications.

Mining and quarrying

The mining and quarrying sectors have been considered as a whole. Table 4.5 below shows the breakdown of its production costs.

Table 4.5. - Production Cost Breakdown in the Mining & Quarrying Sector

	(2)
Gross Value Added	0.700
Fuel and Lubes	0.028
Electricity	0.028
Other inputs	0.244
Production Cost	1.0

Average 1982-1984   (Basic Data: C.B.S.)

Manufacturing Industries

Table 4.6 - Production Cost Breakdown in Industry

	(31)	(32)	(33)	(34)	(35)	(35b)	(36)	(37)	(37b)	(38)	(39)
Gross Value Added	0.681	0.450	0.451	0.556	0.478	0.080	0.343	0.335	0.382	0.435	0.49
Fuel and Lubes	0.010	0.027	0.069	0.022	0.023	0.001	0.016	0.165	0.052	0.017	0.017
Electricity	0.007	0.022	0.011	0.007	0.042	0.001	0.015	0.059	0.134	0.010	0.012
Other inputs	0.302	0.501	0.469	0.415	0.457	0.918	0.626	0.441	0.432	0.538	0.472
Production Cost	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000

Electricity, Light and Power

Table 4.7 - Production Cost Breakdown in Electricity, Light & Power

	(41)
Gross Value Added	0.794
Fuel and Lubes	0.036
Electricity	0.002
Other input	0.168
Production cost	1.000

In this sector the calculation of the fuel and lubes coefficient is rather tricky because it may be subject to steep changes according to the hydro-thermal ratio in power generation which depends on hydrology hazards. Ghana's electricity supply is the responsibility of two national companies, the Volta River Authority (VRA) which is in charge of hydroelectric generation and the Electricity Corporation of Ghana (ECG) which is responsible for electricity distribution throughout the country and which runs a few isolated thermal generators. A change in the prices of petroleum products will affect VRA much less than ECG and the average coefficient for fuel and lubes (cf table 4.7) does not really match with either of the two companies.

Transport

Data available in the Ministry of Transport provided the basis for an estimate of the cost of the following transportation groups:

(a) Inter-city passenger transport (long distance buses)

(b) City passenger transport (taxis)

(c) Inter-city commodity transport (truck and trailer).

Basic economic assumptions were:

- Capital cost: discount rate 25%
- Economic lifetime: 5 years (bus, truck and trailer); 3 years (taxi).
- Investment cost includes a 30% tax.
- Spare parts cost is assumed equal to capital cost annuity.

Table 4.8 - Inter-city Passenger Transport Cost Breakdown

(Long distance buses)

Capital cost	0.394
Insurance	0.001
Personnel	0.153
Fuel and lubes	0.141
Tyres and spare parts	0.311
Unit cost	1.000

This breakdown has been established taking into account two models of long distance buses, SETRA and TATA buses.

Table 4.9 - City Passenger Transport Cost Breakdown

	Taxi	TATA Bus
Capital cost	0.417	0.259
Insurance	0.001	0.002
Personnel	0.97	0.228
Fuel and lubes	0.245	0.212
Tyres and spare parts	0.241	0.299
Unit cost	1.000	1.000

Table 4.10 - Commodity Transport (dry & wet goods)

Capital cost	0.315
Insurance	0.001
Personnel	0.023
Fuel and lubes	0.178
Tyres and spare parts	0.483
Unit cost	1.000

Household budgets

Table 4.11 gives the breakdown of total household budgets for three categories of population according to CBS's 1974/75 survey. According to this survey, households spent half of their budget on food (46% in cities, 57% in rural areas). Second comes clothing and footwear, then rent, fuel and power. Remaining items only weigh a few points each with households in large cities having a larger share than those in rural areas.

Table 4.11 - Household Budget in 1974/75

		Rural	Urban	Large Cities (Accra)
(1)	Food	0.574	0.491	0.462
(2)	Beverages& Tobacco	0.048	0.049	0.052
(3)	Clothing & footwear	0.150	0.163	0.121
(4)	Rent, fuel & power	0.100	0.124	0.147
(5)	Furniture	0.036	0.039	0.043
(6)	Medical care	0.016	0.014	0.009
(7)	Transport & commun.	0.022	0.038	0.057
(8)	Recreation	0.027	0.043	0.056
(9)	Miscellaneous	0.027	0.039	0.053
Total		**1.00**	**1.00**	**1.00**

Source: CBS, 1974-75 Survey

Table 4.12 gives a detailed breakdown of the rent, fuel and power item. Energy represents 53% of this item for rural households and 28% for households in the big cities.

Kerosene was the lighting fuel for most rural households since electricity had a negligible penetration (0.3%). The share of kerosene amounted to 14.2%. In urban areas and in large cities, electricity replaced kerosene for this purpose (share of kerosene from negligible to 4-7%). For cooking, rural households used firewood while urban households used preferably charcoal and LPG.

Table 4.12 - Rent, Fuel and Power Consumption in 1974-75

	Rural	Urban	Large Cities (Accra)
Gross rent and water rates	0.476	0.633	0.721
Fuel and power:			
Electricity	0.003	0.034	0.072
Gas	0.001	0.006	0.012
Liquid fuel(kerosene)	0.142	0.070	0.034
Charcoal	0.036	0.120	0.148
Firewood	0.343	0.137	0.013
Total	**1.00**	**1.000**	**1.000**

Source: CBS, 1974-75 Survey

Table 4.13 gives a detailed breakdown of the transport and communication item. The share of this item devoted to equipment was very low, particularly for rural households.

Table 4.13 – Transport and Communication Consumption in 1974-75

	Rural	Urban	Large Cities (Accra)
Equipment	0.045	0.219	0.201
Repair and spare parts	0.056	0.148	0.108
Petrol & other related expenditures	0.018	0.204	0.229
Purchased transport	0.852	0.404	0.430
Communication	0.029	0.024	0.032
Total	1.000	1.000	1.000

Source: CBS, 1974-75 Survey

The period 1975-76 was marked by high inflation rates, particularly from the beginning of the eighties.

Table 4.14 below shows the consumer price index in 1986 (1977 = 100)

Table 4.14 – Consumer Price Index, Year 1986

		Rural	Urban	Large Cities (Accra)
(1)	Food	3,537.4	3,000.1	2,871.5
(2)	Beverages & Tobacco	5,770.0	7,105.3	7,158.1
(3)	Clothing & footwear	6,121.7	5,221.1	5,205.8
(4)	Rent, fuel & power	7,239.7	3,823.4	3,380.8
(5)	Furniture	6,950.7	6,700.4	6,558.0
(6)	Medical care	5,054.2	4,162.3	5,217.9
(7)	Transport & commun.	5,214.3	7,021.3	7,574.0
(8)	Recreation	5,682.6	5,098.6	5,046.3
(9)	Miscellaneous	6,070.0	5,739.2	5,079.4

Source: CBS

Inflation affected household budget items differently, thus its structure in 1986 Cedis value is likely to have changed. Using the 1974-75 household budget structure to study the impact of a variation in petroleum products prices on household consumption in 1986-87 may lead to questionable results.

CBS is currently working on a new "consumer basket structure" which has yet to be finalized.

If we assume that households' consumption patterns have not changed in quantity, i.e. in 1975/75 and 1986/87 households consume the same quantities of food, clothing, kerosene..., household consumption expressed in 1986 Cedis can thus be deduced by applying the prices indices given in table 4.14 to the 1974-75 consumption figures (taken from CBS survey). This results in the household consumption budget shown on table 4.15 hereafter.

Table 4.15 - Household Budget in 1986

		Rural	Urban	Large Cities (Accra)
(1)	Food	0.434	0.367	0.329
(2)	Beverages & Tobacco	0.057	0.077	0.079
(3)	Clothing & footwear	0.194	0.196	0.143
(4)	Rent, fuel & power	0.154	0.114	0.120
(5)	Furniture	0.052	0.063	0.068
(6)	Medical care	0.017	0.012	0.009
(7)	Transport & commun.	0.024	0.062	0.119
(8)	Recreation	0.033	0.063	0.071
(9)	Miscellaneous	0.036	0.045	0.062
	Total	**1.00**	**1.00**	**1.00**

(own estimate)

According to these figures, there was a general increase in the share of all expenses to the detriment of food. Households spend less money in relative value terms for food in 1986 than in 1974; roughly one third of their budget instead to a half.

Conversely, households spend more money for energy and/or fuel, with some slight differences. Rural households spend more money on lighting and cooking fuels (15.4% of their budget in 1986 compared with 10% in 1974). Urban and large city households spend more money on transport and motor fuel purchases, 6.2% of their budget in urban areas in 1986 compared with 3.8% in 1974, and 11.9% of their budget in 1986 in large cities (Accra) compared with 5.7% in 1974.

Energy Consumption

Table 4.16

Per Capita Consumption of Energy Sources in 1974 and 1985 and GDP

		1974	1985	Coeff. 1985/1974
(1)	Electricity (KWh)	22	33	1.50
(2)	Kerosene (Kg)	11	9	0.82
(2)	Motor fuel (Kg)	51	40	0.78
(2)	LPG (Kg)	0.4	0.3	0.75
	GDP (US $ 1984)	460(3)	360	0.78

(1) ECG sales to households
(2) Total sales
(3) Year 1975

According to table 4.16, only electricity consumption per capita has increased over the 1974-85 period. This is due to a constant extension of the electricity grid and to rural electricification by ECG.

The share of electricity in households' consumption of energy has therefore increased significantly, especially since all other indicators for petroleum consumption other than kerosene show a decrease of the same magnitude as GDP per capita.

Therefore, we have modified the breakdown of 'Rent, fuel and power unit consumption' and of 'Transport and communication' as follows:

Table 4.17 - Rent, Fuel and Power Consumption in 1987 (Estimate)

	Rural	Urban	Large Cities Accra)
Gross rent and water rates	0.41	0.60	0.67
Fuel and Power:			
Electricity	0.015	0.05	0.10
Gas	0.005	0.01	0.03
Liquid fuel (kerosene)	0.200	0.10	0.04
Charcoal	0.03	0.12	0.15
Firewood	0.34	0.12	0.01
Total	1.00	1.00	1.00

Table 4.18
Transport and Communication Consumption in 1987 (Estimate)

	Rural	Urban	Large Cities (Accra)
Equipment	0.05	0.22	0.20
Repairs and spare parts	0.06	0.15	0.10
Petrol & other related expenditures	0.02	0.20	0.23
Purchased transport	0.86	0.41	0.44
Communication	0.01	0.02	0.03
Total	1.00	1.00	1.00

4.5. IMPACT STUDY: ASSUMPTIONS AND RESULTS

4.5.1. General

The aim of this "impact study" is to estimate price changes in the economy when petroleum products prices are increased (by 100% for ease of illustration). Each economic sector responds to the price increase according to its "energy intensity'. We have calculated these responses for industry and mining, transport and households.

Production of any commodity involves a certain mix of capital, labour and inputs (these are raw materials and/or semi-finished products and energy including petroleum products). Total production cost is the sum of the costs of these factors. When the price of one item changes, the entire production cost is affected. Also, since these items are not necessarily independant due to industrial interchanges, the price change of one item may indeed affect the cost of the others.

The total impact on any economy of a petroleum products prices increase is therefore the sum of 2 successive impacts:

.   **Direct impact,** according to the breakdown of the production cost, the direct impact is proportional to the petroleum products weight in the total production cost.

.   **Subsequent impact,** since the increase of the production cost may be passed onto the selling prices of commodities/semi-finished products, subject to industrial interchanges.

Price increases are not necessarily limited to direct and subsequent increases. Since their purchasing power is affected, wage earners may engage Trade Unions and employers in wage negotiations that may generate further rounds of price increases. However, this aspect is out of the scope of the present study.

4.5.2. Assumptions

An underlying assumption of the impact study is the "mechanical behaviour" of the producer, i.e. he will pass onto his selling price all the extra costs of production incurred. We have also assumed that capital costs and labour costs remain unaffected by the petroleum products prices change.

The actual consequences of a price increase can differ:

. sometimes the full cost increases cannot be fully passed to the consumers because of competition or price regulation. Therefore, producers incur a reduction of their profit margin.

. at other times, in anticipation of further cost increases producers may pass more than the manufacturing cost increase to the consumers.

As a simplification, fuel and lubricants used in industry were considered altogether as petroleum products. In Ghana, 70% of energy consumed in industry is derived from petroleum products.

Our analysis has been limited to the direct impact of the increase in petroleum products prices and to the subsequent increases due to changes in the price of electricity.

As end-consumers, households bear all prices increases. They therefore suffer a reduction in purchasing power which is calculated using the households budget as in tables 4.15, 4.17 and 4.18.

4.5.3. Impact on Industry

Table 4.19 - Impact of a 100% increase in Petroleum Product Prices - Industry

	Direct Impact	Subsequent Electricity	Impact Other Commodities
(41) Electricity, light & power	+ 3.6%	-	n.a.
(2) Mining & Quarrying	+ 2.8%	+ 0.1%	n.a.
(31) Agric. & food industries	+ 1.0%	+ 0.03%	n.a.
(32) Textile industries	+ 2.7%	+ 0.01%	n.a.
(33) Wood & wood products	(+6.9%)*	+ 0.04%	n.a.
(34) Paper & paper products	+ 2.2%	+ 0.03%	n.a.
(35) Chemical & plastics	+ 2.3%	+ 0.15%	n.a.
(35b) Refining industries	+ 0.1%	-	n.a.
(36) Non-metal basic industries	+ 1.6%	+ 0.05%	n.a.
(37) Iron & steel industries	+ 16.5%	+ 0.2%	n.a.
(37b) Non-ferrous metal industries	+5.2%	+ 0.5%	n.a.
(38) Metallic products and equipment	+1.7%	+ 0.04%	n.a.
(39) Other industries	+1.7%	+ 0.07%	n.a.

* over-estimated due to assumption

Basic industries are the most affected by a petroleum products price increase. First comes the iron and steel industry (+16.5%), then non-ferrous industries (+ 5.2%). The figure given for wood and wood products may be over-estimated since a significant part of this sector's fuel requirements come from agricultural wastes. The energy sector is also affected (+ 3.6%) (essentially thermal power generation). Thereafter come mining and quarrying (+ 2.8%), textile industry (+ 2.7%), chemical and plastics sector (+ 2.3%) and paper and paper industries (+ 2.2%). Other sectors incur costs increase lower than 2%.

4.5.4. Impact on transport costs

Table 4.20 - Impact of a 100% increase in Petroleum Product Price - Transportation

Inter-city passenger transport (long distance buses)	+ 14.1%
City passenger transport:	
Taxis	+ 24.5%
TATA buses	+ 21.2%
Commodity transport (dry and wet cargo)	+ 17.8%

Of all the sectors, the transport sector is the most affected by a petroleum/fuel price increase (between 13 and 25%). This is considerable, especially since this sector consumes the largest share of petroleum products in the economy and since this sector is vital to the economy. One can thus easily foresee further inflation in the prices of all commodities.

4.5.5. Impact on Households' Budget

Table 4.21 - Direct Impact on Households' Budget
of a 100% increase in Petroleum Product Prices

		Rural	Urban	Large Cities (Accra)
(1)	Food	+ 0.43%	+ 0.38%	+ 0.33%
(2)	Beverages& Tobacco	+ 0.06%	+ 0.08%	+ 0.08%
(3)	Clothing & footwear	+ 0.52%	+ 0.53%	+ 0.39%
(4)	Rent, fuel & power	+ 3.16%	+ 1.25%	+ 0.84%
(5)	Furniture (2)	(+0.36%)	(+0.44%)	(+0.47%)
(6)	Medical care (1)	+ 0.03%	+ 0.02%	+ 0.02%
(7)	Transport & commun.	+ 0.46%	+ 1.75%	+ 3.78%
(8)	Recreation (1)	+ 0.07%	+ 0.13%	+ 0.14%
(9)	Miscellaneous (1)	+ 0.07%	+ 0.09%	+ 0.12%
Total		**+ 5.16%**	**+ 4.67%**	**+ 6.17%**

(1) 2% increase in prices
(2) over-estimated due to assumption.

The loss of purchasing power varies slightly, from -5% for rural households, to -6% for households in large cities. However, some differences should be pointed out.

. **Rural households**

Kerosene is almost the only petroleum product directly used by rural households and its price increase accounts for over half the total increase: 3.16% compared to 5.16%.

Transport consumption (mainly purchased) is low in rural households, thus changes in the price of motor fuels do not greatly affect rural households' budgets, + 0.46% only.

. **Urban households**

Increases in all petroleum products affect equally urban households: + 1.25% for item (4), and + 1.75% for item (7). These two items represent two thirds of the total increase (+ 4.67%).

. **Large cities households**

The increase in the transport and communication item is the most important for households in large cities and represents more than half of the total.

4.5.6. Total impact on the various economic sectors

As mentioned in the 'Introduction', the information available did not make it possible to carry out a thorough analysis of the "total impact" of petroleum products prices changes. However, some studies already carried out in industrialized countries after the first oil crisis give some indications to estimate the total impact.

. For some sectors like basic industries and transport, the direct impact of petroleum products price changes is the main one, the cumulated subsequent impacts (electricity, other energies, other commodities price changes) are lower.

. For manufacturing industries, the cumulated subsequent impact may be of similar magnitude to the direct impact.

Case Study – France

A study of a 100% increase in petroleum products prices gave the following results on the French economy in 1974.

Table 4.22

Households consumption	+ 6.5%
Administration consumption	+ 5.8%
Agriculture	+ 2.4%
Fishing	+11.1%
Ceramics industry	+ 7.1%
Glass industry	+ 7.8%
Non-ferrous metal industry	+ 5.1%
Rubber industry	+ 7.1%
Paper industry	+ 3.7%
Plastics industry	+ 4.9%
Ground transport	+10.5%
Air and sea transport	+19.1%
Electric equipment	+ 2.7%
Saw mills	+ 2.7%
Clothing	+ 1.6%
Footwear	+ 2.1%

model: "RONDANLO"

4.6. MORE ON TRANSPORT COSTS

A conclusion which arose from discussions with N.E.B. officials was that an increase in transportation costs equivalent to the increase in the price of motor fuels has been observed during the past few years, i.e. 100% increase in transport cost was recorded when the price of motor fuel increased by 100%. This conclusion conflicts with the conclusion of the present impact study (table 4.20).

In fact, these two conclusions cannot be compared since in the present impact study, all costs with the exception of petroleum products prices were considered as constant, whereas during the 1985-87 period the Ghanaian economy experienced general price increases. Indeed, transportation costs were affected by changes in the prices of all items, particularly:

- capital cost change
- maintenance cost change
- labour cost change
- motor fuel price change

Table 4.23 - Price Changes, 1985-87

	1986/85	1987/86
Cedis/US$ (Cedi depreciation)	90/55 (- 64%)	150/90 (- 66.7%)
Minimum wage (Cedis/day)	90/70 (+ 28.6%)	112/90 (+ 24.4%)
Premium (Cedis/gallon)	145/96 (+ 51%)	190/145 (+ 31%)
Gas oil (Cedis/gallon)	124/79 (+ 57%)	165/124 (+ 33.1%)

Sources: CBS, GHAIP

Capital used in the transport sector is imported. Therefore, when the Cedi is depreciated, the cost of this capital increases by the same percentage. We have assumed the same percentage of increase (80%) for tyres and spare parts costs.

By adding up all prices changes, one comes to the following result:

Table 4.24 – Impact of Price Changes on Transport Costs

	1985-86	1986-87
Inter-city passenger transport (long distance buses)	+ 48.3%	+ 45%
City passenger transport:		
Taxis	+ 50.5%	+ 45.9%
TATA bus	+ 45.3%	+ 39.9%
Commodity transport (dry and wet cargo)	+ 47.0%	+ 43.6%
Motor fuel price change average	+ 54%	+ 32%

Conclusion

These results come closer to NEB officials' conclusion. However, we would like to point out that increases in petroleum products prices accounted for only a fraction of overall transportation costs increases. Increases in transportation costs resulted from the general inflation, in which the successive devaluations of the Cedi played the most prominent role.

4.7. PRODUCT BY PRODUCT ANALYSIS

Looking separately at each product, impact of a variaticn of each price can be summarized as follows:

Gasoline prices

Any increase in gasoline rpices will affect mostly car owners, which belong to the high income class of the population. Then the social consequences of gasolines prices increases are likely to be more limited than consequences of kerosene or gas oil prices increases. However:

- Gasoline price has a direct impact on taxes fares. Taxis are widely used by most of the urban population, since public transportation (buses) is limited. Therefore any increase in gasoline price will affect the budget of the urban population. According to our estimates, a 100% increase in gasoline (and gas oil price) would have a negligible impact on the rural population, but would mean a 3-4% loss of purchasing power for the urban population.

- Differential between premium and gas oil is now cedis 25 per gallon. Such a differential makes gasoline more attractive than gas oil for cars. A cedis 40-50 per gallon differential would make both products equivalent for cars running at least 50 000 km per year (a lower mileage would make gasoline more attractive). Increasing the differential over 40-50 cedis would encourage dieselisation of car population. Premium and gas oil are already in deficit. However a significant shift to diesel engines would mean increased deficits of gas oil (to be imported at US$ 170-180 per ton) while some excess gasoline should be exported at US$ 150-160 per ton - mid 1987 prices.

Kerosene price

Kerosene price is low vis a vis gas oil price (cedis 110 per gallon vs 165). However in many cases, the population has to pay a much higher price than the official one: in Accra, kerosene is mostly sold in small quantities for a price equivalent to about cedis 210 per gallon and in Northern regions the price is more than 250 cedis. This is due to a number of factors: kerosene is mostly resold in small quantities by peddlers; the refinery produces only limited amonts of this product and there is a shortage of kerosene, especially in rural areas; this shortage is also heightened by the bad state of the roads in many regions, making transport difficult and costly.

Kerosene is used for lighting by the population who has no access to or who cannot pay electricity. Therefore kerosene is an essential commodity for most of rural households. Some kerosene is also used to start fires and for cooking.

Increasing kerosene price would have several consequences:

.   regarding cooking, kerosene is presently the cheapest fuel in urban areas. In rural areas, fuelwood and charcoal are more competitive. A price increase would reduce kerosene consumption with the concomitant shift towards fuelwood. However this would not increase fuel wood consumption by more than 1 or 200 000 TPY.

.   increasing kerosene price would likely reduce the possibility of lighting for large part of the population, mainly in rural areas,

.   the impact on rural households budget would be a reduction of their purchasing pwoer equal to 3-4% of kerosene price increase,

.   the impact on urban population would be more limited since they have access to electricity whose cost is low.

Increasing kerosene price would make more kerosene available, since kerosene use in diesel engines would become unattractive, and encourage distribution to all parts of the country. However, several Ghanaian bodies stressed that:

.   if ex-pump price is increased, the risk of consumer price still increasing faster exists, deteriorating the situation of rural househodls,

.   one important problem is to overcome present transport difficulties, because of bad state of roads network. Regarding distribution, implementation of small retailing outlets in rural areas as envisaged through a World Bank financed project, would allow selling kerosene at the official price to farmers.

Gas oil price

Gas oil is a key product, used for transportation and industrial purposes. Increasing gas oil price would affect prices of most of commodities in Ghana (through increase of transportation costs and production costs in industry). A 100% increase in gas oil price would entail:

.   a 20% increase in transportation costs (commodities and passengers)

.   a small increase (1-2%) in industry production costs (with of course significant variations from one sector to another)

.   a large increase (about 50%) in cost of electricity produced in diesel stations.

Increasing gas oil prices would have a very limited impact on fuelwood consumption, but could encourage susbsitution of fuel oil for gas oil in the industrial sectors where gas oil is used for heating purposes.

Fuel oil price

The present differential between gas oil and fuel oil price (cedis 25 per gallon or 25% of gas oil price) does not reflect the difference between opportunity costs of both products: gas oil is imported for 175 US$ per ton while export price of fuel oil is 110 US$ per ton - mid 1987 prices.

Fuel oil consumption in Ghana is low (about 50 000 tons per year) so that large excesses (160-200 000 tpy) have to be exported. Industry consumes most of the fuel oil as well as 40 000 tpy of gas oil and 50 000 toe of electricty. Fuel oil, at present export price, reveals the least cost fuel in this sector. Therefore a reduction of fuel oil prices would encourage a shift towards fuel oil in industries where gas oil is presently used for heating purposes (Bricks and Tiles, Breweries, Tobacco, Textiles...).

4.8. CONCLUSION

Petroleum products prices cannot be entirely responsible for the inflation experienced in recent years, even if they represent a contributing factor. The steady depreciation of the Cedi and increases in wages seem to be more predominant causes.

Inasmuch as the price of one kilogram of cocoa beans can give an idea of the purchasing power of most rural households whilst the minimum daily wage is the indicative factor of most urban households' purchasing power, one can say that the latter category have suffered more than the former from the petroleum prices increases over the 1977-87 period. Nevertheless, it seems that since the beginning of the 1980's, wage earners have been able to defend their purchasing power better than planters.

Table 4.25 - Purchasing Power Expressed as Gallons of Kerosene

	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986
Daily min. wage	3.0	4.0	2.8	1.4	2.2	2.4	2.0	1.2	1.4	1.1
1 kg of cocoa beans	0.7	1.3	1.9	1.0	0.7	2.4	1.0	0.7	0.6	n.a.

It should also be mentioned that assets depreciation is still based on the purchasing value of the investments, which because of repeated devaluations of the Cedi are far below the renewal value of these investments. As long as assets are not reevaluated, companies will contribute heavily to price increases.

5. APPLICATION OF THE PROPOSED METHODOLOGY

RECOMMENDATIONS FOR PETROLEUM PRODUCT PRICES CALCULATION

5.1. BASES

We have run the computer model to calculate product prices for the third quarter of 1987. The data we used were, as far as possible,   same data which were used for calculation of 20.02.87 prices (same material balance, crude oil and product international prices as of mid 1987).

Crude oil import :

225 000 tons were assumed to be imported (187,500 Bonny Light, 37,500 Brass River). Assumed FOB price was 18.92 $/bbl both for Bonny and Brass River.

Product import : the following quantities were assumed to be imported:

.	Premium	22,500 T	FOB price (Rotterdam)	180 $/T
.	Kerosene	12,500 T	FOB price (Rotterdam)	173 $/T
.	Gas oil	11,250 T	FOB price (Rotterdam)	155 $/T.

Product sales : we have retained the following figures:

		Tons
.	Regular	11 025
.	Premium	54 750
.	Kerosene	37 450
.	A.T.K.	8 650
.	Gas oil	84 850
.	Fuel oil	15 475
.	LPG	2 250

40,000 T of LSFO are exported (112 $/T) as well as 375 T of LPG (160 $/T).

Refining costs are as follows (for 3 months)

		Th.US$	Th.Cedis	Total Th.Cedis
.	Variable costs	600	-	99 000
.	Fixed costs	1 524	217 500	468 960
.	Marketing expenses	-	12 825	12 825
	Total	**2 124**	**230 325**	**580 785**

Summary : total costs are as follows (in million cedis)

- Crude oil cost (225,000 T)   5 866 189
- Product import cost (46,250 T)   1 533 828
- Processing and marketing   580 785
- TOTAL   7 980 802

Exchange rate was assumed Cedis 165/US$.

Refinery consumption and losses were assumed to be 7% (total product sales are 254,825 T while crude oil plus product imports are 271,250 T).

5.2. CALCULATED PRICES

Total costs have been allocated to the various products in proportion to Rotterdam spot FOB prices (yearly moving average, Mid 1986 - Mid 1987). Present and calculated ex-refinery prices compare as follows;

Table 5.1. - Comparison of existing and calculated
ex-refinery prices (Cedis/I.Gallon)

	Existing (20.02.87)	Calculated
LPG	11.40	14.6
Regular	139.30	116.5
Unified Gasoline	142.30	134.9
Premium	144.30	134.9
Kerosene	89.30	134.2
A.T.K.	170.00	132.6
Gas Oil	109.30	123.3
Ind. Diesel Oil	109.58	106.3
Inland Fuel Oil	109.93	85.8
Residual Fuel Oil	110.00	81.8

Calculated prices yield Cedis 8 000 (for 3 months), which is slightly more than revenues which accrue for present ex-refinery prices (7 500 million). However, these calculated prices are:

- lower than existing ones for gasolines, ATK and fuel oil,
- higher for LPG, kerosene and gas oil.

Note : Calculated prices in March 1987 yielded about Cedis 7 500 million (equivalent to revenues which accrue from present ex refining prices). The small increase between March and September is due to some increase in crude oil price (18.92 vs 18.00 $/bl) and to depreciation of the Cedi (from 160 ¢/US$ to 165).

Kerosene price is the highest one, reflecting the spot price of this product on international market.

Adding present distribution margins and taxes to these calculated prices would make for consumer prices very different from present ones and not in line with our objectives. Therefore we propose to calculate prices according to different hypotheses.

5.3. SHORT TERM PROPOSAL

We recommend, for the next prices revision, to calculate ex refinery and ex pump prices taking into account the following :

* Ex-refinery prices should be set up close to import parity price, for all products except kerosene. For kerosene, we propose to reduce international price (spot FOB Europe) used as a reference, by 15 % in order to limit ex pump price increase

* Excise duty should be adjusted for each product in order to still yield cedis 3 900 million and to allow fixing new ex-pump prices close to existing ones for butane, gasolines and gas oil.

* Marketer's margin will be increased from Cedis 5.60/I.Gall. to 7.50. Transporter's and retailer's margins will be kept unchanged, although we feel retailer's margin should be increased

* An exploration levy equal to Cedis 2.70/I.Gall. will be set up to cover GNPC expenses (estimated at Cedis 500 million per year, of which 50 m. marketing expenses, included in refining costs). This levy is set up on gasolines and gas oil only, although it could also be enforced on A.T.K. and fuel oil. Energy fund and Road fund have not been modified. Road fund increase should be envisaged if the revenues are to cover a significant portion of roads maintenance and construction expenses.

Table 5.2. - Preliminary proposal for new ex-pump
prices (Cedis/1 Gallon)

	Existing price (20.02.87)	Proposed price September 87	Proposed Excise duty
LPG	20.00	21.6	0.0
Regular	180.00	191.1	42.0
Unleaded Gasoline	167.30	171.0	42.0
Premium	193.00	202.0	34.0
Kerosene	110.00	140.0	0.0
A.T.K.	170.00	176.4	40.0
Gas Oil	165.00	170.2	9.0
Ind. Diesel Oil	135.78	126.2	8.6
Inland Fuel Oil	122.63	102.0	8.1
Residual Fuel Oil	120.00	97.2	5.0

(Detailed calculations are shown in Annex 16)

Note : Proposed ex-refinery prices yield Cedis 32 000 million per year (present prices yield Cedis 30 000 million). Proposed and present excise duty yield Cedis 3 900 million.

With reference to present prices :

. Kerosene price is increased in order to better reflect international prices and to reduce the gap between kerosene and gas oil price. Although such an increase has obvious social consequences (kerosene is mainly used by the rural population); this is necessary in order to limit kerosene use in diesel engines. The increase should be even higher if kerosene ex-refinery price was set up in line with spot price.

. Fuel oil prices are reduced. This is justified mainly for residual fuel oil, the opportunity cost of which is low since large excesses are reexported. Therefore increasing the difference between RFO price on one hand, IDO and gas oil prices on the other hand, would encourage the substitution of fuel oil for gas oil and reduce gas oil imports.

. The differential between gasolines and gas oil prices is still low and does not provide any incentive to increased dieselisation of the car population (which would mean increased demand for gas oil, a product already in deficit). This differential could even be increased (up to Cedis 40-50/I.Gall.) and gasoline would still be more attractive for cars running less than 50,000 km per year.

. LPG price is unchanged, although ex-refinery price of this product would have to be doubled if it had to reflect landed costs. Since the government wants to encourage LPG use, LPG price should of course be kept low. However, as already mentioned, LPG is likely to be used mainly by the high income population (because of the high costs of cylinders and stoves).

5.4. MEDIUM TERM AND LONG TERM RECOMMENDATIONS

See Conclusions and Recommendations.

ANNEXES

PRICE BUILD-UP OF PETROLEUM PRODUCTS FOR GHANA MARKET (PRICES IN CEDIS/I.GAL.)

	From 22/4/63 To 10/10/83	From 11/10/83 To 28/3/84	From 29/3/84 To 12/9/84	From 13/9/84 To 14/12/84	From 5/12/84 To 18/4/85	From 19/4/85 To 8/8/85	From 9/3/85 To 15/1/86	From 16/1/86 To 19/3/86	From 20/3/06 To 29/6/86	From 30/6/86 To 19/2/87	From 20.02.87 To today
Premium	25.00	35.00	55.00	60.00	85.00	95.00	105.00	150.00	140.00	150.00	190.00
Regular	21.50	30.50	50.00	56.00	80.00	90.00	105.00	145.00	135.00	145.00	190.00
Kerosene	13.20	20.00	30.00	35.00	46.00	50.00	55.00	90.00	80.00	80.00	110.00
A.T.K.	16.49	26.21	38.00	41.00	65.00	68.44	80.00	120.00	115.00	120.00	170.00*
Gasoil	15.90	24.00	36.00	46.00	70.00	80.00	85.00	130.00	115.00	130.00	165.00
Unleaded gasoline	23.60	33.20	54.00	59.00	83.00	87.40	83.00	128.00	142.00	142.00	-
I.D.O.	12.75	20.09	30.00	37.90	60.00	63.13	52.61	91.05	100.00	100.00	135.78
I.F.O.	11.55	15.03	22.50	28.30	44.80	47.17	39.35	73.50	70.00	70.00	122.63
R.F.O.	9.22	14.25	21.20	26.80	42.50	44.75	46.84	75.00	65.00	65.00	120.00
L.P.G.**	2.68	3.75	6.25	7.19	9.38	10.16	10.16	15.15	15.15	15.15	20.00

* Ghana Airways, Ghana Airforce and domestic airlines only

** LPG prices in Cedis/Lb

EXCHANGE RATE ADJUSTMENT - CEDI EQUIVALENT OF US DOLLAR

Date	Cedis	% Increase
7/8/78	2.75	
11/10/83	30.00	990.90
23/3/84	35.00	16.67
24/8/84	38.50	10.00
3/12/84	50.00	29.87
18/4/85	53.00	6.00
12/8/85	57.00	7.54
2/10/85	60.00	5.26
11/1/86	90.00	50.00
Feb .87	150.00	66.66

Note: For Premium, Regular, Kerosene and Gasoil, prices are ex-pump

For I.D.O., I.F.O. and R.F.O., prices are ex-marketers' rates (distribution margins are not included)

For A.T.K. (international airlines), gasoil, I.D.O. and R.F.O. export prices also exist.

ANNEX 2

AVERAGE VALUE OF PRODUCTS SOLD IN GHANA - EX-REFINERY VS LANDED PRICES

	Refinery production Th.M.t.	%	August 1985 Ex.refinery Price ¢/IG	$/T	Landed Price $/T	January 1986 Ex-refinery Price ¢/IG	$/T	Landed Price $/T	March 1987 Ex-refinery Price ¢/IG	$/T	Landed Price $/T
LPG	4.7	0.5	6.22	241.0	400.0	9.30	342.0	350.0	11.4	168.0	300.0
Regular	54.1	5.9	76.01	402.0	293.0	125.05	628.0	245.0	139.3	280.0	205.0
Premium	149.1	16.4	90.52	460.0	304.0	130.05	627.0	260.0	144.3	278.0	217.0
Kerosene	107.4	11.8	42.22	199.0	295.0	64.05	286.0	283.0	89.3	160.0	194.0
ATK	20.5	2.2	67.10	320.0	295.0	120.00	543.0	283.0	170.0	308.0	194.0
Gas oil	270.1	29.6	53.62	241.0	275.0	105.05	448.0	241.0	109.3	186.0	178.0
IDO	1.1	0.1	52.61	232.0	252.0	92.00	385.0	325.0	109.58	184.0	161.0
IFO	23.9	2.6	39.35	165.0	199.0	64.50	257.0	178.0	109.93	175.0	140.0
RFO	24.2	2.6	37.47	155.0	182.0	60.00	236.0	162.0	110.0	173.0	136.0
TOTAL	655.1	71.8		210.8	2C2.0		333.1	178.9		153.0	136.4

Exports			Export price			Export price			Export price		
LPG	1.5	0.2		350.0	350.0		300.0	300.0		250.0	250.0
LSFO	191.2	21.0		125.0	125.0		100.0	100.0		80.0	80.0

VALUE OF THE RECONSTITUTED TON ($/T)				237.8	229.0		354.7	200.5		170.3	153.7
CRUDE OIL FOB ($/T)				210			165			135	
(Exchange rate : ¢/US$)				(57)			(60)			(150)	

N.B. Landed prices include financial charges currently incurred by GNPC/GHAIP for products import

APPENDIX 3

CALCULATION OF EX-REFINERY PRICES - PRESENT SITUATION

Calculations for 20/2/87 ex-refinery prices

Ex-refinery prices must cover product costs (crude oil and product import costs, GHAIP refining costs, GNPC costs).

COSTS

They are estimated as follows:

	Foreign component million $	Local component million ¢	Total ¢
Crude oil import (CIF)	124.4	-	19,904
Product import	34.3	-	5,488
Ghaip processing fee	8.5	720	2,080
GNPC	-	300	300
Others	13.0	144.3	2,224
	180.2	1,164.3	29,996

Remarks

. Crude oil price: 18 $/bl FOB. Import: 900,000 T

. Average crude oil cost : 138.2 $/T (CIF)

. Product imports are as follows: Premium 90,000 tons
Kerosene 50,000 tons
Gasoil 45,000 tons

. Average product cost: 185 $/T

. Others... likely correspond to financial charges

. Exchange rate: 1 US$ = 160 Cedis

REVENUES

	Expected sales Th I.G	Th.tons	Ex-refinery price ¢/I.G.	Total Million Cedis
Premium	63,400	219.0	142.3	9,022
Regular	13,300	44.1	139.3	1,853
Kerosene	40,200	149.8	89.3	3,590
A.T.K.	9,400	34.6	170.0	1,598
Gasoil	86,800	339.4	109.3	9,487
Fuel oil	14,600	61.9	110.0	1,606
LPG (lb)	19,800	9.0	11.4	226
Sub total		857.8		27,381
L.S.F.O. exports[1]		160.0	80 $/T	2,048
L.P.G. exports [2]		1.5	250 $/T	60
Sub total		1,019.3		2,108
<u>TOTAL</u>				**29,489**

[1] Assuming 900,000 tons of crude oil yield about 220,000 tons of fuel oil, of which 14,600,000 I.G or 62,000 tons are sold in Ghana.

[2] Estimate

Annex 4

CRUDE OIL
SUPPLY COST

YEAR 1986

LOADING DATE	QUANTITY TH.TONS	AMOUNT FOB US $	CALCULATED FOB PRICE US$/BL	FREIGHT COST US $	FREIGHT US $/T	C&F VALUE US $
5/1/86	44975.45	9668419.79	28.71	116000.00	2.58	9784419.79
12/1/86	45143.10	9667284.16	28.66	116000.00	2.57	9783224.16
18/2/86	45132.94	9762222.96	29.03	112500.00	2.49	9874722.96
1/3/86	45132.94	9668118.18	28.75	112500.00	2.49	9780618.13
22/3/86	45406.26	4728184.87	14.04	112500.00	2.48	4840684.87
2/4/86	45315.83	4578312.36	13.64	112500.00	2.48	4690812.36
25/5/86	44767.16	4245171.38	12.80	93500.00	2.09	4338671.38
7/6/86	44969.36	4239471.68	12.72	93500.00	2.08	4332971.68
21/6/86	44876.90	3836975.62	11.55	93500.00	2.08	3930475.62
30/6/86	44995.77	3541472.26	10.61	93500.00	2.08	3634972.26
19/7/86	44886.04	3237904.78	9.73	93500.00	2.08	3331404.78
3/8/86	44084.17	3765279.25	11.52	93500.00	2.12	3858779.25
18/8/86	44254.06	4406257.14	13.43	93500.00	2.11	4499757.14
29/8/86	44371.92	4526722.88	13.77	93500.00	2.11	4620222.88
15/10/86	44264.22	4222702.48	12.88	93500.00	2.11	4316202.48
29/10/86	44015.29	5270326.60	16.11			
7/11/86	43763.31	4297317.11	13.21	93500.00	2.14	4390817.11
23/11/86	45570.00	4506154.13	13.64	93500.00	2.05	4699654.13
TOTAL	805924.717	98268297.63	16.47	1710500	2.12	99978797.63

YEAR 1985

LOADING DATE	QUANTITY TH.TONS	AMOUNT FOB US $	CALCULATED FOB PRICE US$/BL	FREIGHT COST US $	FREIGHT US $/T	C&F VALUE US $
5/1/85	44907.38	9464325.13	28.47	185000	4.12	9649325.13
12/1/85	43912.67	9516441.31	29.27	185000	4.21	9701441.31
22/1/85	45135.99	9458006.50	28.30	184000	4.08	9642006.50
10/02/85	43670.85	9457902.27	29.25	184000	4.21	9641902.27
20/02/85	43471.29	9662016.48	28.70	184000	4.05	9846016.48
12/03/85	45689.74	9650421.58	28.53	184000	4.03	9834421.58
9/4/85	44902.29	9678373.57	29.11	184000	4.10	9862373.57
17/4/85	44776.31	9691564.21	29.23	184000	4.11	9875564.21
26/4/85	45115.72	9696022.64	29.03	184000	4.08	9880022.64
3/5/85	44925.67	9683560.85	29.11	184000	4.10	9867560.85
10/7/85	43688.12	9749372.98	30.14	150000	3.43	9899372.98
17/7/85	44952.08	9684610.42	29.10	150000	3.34	9834610.42
25/8/85	45687.70	9714451.12	28.72	116500	2.55	9830951.12
3/9/85	45194.92	9668173.87	28.89	116500	2.58	9784673.87
11/9/85	45044.55	9678091.50	29.02	116500	2.59	9794591.50
1/10/85	45055.72	9654051.86	28.94	116500	2.59	9770551.86
7/11/85	45022.19	9682227.65	29.05	116000	2.58	9798227.65
6/12/85	45258.93	9649803.64	28.80	116000	2.56	9765803.64
21/12/85	44955.13	9690862.50	29.12	116000	2.58	9806862.50
28/12/85	45253.85	9693612.90	28.93	116000	2.56	9809612.90
TOTAL	898624.071	192803892.98	28.98	3072000	3.42	195875892.98

Annex 5

CALCULATION OF CRUDE OILS LANDED PRICES

Exchange rate :   150 cedis / US $

Crude oil	Bonny light		Brass River	
Loading port	Bonny		Brass	
FOB price ($/bbl)	18.92		19.12	
Density	0.837		0.811	
	$ / M.T	% of landed price	$ / M.T	% of landed price
FOB price	142.17	90.0	148.29	90.1
Wharfage and port dues - Loading port	0.69	0.4	0.69	0.4
Freight	2.46	1.6	2.28	1.4
Demurrage	0.43	0.3	0.43	0.3
Insurance	0.29	0.2	0.30	0.2
Losses	0.43	0.3	0.45	0.3
Negociation and handling commission	1.42	0.9	1.48	0.9
Confirmation fee	0.71	0.4	0.74	0.4
Interests	5.50	3.5	5.74	3.5
Exchange and commission	2.49	1.6	2.60	1.6
Wharfage and port dues - TEMA	1.00	0.9	1.00	0.8
Landed price $/T	157.67	100.0	164.01	100.0
c/T	23715.00		24681.00	

Bases of calculation

Freight : AFRA MR : 175.2 ; AFRA LR1 : 96.1 ; average : 135.7 ;
          WS 100 : Bonny : 1.84 ; Brass : 1.71

Insurance : 0.2 % of (FOB + Freight)

Losses : 0.3 % of CIF

Negociation and handling commission : 1 % of FOB

Confirmation fee : 1 % of FOB on the portion of cargo financed by SCB loan
                   (50 % of cargo)

Interests : (LIBOR + 1 3/8) of FOB on the portion of cargo financed by SCB
  loan (50 % of cargo) ; LIBOR ,end of March : 6.50

Exchange and commission : 1.75 % of FOB

CALCULATION OF PETROLEUM PRODUCT LANDED PRICES

Products origin : Rotterdam
(US $ / ton)

	LPG	Regular	Premium	Kerosene	Jet Fuel	Gas Oil	Ind.D.O.	Int.F.O.	Res.F.O.
FOB price	150.00	169.60	181.50	160.10	160.10	145.00	129.70	110.60	106.80
Freight	150.00	14.71	14.71	14.71	14.71	14.71	14.71	14.71	14.71
Demurrage	(1)	0.43	0.43	0.43	0.43	0.43	0.43	0.43	0.43
Insurance	(1)	0.37	0.39	0.35	0.35	0.32	0.29	0.25	0.24
Losses	(1)	0.92	0.99	0.88	0.88	0.80	0.72	0.32	0.31
Negociation and handling commission	(1)	1.70	1.81	1.60	1.60	1.45	1.30	1.11	1.07
Confirmation fee	(1)	0.85	0.91	0.80	0.80	0.73	0.65	0.55	0.53
Interests	(1)	6.03	7.14	6.30	6.30	5.71	5.11	4.35	4.20
Exchange and commission	(1)	2.97	3.18	2.80	2.80	2.54	2.27	1.94	1.87
Wharfage and port dues - TEMA	(1)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Storage cost	(1)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Storage losses	(1)	1.11	1.19	0.54	0.54	0.48	0.44	0.13	0.13
Landed price $/T	**332.09**	**200.34**	**213.25**	**189.51**	**189.51**	**173.17**	**156.62**	**135.39**	**131.29**

(1) due to particular supply conditions, LPG landed price has been estimated at 332.09 $/T

Bases of calculation

FOB prices : average March 1987; Platt's Oilgram

Freight : AFRA GP : 175.2 ; AFRA MR : 225.5 ; average : 200.4 ;
WS 100 : Rotterdam - Tema : 7.06 ; harbour dues (subject to WS variation) : 0.40

Insurance : 0.2 % of (FOB + Freight)

Ocean losses : 0.5 % of CIF for gasolines, kerosene, gas oil ; 0.25 for IDO, IFO and RFO

Negociation and handling commission : 1 % of FOB

Confirmation fee : 1 % of FOB on the portion of cargo financed by SCB loan
(50 % of cargo)

Interests : (LIBOR + 1 3/8) of FOB on the portion of cargo financed by SCB
loan (50 % of cargo) ; LIBOR ,end of March : 6.50

Exchange and commission : 1.75 % of FOB

Storage cost (personnel, maintenance, financial charges) : included in GHAIP processing costs; should all product
be imported and the refinery be closed, storage costs would be about 4 $/T

Storage losses : 0.6 % for gasolines, 0.3 % for gas oil and kero, 0.1 % for fuel oil

ANNEX 7

GHAIP REFINERY - MATERIAL BALANCE
(Thousand metric tons)

	1980	1981	1982	1983	1984	1985	1986
Crude Oil Import	**985.8**	**870.4**	**1121.0**	**481.9**	**860.1**	**889.6**	**843.1**
Bonny	n.a	n.a	n.a	n.a	n.a	759.1	753.8
Brass River	n.a	n.a	n.a	n.a	n.a	130.6	43.6
Qua Iboe	n.a	n.a	n.a	n.a	n.a		45.8
Crude Oil Processed	**1057.5**	**1128.7**	**1040.4**	**480.6**	**746.7**	**965.6**	**883.3**
Bonny	903.1	1014.7	497.4	169.0	475.7	719.3	799.6
Brass River	-	-	142.6	113.3	167.6	244.5	38.5
Qua Iboe	-	-	-	-	-	-	45.2
Zeitena	23.0	-	205.6	84.2	-	-	-
Brega	108.6	-	110.4	43.6	-	-	-
Sahara Blend	22.8	46.5	23.4	37.2	48.4	-	-
Salt Pond	-	67.5	61.0	33.3	55.0	1.8	-
Production	**1004.3**	**1061.5**	**981.4**	**443.6**	**686.5**	**894.6**	**847.7**
LPG	7.0	6.8	7.1	3.2	4.7	5.7	6.2
Regular	74.9	86.2	79.8	49.2	54.7	47.2	54.1
Premium	171.6	169.6	165.6	77.3	118.9	174.7	149.1
Kerosene	119.4	132.8	135.1	49.5	87.6	120.2	107.4
A.T.K.	38.5	31.7	28.6	25.7	13.8	28.0	20.5
Gas oil	301.3	313.1	283.1	119.5	207.8	283.0	270.1
IDO	6.5	5.0	3.1	2.0	0.6	1.4	1.1
IFO	26.4	27.2	36.5	19.5	22.4	12.0	23.9
RFO	258.7	289.0	242.5	97.5	176.0	220.3	215.4
Imports	**30.0**	**-**	**87.7**	**29.4**	**23.8**	**23.9**	**76.0**
Premium						-	40.9
Kerosene	n.a	n.a	n.a	n.a	n.a	-	12.5
Gas oil						23.9	22.6
Deliveries	**767.9**	**799.0**	**734.2**	**564.2**	**540.3**	**675.6**	**708.0**
LPG	6.9	6.4	6.4	3.1	3.8	4.1	4.7
Regular	74.7	85.8	80.6	51.5	55.6	48.5	53.3
Premium	171.0	177.7	167.0	129.7	122.1	172.2	173.8
Kerosene	119.5	137.4	128.3	87.4	83.3	113.9	101.8
A.T.K.	40.0	29.1	29.0	27.2	20.2	24.4	20.8
Gas oil	282.2	295.6	255.6	231.8	222.6	282.7	284.4
I.D.O.	6.5	5.0	3.1	2.3	0.6	1.4	1.1
I.F.O.	26.4	27.2	36.5	19.9	22.4	12.0	23.9
R.F.O.	40.7	34.7	27.7	11.4	9.8	16.3	24.2
Exports	**214.5**	**224.7**	**239.9**	**107.5**	**146.2**	**219.9**	**205.0**
LPG	-	0.2	0.1	-	0.7	1.0	1.5
LSFO	206.1	218.7	237.0	103.6	144.0	218.3	203.5
Gas oil bunker	0.9	1.2	0.5	0.2	0.6	0.2	-
Fuel oil bunker	7.5	4.7	2.3	3.7	1.0	0.4	-

ANNEX 8

COMPARISON OF PETROLEUM PRODUCT PRICES (in US cents/liter)

1. PREMIUM

	Ghana Feb.87	Côte d'Ivoire Jan.87	Togo May 86	Senegal June 85	Cameroon Nov.85	Tanzania 1985	Zimbabwe Jan.86
Ex-Refinery Price	21.2	26.5	17.0	49.2	39.1	53.3	35.5
Marketer's margin	0.8	7.6	3.0	5.6	7.0	3.0	3.8
Transporter's margin	1.5	3.4	2.0	2.1	- (1)	3.2	0.6
Retailer's margin	0.4	3.2	2.0	2.5	3.0	3.6	5.0
Taxes	4.0	74.1	44.0	55.3	8.3	55.9	38.1
Ex-pump price	27.9	114.8	68.0	114.7	57.4	119.0	83.0

(1) Transportation costs depending upon distance (non unified prices)

ANNEX 8

COMPARISON OF PETROLEUM PRODUCT PRICES (in US cents/liter)

2. KEROSENE

	Ghana Feb.87	Côte d'Ivoire Jan.87	Togo May 86	Senegal June 85	Cameroon Nov.85	Tanzania 1985	Zimbabwe Jan.86
Ex-Refinery Price	13.1	28.3	15.0	45.2	23.2	41.0	29.7
Marketer's margin	0.8	6.0	3.0	4.2	5.4	3.0	2.9
Transporter's margin	1.5	3.4	2.0	2.1	- (1)	2.2	0.6
Retailer's margin	0.4	2.7	1.7	2.2	2.3	2.3	3.6
Taxes	0.3	25.1	23.0	6.9	(5.0)	(4.1)	4.6
Ex-pump price	16.1	65.5	45.0	60.6	25.9	45.5	41.4

(1) Transportation costs depending upon distance (non unified prices)

ANNEX 8

COMPARISON OF PETROLEUM PRODUCT PRICES (in US cents/liter)

3. GAS OIL

	Ghana Feb.87	Côte d'ivoire Jan.87	Togo May 86	Senegal June 85	Cameroon Nov.85	Tanzania 1985	Zimbabwe Jan.86
Ex-Refinery Price	16.0	25.7	13.0	44.3	37.4	37.9	29.1
Marketer's margin	0.8	5.3	3.0	3.6	4.2	3.0	2.9
Transporter's margin	1.5	3.4	2.0	2.1	- (1)	3.2	0.6
Retailer's margin	0.4	2.8	1.7	1.8	1.5	2.4	2.9
Taxes	5.4	46.4	36.0	17.1	4.1	5.3	7.2
Ex-pump price	24.1	83.6	56.0	68.9	47.2	51.8	42.7

(1) Transportation costs depending upon distance (non unified prices)

Annex 9

MARKETERS' MARGIN CALCULATION

A. EXPENSES

Depot Expenses	=	¢32.0m
Selling Expenses	=	¢32.0m
Overhead	=	¢100.0m
Bank Charges	=	¢ 8.0m
Product Losses	=	¢ 6.0m
Depreciation	=	¢18.0m
Total Expenses		¢196.0m
Assume Inflation of 30% for 1987	=	¢196.0 x 1.3
Volume 1987 (Projection)	=	38.4m IGS
∴ Expenses per gallon	=	$\frac{¢196.0 \times 1.3}{38.4m}$
	=	¢ 6.64/IG
Margin to break-even (a)	=	¢ 6.64/IG
Yearly replacement investment in pumps, retail equipment, cars, tanks, etc.	=	22,500
To be recovered in margin (after tax)(b)		0.59
To be recovered in margin (before tax) (b)	=	1.31
Required margin (a + c)		7.95
Profit before tax (minimal) 15%,		1.20
Required Margin per IG		9.15

GOIL

INTERNAL MARKET

UPPF PRODUCTS	TOTAL	ACCRA	KUMASI	TAKORADI	TAMALE
REGULAR	3505	2235	326	811	133
PREMIUM	10962	6402	2259	1405	896
KEROSENE	4803	2133	1161	562	947
GAS OIL	19695	8518	4460	2828	3889
SUB TOTAL	38965	19288	8206	5606	5865
NON UPPF PROD.					
IND. D.O.	293	293	0	0	0
INL. F.O.	4357	4357	0	0	0
RES. F.O.	4027	4027	0	0	0
SUB TOTAL	8677	8677	0	0	0
BUNKERS					
A.T.K.	0	0	0	0	0
GAS OIL	1113	1113	0	0	0
IND. D.O.	0	0	0	0	0
INL. F.O.	0	0	0	0	0
RES. F.O.	0	0	0	0	0
SUB TOTAL	1113	1113	0	0	0

TOTAL SALES   48755

MOBIL OIL   GH. LTD.

INTERNAL MARKET

UPPF PRODUCTS	TOTAL	ACCRA	KUMASI	TAKORADI	TAMALE	EASTERN	CENTRAL	VOLTA	B-AHAFO	U-EAST	U-WEST
REGULAR	4371	2200	267	487	34	429	266	387	85	165	51
PREMIUM	12891	7416	1378	797	136	1120	479	1086	237	166	77
KEROSENE	6929	3863	407	528	150	611	314	634	165	169	88
GAS OIL	12266	4594	2370	1544	550	1367	185	555	398	570	133
SUB TOTAL	36457	18074	4423	3355	871	3526	1244	2662	884	1070	348
NON UPPF PROD.											
IND. D.O.	36	32	0	0	0	4	0	0	0	0	0
IND. F.O.	1904	1904	0	0	0	0	0	0	0	0	0
RES. F.O.	0	0	0	0	0	0	0	0	0	0	0
SUB TOTAL	1939	1935	0	0	0	4	0	0	0	0	0
BUNKERS											
A.T.K.	902	902	0	0	0	0	0	0	0	0	0
GAS OIL	0	0	0	0	0	0	0	0	0	0	0
IND.D.O.	0	0	0	0	0	0	0	0	0	0	0
IND.F.O.	0	0	0	0	0	0	0	0	0	0	0
RES.F.O.	0	0	0	0	0	0	0	0	0	0	0
SUB TOTAL	902	902	0	0	0	0	0	0	0	0	0

TOTAL SALES   39298

Annex 10 - Page 2   SALES OF PRODUCTS   1986
                      THOUSANDS I.G.

B.P.   GHANA LTD.

INTERNAL MARKET

UPPF PRODUCTS

	TOTAL	ACCRA	KUMASI	TAKORADI	TAMALE	EASTERN	CENTRAL	VOLTA	B-AHAFO	U-EAST	U-WEST
REGULAR	2947	2947	0	0	0	0	0	0	0	0	0
PREMIUM	9551	9551	0	0	0	0	0	0	0	0	0
KEROSENE	9399	9399	0	0	0	0	0	0	0	0	0
GAS OIL	9008	9008	0	0	0	0	0	0	0	0	0
SUB TOTAL	30905	30905	0	0	0	0	0	0	0	0	0
NON UPPF PROD.											
IND.D.O.	47	47	0	0	0	0	0	0	0	0	0
IND.F.O.	544	544	0	0	0	0	0	0	0	0	0
RES.F.O.	0	0	0	0	0	0	0	0	0	0	0
SUB TOTAL	591	591	0	0	0	0	0	0	0	0	0
BUNKERS											
A.T.K.	1249	1249	0	0	0	0	0	0	0	0	0
GAS OIL	1115	1115	0	0	0	0	0	0	0	0	0
IND.D.O.	0	0	0	0	0	0	0	0	0	0	0
IND.F.O.	0	0	0	0	0	0	0	0	0	0	0
RES.F.O.	0	0	0	0	0	0	0	0	0	0	0
SUB TOTAL	2364	2364	0	0	0	0	0	0	0	0	0

TOTAL SALES   33860

SHELL   GHANA LTD.

INTERNAL MARKET

UPPF PROD.

	TOTAL	ACCRA	KUMASI	TAKORADI	TAMALE	EASTERN	CENTRAL	VOLTA	B-AHAFO	U-EAST	U-WEST
REGULAR	3049	1822	7	171	0	367	246	255	175	2	0
PREMIUM	8905	5192	874	519	142	693	256	654	520	55	0
KEROSENE	7564	2175	375	818	182	1312	583	1536	453	130	10
GAS OIL	14233	5063	2643	1948	998	549	380	448	2074	123	7
SUB TOTAL	33751	14252	3899	3456	1322	2921	1465	2270	3216	310	17
NON UPPF PROD.											
IND.D.O.	202	202	0	0	0	0	0	0	0	0	0
IND.F.O.	1222	145	440	517	0	0	75	30	15	0	0
RES.F.O.	545	545	0	0	0	0	0	0	0	0	0
SUB TOTAL	1969	892	440	517	0	0	75	30	15	0	0
BUNKERS											
A.T.K.	3459	2982	211	83	0	0	0	0	0	163	0
GAS OIL	800	533	0	267	0	0	0	0	0	0	0
IND.D.O.	0	0	0	0	0	0	0	0	0	0	0
IND.F.O.	149	0	0	149	0	0	0	0	0	0	0
RES.F.O.	0	0	0	0	0	0	0	0	0	0	0
SUB TOTAL	4408	3515	211	499	0	0	0	0	0	183	0

TOTAL SALES   40128

Annex 10 - Page 3   SALES OF PRODUCTS   1986
THOUSANDS I.G.

TEXACO   GHANA LTD.

INTERNAL MARKET

	TOTAL	ACCRA	KUMASI	TAKORADI	TAMALE	EASTERN	CENTRAL	VOLTA	B-AHAFO	U-EAST	U-WEST
UPPF PRODUCTS											
RESULAR	1946	746	160	232	0	288	318	189	13	0	0
PREMIUM	8143	3561	2174	723	-206	732	209	257	266	15	0
KEROSENE	5142	1157	1141	465	280	616	249	886	294	54	0
GAS OIL	5963	827	3313	307	295	471	277	156	162	154	0
SUB TOTAL	21194	6291	6788	1727	782	2107	1053	1488	735	223	0
NON UPPF PROD.											
IND.D.O.	15	15	0	0	0	0	0	0	0	0	0
IND.F.O.	1377	1377	0	0	0	0	0	0	0	0	0
RES.F.O.	3	3	0	0	0	0	0	0	0	0	0
SUB TOTAL	1395	1395	0	0	0	0	0	0	0	0	0
BUNKERS											
A.T.K.	0	0	0	0	0	0	0	0	0	0	0
GAS OIL	8592	8592	0	0	0	0	0	0	0	0	0
IND.D.O.	0	0	0	0	0	0	0	0	0	0	0
IND.F.O.	13	13	0	0	0	0	0	0	0	0	0
RES F.O.	0	0	0	0	0	0	0	0	0	0	0
SUB TOTAL	8605	8605	0	0	0	0	0	0	0	0	0
TOTAL SALES	31194										

TOTAL SALES BY MARKETING COMPANIES
(THOUSANDS OF GALLONS-1986)

	TOTAL	UPPF ONLY
REGULAR	15818	15818
PREMIUM	50452	50452
KEROSENE	33837	33837
A.T.K.	5610	
GAS OIL	72785	61165
I.D.O.	593	
I.F.O.	9566	
R.F.O.	4575	
TOTAL	193235	161272

GOIL (THOUSANDS OF CEDIS)

COST BREAKDOWN	UPPF PROD	NON UPPF PROD
STORAGE EXP.	99	0
OVERHEADS	104810	37788
MAINT. OF SERVICE STATIONS	72515	22258
FINANCIAL CHARGES	17458	5800
SUB TOTAL	194882	65846

CAPITAL IN USE:	443032
ALLOW 12% RETURN ON INVESTMENT:	53164

MOBIL (THOUSANDS OF CEDIS)

COST BREAKDOWN	UPPF PROD	NON UPPF PROD
STORAGE EXP.	12123	6063
OVERHEADS	117245	21136
MAINT. OF SERVICE STATIONS	46179	2300
FINANCIAL CHARGES	20000	2000
SUB TOTAL	195547	31499

CAPITAL IN USE:	130575
ALLOW 12% RETURN ON INVESTMENT	15669

B.P.(THOUSANDS OF CEDIS)

COST BREAKDOWN	UPPF PROD	NON UPPF PROD
STORAGE EXP.	33726	3372
OVERHEADS	78247	7824
MAINT. OF SERVICE STATIONS	18986	1898
FINANCIAL CHARGES	88547	8854
SUB TOTAL	219506	21948

CAPITAL IN USE:	91084
ALLOW 12% RETURN ON INVESTMENT:	10930

SHELL (THOUSANDS OF CEDIS)

COST BREAKDOWN	UPPF PROD	NON UPPF PROD
STORAGE	15865	71729
OVERHEADS	85910	29642
MAINT. OF SERVICE STATIONS	24757	19144
FINANCIAL CHARGES	15532	9159
SUB TOTAL	142064	129674

CAPITAL IN USE:	214513
ALLOW 12% RETURN ON INVESTMENT:	25742

TEXACO (THOUSANDS OF CEDIS)

COST BREAKDOWN	UPPF PROD	NON UPPF PROD
STORAGE	78769	23216
OVERHEADS	97751	28811
MAINT. OF SERVICE STATIONS	47414	13975
FINANCIAL CHARGES	23905	7049
SUB TOTAL	247839	73051

CAPITAL IN USE:	127573
ALLOW 12% RETURN ON INVESTMENT:	15309

TOTAL CAPITAL IN USE:	1006777
HENCE 12% OF TOTAL CAPITAL IN USE:	120813

DISTRIBUTION MARGIN PER COMPANY

MARKETER	UPPF SALES TH. I.5.	EXPENSES TH. CEDIS	BREAK-EVEN MARGIN CEDIS / IG	ESTIMATED MARGIN CEDIS / IG
GOIL	38965	194882	5.00	6.37
MOBIL	36457	195547	5.36	5.79
B.P.	30905	219506	7.10	7.46
SHELL	33751	142064	4.21	4.97
TEXACO	21194	247839	11.69	12.42
TOTAL	161272	999838	6.20	6.95

BREAK EVEN MARGIN : WITHOUT ALLOWANCE FOR CAPITAL RECOVERY
ESTIMATED MARGIN : INCLUDING 12 % RETURN ON INVESTMENT

87.

Annex 11

BEICIP model: COST OF PETROL. PRODUCTS TRANSPORT BY ROAD TANKER   4-MAY-87
                              - E C O N O M I C   C O S T -

TEMA - KUMASI : 300 Km-

Tanker type : DAF 2805 with semi-trailer

GENERAL CHARACTERISTICS

Capacity liter	27000.	Lifetime years		7.
Investment Ced.	20000000.	Residual value %		10.

Consumption

Diesel oil liter 100Km	45.00	Diesel price Ced/liter	37.00
Lubes liter 100Km	0.60	Price Ced/liter	220.00

Tyres

Number	20.	Lifetime Km	70000.
Price Cedis	85000.		

Operating crew

Driver Ced/month	7000.	Aid Ced/month	5000.
Nb of op. months	13.0	Op. days per month	26.0

TURN ROUND CHARACTERISTICS

Product shipped	WHITE	Product demand 1000 T/y	100.
Distance Km	300.	Turn round days	3.0
Operating months	11.5	Turn rounds per month	10.1
Volume shipped M3/Year	2673.	Tons shipped Tons/Year	2245.
Total Km per year	59400.	Total 1000 M3xKm (loaded)	802.
Nber of km per operat.days	199.	Required nber of trucks	37.

TRANSPORT COST SUMMARY

. Unit cost Ced*100 /M3xKm	. Bitumen road	. Earth road 1	. Earth road 2	.
. Fuel/ Tyres/ Maintenance	. 513.01	. 716.61	. 871.99	.
. Crew/ Insurance/ Taxes	. 29.43	. 29.43	. 29.43	.
. **With discount rate 12 %**	.	.	.	.
. Capital charges	. 521.78	. 521.78	. 521.78	.
. General expenses	. 106.42	. 174.74	. 234.37	.
. Transport cost Ced*100 /M3*Km	. 1170.63	. 1442.55	. 1657.57	.
. Ced*100 /Ton*Km	. 1393.61	. 1717.33	. 1973.29	.
. **With discount rate 15 %**	.	.	.	.
. Capital charges	. 576.94	. 576.94	. 576.94	.
. General expenses	. 111.94	. 185.05	. 249.10	.
. Transport cost Ced*100 /M3*Km	. 1231.31	. 1508.04	. 1727.46	.
. Ced*100 /Ton*Km	. 1465.85	. 1795.28	. 2056.50	.

Annex 12

TRANSPORTERS' MARGIN
AVERAGE TRANSPORTATION DISTANCE

REGIONAL CAPITAL	UPPF VOLUME	DIST. FROM TEMA REFINERY		V*D	
ACCRA	38617	29	Km	1119893	
CAPE COAST	3762	173	"	650826	
SECONDI;TAKORADI	8538	256	"	2185728	
KOFORIDUA	8554	114	"	975156	
HO	7043	136	"	957848	
KUMASI	15110	299	"	4517890	
SUNYANI	4835	413	"	1996855	
TAMALE	2975	678	"	2017050	
BOLGA	1603	838	"	1343314	
WA	365	741	"	270465	
TOTAL	91402	3677		16035025	175.43

AVERAGE DISTANCE COVERED PER GALLON OF UPPF PRODUCT: 175 Km.

Annex 13

DEALER MARGIN BUILD-UP

Forecourt Staff	12,000.0
Forecourt Supervisor	2,500.0
Watchman	3,000.0
Electricity	13,835.0
Water	2,716.0
Social Security	1,813
Bank Interest Charges	12,393.0
Bank Transfer Charges	12,677.0
Stationery	250
Bad Debt	1,000
Uniforms	5,400
Generator Expenses	–
Dealer Transport Expenses	6,000
Telephone	3,000
Overhead Expenses	6,000
Product Losses (0.25%)	12,657
	95,241

Volume   33,752 IGS caf

Cost/IG   ¢2.82

Add 30% Inflation (1.3 x 2.82)   =   ¢3.67/IG

Add Profit Margin 15% (1.15 x 3.67)   =   ¢4.22/IG

ANNEX 14

DIFFERENTIAL BETWEEN GASOLINE AND GAS OIL PRICE

Main hypotheses :

. differential in fuel consumption : 1 - 2 liters / 100 km
. differential in car cost : 1500 US$ or 225 000 cedis

Difference in car cost to be recovered over 3 years (the lower cost of gas oil consumption should allow to match the higher investment over 3 years ie should allow to save 75 000 cedis per year).

Fuel consumption (liters/100 km)	Gasoline 8 Gas oil 7		Gasoline 8 Gas oil 6		
Annual mileage	20 000	40 000	20 000	40 000	60 000
Fuel consumption (liters/year)					
Gasoline	1 400	3 200	1 600	3 200	4 800
Gas oil	1 400	2 800	1 200	2 400	3 600
Required differential (cedis/gallon)	189	83	164	59	23

ANNEX 15

TRAINING

Training was performed, all over the course of the study.

1. Formal refresher course in Tema, from January 26 to February 6 1987. 12 Ghanaian engineers assisted the course :

1. QUARTEY, E.K.	*	GHAIP
2. D. TARNAWIECKI		NEB/UNDP
3. G.A. KISSEIH	*	GHAIP
4. J.K. SAKYI		GOIL
5. L.M. DANQUAH		GNPC
6. JOHN ATTAFUAZI	*	NEB
7. FELIX B.F. GOMEZ		NEB
8. KWESI AIDOO		GHAIP
9. S.A. ASMEL		GHAIP
10. B.K. SMITH		GNPC
11. J. OWUSU-BONSU	*	NEB
12. CATO-BROWNE		GNPC

    * Full time participants in the study.

    A manual, entitled "Petroleum products pricing principles" was given to the participants at the beginning of the course.

2. On the job training

    -   in Accra, in February, through discussions on the present situation in Ghana and the proposed methodology as well as on the development of the computer model

    -   in Paris, in March : MM J. ATTAFUAH, G. KISSEIH, E. QUARTEY, and J. OWUSU-BONSU were in BEICIP FOR 3/4 weeks and participated actively in development and testing of the computer program as well as in finalization of calculation principles.

ANNEXE 16

MINISTRY OF FUEL AND POWER

NATIONAL ENERGY BOARD

(ACCRA)

PETROLEUM   PRODUCTS   PRICES

BUILD-UP

BASE CASE -3rd Quarter 1987 -
Crude oil price 18.90 $/BL
Exchange rate 165 Cedis/US$
Ref.loc. 7.0% ·Cbs.Grav.th.
Date of the run 14/09/87

Petroleum Products Prices Build-up - NATIONAL ENERGY BOARD - M.F.P. - Date : 14/09.87
- Page 1 -

- Table 1 -

CRUDE OIL SUPPLY-COST

PERIOD 3RD QUART 1987
1 US$ = 165.00 CEDIS

CRUDE OIL	ORIGIN	QUANTITY (metric tons)	FOB PRICE (US$/bbl) (US$/mt)	LANDED PRICE (US$/mt)	TOTAL COST (million US$) (million CEDIS)
BONNY LT	NIGERIA	197500.00	18.92 142.13	157.17	27.47 4662.49
BRASS RIV.	NIGERIA	37500.00	18.92 145.73	152.22	5.03 1003.71
TOTAL		205000.00			35.55 5086.19

- Table 2 -

PETROLEUM PRODUCTS IMPORTS COST

PERIOD 3RD QUART 1987
1 US$ = 165.00 CEDIS

PRODUCT NAME	FOB PRICE ROTTERDAM (US$/mt)	LANDED PRICE TEMA/GHANA (US$/mt)	(Cedis/mt)	QUANTITY (thousand mt)	TOTAL COST (million US$)	(million Cedis)	INTERNATIONAL PRICE SCALE (1) (US$/mt)
LPG	150.00	332.09	54794.35	0.00	0.00	0.00	137.00
REGULAR	165.00	193.64	31951.13	0.00	0.00	0.00	141.50
UNLEADED	165.00	193.64	31951.13	0.00	0.00	0.00	141.50
UNIF. GAS.	187.00	209.92	34635.31	0.00	0.00	0.00	157.40
PREMIUM	190.00	209.92	34635.31	22.50	4.72	779.32	157.40
KEROSENE	170.00	211.76	30290.96	10.50	2.52	415.14	120.40
JET FUEL	170.00	211.76	30290.96	7.00	0.00	0.00	145.29
GAS OIL	155.00	182.29	30077.67	11.25	2.15	333.37	127.21
INC DIESEL	187.00	163.25	26935.79	0.00	0.00	0.00	107.40
THL F.OIL	113.40	139.93	22593.39	0.00	0.00	0.00	81.70
RES F.OIL	111.40	134.55	22031.79	0.00	0.00	0.00	77.30

(1) moving average (12 months) base ROTTERDAM

Petroleum Products Prices Build-up - NATIONAL ENERGY BOARD - M.F.P. - Date : 14/03/97
- Page 2 -

- Table 3 -

PROCESSING AND MARKETING COSTS

PERIOD 3RD QUART 1997
1 US$ =   165.00 CEDIS

	(million Cedis)	(million US$)
1. REFINING : FOREIGN COSTS		
(a) Variable		0.600
(b) Fixed		1.534
2. REFINING : LOCAL COSTS		
(a) Variable	0.000	
(b) Fixed	217.500	
3. MARKETING EXPENSES	12.825	
sub-totals	230.325	2.134
GRAND TOTAL	580.765	

Petroleum P- ucts Prices Build-up - NATIONAL ENERGY BOARD - M.F.P. - Date : 14/03/87
- Page 3 -

- Table 4 -

PETROLEUM PRODUCTS DELIVERIES : QUANTITIES

PERIOD 3RD QUART 1987
1 US$ =   165.00 CEDIS

all figures are in thousand METRIC TONS

PRODUCT NAME	LOCAL CONSUMPTION	RE-EXPORTS	BUNKERING
LPG	2.250	0.375	0.000
REGULAR	10.900	0.000	0.000
UNLEADED	0.125	0.000	0.000
UNIF. GAS.	0.000	0.000	0.000
PREMIUM	54.750	0.000	0.000
KEROSENE	37.450	0.000	0.000
JET FUEL	9.650	0.000	0.000
GAS OIL	84.850	0.000	0.000
IND DIESEL	0.000	0.000	0.000
INL F.OIL	0.000	0.000	0.000
RES F.OIL	15.475	40.000	0.000
TOTAL	214.450	40.375	0.000

- Table 5 -

PETROLEUM PRODUCTS DELIVERIES : PRICES

PERIOD 3RD QUART 1987
1 US$ =   165.00 CEDIS

PRODUCT NAME	PRESENT EX-REFINERY (1) PRICE (Cedis/Gal)	(Cedis/mt)	(US$/mt)	RE-EXPORTS PRICE (US$/mt)	BUNKERING PRICE (US$/mt)
LPG	11.43	25132.67	152.32	150.00	0.00
REGULAR	137.00	41974.91	254.39	0.00	0.00
UNLEADED	137.00	41974.91	254.39	0.00	0.00
UNIF. GAS.	142.00	41133.30	249.61	0.00	0.00
PREMIUM	142.00	41133.30	249.61	0.00	0.00
KEROSENE	87.00	23955.13	145.13	0.00	0.00
JET FUEL	170.00	46138.33	279.83	0.00	0.00
GAS OIL	107.30	27950.53	169.43	0.00	0.00
IND DIESEL	109.53	27547.23	166.96	0.00	0.00
INL F.OIL	109.93	26383.90	159.30	0.00	0.00
RES F.OIL	110.00	25934.13	157.19	112.00	0.00

(1) LPG price is in Cedis/lb

Petroleum Products Prices Build-up - NATIONAL ENERGY BOARD - M.F.P. - Date : 14:09 97
- Page 4 -

- Table 6 -

SUMMARY TABLE

PERIOD 3RD QUART 1987
1 US$ =   165.00 CEDIS

crude oil supply quantity	325.000	(thousand tons)
refining losses (% of supply)	7.00	

	TOTAL COST	UNIT COST
	(million Cedis)	(Cedis/mt)
crude oil supply cost	5306.139	20080.46
processing & marketing	590.765	2279.15
petroleum products imports	1533.903	6015.14
adjustment	0.000	0.00
TOTAL	7930.808	31318.75
value of re-exports	749.100	2939.66
cost of local sales	7981.702	28378.09

- Table 7 -

PETROLEUM PRODUCTS EX-REFINERY PRICES

PERIOD 3RD QUART 1987
1 US$ =   165.00 CEDIS

PRODUCT NAME	INTERN. PRICE SCALE (US$/mt)	PRESENT EX-REFINERY PRICE (US$/mt)	(Cedis/Gal)(1)	PROPOSED EX-REFINERY PRICE (US$/mt)	(Cedis/Gal)(1)
LPG	191.00	152.32	11.40	201.02	15.04
REGULAR	141.50	264.39	139.20	218.80	119.91
UNLEADED	141.50	264.39	139.30	218.81	119.81
UNIF. GAS.	157.40	349.61	143.30	343.09	133.75
PREMIUM	157.40	349.61	142.30	2-3.39	133.75
KEROSENE	120.41	145.13	39.30	171.31	117.37
JET FUEL	145.20	277.89	170.40	224.52	103.42
GAS OIL	137.20	159.43	119.30	175.69	121.29
IND DIESEL	117.40	166.76	109.52	166.07	102.69
IND F.OIL	83.03	152.03	109.93	107.83	33.25
RES F.OIL	77.03	157.19	110.90	105.31	84.19

(1) LPG price is in Cedis/lb

Petroleum Products Prices Build-up - NATIONAL ENERGY BOARD - M.P.P. - Date : 14.09.97
- Page 5 -

- Table 9 -

DISTRIBUTION MARGINS

PERIOD 3RD QUART 1987
1 USS =   165.00 CEDIS

PRODUCT NAME	MARKETER'S MARGIN	RETAILER'S MARGIN	TRANSPORTERS MARGIN
LPG	3.05	1.50	2.85
REGULAR	7.50	2.60	10.50
UNLEADED	7.50	2.60	10.50
UNIF. GAS.	7.50	2.60	10.50
PREMIUM	7.50	2.60	10.50
KEROSENE	7.50	2.60	10.50
JET FUEL	0.00	0.00	0.00
GAS OIL	7.50	2.60	10.50
IND DIESEL	0.00	0.00	0.00
INL F.OIL	0.00	0.00	0.00
RES F.OIL	0.00	0.00	0.00

all margins are in Cedis/Gal except LPG in Cedis/lb

- Table 9 -

PETROLEUM PRODUCTS TAXES

PERIOD 3RD QUART 1987
1 USS =   165.00 CEDIS

PRODUCT NAME	EXCISE DUTY	ROAD FUND	ENERGY FUND	EXPLORATION LEVY	STRATEGIC STOCK LEVY	OTHER TAX
LPG	0.00	0.00	0.00	0.00	0.00	0.00
REGULAR	42.00	5.00	1.00	2.70	7.00	0.60
UNLEADED	42.00	5.00	1.00	2.70	0.00	0.00
UNIF. GAS.	0.00	5.00	1.00	2.70	0.00	0.00
PREMIUM	0.00	5.00	1.00	2.70	0.00	0.00
KEROSENE	0.00	1.00	1.00	0.00	0.00	0.00
JET FUEL	40.00	0.00	0.00	0.00	0.00	0.00
GAS OIL	0.00	10.00	1.00	2.70	0.00	0.00
IND DIESEL	0.00	0.00	0.50	0.00	0.00	0.00
INL F.OIL	0.00	5.00	0.00	0.00	0.00	0.00
RES F.OIL	0.00	5.00	0.00	0.00	0.00	0.00

all Taxes are in Cedis/Gal except LPG in Cedis/lb

Petroleum Products Prices Build-up - NATIONAL ENERGY BOARD - N.E.P. - Date : 14/09/87
- Page 6 -

- Table 10 -

EXPECTED YIELD FROM PETROLEUM PRODUCTS

PERIOD 3RD QUART 1987
1 US$ =   165.00 CEDIS

                             (million Cedis)

EXCISE   DUTY =   976.75
ROAD   FUND =   341.16
ENERGY   FUND =   56.97
EXPLORATION   LEVY =   110.35
STRATEGIC STOCK LEVY =   0.00
OTHER   TAX   =   0.00

TOTAL FISCAL REVENUE =   1499.21

other revenues

LOCAL SALES   =   7231.79
EXPORTS   =   743.10
BUNKERS   =   0.00

Petroleum Products Prices Build-up - NATIONAL ENERGY BOARD - M.F.R. - Date : 14/09/97
- Page 7 -

- Table 11 -

PETROLEUM PRODUCTS PRICES BUILD-UP : DOMESTIC

PERIOD 3RD QUART 1987
1 US$ =   165.00 CEDIS

effective : 14/09/87

PRODUCT NAME	EX-REFINERY PRICE	EXCISE	ROAD	PETROLEUM TAXES ENERGY	EXPLO.	STOCK	OTHER	DISTRIBUTION MARGINS MARKET.	RETAIL.	TRANS.	EX-PUMP PRICE /GALLON(1)	/LITRE(2)
LPG	15.04	0.00	0.20	0.00	0.00	0.00	0.00	2.05	1.50	3.95	21.34	9.32
REGULAR	119.31	42.00	5.00	1.00	2.70	0.00	0.00	7.50	3.60	10.50	191.11	42.04
UNLEADED	119.81	42.00	5.00	1.00	2.70	0.00	0.00	7.50	3.60	10.50	191.11	42.04
UNIF. GAS.	138.75	34.00	5.00	1.00	2.70	0.00	0.00	7.50	3.60	10.50	202.05	44.45
PREMIUM	133.75	34.00	5.00	1.00	2.70	0.00	0.00	7.50	3.60	10.50	202.05	44.45
KEROSENE	117.37	0.00	1.00	1.00	0.00	0.00	0.00	7.50	3.60	10.50	139.97	30.79
JET FUEL	131.42	40.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	176.42	38.81
GAS OIL	121.58	9.00	10.00	1.00	2.70	0.00	0.00	7.50	3.60	10.50	170.18	37.44
IND DIESEL	109.00	8.10	3.00	0.50	0.00	0.00	0.00	6.00	0.00	0.00	126.20	27.75
DIST F.OIL	98.25	8.10	5.50	0.10	0.00	0.00	0.00	0.00	0.00	0.00	101.95	22.43
RES F.OIL	84.19	8.00	5.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	97.19	21.33

(1) for LPG ex-pump price is in Cedis/lb
(2) for LPG ex-pump price is in Cedis/kg

- Table 12 -

PETROLEUM PRODUCTS PRICES BUILD-UP : BUNKERS

PERIOD 3RD QUART 1987
1 US$ =   165.00 CEDIS

effective : 14/09/87

PRODUCT NAME	EX-REFINERY PRICE	EXCISE	ROAD	PETROLEUM TAXES ENERGY	EXPLO.	STOCK	OTHER	BUNKER PRICE /GALLON(1)	/LITRE(2)
JET FUEL	131.42	11.00	03.00	0.00	2.70	0.00	0.00	173.12	38.09
GAS OIL	121.58	36.00	10.00	1.00	2.70	0.00	0.00	173.58	38.24
IND DIESEL	109.00	17.00	8.00	0.60	2.70	0.00	0.00	137.96	31.36
DIST F.OIL	98.25	7.40	5.00	1.00	2.70	0.00	0.00	104.85	23.12
RES F.OIL	84.19	5.00	5.00	0.00	2.70	0.00	0.00	96.89	21.31

(1) for LPG ex-pump price is in Cedis/lb
(2) for LPG ex-pump price is in Cedis/kg