THE PETROLEUM INDUSTRY IN MALAYSIA

by

MUHAMMAD ANUAR ADNAN

A thesis submitted for the degree of Doctor of Philosophy in the University of London

June 1978

ABSTRACT

The aim of this thesis is to study the evolution, structure, administration, effects and future prospects of the petroleum industry in Malaysia in the context of the changing ideas and concepts that are influencing the petroleum industry at present.

The discovery of petroleum deposits in the offshore areas of Malaysia in the early 1970's promises to act as a catalyst to future development. The production of crude petroleum has increased significantly and has emerged as one of the leading activities in Malaysia today.

We are proposing to examine several areas in the development of the petroleum industry - petroleum reserves and production, refinery capacity, crude oil pricing, product supplies and prices, government legislation and petroleum revenue contributions to the economy. It has been predicted that petroleum reserves are limited at present and would be depleted sometime in the beginning of 1990's. With the increasing demand for local crude in refineries, the problem might become worse. By the end of 1970's, it is predicted that there is a necessity to expand local refinery capacity to cope with the growth in demand for petroleum products. Ever since the 1973 'Oil Crisis' and subsequent developments, the structure of the product prices in this country has changed with the increase in crude prices. This has led to 'under-recoveries' to oil companies, product shortages and hoarding. This has also led the Government to involve more and more intervention in the industry especially with the establishment of Petroliam Nasional Berhad (PETRONAS), the National Oil Company.

We conclude the thesis by emphasising the necessity of instituting a programmed development (conservation) of our petroleum resources and local participation in investments in the upstream phase of the industry. The conservation measure would ensure sufficient supplies of crude petroleum for our future needs. A reasonable time-production function would enable PETRONAS to involve in exploration, refining and distribution functions and ensure reasonable price and adequate supply of petroleum products in the future. This is also reasonable in view of the problems involved in the recycling of "surplus" oil money accrued to the Government as a result of a rapid depletion of our oil resources.

ACKNOWLEDGEMENTS

In writing this thesis, I am indebted to many people and institutions that it is not possible for me to mention all of them here. While I express my gratitude to them all, I must mention some specifically.

First and foremost, I particularly would like to thank my supervisor, teacher and mentor Professor Edith Penrose who willingly took me as her student and gave me much of her time to read my work throughout the course and for her invaluable help and understanding, without whose learned guidance and inspiration, this thesis would have never been completed.

The various respondents and informants - oil executives and government officials - who helped me during my field work in Malaysia, I wish to express my gratitude to them for kindly allowing me to interview them, but who must remain anonymous.

To the Vice-Chancellor of the National University of Malaysia, the Dean of the Faculty of Economics and Management and the Head of the Economic Development and Planning of the University, my sincere thanks for granting me the study leave to enable me to pursue the research at London University. My trip to London was made possible by a scholarship awarded by the Commonwealth Scholarship Commission in London. Funds for field research and travel expenses in Malaysia were provided by a grant from the Academic Staff Research Fund, National University of Malaysia which made possible the trips to various parts of the country for the purpose of interviews.

My thanks are also due to the librarians and staff of the following libraries in which I collected the materials for this thesis: Shell Centre in London, Institute of Petroleum London, School of Oriental and African Studies Library, National University of Malaysia Library, Faculty of Economics and Administration Library, Shell Malaya Trading Berhad and PETRONAS Library in Kuala Lumpur.

I am very grateful to Cik Sabariah and Mrs Fonseka for typing the thesis at short notice and what more for expertly handing the big job of typing from marked up pages into readable copy.

I would like to mention that the responsibility for lapses and shortcomings as this work might contain is entirely mine. If this thesis awakens some interest among the reserchers of economics and oil industry executives and government servants and stimulates technical and scientific studies in this subject in the country, I shall consider my labour amply rewarded.

I should also make special mention of the moral support given by my parents at every stage of my research; and but for the way they sustained me with sympathy and encouragement during my periods of disappointment, gloom and despondency, I might not have successfully preserved in my career of research.

Last but not least, I shall be failing my duty as a husband if I had not acknowledged with gratitude the sacrifices made by my wife, Yang Halimah and my children, Shahrizaila and Adlain Marsita, who silently suffered being almost neglected for the past three and half years. Suffice to say that they bore with me admirably the tensions and "depressed" moments during the period of this study in London and in Malaysia.

CONTENTS

CONTENT OF CHAPTERS

APPENDIX

LIST OF TABLES

LIST OF MAPS

LIST OF FIGURES AND DIAGRAMS

LIST OF ABBREVIATIONS

ASEAN	Association of Southeast Asian Nations
BP	British Petroleum
CONOCO	Continental Oil Company
ECAFE	Economic Commission for Asia and the Far East
EMI	Exxon Malaysia Incorporated
ESMB	Esso Standard Malaya Berhad
GDP	Gross Domestic Product
GNP	Gross National Product
HFO	Heavy Fuel Oil
LFO	Light Fuel Oil
LPG	Liquified Petroleum Gas
MTI	Ministry of Trades and Industry
NEP	New Economic Policy
OPEC	Organization of Petroleum Exporting Countries
PETRONAS	Petroleum Nasional Berhad (National Oil Co)
PDA	Petroleum Development Act
SMTB	Shell Malaya Trading Berhad
SMP	Second Malaysia Plan
SPC	Singapore Petroleum Company
SSB	Sarawak Shell Berhad
SSPL	Sabah Shell Petroleum Limited
TMP	Third Malaysia Plan

Please Note: All Dollars quoted in the Thesis are Malaysian Dollars unless otherwise stated.
Exchange Rates:

M$ 4.39 = Stg £1

M$ 2.50 = US $1

CHAPTER 1. INTRODUCTION

1.1 Importance Of Study

There is no shortage of published works on the economics of the petroleum industry and works dealing with the major oil producing countries such as America, Mexico, Venezuela and the Middle East. The writings of such famous oil economists like Frankel[1], Adelman[2], Penrose[3], Cassady[4], Hartshorn[5] and many others are well known in the oil and academic circles. Frankel's pioneering works dated back to 1946 and dealt with the basic problems of the oil industry; a complete work on the structure of costs and prices of the world oil market was done by Adelman; Penrose has analysed the effect on some Middle Eastern economics of the presence of the international oil industry in the area and the interplay of the oil resources in the politics and economic development of these countries, as well as the role of the Organisation of Petroleum Exporting Countries or OPEC; Cassady's work initiated in 1949 by the American Petroleum Institute, explored the general understanding of the economic structure and the

---

1 Frankel, F.H. ESSENTIALS OF PETROLEUM - A Key to Oil Economics, Frank Cass and Company Ltd. 2nd Edition, London 1969

2 Adelman, M. THE WORLD PETROLEUM MARKET, John Hopkins Press, Baltimore 1971.

3 Penrose, E. THE LARGE INTERNATIONAL FIRM IN DEVELOPING COUNTRIES - The International Petroleum Industry, Allen and Unwin, London 1978 and THE GROWTH OF FIRMS, MIDDLE EAST OIL AND OTHER ESSAYS - Frank Cass and Company Ltd. London 1971.

4 Cassady, R. (Jr.) PRICE MAKING AND PRICE BEHAVIOUR IN THE PETROLEUM INDUSTRY, Kennikat Press, New York, 1954.

5 Hartshorn, J.E. OIL COMPANIES AND GOVERNMENTS, Faber and Faber, London 1967.

behaviour of the petroleum industry especially in the areas of price making procedures in the American petroleum industry; and Hartshorn's study which concerned the relationship between oil companies and the Government of the producer countries serves the foundation stone for the changing relations between oil companies and governments in many less developed oil producing countries especially in the early 1970s. Almost all these credited work have, however been confined to the problems of the giant international firms and the major oil producing countries. The problems commonly facing the small oil producing countries as well as oil importing countries, particularly those which are not domiciles of the international oil corporations, have been largely overlooked. However, the reality of these problems which came to light recently resulted in a number of works by a number of economists in a number of countries such as Nigeria[6], India[7], Indonesia[8], Iran[9] and few others. Although primarily based on the specific countries, all the major issues presented by the various authors have been discussed using the background of international events.

---

6 Schaltz, THE PETROLEUM INDUSTRY OF NIGERIA, Oxford University Press London 1958, and Pearson, S.R. PETROLEUM AND THE NIGERIAN ECONOMY, Harvard University Press, 1965.

7 Dasgupta, B. THE OIL INDUSTRY IN INDIA, Frank Cass, London 1971.

8 Sritua Arief, THE OIL INDUSTRY IN INDONESIA, The Manage ment of Resources in a Developing Economy, Sritua Arief Associat Djakarta 1976 and Oei, H.L. PETROLEUM RESOURCES AND ECONOMIC DEVELOPMENT: A Comparative Study of Mexico and Indonesia, Unpublished PhD Thesis University of Texas, 1964.

9 Fesheraki, F. DEVELOPMENT OF THE IRANIAN OIL INDUSTRY - International and Domestic Aspects, Praeger Publishers, New York 1976.

The present research on the economic issues relating to the petroleum industry of Malaysia is the first of its kind undertaken at this level. It attempts to examine some of the major issues facing the oil industry particularly those relating to the production of crude oil, refining, distribution, marketing, prices and costs of curdes and petroleum products and finally the contributions of the industry to the fiscal revenue of the Government.

Essentially, there are four main reasons for the importance of this study and they are discussed below.

(1) In the immediate aftermath of the world wide inflation of 1973-1974 and the associated quadrupling of crude petroleum prices, the discoveries of petroleum deposits in the Malaysian sector of The South China Sea gave the promise of a vast new potential source of wealth. The Petroleum Economist in its November 1974 issue pointed out that "a succession of oil and gas discoveries mainly in 1973-1974 opens the prospect that, with the exception of tiny state of Brunei, Malaysia may by the end of the decade have the highest per capita export revenues from crude and LNG of any South East Asian nation".[10]

(2) The production of crude petroleum increased from being insignificant to highly significant and has emerged as one of the leading activities in Malaysian resource development. With the anticipated increase in domestic production of crude petroleum, exports of crude and partly refined petroleum in

---

10 PETROLEUM ECONOMIST, Nov. 1974, pp. 411-413.

1977 are expected to increase by about 27% to 63.9 million barrels per annum or 175,000 barrels per day. This will raise the value of exports to about M$2,135 million (this does not take into account the price increase since January 1977). This will make petroleum the second highest foreign exchange earner after rubber.[11]

(3) Crude petroleum and natural gas represent virtually the only indigenous energy sources available in the country. With the exception of minor coal deposits in Sabah and a negligible amount of hydro-electric power generation, Malaysia is entirely dependent on petroleum for its energy requirements. In 1975 Malaysia produced 37.25 million barrels of primary energy and consumed 32.08 million barrels giving an excess capacity of 5 million barrels. Out of this 90 percent of total production and consumption is provided by the petroleum sector. In 1970, petroleum provided 84 percent of energy needs and is expected to meet over 90 percent of the energy needs by 1985.[12]

(4) Speculation about the existence of petroleum deposits occurred long before 1973, but it was only about this time that the potential importance of petroleum became a serious political consideration. The announcement by the late Prime Minister in Parliament in 1974 of the establishment of PETRONAS (Petroleum Nasional Berhad), the National Petroleum Corporation Limited, changed the whole political atmosphere. Apathy was replaced by

---

11 See Government of Malaysia. ECONOMIC REPORT 1976/77, Ministry of Finance, Government Printer, Kuala Lumpur 1976.

12 ASIA RESEARCH BULLETIN. December 31, 1976, Singapore pp-272.

a feeling of euphoria but also by a concern that the newly found resource should be locally controlled.[13]

The principal focus of this study is on the post 1970 development of petroleum economy in Malaysia, partly because the development prior to 1970 was very limited and partly because of the highly significant events that have taken place in the past four years. It is during this period that the output of petroleum has expanded threefold from its pre-70 peak; its price has quadrupled since the 1973 oil 'crisis', and PETRONAS was established through the Petroleum Development Act.

1.2 Objectives Of The Study

In the aftermath of the 1969 riot, the Malaysian government announced the New Economic Policy (NEP) in their development plan objectives in the future. The overriding objectives of this new development policy is that of national unity. The NEP comprises two aims or prongs the first of which is to eradicate poverty amongst all Malaysians and secondly to restructure the multiracial, multicultural and multilingual Malaysian society so that the identification of race with economic function and geographical location is reduced and eventually eliminated.[14] The Government believes that both

---

13 Adnan, M.A. "Critical Issues in Petroleum Development in Malaysia", a paper presented at a seminar organised by the Malaysian Economic Convention, May 19-21, 1977, Kuala Lumpur.

14 See Government of Malaysia, SECOND MALAYSIA PLAN, Government Printer, Kuala Lumpur 1970; MID-TERM REVIEW OF THE SECOND MALAYSIA PLAN 1971-1975, Government Printer, Kuala Lumpur 1973; and THIRD MALAYSIA PLAN 1976-1980, Government Printer, Kuala Lumpur, 1976.

these objectives could be attained or realised through the rapid expansion of the economy over time.

The first prong of the NEP aims at improving the economic conditions and quality of life of all races by directly increasing their access to land, physical capital, training and other facilities, thus permitting them to share more equitably in the benefits of the economic growth. To ensure that the poor are provided with sufficient opportunities to participate in and benefit from the process of economic growth, the Government seeks through the second prong of the NEP a fairer distribution among the races of the opportunity to participate in the wide range of economic activity. Through the second prong, the Government aims at providing such assistance for all racial groups in the country to find employment, secure participation and acquire ownership and control in the various sectors of the economy. Subsequently, the distributional objectives of the NEP must depend on accelerated economic growth and mobilisation of the resources both natural and physical available in the country in order to eradicate poverty and facilitate the restructuring of society.

The NEP has been conceived by the Government as the agenda that will guide the nation for the next 20 years at least from 1970 to 1990. Amongst the variables that had been emphasised, one of the driving forces is that of energy sector. Energy especially from petroleum resources is one of the key factors in the development process of any society. The Malaysian society if it develops economically and socially at the tremendous rate as required by the NEP will need the rapid development of the energy economy especially the petroleum resources sector. This should be centered around providing adequate amounts of this type of energy so that it could be adapted efficiently to the process of development and economic growth. Above all, the fiscal revenues from the petroleum resources found in the country could be utilised to achieve the objectives of the NEP earlier.

The discovery of oil in Sarawak (then Colony of the British Borneo) in 1911 has resulted in the production of crude oil which is mainly exported and currently at the rate of some three and half million barrels a year. Its effect on the Malaysian economy has been important ever since and with further development and additional discoveries, the rate of production can be increased substantially during the decade. And during the course of the search for oil, there have been very substantial discoveries of natural gas in the area. The crude oil and gas discovered could be utilised to further the economic development of the country.

To assess the development of the petroleum industry of Malaysia since 1911, an analysis of its history,economy, market structure and contributions to the overall development and growth in the country is made with specific attention given to the identification and evaluation of some of the forces contributing to the progress of the industry, particularly the economic influences leading to the importance of the industry in the future for the country, especially till the end of the century, which is concurrent with the terminal period of the NEP, i.e. 1990.

Chapter 2 will trace the development of the petroleum industry from the early kerosene trade in the late 19th Century leading to the first oil discovery in the country in 1911 and its expansion until the late 1960s. This historical development will give some background indication of the future trend of oil development.

The position of the oil resources in the energy structure of Malaysia will be dealt in Chapter 3. Based on the gross domestic product estimated for the next 15 years by the Third Malaysia Plan (1976 to 1980), the petroleum products required by Malaysia over the same period will be estimated. This will provide an estimate of the product needs and refinery capacities available or to be made available in the future.

The first step in estimating the supplies of crude oil available for refinery use will be the expected reserves and production forthcoming from the Malaysian offshore fields in the future. This will be done in Chapter 4. And secondly, in order to assess the expected supplies of products (refined) from the refineries in the future, the available and expected refinery capacities in the country will be estimated so that surplus and deficit capacities could be located and corrected where and whenever necessary.

Having discussed the upstream and mid-stream operations of the oil industry, the distributional and marketing aspects of crude oil and products will be looked into. Chapter 6 will examine the distribution of crude and product supplies from outside and inside the country in terms of volume, sources, and methods of transportation. The structure of the domestic oil market will be examined in the light of the multinational character of the companies in the market and the marketing practices adopted by them. This will be done in Chapter 7.

Chapters 8 and 9 will discuss the pricing structure and practices of the crude oil and petroleum products in Malaysia, respectively. The structure of prices and costs of crude petroleum and petroleum products produced in Malaysia will be compared with other oil producing countries wherever possible. The effects of the oil crisis of 1973 and the subsequent oil price hikes on the structure of product prices and the ensuring actions taken by the Government in the industry will also be discussed.

Chapter 10 will look into the rationale for the increasing intervention by the Government in the industry. Areas considered will be the changing state of oil legislation in the country leading to the establishment of the state oil company, PETRONAS and the changing structure of fiscal revenues to the Government.

The last chapter summarises the major conclusions derived from the foregoing discussion and the policy implications thereof.

1.3 Limitations Of The Study

The cooperation of industry members and government officials with regard to the research in Malaysia was anything but uniform. It ranged from very poor to excellent. The absence of complete cooperation in some instances very likely handicapped the collection of data. Fortunately alternative sources of information usually were made available by considerate oil executives and government officials. The absence of uniformity in the cooperation provided by industry and government representatives may be significant in itself; this is precisely the type of behaviour one would expect in an in the oil industry, or any industry for that matter, which is comprised of independently operated units rather than of one organisation; the research was conducted during the period of negotiation and bargaining between the oil companies and the government as a result of the Petroleum Development Act and the production-sharing arrangement which resulted from it. In many instances detailed information compiled from company records, especially monthly market reports from 1960s to the middle of 1970s, were never given to anyone outside the company, let alone outside the industry. Despite the inherent difficulties of the research, it is felt that the study has obtained some unusually rewarding material, although much of it are used for background purposes only.

An obstacle to research in this field in developing countries is the lack of data. In Malaysia this is more so as the industry was not of great importance before 1970 and was confined or localised in the state of Sarawak. The systematic and regular collection of statistics pertaining to oil in Malaysia only started with the establishment of PETRONAS and the requirements stipulated by the Government to oil companies in their submissions for price increases. Many of the data available are of confidential nature and therefore are not readily available. Unless an important and useful purpose is served confidential data made available has to be referred to and a conscious attempt has been made to avoid identifying the sources as some of the information may be considered detrimental to the individual concerned or to the disadvantage of informants.

CHAPTER 2

PETROLEUM INDUSTRY DEVELOPMENT SCENARIOS IN MALAYSIA

This chapter will examine or review 2 aspects of oil development in Malaysia: (i) The historical development of oil trade in Malaysia and (ii) domestic crude oil production scenarios. These developments will help to throw some light on the future development of the industry which will be discussed in the subsequent chapters of this thesis.

2.1 Historical Development of Oil Trade In Malaysia

2.1.1. The Early Oil Trade In Malaysia (1886 to 1919)

The presence of oil in the East Indies is first known from Gerinis' RESEARCH ON PTOLEMY'S GEOGRAPHY OF EASTERN ASIA, who states that its existence was known in 954 A.D. - long before stories of the very first Dutch voyage to The Far East, when the explorer Jan Huggen van Lingchoten recorded his adventures. The latter described a well in Sumatra which produced "pure balm"[1]. Another account in Indonesian folklore mentioned that the King of Acheh used burning oil from a well in Deli (in Sumatra) to

---

1 Jan Hugen van Linchosten was the first Dutchman to give an account of the wonders of the Far East. He brought back from Goa in India a story concerning a well in Sumatra 'from which a pure balm flows'. This 'wonderous' substance which appeared in numerous passages in old journals mentioned its customary uses as medicaments and caulking boats in the old world were similarly used in the Far East. See First Dutch Report of The Occurance of Petroleum in Sumatra (1596) cited in Geeretson, THE HISTORY OF THE ROYAL DUTCH, Vol.1., 2nd ed., E.J. Brill, Leiden, 1958, p.20. See also A.L. Ter Braake, 'Mining In The East Indies'., Bulletin 4 of the Netherlands and Netherlands Council Of the Institute of Pacific Relations, N. York, 1944, pp. 66-67.

attack Portuguese ships:

> "..... that in the 18th century people living by the Straits of Malacca (Sumatra) were using earth oil for fuel. During the 16th century the fleet of the kingdom of Atjeh defeated a Portuguese armada under Alfonso D'Alburquerque by the use of 'fireballs' - clumps of rags immersed in oil found in seepages in the Atjeh region lighted and catapulted at the empty ships which were thus set on fire - effective until the Europeans returned with long-range guns".[2]

The story of this Deli well is further described as "oil that is deemed inextinguishable once it has been ignited and that burns upon the sea"[3].

In the first half of the seventeenth century, instructions were said to be repeatedly sent to the Dutch East India Company's envoys at the court of the Sultan of Acheh to bring back with them, for the use of the "Council of Seventeen", a few pots of "Earth Oil" very esteemed and used to treat "stiffness in the limbs"[4]. It is this medicinal capacity that petroleum was prized in Holland at that period. The Dutch East India Company even then imported regular supplies of this "minyak tanah" (literally "oil of earth") which was sold all over Europe in competition with Modena and Tegernsee oil. However, from an unspecified source, "one of

---

2 Dubey, Oil Boom in Indonesia, in INSIGHT, No. 21, 1971 A similar version appears in THE STORY OF THE OIL INDUSTRY IN INDONESIA, published by P.N. Pertamina, 1970, p.7. See also H.L. Oei, PETROLEUM RESOURCES AND ECONOMIC DEVELOPMENT. A comparative Study of Mexico and Indonesia, Unpublished PhD Thesis, University of Texas, 1964.

3 Gerretson, op. cit., p.20.

4 Gerretson, ibid., p.20.

the earliest recorded mentions of oil in Indonesia appears in the Annals of the Chinese Court of 971 A.D., which relates that in that year some lamp oil was sent by the Sumatran Emperor of Srividjaya to the Emperor of China".[5] However, the small oil fields in North Borneo and Sarawak were not described until the twentieth century. The search and discovery of oil fields in these two areas will be described fully in Part 2 of this Chapter.

Although oil production in Malaysia did not begin till in the twentieth century, oil trade activities in Malaysia began in the late nineteenth century or perhaps earlier in the case of native trades in oil. Although statistical data before this period of time is not available, one can safely say that the first trade in oil (kerosene) that Malaysia (then Malaya) had entered into was in the early 1880s when the Anglo-Saxon Petroleum Company began importing into the country after pioneering the Suez Canal for oil products with the first oil tanker on the Far Eastern run.[6]

It was reported from various sources that by 1885 small consignments of Russian illuminating oil in cases were reaching the ports of India.[7] With the arrival in February, 1889, of the first cargo at Singapore, Russian illuminating

---

5 H.L. Oei, op.cit., p.7.

Please see Footnotes 6 and 7 next page.

oil shared the first place with the American product. In another report,[8] it was mentioned that sometime in August, 1886, a cargo of petroleum arrived at the Port of Penang in Malaya and on examination found that the article came under the category of "dangerous substances". Under the law at that time, there was no authority to land it, and the ship was asked to leave to some other port. The Government of the day did not have the power to permit dangerous petroleum to be landed and stored in some remote place from shipping and population. In order to permit the landing of such a dangerous product, the British Governor of Penang was given the power to make rules to provide the import of the product by passing the Petroleum Ordinance of 1886. (This will be discussed in Chapter 6.)

During the last decade of the nineteenth century, the Far East was no longer dependent on kerosene supplies from Russia and the United States only. In 1889, the Burmah Oil Company Limited started operation and produced waxy crude which formed an important part of the world's paraffin wax supply and its kerosene found a ready market in India and Malaya. In 1894, the first consignment of

---

6 Shell or the Anglo Saxon Petroleum Company, the firm of Marcus Samuel and Co., was founded to carry on a general trade with the Far East. Amongst the articles imported were those of polished shells which the Victorian English decorate screens, little boxes and the various knick-knacks fashionables during the period besides cloth and manufactured goods. In return, Samuel brought tea, jute, rice and other materials for the households and factories of Great Britain.

7 Gerretson, F.C. HISTORY OF THE ROYAL DUTCH, Vol.1, p.214.

8 Proceedings of the Legislative Council of the Straits Settlements 1886, October 20, 1886, p. 153.

Langkat oil from Sumatra produced by The Netherlandsche Koloniale Petroleum Maatschappij (N.K.P.M.) arrived in Malaya.[9] In 1901, the kerosene from crude oil in Borneo was also sold along with other imported kerosene on the Far Eastern market.

During this period, there were three main companies supplying kerosene to Malaya. These were (1) The Amalgamated Shell Transport and Trading Company and the Royal Dutch Oil Company with subsidiary companies forming what was known as the Asiatic Petroleum Company, (2) The Standard Oil Company of New York and (3) The Shanghai Langkat (Sumatra) Company. Borneo, Sumatra and Russia were the fields of operations in the case of (1) earlier.

Despite the stiff competition amongst the three companies over the years - the lowering of prices and the fall in the turnover or sales due to the fall in the purchasing power of the population - there was an enormous growth of petroleum trade in the Far East since 1895. Some interesting figures are given in Table 2.1 with reference to the oil trade in Malaya. The trend of oil imports is graphed in Figure 2.1. During the years between 1886 and 1891, the bulk of the imported oil from Malaya was shipped from America by the Standard Oil Company and from Russia

---

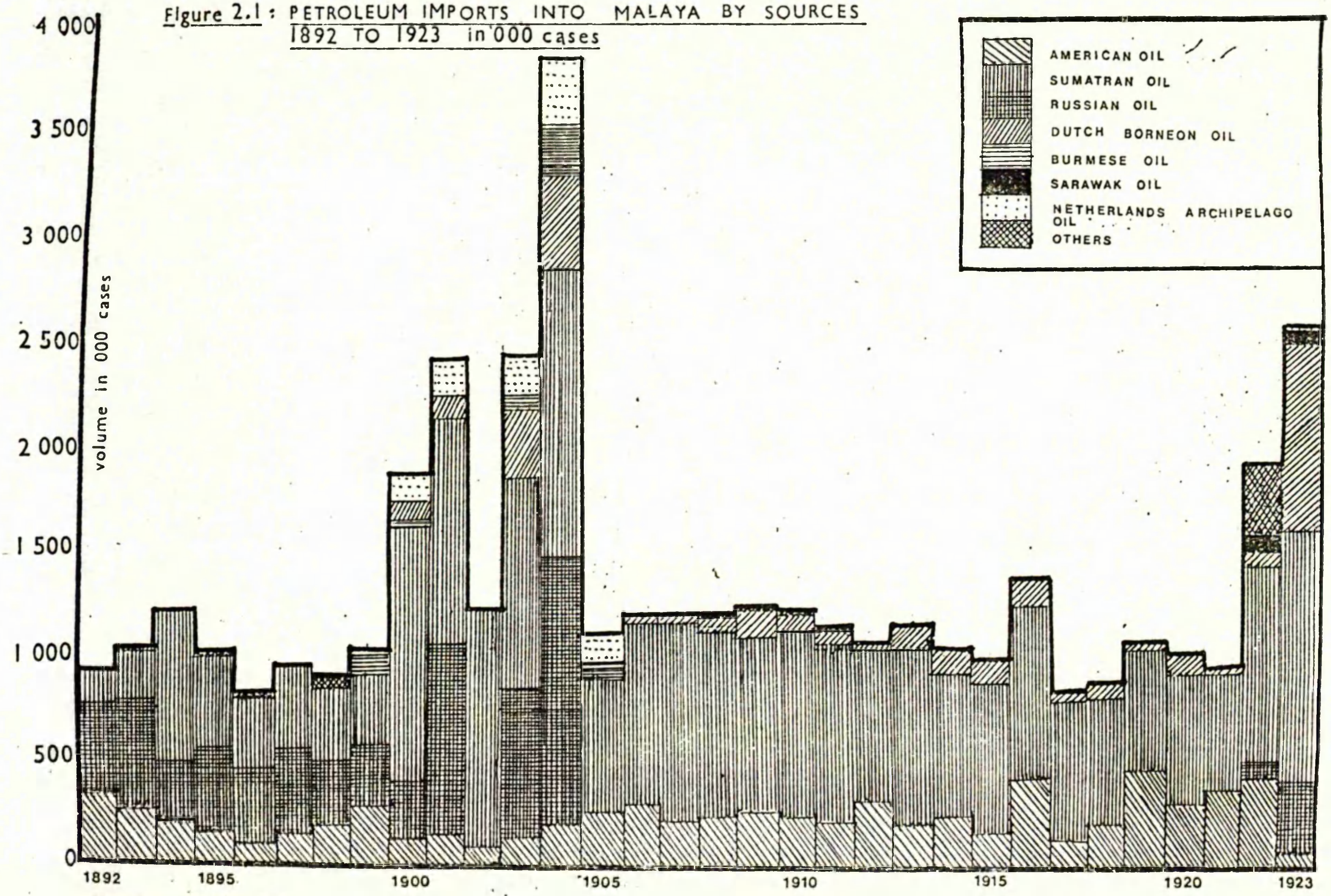
9 Earlier in April of 1892, Kessler, acting on behalf of the NKPM introduced a small quantity of Langkat oil christianed as "Crown Oil" to Penang. He appointed Martjin and Company at Penang as their agents, and gave 2,500 cases every month to sell.

TABLE 2.1: KEROSENE IMPORTS OF MALAYA IN 1892-1920 (in cases)

YEAR	U.S.A.	RUSSIA	SUMATRA	BURMA	NETHERLANDS ARCHIPELAGO	DUTCH BORNEO	SARAWAK	OTHERS	TOTAL
1892	332,858	394,151	104,298	-	-	-	-	4,684	825,991
1893	241,229	507,137	276,792	-	-	-	-	3,358	1,028,516
1894	205,624	268,124	762,320	-	-	-	-	370	1,236,438
1895	114,189	458,387	434,700	-	-	-	-	8,585	1,015,861
1896	99,944	344,532	378,148	-	-	-	-	22,355	844,979
1897	101,234	468,187	400,808	-	-	-	-	3,202	973,431
1898	163,000	348,000	334,000	-	-	-	-	55,000	898,000
1899	230,000	371,000	311,000	124,000	-	-	-	-	11,041,000
1900	106,000	277,000	1,214,000	52,000	107,000	-	-	-	1,888,000
1901	120,000	928,000	1,177,000	-	178,000	25,000	-	-	2,428,000
1902	74,000	9,000	1,126,000	-	150,000	-	-	-	1,359,000
1903	145,000	722,000	957,000	90,000	-	339,000	-	6,000	2,435,000
1904	148,000	1,274,000	1,409,000	187,000	-	464,000	-	6,000	3,880,000
1905	268,000	-	604,000	102,000	174,000	-	-	6,000	1,154,000
1906	286,000	-	923,000	-	-	29,000	-	5,000	1,243,000
1907	222,000	-	961,000	-	-	60,000	-	-	1,243,000
1908	239,000	-	892,000	-	-	116,000	-	3,000	1,250,000
1909	288,000	-	826,000	-	-	148,000	-	52,000	1,314,000
1910	261,000	-	871,000	-	-	97,000	-	41,000	1,270,000
1911	216,000	-	873,000	-	-	46,000	-	8,000	1,143,000
1912	320,000	-	711,000	-	-	28,000	-	-	1,059,000
1913	171,000	-	887,000	-	-	117,000	-	-	1,175,000
1914	253,000	-	704,000	-	-	93,000	-	-	1,050,000
1915	146,000	-	729,000	-	-	109,000	-	-	984,000
1916	433,000	-	844,000	-	-	141,000	-	-	1,418,000
1917	131,000	-	672,000	-	-	18,000	-	-	821,000
1918	169,000	-	636,000	-	-	90,000	-	-	895,000
1919	495,000	-	565,000	-	-	44,000	-	-	1,104,000
1920	306,000	-	628,000	-	-	98,000	-	-	1,030,000

Source: STRAITS SETTLEMENTS BLUE BOOK FOR VARIOUS YEARS FROM 1892 TO 1920.

Figure 2.1 : PETROLEUM IMPORTS INTO MALAYA BY SOURCES 1892 TO 1923 in '000 cases



source: table 2.1

by The Tank Syndicate or Shell. No reliable figures were obtained during this period but it was implied from various and scattered sources of information that each of them equally shared the market. However, the situation of oil trade in Malaya after 1891 was much clearer than the previous periods.

From 2.1, it can be seen that the imports of oil (kerosene) in cases increased from 826,000 cases in 1892 to 1,236,500 cases in 1894 before it went down again to 845,000 cases in 1896. The decline of 171,000 cases of petroleum imported from the 1895 figures was as a result of the change in the system of distributing Langkat or Sumatran oil after 1894. In that year, all kerosene were sent to Singapore to be stored there, and sold from that port, whereas in 1895 and to a great extent in 1896, the same vessles which loaded at Langkat in Sumatra merely passed through Singapore discharging a portion of their cargos when required, or sail direct to other places.

As has been said earlier, there were three major sources of supplies of oil during the period - America, Russia and Sumatra (Langkat) but a minor but increasing in importance was the supplier from Burma. During this period both the American and Russian case oils were declining in terms of volume of imports with competition from Langkat and Burmese oil. This prompted the East Asiatic Petroleum Company to change their strategy which resulted in them gaining possession of crude oil produced in the Far East itself. With the development of Telaga Said in Sumatra in

1897, the Company's share in the Eastern market, especially in Malaya, in the ensuing years after 1900 increased, as seen in the Table 2.1.

In the meantime, the new oil business from Sumatra-Langkat - had increased considerably. The policy of the Dutch government of Indonesia in not excluding the Malayan silver currency in the east coast of Sumatra had helped to establish a very promising oil trade even against such powerful rivals as Russia and America.[10]

After 1895, the prominent feature of the petroleum trade in Malaya was the growth in the importation of oil from Burma. (Before 1899 Burmese imports were classified under "Others"). A small consignment of oil marketed by the Burmah Oil Company had been landed in the Malay Archipelago in the period 1899 to 1905. As shown in Table 2.1, at about the same time in 1899 petroleum imports of Russian and Burmese oils and particularly American oil yielded fair increases but Royal Dutch Sumatran production shared a falling off of 23,000 cases. However, for Sumatran oil of the Royal Dutch, a new brand 'Dragon' entered the market during the year and had taken the place of 'Crown' brand which had rapidly fallen off in production while Burma oil more than doubled its previous record standing at 124,000 cases in 1899 compared to 55,000 cases in 1898.

The importation of petroleum into the country in 1902, however, fell from about 2.4 million cases in 1901 to

10 PENANG ADMINISTRATION REPORT, 1896.

a little over 1.4 million cases, a decline of 44 percent. The outstanding fact in connection with this trade was the inability of Russian and American oils to compete owing to the cheapness of the Sumatran product. In the Table 2.1, while in 1895 to 1904 the imported oils from America and Russia supplied considerably more than half the market, from 1904 onwards supplies from Russia fell off completely and supplies from America formed only about 20 to 30 percent of the trade.

There were 2 points which must be noted in connection with the Malaysian oil trade at this time and the ensuing years. Firstly, the means of transport had, during the last few years, undergone a radical change. The bulk method of transport was superceeding the older system of transporting oil in cases or in tins. Secondly, for the ten years from 1892 to 1901, it was seen that a greater portion of the oil trade in Malaya at that time was of transhipment in nature. The oil imported in Malaya included considerable quantities for local use and the remainder was intended for other countries. However, they were sent for temporary storage in Malayan depots with supplies being drawn out from time to time on instructions from the head office of the different companies importing the oil.

The next forty years or so till the beginning of the Second World War saw a great change in the development of the world petroleum industry which inevitably shaped the history of oil trade in Malaya as well. The crucial event of shaping this development was sometime in 1901 when a conference was held between the East Indian producers of crude oil and the Russian exporters of petroleum products to discuss the possibilities of reaching an agreement between them. As result of this conference an alliance was reached amongst the three producers and marketers of The Royal Dutch, The Shell and Transport Company, and The Rothchilds.[11] And following from this, another agreement between The Royal Dutch and The Shell Transport and Trading Company was made in February 1907 which resulted in the emergence of the Royal Dutch/Shell Group of Companies. An agreement between The Burmah Oil Company and The Asiatic Petroleum Company - a subsidiary of Shell in 1905 prevented further imports of Burma oil into Malaya and the neighbouring countries.[12] However, there was a small but increasingly significant imports of petroleum products from Dutch Borneo since 1903. And from 1905 till 1929, there were only 3 suppliers of oil products into Malaya namely America, Sumatra and Dutch Borneo.

---

11 At the time of the amalgamation, The Royal Dutch possessed crude oil and Shell and Transport Company did not have any crude sources.

12 The Burma Oil Company directed its Burmese oil exports more towards India - its 'natural' market. Its turnover in Malaya was around 100,000 cases and in the Far East 3 million cases. The chief stipulation of the Agreement was that the Royal Dutch guaranteed its turnover in India with the undertaking that the Burmese oil was allowed to market 100,000 cases per week before the Asiatic Petroleum Company sold anything.

2.1.2 The Changing Structure Of Oil Trade After 1920

Up to the period of 1923 and beyond, the petroleum trade in Malaya showed a fluctuating trend with most times characterised by decreasing import volumes and values except for the years of 1917, 1918, 1922 and 1925 particularly the latter two years. From 1922 onwards oils from Russia, Sarawak (for the first time) and 'Others' make an impact on the import trade figures besides the big increases from sources such as Sumatra and Dutch Borneo, far more than compensating the declining of import volume and value from America.

One interesting feature of the petroleum trade after the 1920s till the beginning of the Second World War was the changing product composition. At around 1920 or before that, kerosene ceased to be single predominant export item in oil trade and it began to be traded in terms of tons instead of in cases. In the case of Malaya, there were 4 main types of petroleum products that comprised export and import items in the trade - motor spirit, kerosene, fuel oil and lubricating oils. There were also others which included greases and paraffin or petroleum wax apart from crude oil exports of Sarawak.

In the trade volume figures shown in Table 2.2, fuel oil predominates over the other products after the 1920s. This was followed by gasoline and kerosene. The trend of trade for the products over the 20 year period

TABLE 2.2 : MALAYAN TRADE IN PETROLEUM PRODUCTS 1920 - 1940

(Figures rounded into '000 Units)

Products	Unit		1920	1922	1924	1926	1928
Motor Spirit	Gal.	X	723.6	3,635.8	15,262.5	205.4	184.3
	Gal.	M	3,286.9	7,297.4	24,037.4	273.2	290.8
	Gal.	N	-2,563.3	-3,661.6	-8,774.9	-67.8	-106.5
	L. Ton	N	-8.23	-11.76	-28.4	- 0.22	- 0.34
Kerosene	Gal.	X	3,930.6	10,835.7	12,257.8	61.6	111.2
	Gal.	M	8,256.7	15,220.0	20,068.9	91.3	147.0
	Gal.	N	-5,726.1	4,384.3	-8,211.1	-29.7	-35.8
	L. Ton	N	-19.8	-15.2	-28.5	- .1	- .1
Fuel Oil	L. Ton	X	1.9	14.3	33.7	218.1	281.6
	L. Ton	M	21.9	109.2	297.0	346.6	524.8
	L. Ton	N	-20.0	-94.9	-257.0	-128.5	-243.2
Lub. Oil	Gal.	X	962.5	1,330.4	2,263.6	2,457.6	1,553.6
	Gal.	M	1,445.1	1,311.3	4,288.8	6,242.8	5,683.1
	Gal.	N	-482.6	+19.1	-2,025.2	-3,785.2	-4,129.5
	L. Ton	N	-1.9	+ 0.1	-7.9	-14.7	-16.1
Others		X	-	-	-	2.7	3.9
	L. Ton	M	0.6	0.7	1.3	15.2	22.2
	L. Ton	N	- 0.6	- 0.7	-1.3	-12.5	-18.3

Notation: X = Export; M = Import; N= Net Export(+), Net Import(-)

Source: Basic data compiled from Straits Settlements Blue Book for various years 1920 to 1940.

1930	1932	1934	1936	1938	1940
443.3	273.0	320.5	240.6	360.7	421.5
546.7	319.3	405.1	320.5	449.0	546.4
-103.4	-46.3	-84.6	-79.9	-88.3	-124.9
- 0.3	- 0.1	- 0.3	- 0.3	- 0.3	- 0.4
118.8	69.6	53.8	92.1	118.8	82.2
158.4	93.4	91.5	134.5	162.3	147.9
-39.6	-23.8	-37.7	-42.4	-43.5	-65.7
- 0.1	- 0.1	- 0.1	- 0.2	- 0.2	- 0.2
428.5	292.4	350.3	22.2	510.4	141.2
633.7	387.7	346.9	528.2	632.0	651.3
-205.2	-94.7	+ 3.4	-526.0	-121.6	-510.1
941.2	2.5	4.3	2.2	3.1	5.4
4,086.4	9.2	13.5	12.4	13.8	23.0
-3,145.2	- 6.7	- 9.2	-10.2	-10.7	-17.6
-12.3	- 0.03	- 0.04	- 0.4	- 0.04	- 0.07
1.4	8.0	5.6	1.9	1.8	6.4
18.5	10.4	17.1	22.0	24.2	26.1
-17.1	- 2.4	-11.5	-20.1	-22.4	-19.7

25

proved to be fluctuating as could be seen from the Table 2.2 earlier. The two most fluctuating years in the product history during this period were the times of the First World War 1925-26 and the World Economic Depression in 1931 till 1933.

The volume in net figures of exports (+) or imports (-) shows a sharp drop in the net imports of the three main products - motor-spirit, kerosene and lubricating oil in 1940 compared to their levels in 1920. The net import of motor spirit in 1940 was around 400 long tons compared to about 8,200 long tons in 1920; in the case of kerosene it was 227 long tons in 1940 compared to 19,800 in 1920. The net import of lubricating oil was registered at 1880 long tons in 1920 and only 68.6 long tons in 1940. The decreases in these products were more pronounced during the War years from 1924 to 1925 and the Depression period from 1931 to 1933. However, in the case of fuel oil it showed an increase of net import rising to 510,000 long tons in 1940 compared to 20,000 long tons in 1920.

2.1.3 The Oil Trade After The Second World War

After the Second World War, the structure of the various petroleum products in the oil trade accounts in Malaya had shifted significantly. Besides the 4 main products mentioned earlier, 5 other products were added to the export and import figures. They were aviation spirit, aviation turbine fuel, gas and diesel oils, asphalt and bitumen. Aviation spirit appeared in the trade account in 1948 and aviation turbine fuel 7 years later in 1958. Gas and diesel oil appeared in 1948.

In Table 2.3 the net import of motor spirit had advanced substantially since the end of the war - this indicated the increasing demand for the product in the domestic market. The main reason for this probably was the increase in the number of motor vehicles imported into the country, especially after the Second World War. This occurred despite the activity of the Communist guerillas and the imposition of curfew throughout the country which put a very severe limit upon movement in Malaya at that time. After 1962, the structure of trade in this product showed a surplus of exports over imports i.e. net exports (+). This was the result of the establishment of 2 other refineries in Malaya at Port Dickson. The surplus was above and beyond the requirements in the country.

The net imports of kerosene widely used as an illuminant and for cooking represent demand increased by 13 times from 1946 till 1962 before the establishment of the refineries. This to some extent reflects the increase in the standard of living at that time. This was also attributed to the liberal use of artificial lighting because of the high level of prosperity of smallholders' rubber plantations as a result of the Korean War boom (resulting in the increase in demand for rubber) and the good prices commanded by primary products.

TABLE 2.3 : MALAYAN TRADE IN PETROLEUM PRODUCTS 1946 - 1968

(Figures rounded into '000 Units)

PRODUCTS			1946	1948	1950	1952	1954	1956
Motor Spirit	Gal.	X	102.8	182.5	514.4	735.9	904.5	899.9
	Gal.	M	173.8	236.0	689.8	992.0	1,194.5	1,240.4
	Gal.	N	-71.0	-53.5	-175.4	-256.1	-290.0	-340.5
	L. Ton	N	- 0.2	- 0.2	- 0.6	- 0.8	- 0.9	- 1.1
Kerosene	Gal.	X	90.3	105.9	113.4	374.8	428.2	382.1
	Gal.	M	103.7	93.1	172.9	408.2	378.5	1,182.2
	Gal.	N	-13.4	+12.8	-59.5	-33.4	+49.7	-800.1
	L. Ton	N	- 0.05	+ 0.04	- 0.2	- 0.1	+ 0.2	- 2.8
Fuel Oil	L. Ton	X	101.0	623.6	1,172.6	1,721.6	2,137.8	2,606.0
	L. Ton	M	573.5	561.1	1,222.9	1,958.8	2,375.8	2,791.3
	L. Ton	N	-472.5	+58.5	-50.3	-177.2	-238.0	-185.3
Lubricating Oil	Gal.	X	1.7	7.0	4.2	4.1	5.8	5.8
	Gal.	M	12.0	16.7	22.3	28.9	24.4	34.3
	Gal.	N	-10.3	- 9.3	-18.1	-24.8	-18.6	-28.5
	L. Ton	N	- 0.04	- 0.04	- 0.07	- 0.1	- 0.07	- 0.1
Aviation Spirit	Gal.	X	-	122.6	91.8	140.8	246.4	233.5
	Gal.	M	-	-	-	-	56.3	61.9
	Gal.	N	-	122.6	+91.8	+140.8	+190.1	+171.6
	L. Ton	N	-	+ 0.4	+ 0.3	+ 0.4	+ 0.6	+ 0.5
Asphalt	L. Ton	X	0.4	1.5	1.2	5.9	10.1	132.4
	L. Ton	M	4.5	14.0	30.0	36.2	40.2	176.9
	L. Ton	N	- 4.1	-12.5	-29.7	-30.3	-30.1	-44.5
Gas Oil	Gal.	X	-	50.9	157.8	301.7	392.6	365.0
	Gal.	M	-	139.0	305.8	789.7	768.1	783.6
	Gal.	N	-	-88.1	-148.0	-488.0	-375.5	-418.6
	L. Ton	N	-	- 0.4	0.6	- 1.8	- 1.4	- 1.6
Diesel Oil	Gal.	X	-	219.8	445.2	443.7	300.8	348.2
	Gal.	M	-	510.6	729.6	741.7	690.3	705.6
	Gal.	N	-	-291.2	-284.4	-298.0	-389.5	-357.4
	L. Ton	N	-	- 0.1	- 0.1	- 0.1	- 0.1	- 0.1
Aviation Turbine Fuel	Gal.	X						
	Gal.	M	-	-	-	-	-	-
	Gal.	N						
	L. Ton	N	-					

Source: Basic Data from Straits S[illegible] BLUE BOOK for various years from 1946 - 1968

Notation: X = Export; M = Import; N = Net Export(+), Net Import(-)

1958	1960	1962	1964	1966	1968
697.4	817.5	657.4	758.1	104.7	167.9
993.5	1,048.4	666.1	574.5	82.4	91.4
-296.1	-230.9	- 8.7	+183.6	+22.3	+76.5
- 1.0	- 0.7	-	+ 0.6	+ 0.07	+ 0.04
321.1	350.4	286.6	216.6	32.2	104.5
1,044.8	1,475.3	453.8	303.4	41.4	49.1
-723.7	-124.9	-167.2	-86.8	- 9.2	+55.4
- 2.5	- 0.4	- 0.6	- 0.3	0.1	0.1
2,187.9	2,106.7	2,644.0	4,240.7	314.4	240.7
2,477.2	2,193.4	2,575.1	3,235.0	35.7	45.7
-289.3	-86.7	-68.9	-15.7	+278.7	+195.0
182.5	15.9	222.0	224.6	16.2	14.4
61.4	126.5	163.4	150.0	4.2	0.2
+121.1	-110.6	+58.6	+74.6	+12.0	+14.2
+ 0.1	- 0.4	+ 0.2	+ 0.2	+ 0.1	+ 0.1
37.0					
49.0					
-12.0					
354.6	2,287.3	3,194.7	3,193.5	36.6	70.1
755.0	912.8	796.7	742.5	286.9	376.0
-400.4	+1,374.5	+2,398.0	+2,451.0	-250.3	-305.9
- 1.5	+ 5.2	+ 9.0	+ 1.0	- 1.1	- 1.7
219.6	249.2	286.1	292.7	71.8	38.6
715.5	669.8	914.6	-	37.6	38.6
-495.9	-420.8	-628.9	-	+34.2	0.0
- 1.9	- 1.6	- 2.4	-	+ 1.3	0.0
22.7	122.4	278.4	226.0	22.6	5.2
116.3	475.3	453.8	303.4	21.0	2.4
-93.6	-352.9	-175.4	-77.4	+ 1.6	+ 2.8
- 0.4	- 1.2	0.6	0.2	0.1	0.1

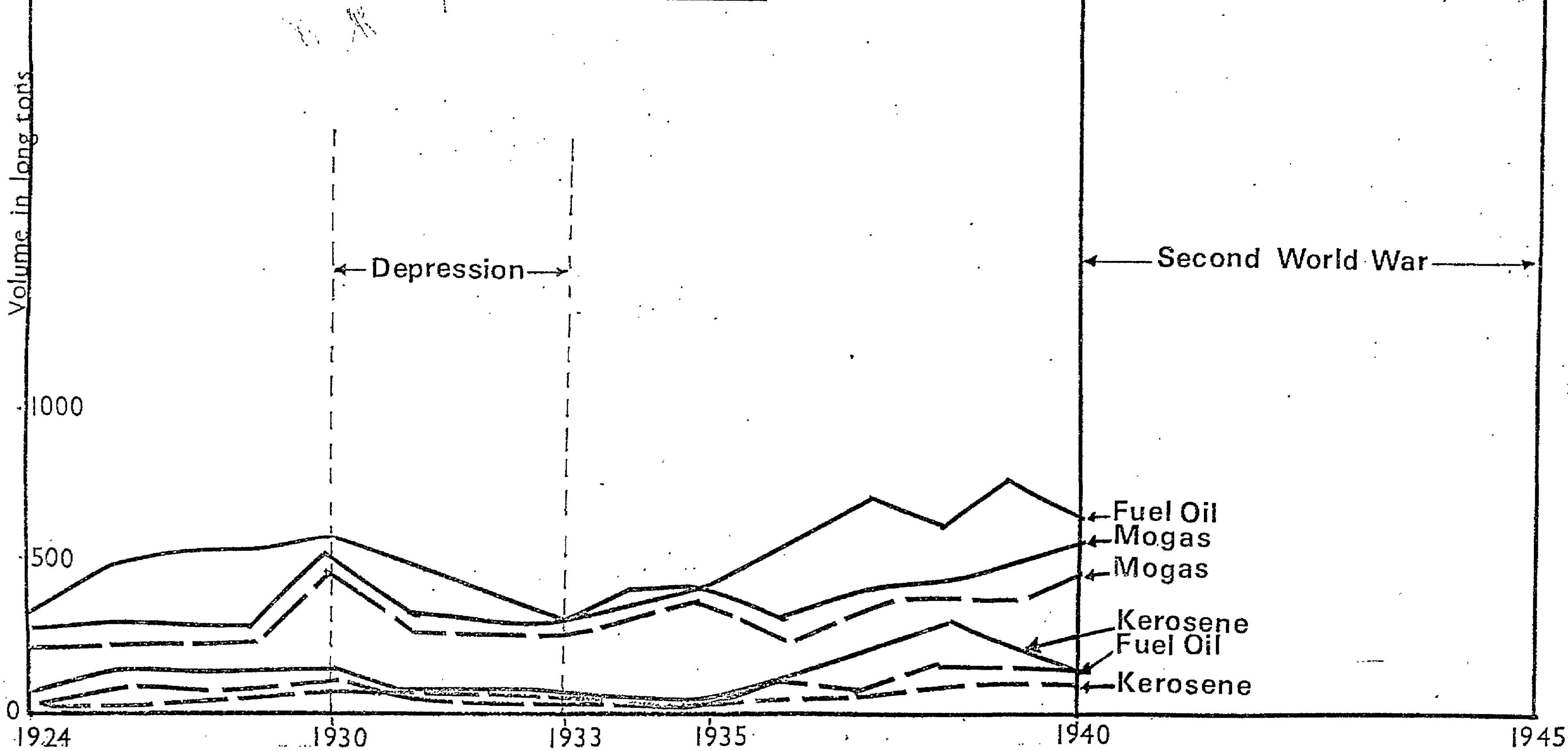
In the case of fuel oil, however, the product showed a fluctuating trend in the post war years. However, after 1964 there was a net surplus of products for export from domestic refineries. It is worth noting that as in some under-developed regions the demand for kerosene was nearly as large as for gas/diesel oils and fuel oils at that time. In Malaya, lighting in main centres was being increasingly provided by electricity generated by thermal power stations in large towns and by diesel plants elsewhere. This fact partly accounts for the country's quickly rising consumption of both gas/diesel oils and fuel oil which was further affected by the rising level of industrial developments after independence in 1957.

Another significant feature which occurred during the post-war period was the emergence of trade and consumption in aviation fuels - the aviation spirit or gasoline in 1948 and the aviation turbine fuel in 1956. Their use had begun to take root and increased substantially over the years with the development of the air services in the country.

To trace out the trend of development of oil trade in Malaya between 1920 and 1963, Figures 2.2 (a) and 2.2 (b) have been included here. The graphs show how erratic were the trends during the years.

From the above discussion, it is concluded that the period before 1963 was characterised mainly by trade in

Figure 2.2A MALAYAN PETROLEUM PRODUCTS IMPORTS & RE EXPORTS FROM 1926 TO 1940 (in '000 units)



Source: Graphed from Table 2.2

Figure 2.2 B (1) MALAYAN PETROLEUM PRODUCTS IMPORTS 1946 TO 1963

Source: Graphed from Table 2.3

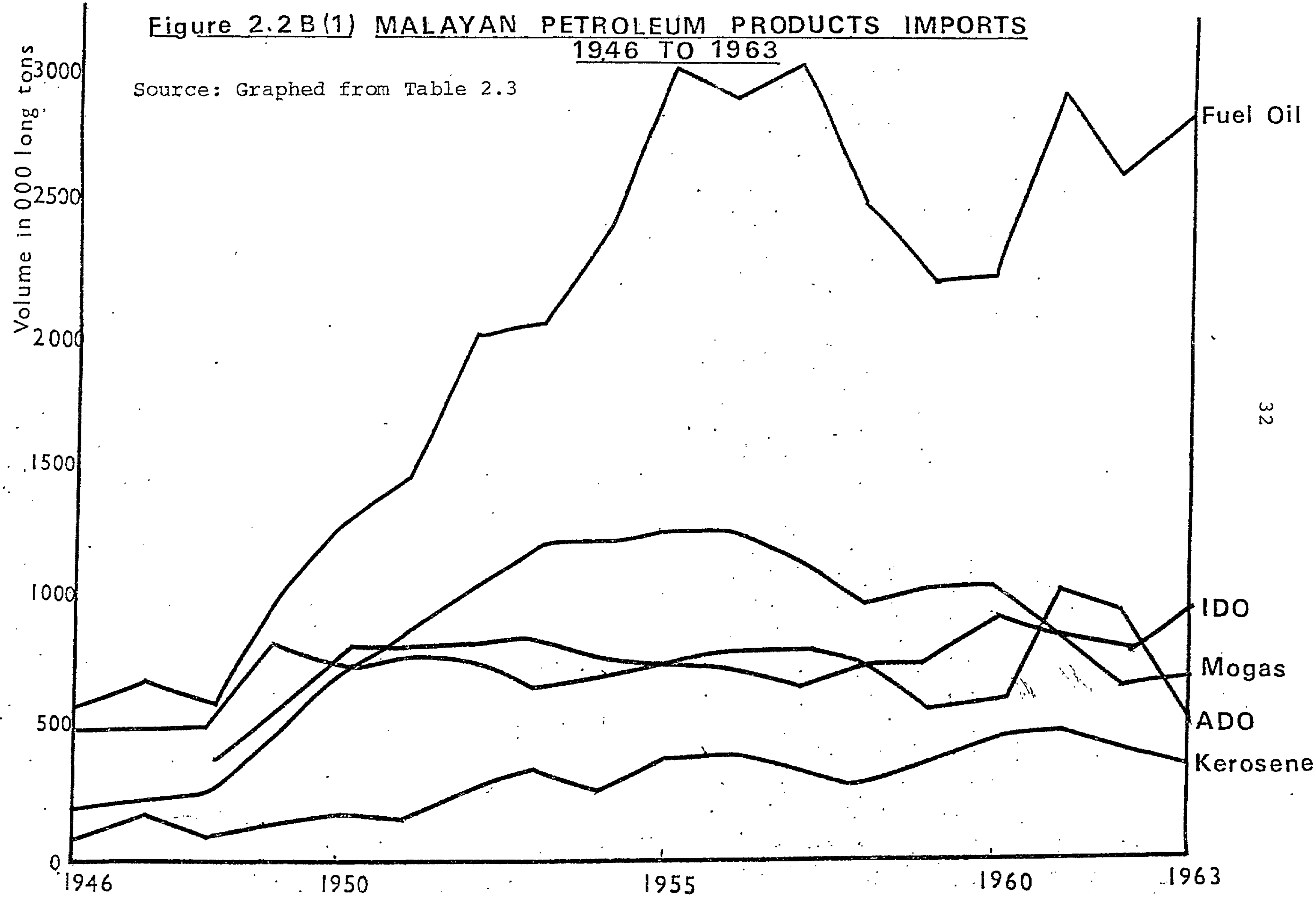
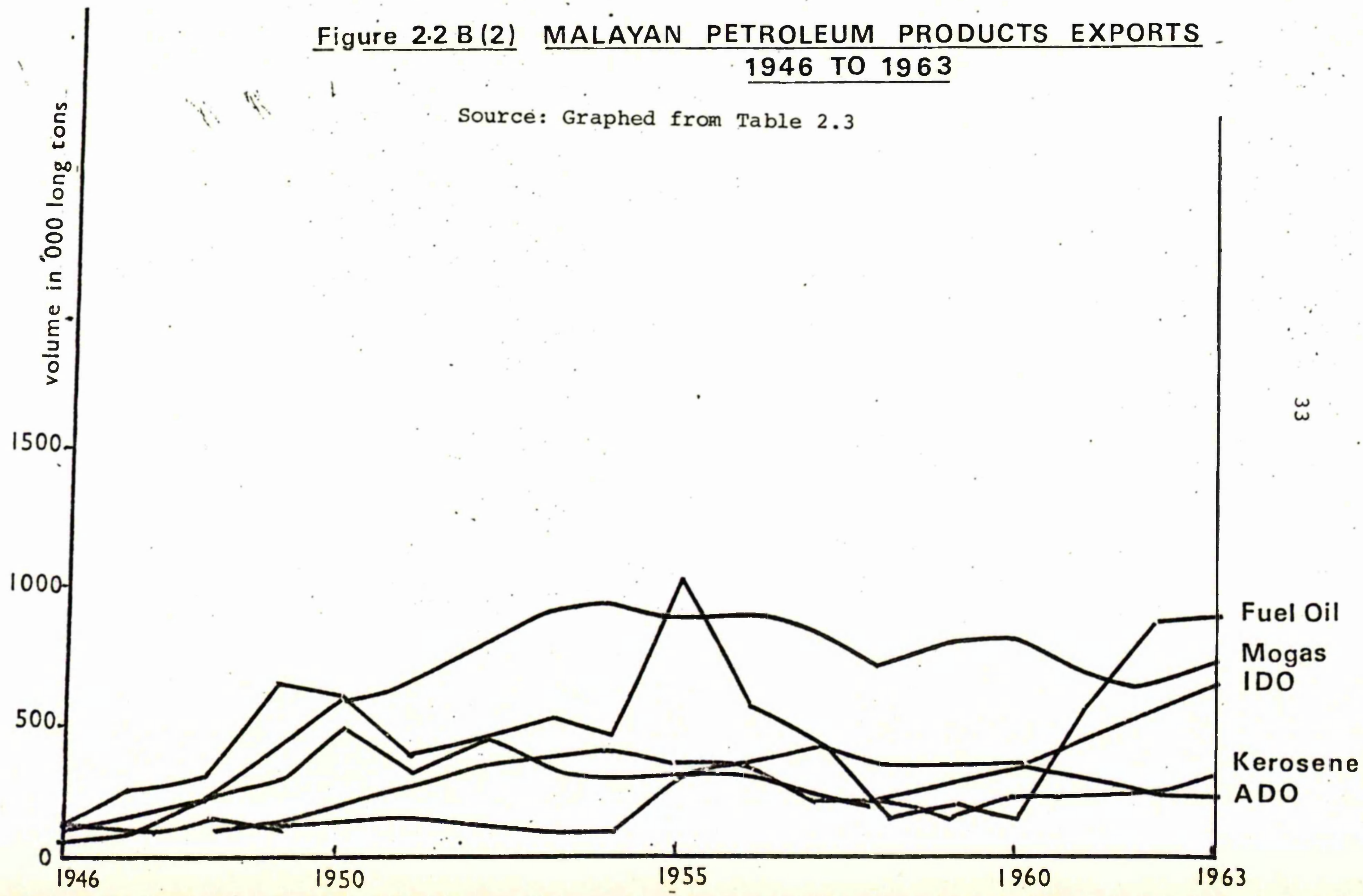


Figure 2.2 B (2) MALAYAN PETROLEUM PRODUCTS EXPORTS 1946 TO 1963

Source: Graphed from Table 2.3



the form of transhipment (imports as re-exports to the neighbouring countries). However, as we shall see in later chapters, with the establishment of the refining industry in Peninsula Malaya, there is a reversal of trend in the structure of oil trade in Malaya. Surplus of production in most products from the refineries are exported mainly to the neighbouring countries, thus reversing the negative figures mentioned earlier.

Another significant development of oil trade in Malaysia was the emergence of the Malaysian State of Sarawak (then under the British Empire) into the world oil scene in 1911 with the production and export of crude oil from Miri Field. At that time Sarawak was one of the 2 major oil producers in the British Empire (the other being Trinidad in 1908). This development will be traced and discussed in the following section.

2.2 Crude Oil Production Scenarios

2.2.1 The Beginning Of The Domestic Crude Oil Producing Industry

The petroleum industry of the East Indies, which has now assumed considerable dimensions, ~~is of comparatively recent growth~~ dated back in the case of Indonesia and Borneo to no earlier than 1897. In the case of Malaysia, the early history of the industry is very sketchy and incomplete. The story of oil in the Malaysian eastern state of Sarawak can be said to be almost as old as the inhabitants, since they had, from the earliest times, realised the value of this strange substance which appeared in seepages in certain parts of the territory.[13] According to observations made by A.H. Everett in the 1870s in the Miri area, "a small native industry flourished in the area, oil being obtained for local use from shallow surface well.[14] The oil might have seeped, over centuries, through the geological fissures from an underlying stratum of oil-bearing sand. It was also found that the bituminous residue or asphalt which was found at the seepages (the result of evaporation and oxidation) was also used by the natives for caulking their dugouts. Later the use for that purpose of damar, an indigenous resin, and the importation of kerosene oil combined to make the working of these seepages less advantageous, and interest gradually lost in them.

The presence of oil seepages in the neighbourhood of Baram and Miri Rivers had been known for many years before active steps were taken to investigate the possibilities of obtaining a commercial production for them. A series of more or less eight seepages, located a little inland from the original Miri villages, were actually exploited in a primitive way by the Miri Malays. The procedure adopted by the locals was to dig pits above three feet deep in the zone of the seepages. Being in a swampy

---

13 F.W. Rowe, THE NATURAL RESOURCES OF SARAWAK, Government Printer, Kuching, p.24.

14 At that time there was a small population in and around Miri; the trade of Miri was mostly jelutong wood, brassware, and preserved fish. The inhabitants knew little of the world beyond Miri.

ground, these pits were filled with water on the surface of which the oil floated. This was skimmed off by the locals using gourds or coconut shells, and burnt for lighting their huts in very primitive lamps, made from any convenient vessel, such as an empty tin, a small gourd or even a bottle, using a strip of cotton or cloth to serve as wick.[15]

Indications of petroleum had been known in Borneo and other islands of the East Indian Archipelago in various journals.[16] And as far back as 1853, Motley[17] noticed oil occurrences in the island of Labuan. In 1863, Menten[18] found seepages in the island of Tarakan, on the east coast of Borneo. In 1886 a very shallow well was drilled in Labuan which gave a small flow of oil for 13 years at least. Collingwood[19] in 1867, described a petroleum spring in British Borneo, and stated others were known. About 1887, three wells were in existence on the Klias Peninsula on the north Borneo Bay, and these gave oil in large quantities. According to some reports, J.H. Menten[20] was certainly the pioneer of the industry in Borneo. In 1888, he obtained oil and coal concessions near the mouth of the Mahakan River and later obtained further concessions near Balik Papan. Further

15 Cochrane, T.G. Empire Oil: "The Progress of Sarawak", Paper presented to the Royal Society of arts on March 4, 1924 appeared in JOURNAL OF THE ROYAL SOCIETY OF ARTS, March 28, 1924, pp 308-309.

16 Posewitz, BORNEO, Berlin, 1899 sited in J. Kewley, The Crude Oils of Borneo, in JOURNAL OF THE INSTITUTION OF PETROLEUM TECHNOLOGISTS, Vol.VII, p.209,pt.27, July 1921.

17-20 De Crespigny in his diary in 1882 as told in Charles Hose, ROMANCE AND RESEARCH OR A JUNGLE WALLAH AT LARGE, Hutchinson Company, London 1927.

indications were found in the Bolongan area of West Borneo, Sarawak and elsewhere.[21]

According to some reports, on the north coast of Borneo, petroleum and its residue have long been collected in hand dug pits for lighting and from seepages for caulking of canoes. De Crespigny,[22] in his diary, reported that the inhabitants had used the oil mixed with resin for caulking their boats and had attempted to use it for lighting by employing an open wick as they did with coconut oil, but the 'Earth Oil' as they called it, invariably caught fire, usually with disastrous results to their houses. Harper[23] commented that the inflamatory nature of the oil soon earned for it a reputation. It was said to have a Hantu meaning ghost, which had an insatiable desire to burn down houses.

Other observations were made on this subject, including one by Tate who wrote the following : "the uses for oil were for lamps and the preservation of wood and palm-leaf manuscript".[24]

---

21 Engler, Hofer Das Erdol, Vol.ii, p.535 cited in J Kewely, ibid., p.210.

22 De Crespigny in his diary in 1882 as told in Charles Hose, ROMANCE AND RESEARCH OR A JUNGLE WALLAH AT LARGE, Hutchinson Company, London, 1972.

23 Harper, G, The Miri Field 1910-1972 in SARAWAK MUSEUM JOURNAL, January/December 1972, Government Printer, Kuching, p.21.

24 Tate, D.J.M, THE MAKING OF MODERN SOUTHEAST ASIA; The European Conquest, Vol.1, Oxford University Press, Kuala Lumpur, 1971.

However, in the beginning of the twentieth century, a significant development occurred which transformed the Malaysian oil industry from its indigeneous character into a commercial and international one. The finding of oil in Sarawak coincided with the time when the demand for oil in the world was beginning to increase beyond all previous measures due to the expansion of the motor industry. The application of western capital and technology to the indigeneous oil industry has transformed the character of the industry from a small, native non-commercial undertaking to what is now a world-wide enterprise whose finance, technical know-how and management are provided by westerners. The change of event was made possible by the advent of British rule in British Borneo.[25]

As early in the 1870s oil shales had been located. The oil shales were found in belts of narrow width but of great length just below the border on both the east and west coasts. It was during the Chartered Company's rule that oil pools were located in Sekutai, near Kudat in North Borneo. A man by the name of Frank Hutton also investigated this spring and said that it would turn out 100

---

25 When James Brooke, the first Rajah of Sarawak, died in 1868, Charles Brooke succeeded him. In 1888, Sarawak concluded an Agreement with the British Government which placed the State under the protection of the United Kingdom. After the Japanese occupation, the third Rajah, Sir Charles Vyner Brooke, handed the country over the care of the British Crown. Finally, on 1 July 1946, Sarawak became a British Colony and 19 years later gained independence, with North Borneo (Sabah) and since then joined the Federation of Malaysia.

gallons (about 3 barrels) a day with proper machinery.[26] Somehow, no boring operations were undertaken.

Officialdom first recognised the presence of oil seepages when they were reported in the diary of Claude Champion de Crespigny, the Resident of Baram, in 1882. He took charge of Baram District in Sarawak when it was ceded to the Rajah (Ruler), Sir Charles Brooke, in June of that year.

De Crespigny recorded that 18 wells had been dug, by hand, some years previously. This was indicated in his diary for the month of May; he suggested that the whole district should be 'thoroughly searched and reported on'.[27] But the Rajah probably never gave the recommendation as nothing was done. After all the year was 1882 and the demand for petroleum in Sarawak was nil.

---

26 The site first attracted attention in 1880, and was inspected by the Sarawak Government in 1891 whose report was made by its engineer,

"the land more or less saturated with petroleum extends over an area of about a square mile .... at 10 feet below the surface oil and gas rose in large quantities but I found it impossible to sink further as water was coming in".

See Report by Consulting Engineers to the Governor, 12 October 1891, cited in K G Tregonning, UNDER CHARTERED COMPANY RULE (North Borneo 1881-1946), University of Malaya Press, 1958, p.100.

27 C Hose quoted De Crespigny's diary the following,

"....... the celebrated earth oil at Miri found in about 18 wells which some people dug a few years ago in the hope of being purchased by possible buyers." See Charles Hose, op.cit. p232.

Dr Charles Hose succeeded De Crespigny as the Resident of the District of Baram in 1888. Sarawak's oil industry owed much to him.[28] And during the following years, Hose was fortunate in discovering many seepages when he visited the locality in addition to those already known. These were reported to the government which secured the services of an English geologist to determine these findings. The geologist advised the Government that the oil could not be worked commercially. However in 1899, another geologist, C Schmidt, visited Labuan and the adjacent coast of the Klias Peninsula, Padas Bay and Brunei. In his report, he referred to several seepages and recommended a thorough survey of the area concern, especially the Miri and Baram rivers already described.

Hose was certain that, with proper management and skill, the oil could be worked commercially. Upon his recommendation, a few years later the Rajah granted permission to have some tests holes dug, but no great success attended the efforts. Despite the setbacks, C Hose began to prepare a map of the district and marked all the seepages and managed to locate some 28-30 indications on his map.

---

28 The tribute to Charles Hose's work was made by G Howell in the <u>JOURNAL OF OIL, ENGINEERING AND FINANCE</u>, March 1926 and as follows,

"... Dr Erb was accompanied by the real pioneer in establishing another portion of British territory as an oil producing zone, an unconditional thanks to the British people should be awarded to this far reaching administrator".

C Hose himself described the development of the oil resources of Sarawak as "some of the most satisfactory enterprise of the many which he was concerned during his life in Sarawak".

In the meantime during the period 1888 to 1907 there was little reliable chronological record of the happenings in the Miri oil area. It is known that some drilling was undertaken by the Borneo Company Limited, permission being granted for this purpose, and for the subsequent marketing of any oil produced, by Rajah Brooke.

In 1907, Dr C Hose asked the Rajah's permission to take his map and samples of the petroleum to the Shell Asiatic Petroleum Company in London.[29] Upon Agreement, later in 1909, the Rajah agreed to come to London to sign the concession and lease made between the Government of Sarawak and the Anglo-Saxon Petroleum Company.[30] The lease was the Sarawak Oil Prospecting Licence and marked the cornerstone for the oil industry in Malaysia.

Dr Erb, the petroleum expert from the Anglo Saxon Petroleum Company carried out a general geological survey of a large part of north Sarawak and reported back ~~in~~

---

29 The formation of the Asiatic Petroleum Company Limited arose from an Agreement in 1903 between the Royal Dutch Petroleum Company and the 'Shell' Transport and Trading Company Limited. The Asiatic Petroleum Company Limited was to act as joint marketing company in the East for Royal Dutch and Shell. Later in 1907,

30 The willingness of the Rajah both to encourage the development of the oil wells and to allow capital in for the purpose was because of the revenues that Sarawak would benefit from the find and the understanding that there would be no attempt to exploit his subjects. See Steven Runciman, THE WHITE RAJAHS - A history of Sarawak from 1841 to 1946 Cambridge University Press, 1960.

to the Anglo-Saxon Petroleum Company in London confirming the numerous oil shows. At the Annual General Meeting of the Shell Oil Company in London in 1909, Sir Marcus Samuel reported the find of oil at Miri and the concession was granted without payment by the Rajah. The Sarawak Oil Company known as the Sarawak Oilfields financed by Shell with a capital of £500,000 moved in soon afterwards.

In the meantime various companies had searched for oil in the northern part of the Borneo island since the turn of the 20th century. In 1905, the British Borneo Exploration Company was founded which acquired for a period of 50 years the right to exploit all mineral resources in North Borneo, with the exception of the coal deposits in the southern part of the country.[31]

In 1908, the British Borneo Petroleum Syndicate[32] came into being and took over the exclusive rights to prospect oil in British Borneo. The company sent out a

---

31 Interest in copper and iron-ore faded after the failure to find deposits by the Exploration Company and the Company was liquidated in 1916.

32 The British Borneo Exploration Company transferred their concession rights for petroleum prospecting to a subsidiary company - the British Borneo Petroleum Syndicate Limited (B.BP.S). In accordance with the recommendations made by C Schmidt in his Report published in 1904 on some of his observations on oil seepages made in 1899, the northern part of the Klias Peninsula was explored intensively. The B.B.P.S. carried out deep drilling in the Mensian River area (Klias Peninsula) during which gas and traces of heavy oil were found. See Max Reinhard and Edward Wenk, GEOLOGY OF THE COLONY OF NORTH BORNEO, Bulletin No.1, Geological Department of the British Territories in Borneo, His Majesty's Stationery Office, London 1951 p.4.

manager, a Shell Company man and began serious investigation. Under him, many attempts at drilling involving heavy expenses were made but without fruitful results. In the same year, the first exploratory well was drilled at Jerudong in Brunei. In 1909, the Company changed its name to the Anglo Saxon Petroleum Company and in the same year a second well was drilled to 1,000 feet but no oil was discovered. The Syndicate soon ran out of capital through failure in finding oil in great quantities in the area. They soon diverted their attention to a field near Brunei.

In 1912, the Syndicate handed over its rights in North Borneo to a Dutch firm, the Netherlandsche Koloniale Petroleum Maatschappij (the Netherlands Colonial Petroleum Company)[33]. This Company carried out an extensive geological survey of the country in 1913 but did not locate

---

33 A circular was issued by the British Borneo Petroleum Syndicate to its shareholders stating that an agreement had been entered into with the Nederlandsche Koloniale Petroleum Maatschappij under which the Company undertook the expensive prospecting for petroleum of the 30,000 square miles in the British North Borneo over which the Syndicate held the exclusive petroleum rights, the immediate developments by drilling of the Klias Peninsula Oilfield which was held by the Syndicate on mining lease, and the similar development of all further oilfield in British North Borneo which might be located in the course of their prospecting operations. See <u>THE PETROLEUM REVIEW</u> August 10, 1912, Vol.27, No. 535.

very many deposits, though the Sebatik Island the Klias Peninsula seemed promising areas.[34] This was examined on behalf of the Royal Dutch Shell by M. Blumerthal and an exploration deep well was drilled, which met only traces of oil. In 1918, attempts were made by a subsidiary company of the Anglo-Persian but again without much success. In 1920, D'Arcy Exploration Company, a subsidiary of the Anglo Persian Company, prospected the Klias Peninsula but decided not to drill. In 1922, the Japanese Kuhara Company began investigation. They were granted concessions to work the Sekutai and the Klias areas.[35] Between 1924 and 1931,

---

34 From a scientific point of view, the geological exploration carried out on behalf of the N.K.P.M. in Borneo yielded very fruitful results;but no results whatever were obtained from economic point of view. Four wells in the proven oil bearing area of the Klias Peninsula were drilled to depths of 572 meters (well 1), 390 meters (well 2), 897 meters (well No 3) and 727 meters (well 4). They did not however, yield sufficient production, as the pronounced tectonic disturbances had already affected the occurrance of oil. Two wells on the island of Mangalum off the west coast, had to be abandoned at shallow depth (440 meters and 354 meters) on account of technical difficulties. See Max Reinhard and Edward Wenk, op.cit. p.6.

35 The oil companies which were temporarily active at that time, and had agreements with the British Petroleum Syndicate that held the oil rights for the whole of North Borneo until 1930 were: Bombay-Burmah Petroleum Company (1897-98); Burmah Petroleum Syndicate(1909-1911);Nederlandsche Koloniale Petroleum Mij(N.K.P.M. or Stanvac)(1912-16); Kuhara Mining Company(1916-20)/As will be seen in the later section of this chapter, Japan made it apparent that she engaged in the war because of her ambitions to establish a sphere of influence in which she could command the raw materials necessary to sustain and increase her strength. To achieve this objective, she needed adequate supply of oil resources which at that time she was lacking. It is no wonder that the effort made by the Kuhara Company in 1922 to acquire an oil base in South-East Asia in North Borneo alarmed the British Government. See Lionel Wigmore, THE JAPANESE THRUST, Australian War Memorial, Griffin Press, Adelaide, 1957/; D'Arcy Exploration Syndicate (1920-24); the Singapore Oil Syndicate (mainly Chinese Capital)(1925-30). See Geological Department of British Borneo, THE GEOLOGY OF SARAWAK, BRUNEI AND THE WESTERN PART OF N.BORNEO, KUCHING.

the rights were acquired by a syndicate of Singapore Chinese which carried desultory operations there. Ten years later, between 1935 and 1939, a large scale exploration was conducted by geologists employed by the Royal Dutch Shell Group. The prime object of these explorations was the search for oil but tended to restrict field studies to those formations which appeared to be connected with the presence of oil.

2.2.2 The Miri Oilfields In Sarawak

The Miri oilfield, the first to be developed in the region, is to the north of Sarawak near Lutong. The first well drilled was sited on a hill, which mystified the local population who had expected the drilling to take place in the swamps about one hundred yards away where the seepages were occuring.[36]

---

36 The event was well described by G Harper thus,

"On the 10 August, 1910, a group of Miri inhabitants watched with interest as a small party of oilmen, who had set up drilling equipment on a hill overlooking the town, began the slow and laborious task of drilling into the ground using the cable tool method little improved since its invention by the Chinese centuries before. For some of the spectators the interest was stimulated with certain amount of apprehension. They knew that below the Miri Hill was a large cave in which lived two ferocious tigers, if the drillers penetrated into the cave, the tigers might well escape and ravage the countryside." G Harper, op.cit., p. 30.

The wooden derrick was erected and drilling into the ground was made by the cable tool, a method little improved since its invention by the Chinese centuries before. The spudding-in of Miri No. 1 well was made on August 10, 1910, and exactly two months later, oil was struck at a depth of 447 feet and the well produced 4 tons of water-free oil per day. It was then deepened to 510 feet from which it produced 12 tons per day. At a depth of 805 feet, the well yielded 90 barrels per day of oil and by 1920 only about 70 wells had been completed with an average daily production of 2,200 barrels from sands down to 1,700 feet.[37] The mere capacity to produce oil itself was of no value commercially unless it can at any rate be stored as it is produced and, still more important, shipped to some market where it can be sold.

Following their earlier success of the Miri No. 1 well, the Anglo-Saxon Petroleum Company put down a second well, the Miri Well No. 2 in April 1911 and production

---

37 The cable tool method is essentially a system of pounding out a hole by repeated blows with a bit attached to heavy length of steel suspended from a wire rope. The drill stem provided the height to force the bit into the ground and the hole was kept empty except for a little later at the bottom. After drilling a few feet, the bit was pulled out and the cuttings removed with a 'boiler' - an open tube with a valve at the bottom. Steel pipes known as casing, of progressively small diameter were run from time to time to prevent the hole from caving and to keep back any water flow. This technique of well drilling dated back to ancient China which described wells drilled as early as the 3rd Century A.D. to tap underground strata of brine.

reached 1275 barrels. In 1912, production reached 41,539 barrels, in 1913 to 194,160 barrels from 8 wells and in 1914 it totalled 472,948 barrels.[38] And in London, Sir Marcus Samuel announced that "the production of oil in Sarawak amounted to 200 tons per day. A small royalty was paid to the Sarawak Government for every ton".[39] Large and regular shipments of the oil took place and the oil was treated at the Shell Company's refineries in Sumatra.

In 1924, the weekly production of the fields amounted to around 85,100 barrels. This placed Sarawak at that time on the list of oil producing countries included in the British Empire. .However, the Shell Company of Sarawak had deferred of a refinery until they had a large production. In the meantime the company were treating the oil obtained there at their refineries in Sumatra, and was making the first shipment of crude to Egypt.

The control of the sea and harbourage of the British warships was important, and when oil began to replace coal as a fuel for British warships, its value as an imperial

---

38 Harper, J. op. cit., p.38

39 Marcus Samuel's address to Annual General Meeting of Shell in London in 1915.

factor became important.[40] The Rajah insisted that a clause should be inserted in the Concession by which a certain amount of oil should be stored for the use of the British Navy, the first political clause of its kind in the history of the British Empire. The clause reads,

> "The Company (concessionaire) hereby convenents that during the continuance of the licences hereby granted it will not export any of the said mineral products which can be safely used as a liquid fuel, so as to leave a quantity of less than a thousand English tons stored in the district aforesaid, and further stored that such quantity of ten thousand tons of liquid fuel shall be used only for the purpose of supplying the ships of the Navy of Great Britain or any other of her colonies". 41

The Anglo-Saxon Petroleum Company in London saw the importance of the clause, and at once took steps to arrange for the installations of tanks for the proper storage of the oil. The only exceptions to this agreement have been that for a period during and after the War, with the consent of the Rajah and the Admiralty, fuel oil was stored at Singapore instead of at Miri. The naval vessels of the Allies including the Japanese, were included those which could be

---

40 "Oil has been a special position in British trade. The Sterling Oil companies serve the economy of every part of the Commonwealth and made a big contribution to the general strength of the sterling", according to an article in Resources of the Colonial Empire VII - Oilfields in Trinidad and Borneo, <u>THE TIMES BRITISH COLONIAL REVIEW</u>, Winter 1952, Quarterly No.8.

41 According to Charles Hose, this was the first political clause of its kind in the history of the British Empire. C Hose, op.cit. C Hose also commented, ".... for a time Charles (Charles Brooke) believed that the new oil field at Miri might tempt the British Colonial Office to assume direct control of Sarawak, and this sharpened his conviction that the State would have to be strengthened to survive as an independent identity..." C Hose's letter to <u>THE MORNING POST</u>, November 7, 1912 and to Arnold White, November 20,1912 cited in Robert Pringle, <u>RAJAH AND REBELS</u>: The Ibans of Sarawak under Brooke Rule,1841-1941, McMillan Company, 1970.

supplied from that 10,000 tons of Sarawak oil. By the outbreak of the First World War, Miri had become established and was recognised as a potential oil bearing field of importance. The production of oil had become considerable, and a valuable quantity was at the disposal of His Majesty's navy amounting to two million barrels.[42]

2.2.3 Production History Of The Miri Field Till World War II

No reliable statistics on oil are available prior to 1911. Nevertheless between 1911 and 1929, the amount of oil produced and exported from Sarawak increased more than two-fold and except from 1917 to 1919, there was a considerable year to year increase in crude oil production and export from Sarawak. This is shown in Table 2.4.

Although oil production shown in Table 2.4 had increased over the period the development of the field was slow mainly due to the slowness of the cable-tool method of drilling (to drill 100 feet in one month is an achievement!). By 1920, only 70 wells had been completed with an average daily production of 2,200 barrels and for the first time total yearly production reached the million mark and oil royalty in the hundred thousand figure. In 1925 rotary drilling was introduced and the old cable-tool method was

---

42 During the Second World War not only British warships, but the naval vessles of the British Allies - the Japanese, were supplied with Sarawak oil, see C Hose ibid.

TABLE 2.4

MALAYSIA: PRE-WAR CRUDE OIL PRODUCTION AND NATURAL GAS PRODUCTION AND ROYALTY PAYMENTS 1911-1940

Year	Crude Production (in barrels)	Oil Royalty (M$)	Natural Gas ('000 cub ft)
1911	1,275	5,346.43	-
1912	41,539		
1913	194,160	7,068.86	-
1914	472,948	25,541.28	-
1915	497,770	26,957.28	-
1916	655,248	35,179.21	-
1917	565,930	28,518.68	-
1918	513,782	23,783.21	-
1919	612,998	28,429.07	-
1920	1,061,190	118,125.88	-
1921	1,498,938	190,063.52	-
1922	3,025,450	406,161.29	-
1923	4,187,205	578,007.93	-
1924	4,424,646	612,554.81	-
1925	4,520,296	618,685.28	-
1926	5,248,439	718,956.59	52,790
1927	5,236,602	710,045.66	55,684
1928	5,506,568	756,506.09	93,449
1929	5,552,177	791,148.48	106,183
1930	5,114,182	737,597.27	88,428
1931	3,891,027	557,565.82	61,313
1932	2,540,460	359,236.83	37,411
1933	2,441,677	344,249.94	28,439
1934	2,085,279	297,903.02	21,778
1935	1,902,853	271,836.09	17,885
1936	1,668,390	238,314.45	15,678
1937	1,574,204	224,886.34	15,707
1938	1,498,901	214,128.74	17,300
1939	1,223,917	174,845.20	16,113
1940	1,094,022	156,288.85	12,580
1941	707,772	101,110.31	6,758

Source: Documents relating to Petroleum Resources Development in Individual Countries of the ECAFE Region: British Territories of Borneo by F.W. Rowe in Ecafe Document 1 & NR/PR/1 replaced.[43] Most of the oil accumulations had been found by the following year. Peak production of $5\frac{1}{2}$ million barrels a year was reached in 1929 with government revenue reaching $800,000. Then the deterioration of the economic conditions towards the end of the period retarded the drilling programme.

As oil production was increased towards the end of the period associated gas production either was flared or when possible was consumed internally within the petroleum indistry in producing and processing operations and in auxillary installations.

Meanwhile from 1927 till 1930 the coastal plains of North Borneo were examined by extensive gravity surveys. A few detailed investigations were still made in 1930 till 1931 but the grave worldwide economic crisis in the early 1930s is reflected in greatly decreased activity between 1930 and 1934. In 1931 drilling activities were confined to deepening of existing wells. Drilling of new wells was resumed in 1936 and continued till 1941 when the field was shut down and some of the essential equipment were shipped to Singapore before the Japanese invasion. At the time of the shut down, 408 wells out of a total of 597 were yielding a total of about 3,000 barrels of oil daily, all but 13 were pumping oils.

---

43 Unlike the cable tool method, the cutting bit at the end of the drill in the rotary method is revolved by engine power. The rotary bit came in various sizes and usually have cutters that look like a cogwheel set at angles. The engine set a large turntable to rotate and this section would revolve the drill pipe and the drilling down into the ground.

By the end of 1940, the field had just produced over one million barrels during the year and the operators were less concerned with producing more oil than with shutting the fields in case of enemy invasion.[44]

Before the outbreak of the Second World War and the invasion of the Japanese, petroleum was produced in the Borneo States from three separate fields - the Miri field in Sarawak (Malaysia) operated by Sarawak Shell Oilfields Limited (formerly the Anglo-Saxon Petroleum Company Limited), the Seria and Jerudong Fields in Brunei operated by the Brunei Shell Petroleum Company Limited. Both were and still are associated companies of the Royal Dutch Shell Group. Refining and shipping operations were carried out by the Sarawak Shell Oilfields Limited at Lutong (near Miri) on the north-east coast of Sarawak.

2.2.4 The Petroleum Industry Production During The Second World War

When the production of crude oil in the Netherland Indies reached its record production in 1939 and 1940 at around 8 million tons (at that time in Sarawak it was around 177,000 tons after its peak production of 806,000 tons in 1929), the political climate of the world increasingly deteriorated. During this period of rising tension, the demand for petroleum products became a crucial issue on the part of Japan.

---

44 BERITA SHELL (SHELL NEWS), Vol.2, No 7 October/November 1974, Shell Company, Malaysia, Kuala Lumpur,

Throughout the 1930s and during the first part of the war, Japan's economy and military strategy were affected greatly by its lack of oil resources.[45] Realising this the Japanese Government in the early part of 1930s had made an early attempt to overcome the handicap by various measures which included governmental direct control, various incentives leading to the establishment of a synthetic fuel industry by conservation measures and rationing.[46]

The above moves by the Japanese Government were successful for sometime but in 1940, the United states announced the cancellation of the Japanese-American Treaty of Commerce on the ground that Japan had allegedly strengthened

---

45 Japan ranked 22 nd amongst the oil producing nations at that time. Its output in 1941 was 1.9 million barrels of crude oil or less than 0.1% of the world's total. The U.S. produced 1.4 billion barrels in 1941 over 700 times that of Japan. Japan's 1941 production from wells and synthetic plants was less than 12% of her peacetime requirements. Cohen, J.B. JAPAN'S ECONOMY IN WAR AND RECONSTRUCTION, University of Minnisota Press, Minneapolis, 1949, p.133.

46 In 1934, the Japanese Government adopted the Petroleum Industry Law whereby the Government stipulated the amount of crude oil and oil products that could be imported and refined and the price to be sold fixed by the government. This was administered by a Fuel Bureau which was set up in 1937. There were several laws enacted to stimulate the establishment of a synthetic fuel industry which included a) The Synthetic Petroleum Production Law to encourage and subsidise synthetic oil production; (b) The Imperial Fuel Development Company Law providing the establishment of a national oil company known as the Imperial (Teikoku) Fuel Development Company established in 1938; (c) The Petrol Excise Law exempting all synthetic oil from tax and (d) The Alcohol Monopoly and Compulsory Alcohol Admixture Laws which made production of alcohol a government monopoly; (e) Petroleum Resources Development Law (1938) to enable the government to supervise and control drilling operations whereby the drilling of new wells was granted a government subsidy of about 66⅓% of cost; (f) Gasoline and Heavy Oil Sales Regulations (1938) whereby petrol was rationed by a voucher system and in 1938 the rationing of sales was administered by the Petroleum Distribution Company (Seikyu Haikyu Tosei KK) then by Imperial Oil Co. (Teikoku Sekiyu KK) set up in 1941 and even later this function was shared with another control control company called Tao Oil Company. See Cohen, J.B., ibid.

its imperialist expansion to Asian countries. Before the oil embargo[47] in 1940 Japan relied almost entirely on imported oil - four fifths or 80 percent of it from the United States, 10 percent from the Netherland Indies, and the rest from Latin America (Mexico), Middle East (Bahrain) and Eastern Europe (Roumania). In facing with this critical situation, there were 2 options open to the Japanese. Firstly, they could build up their synthetic oil production to substantial proportions and secondly, she had to shift her sources of imports. Japan had been increasingly attracted to the great oil resources of the Netherlands East Indies, which geographically closest to Japan, which had enough capacity of oil supply to meet the Japanese need.

To overcome this critical situation various Japanese teams had already been sent earlier to the Indies to do research on oil production. One of the delegation sent to the Indies was to negotiate oil concessions in the Indies and further oil importation to Japan. Unfortunately, both the Netherlands East Indies Government and the Japanese delegation failed to reach any negotiation in June 1941. On July 28 of the same year, the Dutch East Indies Government announced its intention to freeze all Japanese assets in the Indies, thus following the same measures taken by the Americans and British earlier. In retrospect, the Japan-East Indies oil negotiation became the last 'peaceful'

---

47 Because of the earlier strategy of stockpiling, Japan was able to build up a large inventory before the outbreak of the war up to 50 million barrels of oil (crude and refined) in 1939 but, however, declined to 43 million barrels by December 1941 due to United States, Dutch and British embargoes. See Cohen, J.B. , ibid., p.134.

negotiation that Japan involved before the war. This failure had led Japan to the Pacific War.

Before the Japanese occupied the Indies, the Bataafsche Petroleum Maatscha-ppij (BPM),the Nederlandsche Koloniale Petroleum Maatschappij (NKPM) and other oil companies had deliberately destroyed oil wells, pipelines, refineries and other installations in order that the Japanese could not use them. Before the invasion, the Sarawak Oilfield Limited (SOL) belongong to Shell with their settlement at Miri and refinery at Lutong, and the British Malayan Petroleum Company Limited in Brunei, cleared oil stocks of gasoline and lubricating oil. The most important producing wells in Seria (Brunei) had already been rendered useless to the enemy by plugging i.e. by pumping cement at the bottom and top of the casings. In order to deny the Japanese the production of the less important wells, the supply of high pressure gas used to gas lift the oil was cut. Then some of the essential equipment was shipped to Singapore before the Japanese occupation. At the time of the shutdown of the Miri Oilfield in Sarawak, 408 wells out of a total of 597 were yielding a total of about 3,000 barrels of oil daily; all but 13 were pumping wells. By the end of 1940, the operators were less concerned with producing more oil than with shutting the oilfield in case of enemy invasion.

Soon after the war broke out on December 8, 1941, the oil corps or workers set up by the Japanese Government before the war quickly reached such areas as British Borneo, Dutch Borneo, North, Central and South Sumatra where they started restoration as well as new drillings. A few months after the fall of Singapore to the Japanese, a large number of skilled and experienced oilfield workers, accompanied by a great deal of oilfield equipment and machinery landed at Miri. The Japanese had managed to find out exactly where in Singapore both men and machinery were hidden and had promptly brought them back to Miri. Ex-company workers of Sarawak Oilfields Limited and the British Malayan Petroleum Company of Brunei found themselves working for the new Ryo Hai Kyu Sho or The Oil Supplying Service.[48]

Japan depended almost entirely on petroleum products from the captured East Indies fields for the prosecution of its wartime operations. Production of most fields was commenced early in 1942, despite the great destruction of installations with the evacuation by Allied forces. The production mostly came from 6 fields in 2 districts in North Sumatra (Atjeh and East Coast), 4 fields from Middle Sumatran districts (Airmolek and Pekan Baru), 16 fields from 4 districts of South Sumatra (Talangdjinar, Pendopo, Mengoendjaya and Djambi), 9 fields from Netherlands Borneo districts (Southeast Borneo and Northeast Borneo(Tarakan)), 1 field each from Ceram and Netherlands New Guinea and 2 fields from British Borneo (Seria and Miri).

---

48 BERITA SHELL (SHELL NEWS), op.cit. p.9

Table 2.5 gives the production from the various areas in the East Indies during the Japanese occupation 1941 to 1945. About 17 million kiloliters (about 106.9 million barrels) of crude oil were extracted from the East Indies oilfields during the Japanese occupation. The success of the Japanese occupation had been that by the end of 1943 they had managed to restore oil output in the southern zone (Southeast Asia) to almost its pre-war level. As shown in the Table 2.5, crude oil production in the southern zone had totalled 65 million barrels in pre-war, then dropped to 26 millions in 1942, but was increased to wartime peak of 47 million barrels in 1943 then dropped again to about 27.6 million barrels towards the end of the war. From this total, the two fields in the British Borneo produced around 410.8 barrels in 1942 rising to 792,300 a year later plunging into 364,000 in 1944 before registering zero output towards the end of the year.

This increase in production of crude was followed by the increase in the production of petroleum products. During the Japanese occupation of Southeast Asia, the refineries in the area were quickly restored while their capacity was always adequate for the purposes at hand. They had, however, some difficulty in continuous operation due to the need for spreading skilled personnel very thinly and the inability to obtain spare parts and replacement equipment from Japan.

Despite the rapid increase of oil production in

TABLE 2.5

ANNUAL PRODUCTION OF CRUDE PETROLEUM IN EAST INDIES
1942-1945 (Kiloliters of 6.29 barrels of 42 US gallons)

Area	1941	1942	1943	1944	1945	Total
Java		310,000	579,000	391,000	244,000	1,524,000
North Sumatra		293,145	751,766	n.d.	n.d.	1,044,909
Middle Sumatra			14,405	n.d.	n.d.	14,405
South Sumatra		2,103,500	4,065,200	3,010,200	725,000	9,903,900
Netherlands Borneo						
a) S Borneo		297,500	834,000	408,000		1,539,000
b) N E Borneo (Tarakan)		158,000	381,000	210,000		749,000
Ceram		300	2,250	300		2,850
Netherlands New Guinea			1,000	3,000		4,000
British Borneo						
c) Seria) d) Miri)		410,885	729,315	364,000		1,567,200
Minimum Total Production(Kl)	9,051,567	3,573,330	7,420,934	4,386,500	969,000	16,349;764
M.T.P.(barrels)	56,928	24,467,245	46,677,675	27,591,085	27,591,085	102,840,015

(a) Minimum total
(b) Includes 11,097 kiloliters produced in 1941
(c) Quantity exported indicates minimum production figures
(d) The average figures for Miri are 1942, 1943, 1944 and 1945

See Continuation on next page.

The statistics in the Table above were abstracted from a comprehensive report on the petroleum industry in the East Indies during the Japanese occupation prepared under the auspices of the Ministry of Commerce and Industry by a special commission of more than 100 Japanese who were engaged in the petroleum industry in the East Indies during World War II since the official army and navy records in Japan were destroyed just before the end of World War II. Most of the data, including the statistics presented in the above table are from memory or from private notes kept by individuals. It could also be that the statistics might be based upon the Japanese documents submitted to the Allied Forces after the Japanese surrender, the crude oil production in the East Indies during the Japanese occupation period. See _Mining for Oil in Japan_; Natural Resources Section, Report No. 89; _Japanese Oil Activities during the Second World War time in Southeast Asian Countries, Chapter 4_.

the East Indies, Japan, however, suffered from a serious shortage of tankers due to their sinkings during the war. As a result, the damage caused in terms of crude oil, heavy oil and gasoline lost during shipping from the East Indies to Japan became large. The Japanese then reversed their two year oil policy and tried once again to stimulate domestic output.

The drop in imported oil from the East Indies and the difficulty of increasing local production were the turning points of the Japanese fuel situation and affected her war economy and machinery greatly. The Allied denial of this source of oil imports from Southeast Asia to Japan during the war was one of the main causes that led to the downfall of the Japanese occupation in the East Indies in the middle of 1945.

2.2.5 Post-War Production Of Miri Field

The Japanese invasion of Borneo at the beginning of 1942 and the subsequent invasion by the Australian forces (9th Division) on July 21, 1945 led to an almost destruction of both the Seria and Miri fields. It was not until the following September that the Australian Army and the Shell Company's technicians completed the huge task of putting out 377 oil well fires.

Rehabilitation of the field went ahead rapidly inspite of many obstacles. The first post-war cargo of crude oil was shipped to Australia in March 1946. By August 1947, the immediate programme of post-war reconstruction had been completed.

The post-war years witnessed the greatest oil company effort. The magnitude can be appreciated from the fact that three companies of the Royal Dutch Shell Group spent M$117 million on oil investments between 1939 to 1948 or at an average of M$11.7 million per year. Of this total about two thirds went into exploration and drilling, one-fifth into geological surveys and one twentieth into field geological surveys.[49]

During the post-war period, production of the Miri field never returned to the pre-war levels. As indicated in Table 2.6 it had been obvious that from the sharp drop in the figure between 1929 and 1935 from 5½ million to 2 million barrels that the pressures in reservoirs were running down. In the post-war years only once, i.e. in 1956 did production pass the half a million barrel mark. At the beginning of 1972, only 90 wells of the 609 drilled during the history of the field were still pumping. Production had fallen to 450 barrels a day and was dropping rapidly. And after 62 years of production, the oil reserves on the Miri field were exhausted and Sarawak Shell had no alternative but to close it down.[50] The production of

---

49 Geological Survey Department of British Borneo, <u>ANNUAL REPORT 1956</u>, Kuching.

50 At the close down of the Miri field, it still managed to produce 3 barrels of oil a day and when finally stopped had produced over 650 million barrels of oil.

TABLE 2.6

MALAYSIA: POST WAR CRUDE PRODUCTION, OIL ROYALTY AND NATURAL GAS PRODUCTION

Year	Crude Production (in barrels)	Oil Royalty (M$)	Natural Gas Production (in '000 cub.ft.)
War Production			
1942		60,000[c]	n.a.
1943		60,000[c]	n.a.
1944	710,200	60,000[c]	n.a.
1945		60,000[c]	n.a.
Post-War Production			
1946	19,264	60,000	n.a.
1947	179,569	69,250.53	Post war production negligible
1948	361,511	92,782.71	
1949	417,761	103,662.60	
1950	414,196	103,501.00	
1951	372,780	98,252.00	
1952	359,194	155,331.00	
1953	351,484	262,775.00	
1954	503,429	387,122.00	
1955	471,526	377,166.00	
1956	508,781	438,201.00	
1957	398,314	–	
1958	398,314	–	
1959	382,928	–	
1960	416,094	–	
1961	417,886	n.a.	
1962	400,918	n.a.	
1963	357,882	n.a.	
1964	337,701	n.a.	
1965	336,875	n.a.	
1966	345,700	n.a.	
1967	328,300	n.a.	
1968		n.a.	
1969	Diminishing	n.a.	
1970	Production	n.a.	
1971	From Miri Field	n.a.	

Source: Documents relating to Petroleum Resources Development in Individual Countries of the ECAFE Region: British Territories of Borneo, op.cit.

crude oil from the Miri oilfields from 1911 till its closure/shut-down in 1973 is graphed in Figure 2.3

In the meantime in Sarawak between 1954 till 1963 there were very few wells drilled that had oil. In 1958, oil was found in 4 wells and in 1963 only 1 well drilled had oil as shown in Table 2.7. Throughout this period there had been a number of failures as shown by the number of dry wells. Many of these wells were dried at the exploratory stage. The number of wells abandoned was even greater during this period. In 1961, as much as 73 production wells were abandoned. There were few exploratory wells drilled in Sabah and all of them ended in dry wells.

Over the period from 1947 to 1957 the Shell Group of Companies in Sarawak, North Borneo and Brunei (the last is not a state in Malaysia) incurred 2 main types of expenditures in their search for oil. The exploration expenditure of over $168 million as shown in Table 2.8 represents capital spent in the search for oil, and included cost for topographic, geological and geophysical surveys, exploration drilling on land and in recent years exploration drilling at sea; the money expanded is capital on which no return is obtained if oil is not found in commercial quantities. The capital expenditure of more than M$668 million represents the money which has to be invested after the oil has been found in order that it may be produced. Table 2.8 also gives some idea of the exploration expenditures

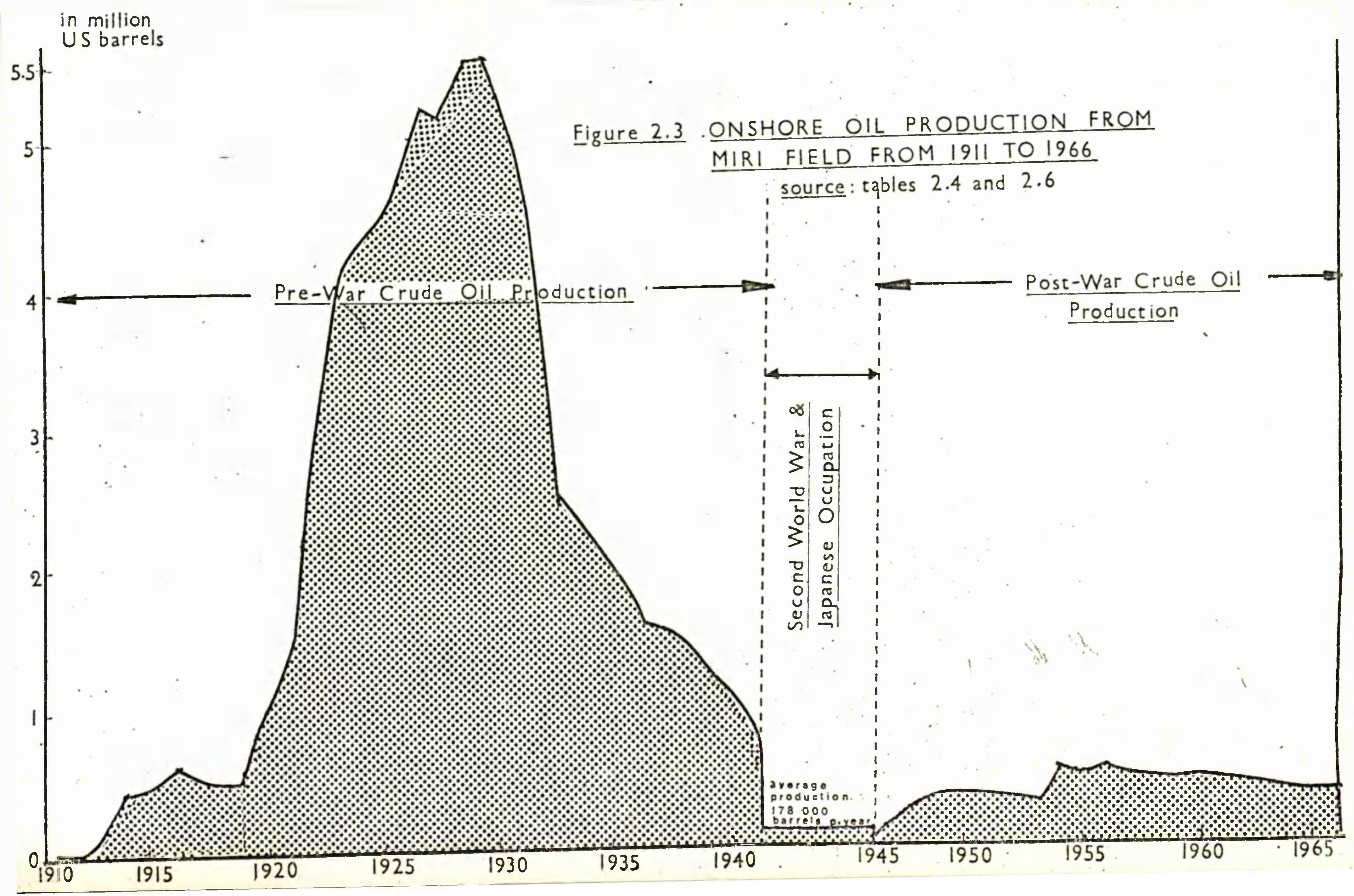


Figure 2.3 ONSHORE OIL PRODUCTION FROM MIRI FIELD FROM 1911 TO 1966

source: tables 2.4 and 2.6

TABLE 2.7
NUMBER OF WELLS DRILLED IN SARAWAK AND SABAH 1954 TILL 1963

	SARAWAK						SABAH					
	Number Of Wells Drilled		Dry Wells		Abandoned Wells		Number Of Wells Drilled		Dry Wells		Abandoned Wells	
Year	P	E	P	E	P	E	P	E	P	E	P	E
1954	–	1	–	1	–	–	–	1	–	1	–	–
1955	–	5	–	5	2	–	–	–	–	–	–	–
1956	–	4	–	4	8	–	–	–	–	–	–	–
1957	–	2	–	2	3	–	–	–	–	–	–	–
1958	4	–	1	–	4	–	–	1	–	1	–	–
1959	–	–	–	–	32	–	–	1	–	1	–	–
1960	–	3	–	3	41	–	–	–	–	–	–	–
1961	–	1	–	1	73	–	–	4	–	4	–	–
1962	–	6	–	6	69	–	–	1	–	1	–	–
1963	1	2	1	2	23	–	–	–	–	–	–	–

Notation: P = Production
E = Exploratory[a]

a = Exploratory wells are those that have not yet started to produce oil in large quantities.

Source: Unpublished Statistics Of The Brunei Shell Petroleum Limited

TABLE 2.8

POST-WAR EXPLORATION EXPENDITURES IN MALAYSIA 1947 TO 1963 (IN M$ '000)

Year	Sarawak	Sabah	Total For Malaysia	Total Exploration Expenditure In Borneo	Capital Expenditure	Total Expenditure
1947	n.a.	n.a.	n.a.	55 (1)	16,793	16,848
1948	n.a.	n.a.	n.a.	716	28,302	29,018
1949	n.a.	n.a.	n.a.	2,763	29,137	31,900
1950	n.a.	n.a.	n.a.	6,711	35,975	42,686
1951	n.a.	n.a.	n.a.	9,516	39,022	48,538
1952	n.a.	n.a.	n.a.	19,810	77,152	96,962
1953	n.a.	n.a.	n.a.	20,938	113,186	134,124
1954	8,000	2,000	10,000	25,745	120,953	146,698
1955	16,100	1,400	17,500	30,163	82,446	112,609
1956	11,200	2,500	13,700	30,810	72,447	103,257
1957	6,400	4,100	10,100	20,856	52,801	73,657
1958	600	4,200	4,800	n.a.	n.a.	–
1959	3,800	2,100	5,900	n.a.	n.a.	–
1960	3,600	700	4,300	n.a.	n.a.	–
1961	2,500	6,600	9,100	n.a.	n.a.	–
1962	14,500	2,700	17,200	n.a.	n.a.	–
1963	8,500	1,500	10,000	n.a.	n.a.	–

(1) includes exploration expenditures in Brunei

Source: Unpublished Statistics of THE BRUNEI SHELL PETROLEUM LIMITED Financial Commission For Asia and the Far East (ECAFE) Document 1 E NP/PR/5.

incurred by the Shell Companies of Sarawak and Sabah from 1954 to 1963 prior to striking oil. Sarawak Shell spent the largest amount of money in exploring for new oil reservoirs, especially since the Miri field was depleted and exhausted in its production then. In 1955, the biggest amount of expenditure in a single year was made, totalling M$16 million. Throughout the 10 year per riod, from 1954 to 1963 a total of M$74.8 million was spent in Sarawak out of a total of $102.8 million, for Malaysia as a whole. And for Sabah, although exploratory drilling had not been carried out in some years (1955 to 1957, 1960 and 1963), there were expenses involved in geological survey. An average of M$2.8 million were spent over the period but without striking oil.

In the meantime, although a large proportion of the Peninsula or mainland Malaysia has not been thoroughly searched and surveyed, geologists believe that the prospect of there being large workable reserves of petroleum are very remote. This fact is based on the geological conditions of the area which are not favourable for the presence of petroleum.[51] This is inspite of the fact that the mainlaind is surrounded by petroleum producing countries.

---

51 In one compiler report, Savage wrote that the prospects of there being large workable reserves of petroleum at depth in Peninsula Malaysia were non-existent. See Savage, H.E.F. A note on Oil and Gas in Malaya: Report for the Organising Committee for the 20th Session of the International Geological Congress(Mexico)1956(Unpublished)cited in A Renwick(Ed.) FUEL RESOURCES -(Coal, Lignite and Petroleum) IN MALAYA, Geological Survey Dept., Ministry of Lands and Mines, May 1966 p.100 still in 1962 Alexander concluded that in a survey undertaken between 1956 and 1958 covering approximately 16,000 square miles or nearly one-third of the Federation of Malaya, gave no indication of....

From the above discussion, it is seen that over the span of time from its early discovery to its post-war development, the oil industry passed through a number of periods of rapid expansion, static and then declining production. It is not until in the early 1970s as a result of the various successes of oil exploration and drillings in the offshore areas in Malaysia, that the oil industry regained its pre-war prominance once again with ever increasing production. This will be discussed in Chapter 4.

51.. geological conditions favourable to the accumulation of petroleum. See Alexander, J B. The Prospects for ECAFE Symposium on THE DEVELOPMENT OF PETROLEUM RESOURCES OF ASIA AND THE FAR EAST (Published) cited in A Renwick, ibid, p. 100.

CHAPTER 3

PETROLEUM IN THE ENERGY STRUCTURE OF MALAYSIA

3.1 Energy Use by Types

There are no data available for the consumption of energy in Malaysia prior to 1960. From the sketch of the historical development of energy use (particularly from petroleum) highlighted in Chapter 1, it can be inferred that the consumption of energy in general and petroleum products in particular in Malaysia was relatively small before the war and the immediate post war years. However, since independence in 1957, the consumption of energy has shown a rapid increase. In Table 3.1, the consumption of energy has increased from 63.8 trillion BTU in 1960 to 231 trillion BTU in 1975 or about 4 times in the last 15 years.

Perhaps the most significant aspect of energy consumption shown in Table 3.1 is the changing structure of the different types of energy use over the period.

Primary sources of energy such as oil, charcoal, hydroelectric power, coal and firewood enter the consumption points through trade channels and are therefore considered commercial forms of energy. In terms of

TABLE 3.1

PENINSULA MALAYSIA: COMMERCIAL MARKET DEMAND FOR ENERGY CONSUMPTION 1960-1975
(in Trillion BTU/yr)

Energy Type	1960	%	1965	%	1970	%	1975	%
Oil	54.72	85.82	91.74	86.80	138.3	86.87	206.84	89.52
Charcoal	4.74	7.43	5.14	4.86	4.51	2.83	4.99	2.16
Water Power	2.58	4.05	9.41	8.90	15.42	9.69	18.52	8.02
Coal	0.76	1.19	0.39	0.37	0.39	0.24	0.19	0.08
Firewood	0.96	1.51	0.81	0.77	0.58	0.36	0.49	0.21
Total	63.76	100.0	105.69	100.0	159.20	100.0	231.03	100.0

Source: Esso Standard Malaysia Berhad (ESMB) volume, the consumption of oil showed the biggest increase from 54.72 trillion BTU in 1960 to 206.84 trillion BTU in 1975 registering a 4 fold increase. The second most important energy source is water power, which registered an increase to 18.52 trillion BTU in 1975 compared to 2.58 trillion BTU in 1960 or a 6 fold increase over the last 15 years. The consumption of charcoal has remained static during the period at just below 5 trillion BTU. It was second in order of usage in 1960 but gave way to water power in 1970. Coal and firewood showed declining importance, both totalling 1.6 trillion BTU in 1960 to 0.6 trillion BTU in 1975.

Another interesting observation from Table 3.1 is the percentage share of each of the energy types in overall energy consumption. Petroleum has remained the most dominant fuel over the last 15 years. It increased its share from 86 percent in 1960 to 90 percent in 1975. Water power increase was from 4.05 percent to 8.02 percent while charcoal, coal and firewood showed decreases from 7.4 percent to 2.2 percent, 1.5 percent to 0.2 percent, 1.0 percent to 0.2 percent respectively. This type of development has been due to the imbalance in the various sources of energy in this country. Malaysia is endowed with petroleum resources and to a limited extent water power but as pointed out earlier, she lacks coal resources. Firewood and charcoal are mainly used in the rural sector of the economy.

3.2 Energy Use by Sectors

Perhaps a more important aspect of the energy economy than the one discussed earlier is the distribution of use of the different types of energy in the different economic sectors.

Table 3.2 shows the distribution of energy by economic sectors: (a) Industrial and Other Demand (b) Electricity and Power Generation (c) Transportation and (d) Household and Small Consumers.

The first category (a) registered the biggest use of energy in 1975 increasing by 4 fold from its 1960 level of 18.16 trillion BTU. The Transportation Sector which used to be the biggest consumer of energy in 1960, gave way to the Industrial Sector in 1975 after having shown only an increase of two and half times to 55.2 trillion BTU in 1975. However, the Electricity and Power Generation Sector showed a substantial increase of about 50 trillion BTU to 66 trillion BTU in 1975 while Household and Consumer increased by 10 trillion BTU to 18.2 trillion BTU in 1975.

Another interesting development in energy use by

TABLE 3.2

PENINSULA MALAYSIA: END USERS OF PRIMARY ENERGY BY SECTORS 1960-1975

(in Trillion BTU)

End Users	1960	%	1965	%	1970	%	1975	%
a) Industrial and Other Demands								
Oil	17.40		36.40		62.20		91.53	
Coal	0.76		0.33		0.39		0.19	
	18.16	28.47	36.73	34.75	62.59	39.32	91.72	39.70
b) Electricity and Power Generation								
Oil	13.67		19.68		28.50		47.45	
Water Power	2.58		7.64		15.42		18.52	
	16.25	25.48	27.32	25.85	43.92	27.59	65.97	28.55
c) Transportation								
Oil	19.62	30.76	30.14	28.52	40.21	25.26	55.19	23.89
d) Household and Small Consumer								
Oil	4.04		5.53		9.30		12.67	
Charcoal	4.74		5.14		4.51		4.99	
Firewood	0.96		0.84		0.58		0.49	
	8.74	13.7	11.51	10.89	14.39	9.04	18.15	7.86

Source: Esso Standard Malaysia Berhad (ESMB) sectors is the changing share of energy use in the sectors, In 1960, the Transportation Sector registered 31 percent (Oil) compared to Industrial and Other Demands 28.5 percent (mostly Oil) and Electricity and Power Generation 25.5 percent (mostly Oil). However in 1975, owing to the rapid expansion in industrial development in Malaysia after independence and the successive Malaya and Malaysia Plans, the Industrial and 'Other' Sectors became the prime users of energy followed by Electricity and Power Generation as a result of the Industrial demand for power and rural electrification programme of the Government with the Transportation and Small Consumers constituting the remainder.

3.3 Pattern of Consumption of Petroleum Products in Malaysia

The main aims of the rest of the sections are to examine (i) the consumption pattern of petroleum products from 1970 to 1975 and (ii) forecasts of growth and pattern of demand for petroleum products from 1976 to 1990. The various petroleum products that enter into the discussion are aviation fuels (aviation turbine fuels or ATF and aviation gasoline or AVGAS), motor spirit or motorgasoline or mogas, kerosene, diesel oils (automotive diesel oil or ADO and industrial diesel oil or IDO), fuel oil, marine diesel oil and liquified petroleum gas or LPG.

Table 3.3 shows Malaysia's consumption of petroleum products from 1970 to 1975. The total consumption has been rising during the past 5 years of an average rate of 9.1 percent per annum and currently the rate of consumption is about 100,000 barrels per day or more. The growth rate of 9.1 percent per annum mentioned earlier is about one half times higher than the wide-wide estimated average increase of 5.9 percent per annum. And the consumption of 36.2 million barrels in 1975 represents a per capita consumption of 2.94 barrels per annum.

There are four categories of petroleum products which showed the highest rate of increase or growth per annum shown in Table 3.3. They are LPG, ATF, Premium Mogas and Fuel Oil in that order.

The rate of growth of 20.5 percent over the period gives LPG the highest annual rate of growth amongst the petroleum products. The highest rate of growth achieved by LPG was due to the shift from the consumption of kerosene and solid fuels brought about by the increase in the standard of living and income of the population and the rapid rate of urbanisation where a cleaner fuel is preferred. The restriction in the supply of kerosene by the oil companies during this period as a result of price control imposed on this product by the Government and the availability of more LPG made by the oil companies (there

TABLE 3.3

MALAYSIA: CONSUMPTION PATTERN AND GROWTH RATES OF PETROLEUM PRODUCTS - 1970-1975 (IN '000 BARRELS)

Product	1970	% Growth	1971	% Growth	1972	% Growth	1973	% Growth	1974	% Growth	1975	Average Annual Growth Rate
Liquified Petroleum Gas	320	24.7	399	35.8	542	28.6	697	11.5	777	4.5	812	20.5
Aviation Gasoline	45	8.9	49	-13.3	43	7.0	46	17.4	54	1.8	55	4.1
Aviation Turbine Fuel	852	6.2	905	4.8	948	32.0	1251	14.9	1437	15.4	1658	14.2
Kerosene	1469	14.5	1682	7.0	1799	7.9	1941	4.2	2023	4.7	2118	7.6
Mogas Premium	2292	12.2	2572	16.7	3001	17.7	3533	3.6	3661	13.7	4161	12.7
Mogas Regular	1296	-1.1	1282	3.2	1323	7.1	1417	20.1	1702	6.1	1805	6.9
Gas/Diesel Oil	8826	7.7	9503	9.1	10372	7.8	11185	3.4	11569	1.7	11760	5.9
Fuel Oil	7350	13.1	8314	11.5	9273	11.8	10368	12.9	11704	6.2	12428	11.1
Marine Diesel Oil	198	3.0	204	-9.9	184	22.3	225	-4.0	216	26.0	272	6.6
Total Petroleum Fuels	22648	10.0	24910	10.3	27485	11.6	30663	8.1	33143	5.8	35069	9.1
Bitumen/Asphalt	410	29.8	532	13.5	604	5.5	637	-12.4	552	3.1	535	5.5
Lubricants	336	13.1	380	16.6	443	21.9	540	-3.6	521	-6.7	486	7.7
Solvent/Other Products	24	16.7	28	12.5	63	36.5	86	-17.4	71	31.0	93	31.2
Total Petroleum Products	23418	10.4	25850	10.6	28595	11.6	31926	7.4	34287	5.5	36183	9.1

Source: Petroliam Nasional Berhad (PETRONAS) - National Oil Company of Malaysia is no price control on LPG), leads to an increase in LPG consumption over the years. The high growth rate of 14.2 percent per annum of Avtur over the period reflects the expansion programme of the Malaysian Airlines System (MAS), the national flag carrier, and the increasing preference for air transportation brought about by the economic activities and the level of income especially after independence (1957) and the formation of Malaysia (1967) and the increased aerial operations against the Communists by the military forces along the Thai-Malaysian border to the north. The high rate of increase for Mogas (13.2 percent) during this period comes mainly from Premium Mogas category. The rate of growth in the motor gasoline consumption is consistent with the rate of increase of motor vehicle population which is almost 11 percent per annum. And fuel oil increase of 11 percent per annum is due to the vast expansion programme of rural electrification under the successive 5 Year Plans of the Government and more intensive power consumption in the process of independence since industrialisation.

In terms of distribution shown in Table 3.4, Gas/ Diesel Oils and Fuel Oil shares which together account for 66.8 percent show the most significant share in total product distribution. However, fuel oil share has shown to increase at the expense of gas/diesel oils over the period from 31.4 percent in 1970 to 34.3 percent in 1975.

TABLE 3.4

MALAYSIA: SHARE DISTRIBUTION OF PETROLEUM PRODUCTS 1970-1975 (IN PERCENTAGE)

	1970	1971	1972	1973	1974	1975
Liquified Petroleum Gas	1.4	1.5	1.9	2.2	2.3	2.2
Aviation Gasoline	0.2	0.2	0.2	0.1	0.2	0.2
Aviation Turline Fuel	3.6	3.5	3.3	3.9	4.2	4.6
Kerosene	6.3	6.5	6.3	6.1	5.9	5.8
Mogas Premium	9.8	9.9	10.5	11.1	10.7	11.5
Mogas Regular	5.5	5.0	4.6	4.4	5.0	5.0
Gas/Diesel Oil	37.7	36.8	36.3	35.0	33.7	32.5
Fuel Oil	31.4	32.2	32.4	32.5	34.1	34.3
Marine Diesel Oil	0.8	0.8	0.6	0.7	0.6	0.8
Sub-Total	96.7	96.4	96.1	96.0	96.7	96.9
Bitumen/Asphalt	1.8	2.0	2.2	2.0	1.6	1.5
Lubricants	1.4	1.5	1.5	1.7	1.5	1.3
Solvent/Other Products	0.1	0.1	0.2	0.3	0.2	0.3
Total Petroleum Products	100.0	100.0	100.0	100.0	100.0	100.0

Source: Derived from Table 3.3 earlier.

3.4 Energy Consumption in Relation to Gross National Product

The significance of the contribution of primary energy sources to civilisation is undeniable. Yet, many countries in the world which are endowed with abundant energy resources rank low on the international scale when measured by income. Others with virtual dependence on imported fuels because they lack such resources (e.g. Denmark) may be amongst the most prosperous. This is because in the case of the former, education, technology and other natural resources are a necessary condition of growth; in the case of the latter, they can acquire the needed fuel supplies through international trade provided that they have the facilities to utilise the imports for exports. In short, energy consumption and overall economic development are related.

A prominent characteristic of per capita consumption of commercial energy forms is its systematic and close association with indicators of general economic development meansured by per capita Gross National Product (GNP). That is to say the higher the nation's income or output on the current international scale, the higher, in general, is its level of energy consumption. And when national energy consumption and GNP (both per capita) are plotted against each other, the resulting scatter of points falls within a fairly narrow band along an upward sloping regression line. In a study on 23 selected countries with varied economic background by Darmstadter[1] and others, it was found that the close association is reflected in a correlation coefficient of 0.87. Of the 23 top ranking nations in terms of per capita GNP in the study, 15 are also amongst the top 20 in terms of energy consumption per capita, of the 10 lowest in GNP per capita, 8 are among the lowest in energy consumption. The conclusion drawn from the study is that in general, the energy GNP ratio is likely to be lower in predominantly agricultural economies and higher in highly industrialised countries.

Another study on the relationship between the level of income and development and energy demand was by Mikdashi. In Mikdashi's study on 5 countries - United States, Northern Europe, Southern Europe, Japan and Latin America - for 1960-1966 on the correlationship between GNP and per capita energy consumption, he obtained a linear relationship of GNP per capita, Y = 0.14, energy consumption per capita, X = - 2.5 and correlation coefficient, $r^2 = 0.996$[2]. In a recent study by Fesharaki on the Iranian economy between 1960 and 1982, he found that there was a strong and direct correlation between the rate of economic growth and the consumption of the 4 main petroleum products (gasoline, kerosene, gas oil and fuel oil) for 1957-75 showed a regression line of D = - 164.58 + 6.55 GDP with $r^2 = 0.99$[3]. In all these studies it was seen that

1 Darmstadter, J., Teitelbaum, P.D., and Polach, J.G. ENERGY IN THE WORLD ECONOMY: A Statistical Review of Trends in Output, Trade and Consumption since 1925, J.HOpkins Press, Baltimore, 1971

See Next Page for 2 and 3.

there existed a direct relationship between the rate of growth of GNP and the rate of growth of demand for energy. The relevant study for Malaysia is shown in Table 3.5.

In the Table, the growth of energy demand exceeded that of Gross Domestic Product (GDP) except in 1973. This indicates rapid economic progress and the greater utilisation of energy resources. This is the general characteristics of many developing countries in their "take off" stage before reaching the stage of "sustained" growth. It can be argued here too that there is a very strong and direct correlation between the rate of economic growth and the consumption of petroleum products in Malaysia in the past. This trend is expected to continue into the future.

3.5 Forecasts of Petroleum Products Consumption 1976 to 1990

3.5.1 Methodology

There are a host of methods of estimating demand for petroleum products but none of them is entirely satisfactory. The usefulness of any one particular method rests on the nature of the problem in question, the availability of data, considerations of time and resources. Owing to the constraints of data in Malaysia, there are

---

2 Z Mikdashi, THE COMMUNITY OF OIL EXPORTING COUNTRIES Allen & Unwin, London, 1972 pp 120-21.

3 F Fesharaki, DEVELOPMENT OF THE IRANIAN OIL INDUSTRY International and Domestic Aspects, Praeger Press, 1976 pp 243-44.

TABLE 3.5

ANNUAL GROWTH RATES OF GDP AND ENERGY DEMAND (%)

Year	GDP(million M$) (1)	Rate of GDP Growth	Consumption('000 barrels) (2)	Rate of growth in Consumption	Ratio of Consumption Growth to GDP Growth
1970	10,708		23,418		
1971	11,589	8.2	25,850	10.4	1.27
1972	12,349	6.6	28,595	10.6	1.61
1973	13,867	12.3	31,926	11.6	0.94
1974	14,797	6.7	34,287	7.4	1.10
1975	15,315	3.5	36,183	5.5	1.57

Source: Data for (1) obtained from Appendix 3A
Data for (2) obtained from Table 3.3 earlier

probably three suitable approaches for forecasting of petroleum products consumption. The three methods to be considered here are: (i) Extrapolation of past trends, (ii) Micro-approach and end-use analysis and (iii) Macro-approach.

a) Extrapolation of Past Trends

This is the most common method but it has limited usefulness and provides a convenient first approximation.

This method assumes that there have not been any severe structural changes in the economy and that influences in the past will continue to be valid in the future. Since Malaysia is undergoing structural shift from agricultural to industrial production, the trending of past data will not be applicable for forecasting. However, the trend of the average annual growth rate of per capita energy consumption (petroleum products in Malaysia) is fairly stable in the long run and this can be used as an indication of the highest projected figure.

b) Micro-approach or End-use Analysis

In many ways end-use analysis is the most satisfactory approach to projection of petroleum products consumption. This method seeks to project the future consumption of the different sectors of the economy and thus taking into account the different growth rates of the various sectors. However, currently there is insufficient statistical data by end-use by product for Malaysia made available. Therefore further collection of data by end-use by product needs to be done before any analysis using this method is possible. This could perhaps be taken up in the second round of attempt or research.

c) <u>Macro-approach</u>

As a first attempt at long-term forecasting of Malaysian consumption of petroleum products by product by year, this method is the most suitable one.

The macro-approach involves the correlation of consumption with an independent variable such as Gross Domestic Product (GDP) or industrial production. It requires, however, reliable statistical data both for past petroleum products consumption and the behaviour of the economy as a whole. Past studies of energy consumption indicates a very significant correlation with GDP. As petroleum fuels accounted for over 90 percent of total energy consumption in Malaysia, this approach is used in the following forecasting.

d) <u>Assumptions</u>

1. The projections given in the subsequent section assume that basically the present composition of energy

consumption of Malaysia will continue to be unchanged. It is however, assumed that economic development will continue rapidly and thus, given its natural wealth and the competitive thrust and commercial instincts associated with its diversified natural stock, the economy will experience in time more diversified development and industrial growth.

2. The average annual growth rate of petroleum demand is expected to be similar to the average annual growth rate for energy as a whole in the period 1976 to 1990. This would imply that the contributions of other forms of energy such as solid fuels, hydro and nuclear plants to total energy consumption will be insignificant within the prescribed period. The development of the Cameron Highlands hydro-electric potential has been allowed for and the consumption of solid fuels is expected to remain very small as in the past. At present, the introduction of nuclear power on a large scale cannot be foreseen, at least before 1985. So far as natural gas is concerned, the position could, but would not necessarily change if indigenous natural gas were found in Malaysia. Failing this, however, the significant use of liquefied natural gas cannot be foreseen unless demand for gas as a premium fuel were much higher than it appears to be at present. Thus, there will be no significant substitution of various forms of primary energy.

3. The correlation coefficients between total petroleum product consumption and gross domestic product (at constant 1970 prices) for the period 1970 to 1975 will be stable for the forecasting period 1976 to 1990.

4. The target growth rates of GDP for the three periods 1976 to 1980, 1981 to 1985 and 1986 to 1990 as outlined in the Third Malaysia Plan is envisioned.

5. Consumer preference for comfort and convenience in using petroleum products makes them competitive in the face of an increase in cost relative to other forms of energy within the prescribed period. Since the main oil crisis of 1973 and the successive crises, the retail prices of main petroleum fuels - mogas, kerosene, diesel oil and LPG - have been controlled by the Government. Since the demand for most if not all petroleum products are price-inelastic, price has a small influence in our demand projection.

6. The concepts of consumption, quantity demanded and domestic sales are used interchangeably. This assumes that all sales are demanded and consumed and the change of stock (stock at the beginning and stock at the end) is either zero or negligible in the long-run.

3.6 Estimations of Consumption Demand from 1976 to 1990

The estimations of the 1976 to 1990 figures are obtained by: (i) using linear least-square method to determine the significance of each petroleum product with an independent variable such as Gross Domestic Product at factor cost or industrial growth at factor cost and then choosing the most suitable linear equation, and (ii) substituting the projected values of the independent variable in the best linear equation to obtain the projected values of the petroleum product.

The most significant independent variable for each petroleum product is Gross Domestic Product at factor cost. The main reason is due to the fact that no data is made available on end-use of each petroleum product in Malaysia made either by oil companies or government agencies and thus no correspondence can be made with each sector of the gross domestic product.

The equations using linear least square estimates are shown in App. 3B and the estimated values are tabulated in Table 3.6.

3.7 The Estimated Consumption Pattern of Petroleum Products from 1976 to 1990

From Table 3.6, Malaysia is estimated to consume an average of 156,000 barrels of petroleum products per day in 1980, 236,000 barrels per day in 1985 and 355,000 barrels per day in 1990. The average annual rate of growth for the first 5 year period from 1976 to 1980 is 9.5 percent. Then the rate decreases to 8.7 percent from 1981 to 1985 and 8.4 percent in 1986 to 1990. The main reason of the decline is the estimated decline in the growth rate of the Malaysian gross domestic product at factor cost (see Appendix 3A). In terms of per capita consumption, however, the estimated increase is from 2.94 barrels per annum in 1975 to 4.06 barrels per annum in 1980. This increase of 7 percent per annum in the next 5 years could indicate firstly the shift from primary to manufacturing industries under the aegis of the Third Malaysia Plan 1976-1980, which are more energy intensive, and secondly, the increase in transport services and facilities which grow faster at this stage of development.

In Table 3.6, the estimated growth in consumption for all petroleum products is expected to range between

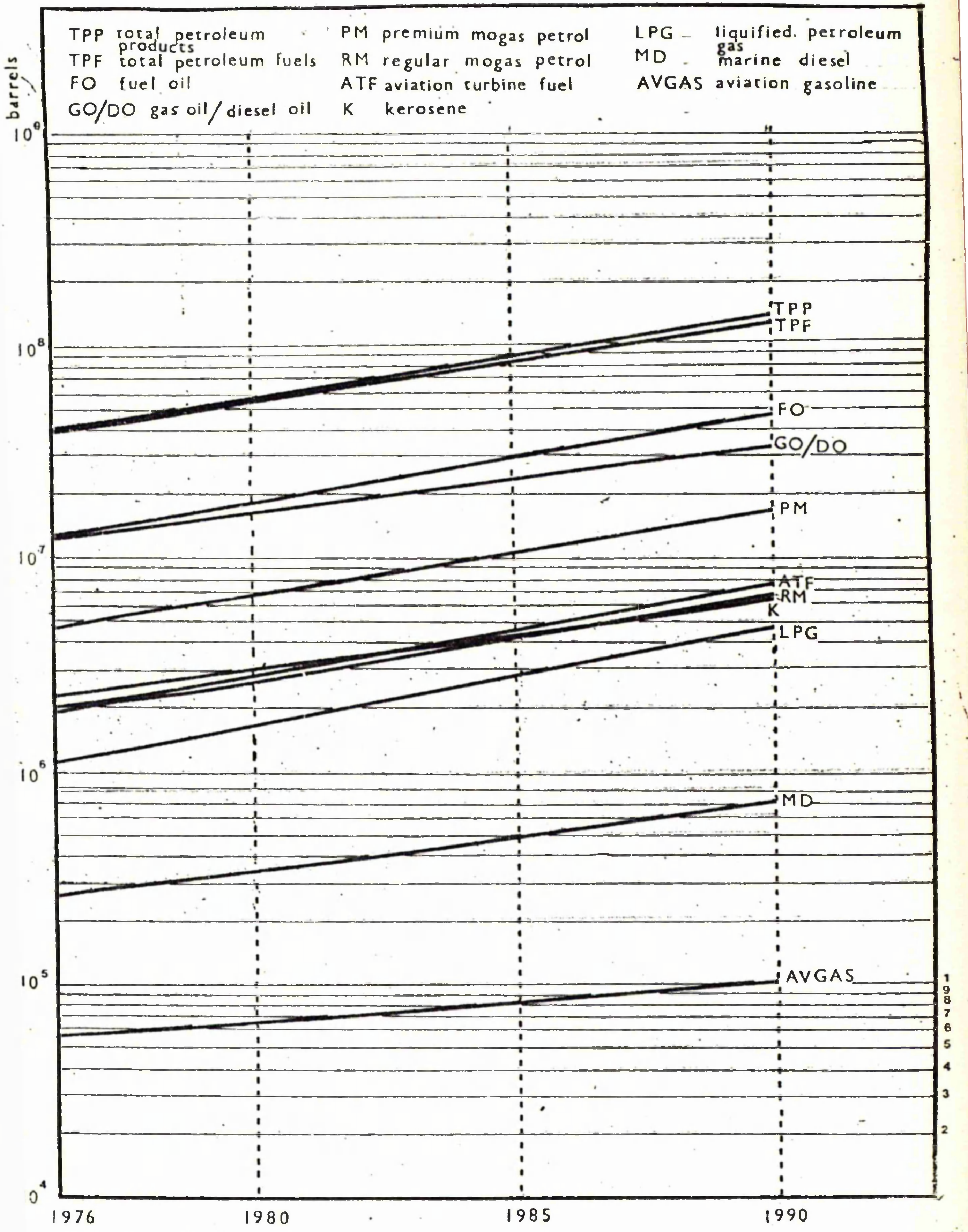
TABLE 3.6

MALAYSIA: ESTIMATED CONSUMPTION AND GROWTH OF PETROLEUM PRODUCTS 1976-1990 (UNIT: '000 BARRELS)

	1976	1977	1978	1979	1980	Annual Growth Rate 1976-80 (%)	1985	Annual Growth Rate 1981-85 (%)	1990	Annual Growth Rate 1986-90 (%)	Average Annual Growth Rate 1976-1990
Liquified Petroleum Gas	980	1136	1305	1487	1686	15.5	2880	11.3	4655	11.0	33.9
Aviation Gasoline	57	59	62	64	67	4.1	82	4.1	100	4.0	12.4
Aviation Turbine Fuel	1787	2030	2296	2583	2895	12.8	4771	10.5	7558	9.6	30.2
Kerosene	2290	2470	2667	2879	3110	8.0	4496	7.7	6555	7.7	20.4
Mogas Premium	4494	4980	5510	6083	6707)	10.5	10453)	9.4	16020)	8.8	
Mogas Regular	1926	2134	2362	2607	2874)		4480)		6865)		
Gas/Diesel Oil	12782	13676	14652	15704	16850	7.1	23739	7.2	33972	7.4	19.0
Fuel Oil	13670	15167	16802	18564	20486	10.7	32025	9.4	49170	8.9	25.7
Marine Diesel Oil	263	281	300	321	345	-	492		712		19.3
Total Petroleum Fuels	38249	41933	45956	50292	55020	9.5	83417	8.7	125606	8.5	23.5
Total Non-Fuel	1229	1338	1430	1562	1804	-	2601	-	3798	-	22.2
Total Petroleum Products	39478	43271	47386	51854	56824	9.5	86018	8.7	129404	8.4	23.4

Source: Derived from calculation in Appendix 3 B

Figure 3.1 : PROJECTED CONSUMPTION OF PETROLEUM PRODUCTS IN MALAYSIA 1976 TO 1990



source: table 3.6

19.0 percent to 34.0 percent in the next 15 years from 1976 to 1990. One of the most significant changes in the future as indicated in the Table is the competition between kerosene and liquefied petroleum gas especially for domestic burning and lighting. Kerosene is expected to show a decrease from 5.5 percent in 1980 to 5.1 percent in 1990 while LPG is expected to increase from 3.0 percent in 1980 to 3.6 percent in 1990. This is so in view of the expected rise in income and general urban drift which would bring about a substitution of kerosene for LPG.

In Table 3.7, which shows the expected share of distribution of petroleum products consumption over the next 15 years, the share of diesel oil category is expected to decrease further from 29.7 percent in 1980 to 26.2 percent in 1990. Gas/diesel oils are mainly used in the transport and mining industries and these two sectors especially the Malaysian Railways and tin-mining are expected to have lower growth due to competition from road transport and the slow rate of new commercial tin-ore discoveries. However, in the case of fuel oil, its share of consumption is expected to increase from 36.0 percent in 1980 to 38.0 percent in 1990. Out of the expected increase, electricity generation generally accounts for about 70 percent of the total fuel consumption. In the Third Malaysia Plan (TMP), the demand for power is expected to increase by about 12 percent per annum. Since not all electricity generation is by thermal facilities, the expected growth rate for fuel oil

TABLE 3.7

MALAYSIA: ESTIMATED SHARE OF DISTRIBUTION OF PETROLEUM PRODUCTS 1976-1990

	1976	1977	1978	1979	1980	1985	1990
Liquified Petroleum Gas	2.5	2.6	2.7	2.9	3.0	3.3	3.6
Aviation Gasoline	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Aviation Turbine Fuel	4.5	4.7	4.8	5.0	5.1	5.5	5.8
Kerosene	5.8	5.7	5.6	5.6	5.5	5.2	5.1
Mogas Premium	11.4	11.5	11.6	11.7	11.8	12.1	12.4
Mogas Regular	4.9	4.9	5.0	5.0	5.1	5.2	5.3
Gas/Diesel Oil	32.4	31.6	30.9	30.3	29.7	27.5	26.2
Fuel Oil	34.6	35.1	35.5	35.8	36.0	37.1	38.0
Marine Diesel Oil	0.6	0.6	0.6	0.6	0.6	0.6	0.6
Total Petroleum Fuels	96.9	96.9	97.0	97.0	96.9	96.6	97.0
Total Non-Fuel	3.1	3.1	3.0	3.0	3.1	3.4	3.0
Total Petroleum Products	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Source: From Table 3.6

consumption by the electricity boards is expected to be around 10 percent per annum. This leads to about 2 percent increase from 1980 to 1990 for total fuel oil consumption in the percentage distribution of total petroleum products consumption.

3.8 Limitations of Forecasts or Projections

There are 3 main limitations of the forecasts for petroleum product consumption for the next 15 years from 1976 to 1990:

Firstly, the projections are dependent on the target rates of growth of the Gross Domestic Product at factor cost of the Third Malaysia Plan. As such, the projected consumption figures should be viewed as targets rather than actuals.

Secondly, as has been indicated earlier in our assumption of projection, no account has been taken in the 1980 to 1990 projections as far as natural gas is concerned.

Thirdly, in making forecasts or projections of this nature, especially forecasts for a number of years ahead, they are likely to prove unreliable in practice since it is not possible to foresee the more distant future in sufficient detail. To mitigate this problem and to bring it in line with best possible expected forecast under the prevailing background and knowledge, it has been suggested to consider future oil demand as lying within a range of possibilities. We have considered this in the study, and have simplified the task by taking the Medium-Level - midway between High and Low levels Forecasting. Even then we must admit projections further ahead than 1985 should be treated with great caution.

CHAPTER 4

POST-WAR CRUDE-OIL EXPLORATION AND DEVELOPMENT

4.1 Scenario of Crude Oil Exploration

The first major phase of petroleum exploration activity in Malaysia and elsewhere in East Asia after the Second World War began in 1946. This lasted for the next decade till 1963 when the major activity was mainly directed towards the re-establishing onshore production facilities damaged and destroyed during the war and modest onshore exploration efforts. Hartley called this particular stage of oil development the Post-War "Rehabilitation" period[1]. The onshore areas of Sarawak, North Borneo, and Brunei and other East Asian countries were actively explored. In Malaysian areas of Sarawak and North Borneo, explorations were mainly conducted by the Royal Dutch Shell Group of Companies which had been active in this part of the world before the World War II.

It is also during this period that the scenarios of oil development have taken the form of a shift from onshore to offsh areas in Malaysia. This changing or shifting of interest on to the offshore areas was brought by the fact that (as) the coastline of West Borneo Island cuts obliquely across the geosynclinal basin and (b) prospective oil basin lie offshore as a continuity of major producing fields, Seria in Brunei and Miri in Sarawak, which lie on the coast and partly under the sea and (c) geologists have long known that East Asia's continental shelf including that of the Brunei coast was that

1 Hartley, A.G. "Offshore Petroleum Exploration in East Asia -An Overview", OSEA Conference, Singapore, 1976. Also in Petroleum News Southeast Asia, 1976.

rich sediments carried to sea by rivers had left thick "Tertiary" and "Cretaceous" deposits beneath the seabed, dating back some 100 million years - a good sign of the presence of oil.[2]

The large amount of exploration work to be done in the pre-war period and immediate post-war years coupled with rehabilitation efforts after World War II kept Shell fully occupied at the beginning. Shell Group of Companies then began to shift their interest to offshore oil possibilities. However, it was not until the early 1950's that large scale offshore exploration with its difficulties in terms of technology and high cost began to be considered as a practical possibility. This has been brought about strongly by (i) exploration on land had resulted in no new oil discoveries, (ii) practical successes achieved by offshore exploration in the Gulf Coast of United States, Lake Maracaibo and the Persian Gulf where major oil companies mastered drilling in shallow water (which began in Gulf of Mexico in the late '30s) and were well on their way to developing the technology in deep water drilling, and (iii) the major technical breakthroughs in the post-war years where by the time Shell began offshore exploration along the Borneo coast in the late 40s, seismic technology (developed in the mid-30s) were able to map the configuration and thickness of offshore sediments, thus giving the geophysists a reading of the probability of finding oil and other hydrocarbons, the development of radio location systems and improvement in offshore drilling and production installations.[3]

2-3 "Offshore Oil Fever :East Asia's Continental Shelf-The 3 Main Offshore Oil Basins", in PACIFIC BASIN REPORTS,San Francisco, Feb. 1971, p.42.

According to Hartley,[4] the second major exploration and development activity after the post-war rehabilitation period in East Asia was brought about by political and economic events, internal and external to the region. These events have the effect of reducing the exploration activity in this part of the world between 1964 till mid-1967. Five factors contributed to this development. Firstly, major exploration efforts and/or successful discoveries being made outside of East Asia (in Libya, North Sea (Dutch Sector), West Africa and Latin America), which drew industry efforts and funds away from most of this region. Secondly, the political and/or economic uncertainty of investments in oil in East Asia because of the instability of politics and policies. Thirdly, lack of any real commercial success in exploration drilling in many of the countries in East Asia. Fourthly, oil production was in the state of surplus throughout the world. Fifthly, the erosion in oil prices worldwide began in the early 1960s. However, these factors found exception in the case of Sarawak, North Borneo and Brunei. In these countries, both political stability and special exploration incentives (Shell Group of Companies being British and these three states were then British Colonies (Brunei is still a British colony))coupled with the discovery of several major oilfields from late 1963 through the early 1970s helped maintain a continuous oil activity in these areas. Unlike many other areas during this period, the relationship between oil companies and most governments has been "good" since these countries then were not yet affected by the new wave of "nationalistic" laws and policies, which swept through the region during this time. It is also during this period

4. Hartley, A.G., op.cit., p.42.

that the importance of offshore oil reserves and the oil industry's newly developed technical ability to explore and produce these major reserves begin to be fully recognised. The greatest impact of this being shown in Brunei in 1963 when the Royal Dutch Shell made its offshore discovery after initiating its offshore exploration programme in 1953. This initial success spurred the interest of oilmen to turn to these areas where both offshore production had been established and where large but relatively shallow continental shelf existed.

However, detailed exploration and development of these offshore basin by international oil companies awaited further a more congenial political situation, further development of offshore drilling technology and a realignment of supply and demand factors within the oil industry.[5] Until as recent as 1972, political factors were retarding oil development in East Asia offshore. This instability was hardly a propitious circumstance for British and American companies to develop offshore oil. Secondly, the main factor was that of international oil demand - supply situation. This results primarily from unstable political and economic conditions in the Middle East, at a time of rapid growth in total world oil demand. The closure of the Suez Canal in 1966 combined with the sabotage and closure of Trans-Arabian Pipeline (TAPLINE), the Arab-Israeli War, oil price hikes and embargoes by the Arab producing governments in 1973 worried the main consuming countries of the West. This is especially so in Western Europe, which relies on the Middle East and North Africa for

5. PACIFIC BASIN REPORTS, op.cit., p.4½.

more than 80 percent of its oil, and Japan, which gets 87 percent of its crude from the Middle East. Significantly, South East Asia's share of Japanese oil imports has already risen to 12 percent and should go higher. Thirdly, as a result of heightened demand coupled with threats to control of existing supply sources, the oil companies have launched a massive search for new petroleum sources in North America, (Alaska's North Slope and Canada's Artic), Europe (North Sea off Britain and Holland), Africa, Latin America, Australia as well as the Far East. A large part of this (if not the greater part) is concentrated on continental shelf exploration. This reflects tremendous advance in offshore oil drilling technology over the last 20 years. And fifthly, the sudden interest in East Asian oil was the public clamour to reduce industrial pollution particularly in Japan and United States. This is because oil found in the continental shelf (and on Alaska's North Slope) is low in sulphur content. Oil from the Middle East particularly Kuwait and Saudi Arabia, on the other hand, is mostly high in sulphur content (the comparison between Malaysian and Middle Eastern crudes will be discussed in Chapter 5). This tends to pollute the air both in its refining and its ultimate combustion. Import-dependent Japan, where oil consumption is expected to quadruple in 15 years, securing a stable oil supply not only near the home islands but low in sulphur is top priority. Similarly, "Freight-plus-Quality Advantages" exists for East Asian crudes in other western rim Pacific Basin markets, as well as on the United States' West Coast.

Following from the above development, the Malaysian petroleum industry entered into another major phase from 1967 to 1974.[6] According to Hartley, this period has been the most productive in East Asian oil development. With the development of more advanced offshore exploration equipment, knowhow and techniques, new offshore exploration areas were acquired and commenced to be developed in the late 1960s and early 1970s. Discoveries were also made during this period in offshore Malaysia although several of these 'discoveries' have yet to be developed.

The world development traced earlier had left its imprint on the pattern of oil exploration and development in Malaysia in the post-war years, in terms of areas explored, number of wells drilled and brought into production, and the number of companies involved in oil exploration and development.

4.2 Post-War Oil Exploration in Malaysia

In the course of an intensive geological and geophysical investigation both on onshore and offshore areas of Sarawak since 1911 up to 1965, the Royal Dutch Shell Group of Companies have drilled some 50 exploration wells on land. 30 of the wells were drilled before the Second World War and the rest after the war. They drilled 15 wells offshore as well since 1957 when the effort first began.[7]

6 Hartley, A.G., op cit.

7 Geological Department of British Borneo, THE GEOLOGY OF SARAWAK, BRUNEI AND THE WESTERN PART OF NORTH BORNEO, Kuching.

The country's first offshore rights went to Royal Dutch Shell Group of Companies after World War II as extensions of their North Borneo concessions in Sabah, Sarawak and Brunei.[8] In fact, Shell became East Asia's first offshore drilling operator in 1956, when it began drilling on the North Borneo Shelf, and later became the region's first offshore producer in 1965 when the Lutong field was brought into production. Significantly, these early offshore efforts were confined to the British controlled States of North Borneo were probably the most "politically stable" areas of East Asia at that time (as opposed to earlier conception of political instability in the region due to the Vietnam War and Communist subversion in all the countries in the region).[9]

Since 1959 the Dutch-shell Group of Companies concentrated their drilling efforts on the offshore area as none of the exploration wells onshore was successful. The two offshore wells drilled by the company in 1957 were from a fixed marine drilling platform. Then in 1961, the Shell Group of Companies employed the Orient Explorer, a mobile drilling platform, which began drilling work in Sarawak offshore areas. After it had drilled 9 wells it was replaced by the Sidewinder, a floating drilling vessel towards the end of 1964.[10]

The exploratory wells drilled from the Orient Explorer off Sarawak near Bintulu during 1962 showed good indications of the presence of oil, although it was not rated as commercial. Nearby the border between Brunei and Sarawak,

8–9 PACIFIC BASIN REPORTS, op.cit p.42
10 Geological Department of British Borneo, op.cit.

Shell Brunei had discovered good prospect of oil as a result of exploratory drilling encouraged by this prospect and their early discovery, Shell Sarawak intensified their drilling. Two large offshore drilling units replaced the Orient Explorer and Sidewinder which proved to be incompatible with the conditions of the sea-level by the depth of the Borneo waters in the case of the former and unstable in rough water in the latter. Shell was convinced of the good prospect of finding oil offshore to enable them to incur heavy capital expenditure such as these.

In the case of Sabah, exploration works by several interested oil companies have been carried out since 1915 (see Chapter 2 earlier). These companies concentrated their attention to several areas on the Klias Peninsula near Kudat, on Sabatik and Magalum Islands and in the South China Sea off the west coast of Sabah. However, none of these exploration wells were successful.

In the post-war years, exploration in Sabah, as in Sarawak earlier, also concentrated on the offshore area. In 1958, the first deep offshore well was drilled by Shell from a fixed platform. Then 3 years later, 5 deep exploration wells were drilled. Five of these 6 wells found no trace of oil or gas. The only well called Keranan drilled into a sand with no commercial significance but with some hydrocarbon indications.

The concession areas chosen and granted to the Shell

Group of Companies were located in the supposedly best geological indication for the formation of crude oil deposits. The Shell Group of Companies, being partly British in origin, was fortunate enough to exercise their influence under the British rule with the result that even after independence they still possess the optimal concession locations in the country. Its monopolistic and privileged position in the past with respect to licence selection enabled the Company to exercise the position of dominance in the development of the Malaysian oil industry in the past, present and in the future. The privileged position of Shell also has resulted in its early entrenchment in the oil business in this part of the world and in the hostile and geologically unexpected areas with unfavourable physical conditions both on land and sea (the South China Sea is affected by the monsoon weather and winds) and poorly developed infrastucture. The risk undergone by the company in capital and equipment development in the past has earned it as the pioneer in the industry.

The earlier indication of crude oil discoveries in commercial quantities by Sarawak Shell has spurred interest by the other mineral oil companies to explore for oil in the country. The new comers were able to obtain concessions in those areas only when Shell abandoned the area. They are in a way handicapped by the fact that they were given the less favourable area in terms of the possibility of oil find. On the other hand, they would concentrate on certain areas as risk was decreased by the earlier extensive work carried out by Shell.

With the interest shown by the international oil companies in bidding for concessions in offshore areas, the Government passed the Continental Shelf Act of 1966. The Act states:

> "Malaysia proclaims ownership of the natural resources to be found beneath the sea bed of the continental shelf beyond the territorial limits of the coastal States up to a water depth of 200 meters or deeper...."[11]

The Government was then able to dispose licences for the continental shelf. The Government designated the coastal waters to a depth of 100 fathom line. The option consisted of a number of concession blocks of 4,000 square mile each. The granting of a prospecting licence was contingent upon a payment of premium.

Until 1964, only Shell Sarawak and Shell Sabah held oil concessions in Malaysia. However, since the passing of the Continental Shelf Act of 1966, the number of bidders and concessionaires have increased. With this development, the crude oil industry in Malaysia was no longer dependent on the monopoly of one company, and this improves the negotiating position of the Government with the oil companies. Moreover, the participation of oil companies of different nationalities improves the negotiating position of the Government with the oil companies. Moreover, the participation of oil companies of different nationalities reduces the danger of obligopolistic arrangement and behaviour as they are competitive concession bidders for high premium.

11 Review of the Development of Petroleum Resources in Malaysia by the Department of Mines and Geological Survey appeared in Proceedings of the <u>FOURTH SYMPOSIUM ON THE DEVELOPMENT OF THE PETROLEUM RESOURCES OF ASIA AND FAR EAST</u>, ECAFE, Bangkok, 1972.

4.3 Oil Concession Areas And Oil and Gas Fields

Figures 4.1A and 4.1B show the offshore areas of Malaysia that are actively explored by the various oil companies. Figure 4.1A shows the offshore areas that have been explored by Mobil, Exxon and Continental Oil Company (Conoco), in Peninsula Malaysia. Only two tiny strips a and b (shaded) in the Figure 4.1A remain unexplored, both being in the Straits of Malacca, immediately to the north and south of the area already explored by Mobil. Figure 4.1B, on the other hand, shows the offshore areas that have been explored for Sarawak and Sabah. Between the six oil companies concerned, Sarawak Shell, Sabah Shell, Exxon, Oceanic, Aquitaine and Teiseki, they have explored most of Sabah and Sarawak offshore areas and only small pockets of unexplored areas remain.

Figure 4.2 gives the actual areas that have been explored by each of the eight oil companies mentioned earlier. With the passing of the Petroleum Development Act of 1973 and the production sharing formula, (a detailed discussion will be made in Chapter 10), the areas made available and now being explored under the production sharing agreement or called "contract" areas are much smaller than those areas made available under the old "concession" system. Figures 4.2a and 4.2b show the present contract areas for Peninsula and East Malaysia respectively. In the case of Peninsula Malaysia, a production sharing agreement has not yet been contracted with Continental Oil Company (Conoco), but discoveries have been made in the area defined. In the case of East Malaysia,

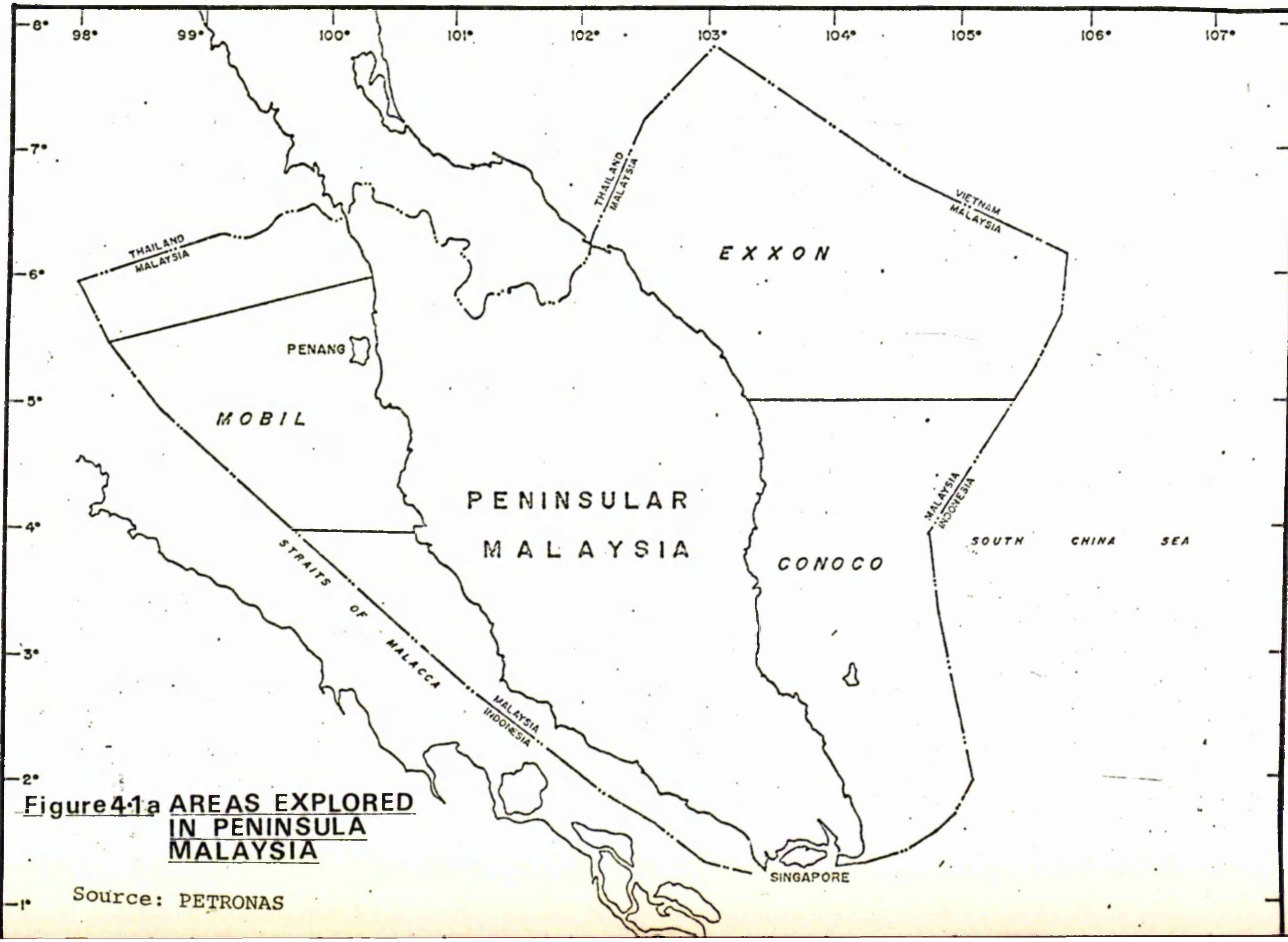


Figure 4.1a AREAS EXPLORED IN PENINSULA MALAYSIA

Source: PETRONAS

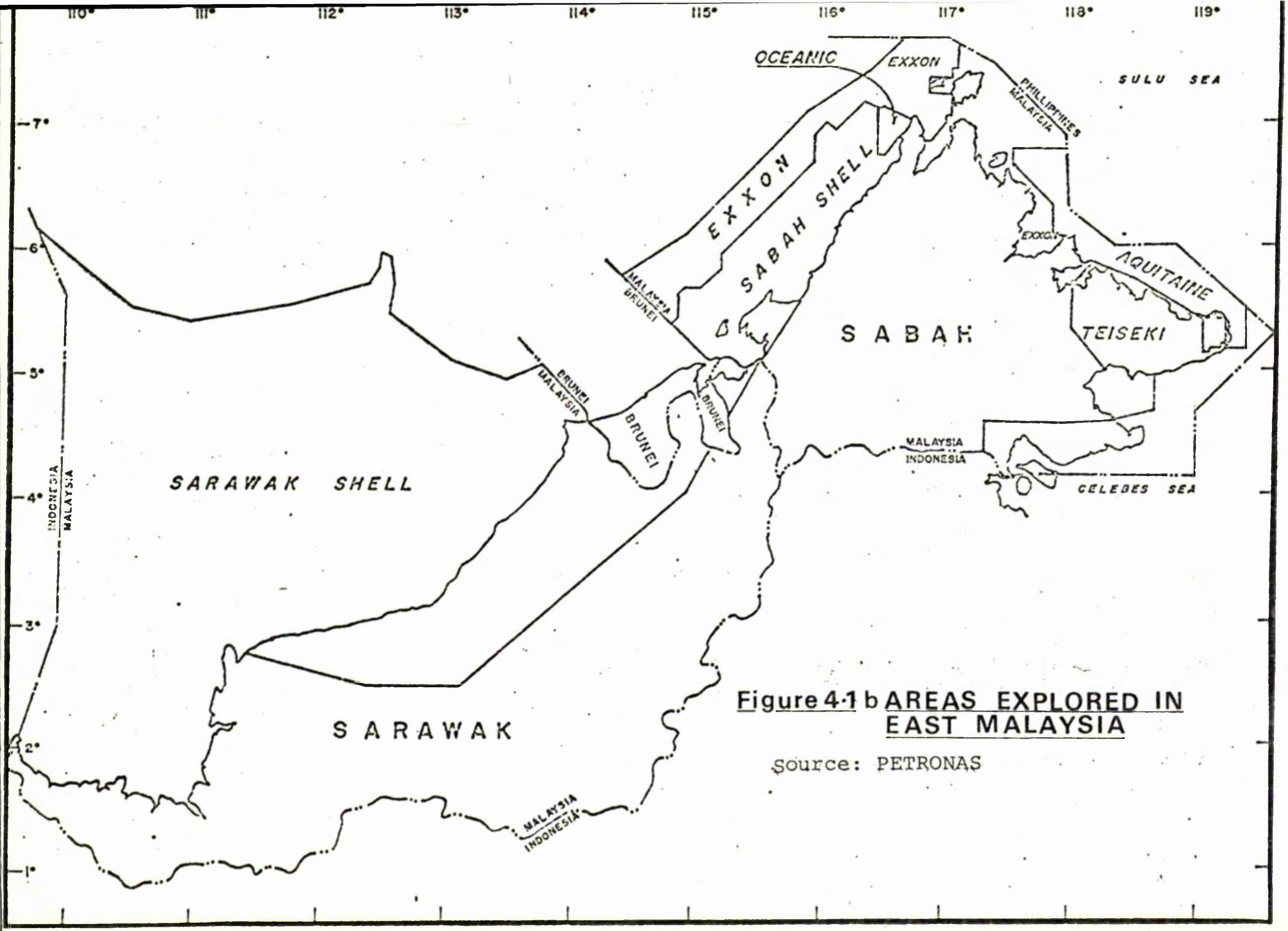
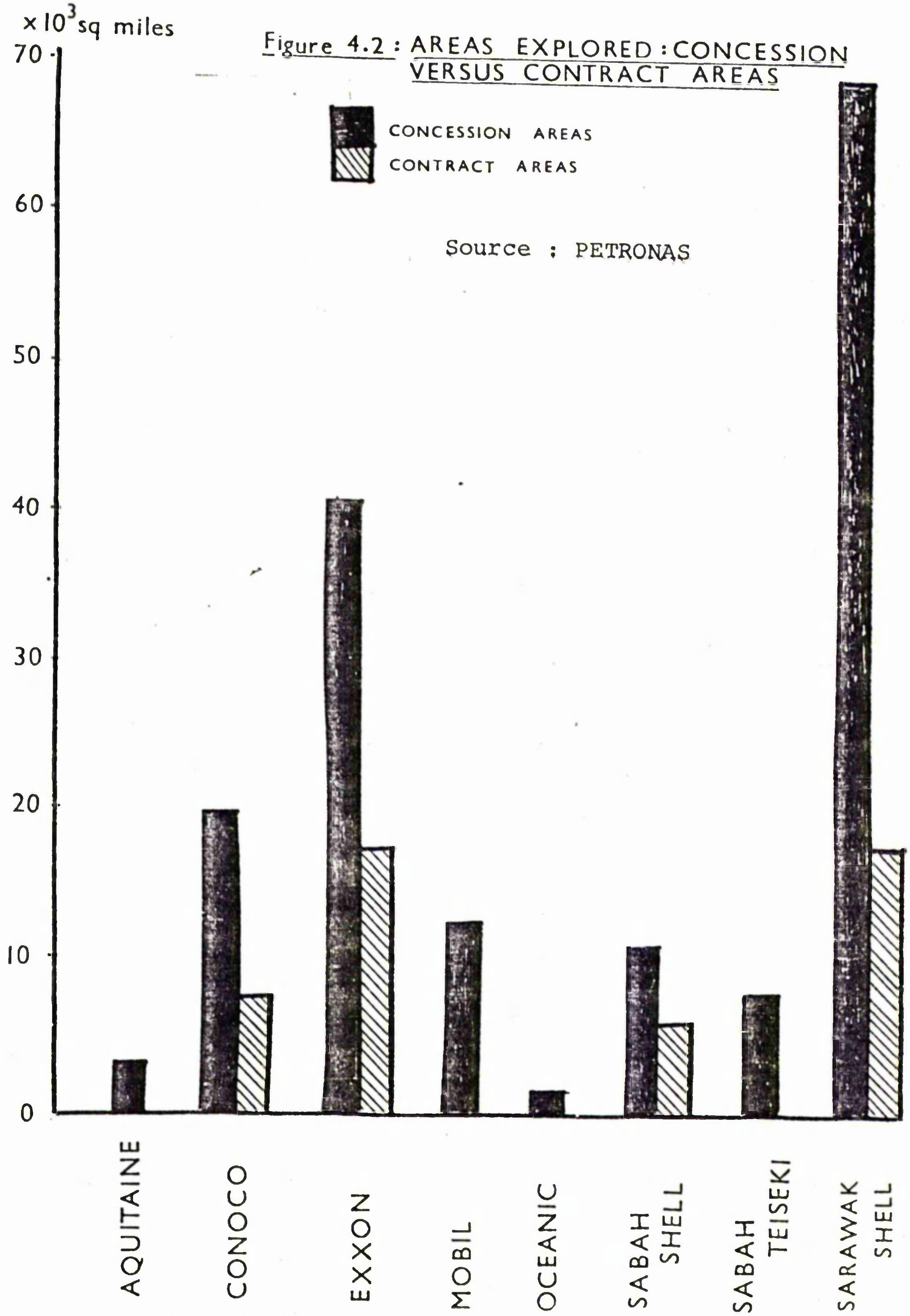


Figure 4·1 b AREAS EXPLORED IN EAST MALAYSIA

Source: PETRONAS

Figure 4.2 : AREAS EXPLORED : CONCESSION VERSUS CONTRACT AREAS



source : PETRONAS

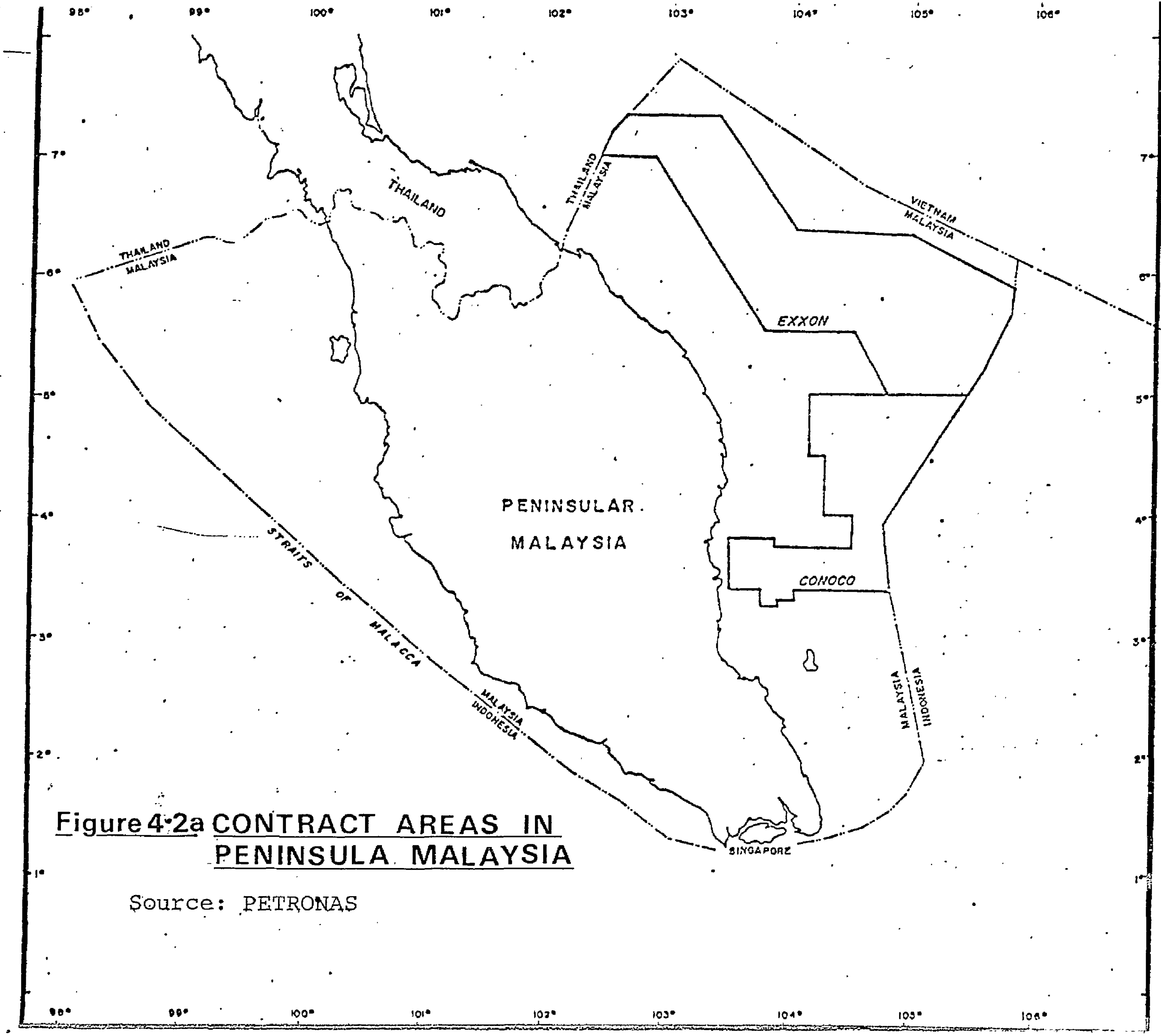
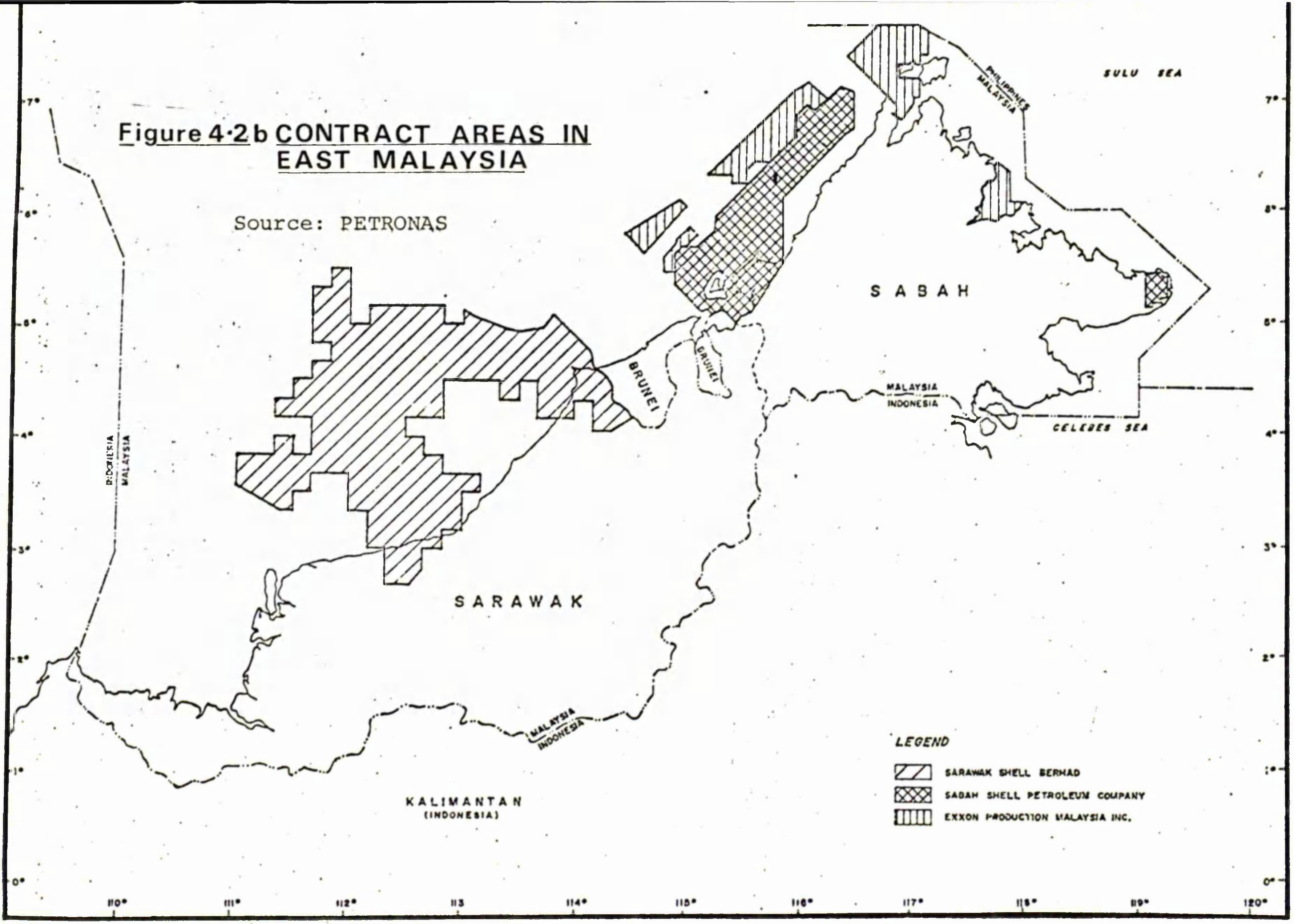


Figure 4.2a CONTRACT AREAS IN PENINSULA MALAYSIA

Source: PETRONAS

Figure 4·2b CONTRACT AREAS IN EAST MALAYSIA

Source: PETRONAS



all the three companies (Exxon, Sabah Shell and Sarawak Shell) have signed the production sharing agreement.

The country's first offshore rights went to the Royal Dutch Shell Group of Companies after World War II, an extension of their Borneo concessions in Sarawak, Brunei and Sabah. Shell became the first offshore drilling operator in 1956 when it began drilling on the North Borneo Shelf and became the country's offshore producer in 1965 when the West Lutong Field was found. Later in 1967, 1970 and 1971 three other fields were found: Baram, Baronia and Bakau - all in the area offshore Sarawak; other oil fields in Sarawak are Fairley Baram and Tukau. In Sabah, Shell Sabah has two fields - Semarang and West Erb found in 1974. The other oil strike in offshore Sabah was Exxon's Tembungo field found in 1974. This is shown in Figure 4.3a.

The major gas field in the Malaysian waters in offshore Sarawak is Shell's "F" area or Luconia discovery in 1974 with gas reserves conservatively estimated at 6 trillion cubic feet.

Though most of the offshore production to date comes from East Malaysia, there have been some significant discoveries off the East Coast of Peninsula Malaysia. Several years of exploration without commercially exploitable reserves boing found gave way to petroleum gas finds off the East Coast in 1973 by Exxon and Conoco. Exxon came up with several highly rated gas discoveries and a promising petroleum discovery.

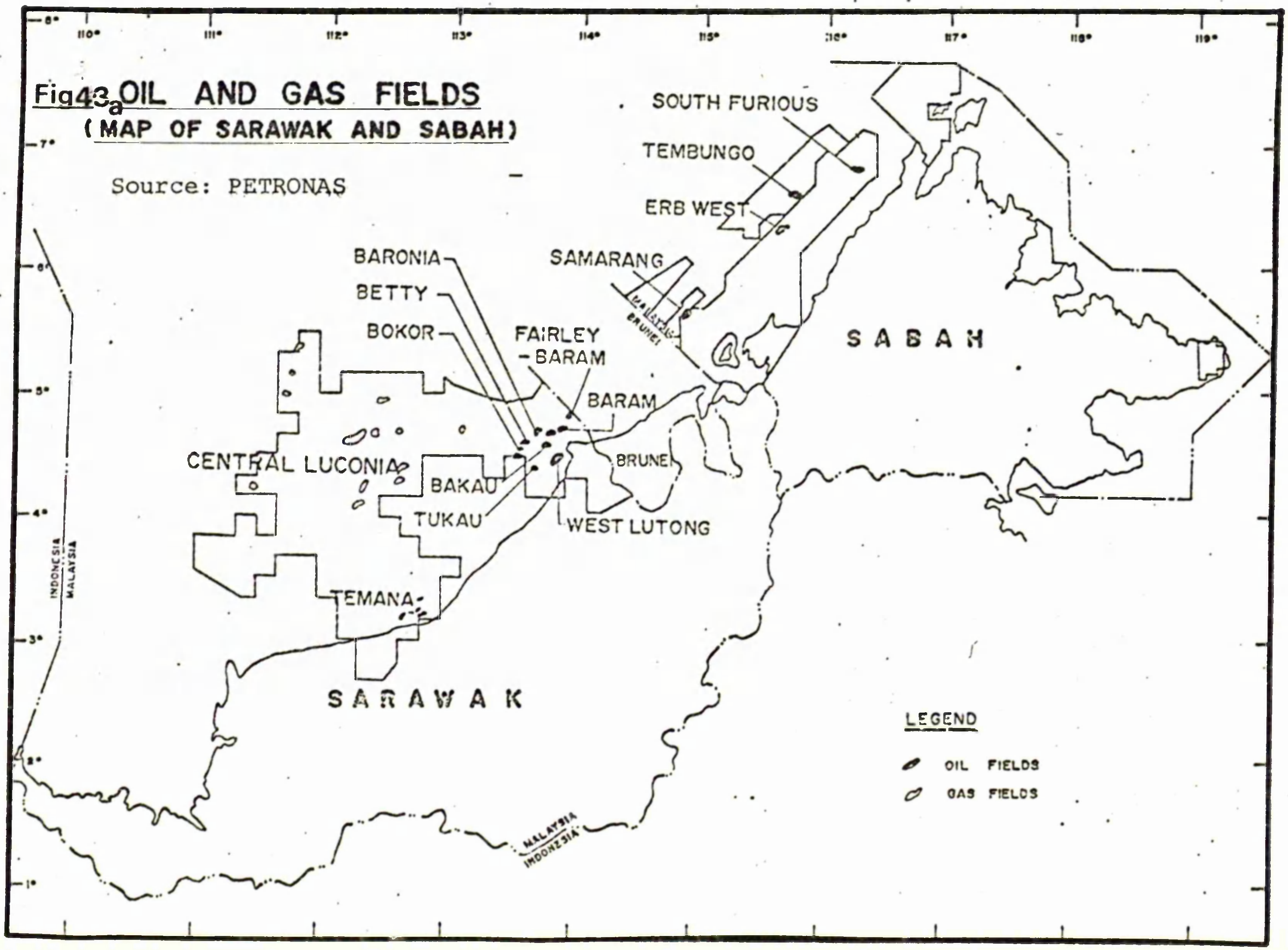


Fig 43a OIL AND GAS FIELDS
(MAP OF SARAWAK AND SABAH)

Source: PETRONAS

The oil finds were Pulai, Pilong, Bintong, Jerneh and Bekok and Setigi wells. Conoco's discoveries were at Sotong in 1973 and later at Anding, Duyong and Duyong Barat. The petroleum field found off Peninsula Malaysia's East Coast on Exxon's concession is the Tapis field (1975) with estimated reserves of 320 million barrels of oil - the largest so far found in this country. The petroleum from Pulai, Bekok and Setigi and Tapis is expected to be brought into production sometime in 1977. The only offshore zone to be investigated in depth is in the Straits of Malacca. In Peninsula Malaysia, Duyong is the only gas field and found in Conoco's concession area. The oil and gas fields for Peninsula Malaysia is shown in Figure 4.3b.

4.4 Drillings And Crude Oil Production

In the period of 1959 to 1976, the number of oil wells drilled by the different exploration companies as shown in Table 4.1 was approximately 244 wells. Out of these the number of wells drilled in East Malaysia is around 194 or 78 percent and Peninsula Malaysia 54 or 22 percent. They were mainly concentrated in the Continental Shelf areas on the West Coast of Sabah and Sarawak and the East Coast of Peninsula Malaysia.

In the early part of the 16 year period, the wells were located in the areas bordering the Miri offshore fields. They were drilled by the Sarawak Shell Oil Company. Later, there was a widespread rate of drilling away from the

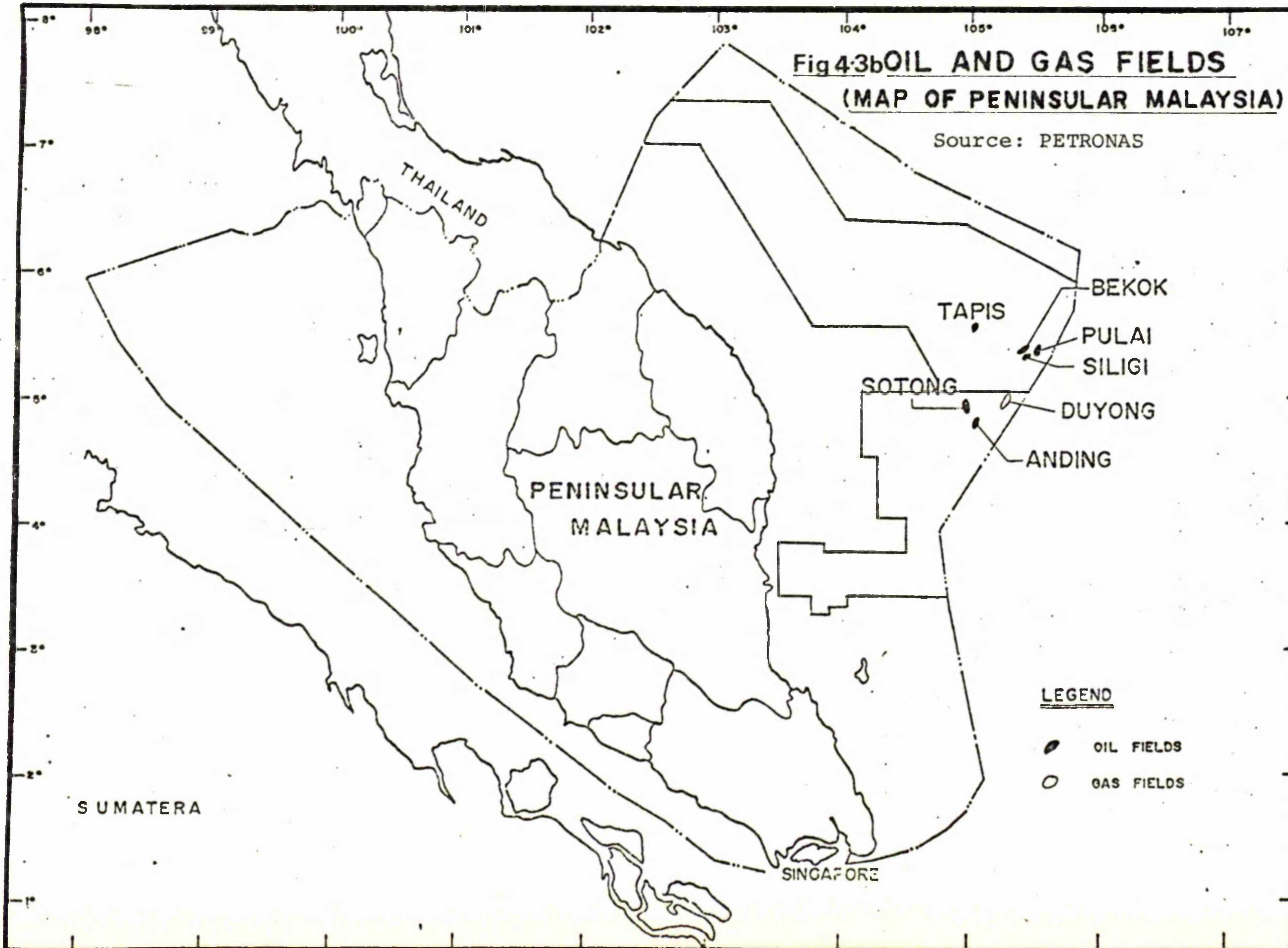


Fig 4·3b OIL AND GAS FIELDS
(MAP OF PENINSULAR MALAYSIA)

Source: PETRONAS

TABLE 4.1

EXPLORATION WELLS DRILLED AND FOOTAGE 1956-1976

Year	Company	No of Wells	Location	Total Depth
1956	Sarawak Shell	2	Sarawak	12,716
1958	Sabah Shell	1	Sabah	8,862
1961	Sarawak Shell	1	Sarawak	7,845
	Sabah Shell	4	Sabah	30,333
1962	Sarawak Shell	7	Sarawak	49,818
	Sabah Shell	1	Sabah	6,151
1963	Sarawak Shell	2	Sarawak	16,624
1964	Sarawak Shell	4	Sarawak	35,301
1965	Shell Group of Companies	18(1)	Sabah, Sarawak & Brunei	n.a.
1966	Shell Group of Companies	24 (1)	Sabah, Sarawak & Brunei	90,117
1967	Sarawak Shell	27	Sarawak	93,094
	Sabah Shell	1	Sabah	9,556
1968	Shell Group of Companies	17(1)	Sabah, Sarawak & Brunei	n.a.
1969	Sarawak Shell	20	Sarawak	139,169
	Exxon	4	Peninsula Malaysia	n.a.
1970	Aquitaine	3	Sabah	26,187
	Conoco	2	Peninsula Malaysia	n.a.
	Exxon	8	Sabah	35,137
	Sabah Teiseki	3	Sabah	n.a.
1971	Exxon	6	Peninsula Malaysia	43,630
	Conoco	1	Peninsula Malaysia	9,500
	Mobil	1	Peninsula Malaysia	5,484
	Exxon	5	East Malaysia (Sabah)	41,138
1972	Aquitaire	2	Sabah	21,354
	Ashland	2	Sabah	11,030
	Exxon	2	Peninsula Malaysia	15,872
	Exxon	11	Sabah	80,075
	Mobil	1	Peninsula Malaysia	4,245
	Shell	3	Sabah	n.a.
1973	Conoco	1	Peninsula Malaysia	10,018
	Exxon	1	Sabah	7,333
	Exxon	3	Peninsula Malaysia	n.a.
	Sabah Shell	13	Sabah	n.a.
	Sabah Teiseki	1	Sabah	12,139
1974	Conoco	7	Peninsula Malaysia	66,255
	Exxon	7	Peninsula Malaysia	50,101
	Forex Oil	1	Sabah	7,500
	Sarawak Shell	10	Peninsula Malaysia	83,982
	Sabah Shell	6	Sabah	45,209

(1) includes Shell Brunei

TABLE 4.1 (CONTD.)

EXPLORATION WELLS DRILLED AND FOOTAGE 1956-1976

Year	Company	No of Wells	Location	Total Depth
1975	Mobil	1	Peninsula Malaysia	5,418
1976	Aquitaine	3	Sabah	23,595
	Conoco	2	Peninsula Malaysia	6,355
	Exxon	6	Peninsula Malaysia	42,056

Source: American Institute of Petroleum Geologists Section on Oil in South-East Asia, August Issues of Various Years from 1956 to 1976.

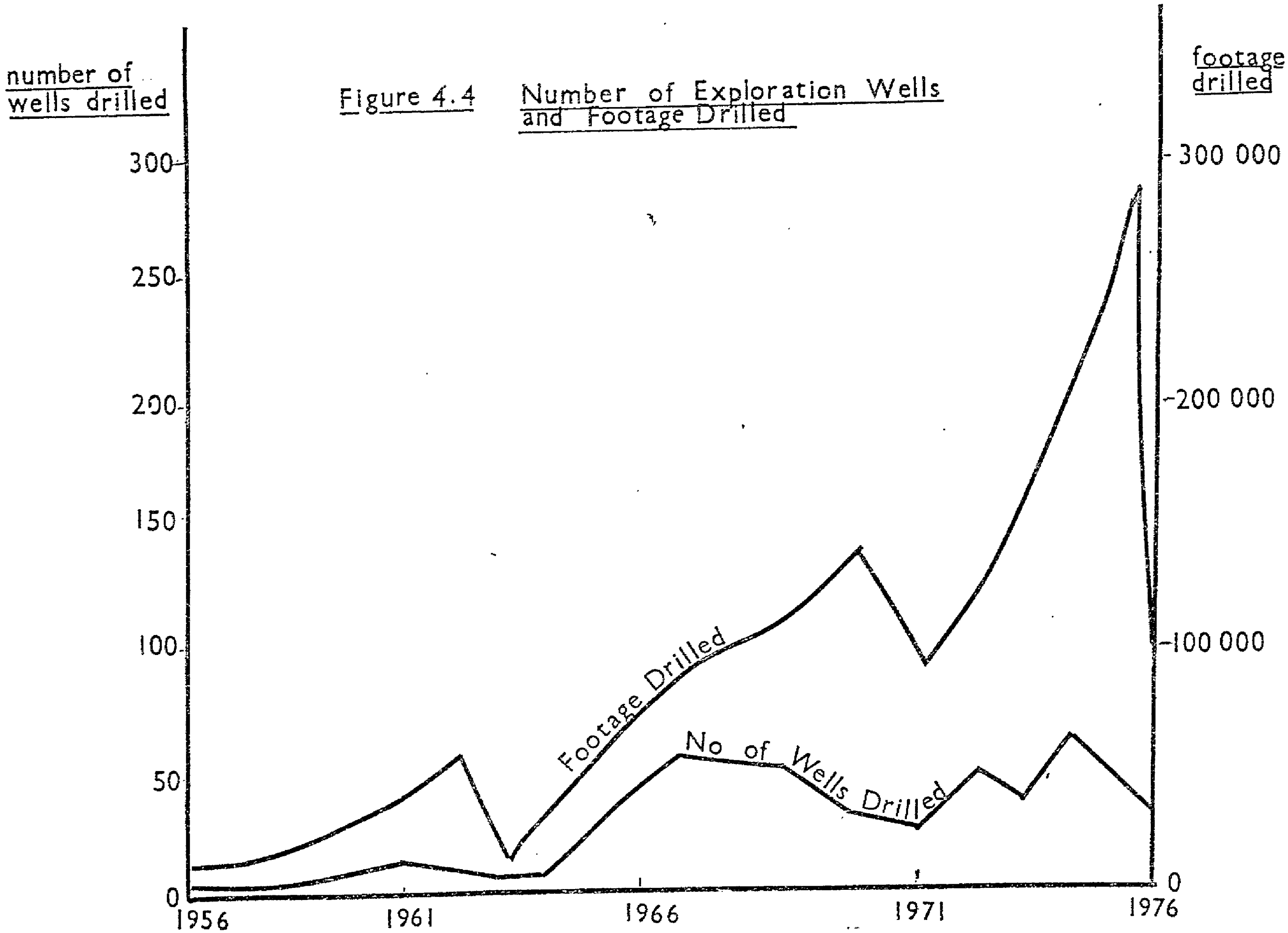
continental shelf areas into the areas more than 100 ft. fathoms.

The discovery of the first offshore wells in Sarawak in 1964 spurred the number of drillings not only by Shell but also by the other oil companies. There was an increased number of drilling activities in the offshore areas of Sarawak and Sabah. The Shell Group of Companies were eager to develop the concession areas quickly as their licence agreements require them to surrender 50 percent of their oil prospecting licence after January 1, 1960. This event explains the large number of exploration wells drilled at that time. Since 1964 the number of wells drilled has risen immediately. This is graphed in Figure 4.4.

Since 1965 saw the shift in emphasis in the types of drilling from exploration drilling to appraisal and development wells. This change in trend indicates the change in the phase of development of oil fields.

Although crude oil in Malaysia started in 1911, since the Second World War the production from the only and nearly exhausted Miri fields was declining very quickly. The highest rate of production achieved since the war was just under 1,400 barrels per day in 1956 but since then production has continued to decline steadily. A temporary slight increase in production in 1960 and 1961 achieved by the successful reopening of some old wells but was not maintained. By 1963 production had fallen to 372.5 thousand barrels in that year

Figure 4.4 Number of Exploration Wells and Footage Drilled



source : Table 5.1

or just over 1,000 barrels per day. By the end of 1963, some 620 wells had been drilled at Miri - about a dozen of them since the War - but only 175 of these, with depths ranging from 57 to 3,355 feet were still yielding oil (all by pumping).

When the Miri field was finally exhausted, the ultimate recovery of Miri field was slightly at 80 million barrels and of these some 70 million barrels had been produced by the end of 1963. The remaining proven reserves to sustain further production was the annual production which declined from the 1963 rate of just under 1,000 barrels of oil per day till the minimum economic limit of production was reached in 1972 when the field was finally shut down.

Exploration successes and current development activity for crude oil resources have stimulated discussions and optimistic opinions concerning Malaysia's self-sufficiency in oil production. In 1967, the daily production of indigenous crude oil has risen from just about 330 thousand barrels in 1966 or about below 1,000 barrels per day to 1.5 million barrels in 1967 or about 4,000 barrels a day. The increase in production came from the west Lutong Field which was discovered in 1965 and brought into production in 1967. The increase in production came from the new fields. The daily production of crude oil rose rapidly from 1967 till 1973 to 72.2 million barrels or just below 200,000 barrels per day or 5 times the 1967 level. The increase in production till

1973 came almost entirely from the Sarawak fields of Baram (1967), Baronia (1970), Bakau (1971) besides West Lutong (1965). And besides the 4 offshore fields found prior 1971 the other offshore oilfields in Sarawak which brought into production since that year was Fairley-Baram and Tukau. In Sabah, Shell's production came from 2 other fields - Semarang and West Erb found in 1974. Tembungo field which was found in 1974, brought into production recently.

Table 4.2 shows the Malaysian crude oil production from 1960 to 1976.

4.5 Investments And Costs In Crude Oil Production

Like any other natural resources (tin, iron-ore etc) the production of petroleum require a number of investments before it can be produced and utilised. The discovery of the petroleum deposits in the South China Sea sector of Malaysia elucidated earlier in Section 4.4 needs an input of substantial and sustained efforts and costs before tangible benefits can be accumulated by the various oil exploration companies.

The cost of production in the South China Sea is much more expensive than a number of other countries because the area is not one of prolific in oil deposits. On top of that water-depths and weather conditions have forced the exploration and production companies to use expensive and untried equipment.

TABLE 4.2

MALAYSIA: CRUDE OIL PRODUCTION 1960-1976 (IN '000 BARRELS)

Year	Total Annual Production	Index	Increase (%)	Production Per Day ('000 barrels)
1960	435.1	28.598		1.192
1961	435.1	28.598		1.192
1962	418.2	31.628	- 4.0	1.145
1963	372.5	24.484	- 11.0	1.020
1964	351.6	23.110	- 5.7	0.963
1965	345.7	22.722	- 1.7	0.947
1966	328.3	25.128	- 5.1	0.899
1967	1,521.4	100.0	+363.4	4.168
1968	3,387.4	222.65	+122.6	9.280
1969	6,558.7	431.096	+ 93.6	17.969
1970	25,070.9	1,647.88	+282.3	68.687
1971	33,866.9	2,226.035	+ 35.08	92.786
1972	76,831.0	5,050.020	+126.9	210.495
1973	72,263.0	4,749.77	- 6.0	197.980
1974	68,124.0	4,477.72	- 5.8	186.64
1975	64,364	4,230.58	- 5.6	176.339
1976	60,546.8	3,979.6	- 6.0	165.88

Source: Bank Negara Malaysia Annual Report 1976

The sums involved in crude oil production in Malaysia are great. The South China Sea development is characterised by the vastness of the outlays required for both expansion and production. Table 4.3, shows the costs of investments of the various oil companies. The investments represent the yearly capital expenditures (not cumulative) which excludes producing and operating expenses. The four categories of capital investment shown in the table are Exploration and Surveying, Terminal Facilities, Production Facilities and Administration and other costs.

Under Exploration and Survey, it includes the costs of investments in exploration and drilling, geological and geophysical, rentals and overhead expenditures and other expenditures related to exploration. The investment in Terminal Facilities, on the other hand, includes storage tanks, pipelines, shipping terminals (mooring and loading facilities). The third category is that of production facilities which encompasses the building of production platforms and drilling. Other investments include transport equipment services units and facilities and general plant and equipment.

The period of investments from 1973 till 1976 is the period where there is a "bee-hive" of activity in petroleum exploration as a result of the oil crisis and shortage of crude in the oil market which drove oil companies to many parts of the world to find new sources of oil. It is also

TABLE 4.3

MALAYSIA: OIL COMPANIES INVESTMENT IN EXPLORATION, TERMINAL FACILITIES AND PRODUCTION FACILITIES 1973-1976 (in M$ million)

	1973	1974	1975	1976
1 Exploration Expenditures				
a Oceanic	–	5.0	0.85	3.0
b Sabah Teisaki	6.5	4.5	1.4	–
c Aquitaine	1.0	–	17.0	75.0
d Conoco	26.9	44.2	10.4	– –
e Shell Sabah	18.7	32.2	16.7	20.0
f Shell Sarawak	10.8	31.9	53.2	33.0
g Exxon	23.1	76.3	86.0	3.6
h Mobil	–	2.5	0.3	–
Sub-Total	87.0	189.1	174.3	134.6 (Minimum)
2 Terminal Facilities				
a Shell Sarawak	–	–	30.5	1.3
b Shell Sabah	0.6	12.0	31.1	9.6
c Exxon	2.1	12.3	15.2	–
Sub-Total	2.7	24.3	76.8	10.9
3 Production Facilities				
a Shell Sarawak	59.9	81.5	123.5	86.5
b Shell Sabah	–	23.0	109.3	85.9
c Exxon	11.0	39.7	77.9	–
Sub-Total	70.9	144.2	310.7	172.4
4 Others				
a Sabah Teiseki	–	0.37	0.38	–
b Shell Sabah	–	18.8	9.82	9.01
c Shell Sarawak	–	0.35	0.64	0.51
d Exxon	–	5.6	1.7	–
Sub-Total				
Grand Total	159.6	347.6	561.8	327.4

Source: Private Communications With The Oil Companies the period whereby new areas of increased reserves are demanded upon by oil companies. South China Sea has been the focus of interest following an earlier discovery of 2 offshore fields by the Shell Group of Companies in the late 1960s.

There are 7 companies actively involved in the exploration of the South China Sea sector of Malaysia. Up to now only Shell Sarawak, Shell Sabah and Exxon and Conoco have located oil and gas fields in their concession blocks. However, only 3 out of the 4 companies have started to invest in building terminal and production facilities and their finds have shown to be of commercial quantities.

Table 4.3 shows the main items of expenditure over the past 3 years 1973-75. Production platform and drilling investments account for about M$585.0 million or 41.8 percent of the total capital costs. The production platform is the most significant item and the cost will vary according to the number required, size and water depth of the field concerned. The need for more than one production platform and separate platform for pumping, separation and accommoda-tion would result in increasing capital costs. Similarly exploration drilling account for a large amount of cost in this category.

Amongst the investment in terminal facilities, the most costly being offshore storage tanks and shipping terminals. In the case of the South China Sea area of Malaysia the costs under this category amounted to around M$103.8 million or about 11 percent of total capital costs.

Funds required to develop oil and gas discoveries and potential reserves such as mentioned above are difficult to assess and generalise for different and varied regions in the world, since the costs associated are based on many factors such as water depth, distance from the shore, on-shore receiving facilities, platform construction facilities, geology of reserves and expected end-use of the crude oil produced.

Table 4. 4 and Figure 4.5 show some relative costs associated with oil discovery and development between offshore in less than 150 feet water depth and offshore field of more than 150 feet water depth in 1969. This is compared to production costs of Middle Eastern crudes (average to Japan), Kuwait and Minas (Indonesia) crudes. In the Table the technical costs is highest in the case of Sarawak offshore areas - US$0.90 ¢ per barrel in the case of water depth of more than 150 feet, US$0.71 ¢ per barrel in the case of crude from water depth less than 150 feet, compared with US$0.30 ¢ per barrel in Indonesia (on land); US$0.15 ¢ Middle East crudes and US$0.10 ¢ in the case of Kuwait. In the calculation of margins per barrel of crude, Minas crude of Indonesia shows the highest with US$0.51 ¢ per barrel with Sarawak

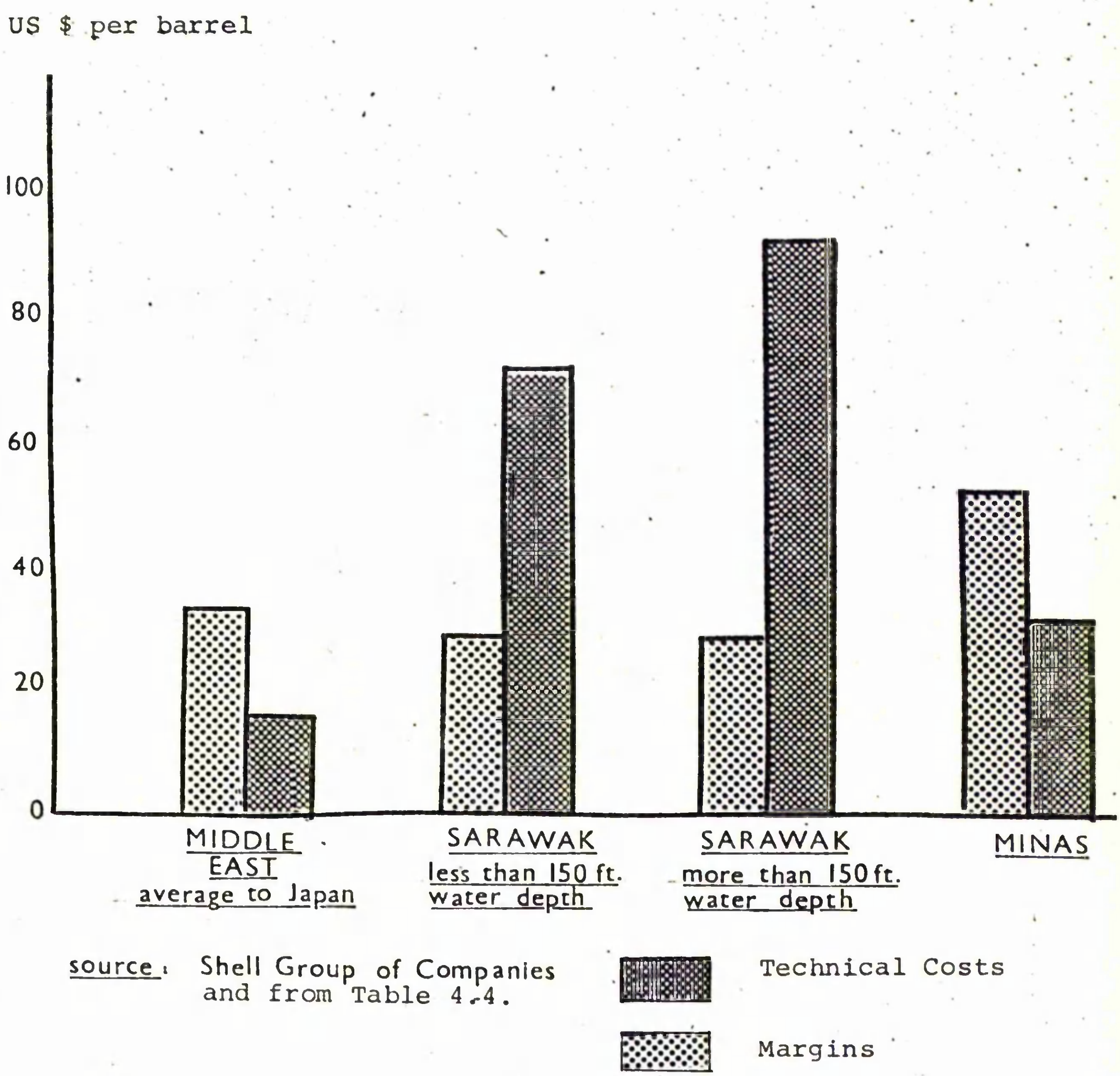
TABLE 4.4

BREAKDOWN OF COSTS OF DIFFERENT CRUDE OILS IN 1969
(Figures in US Dollars per barrel)

		Kuwait	Middle East Crudes Average to Japan	SARAWAK Water Depth Less than 150'	SARAWAK Water Depth More than 150'	Minas (Indonesia)
1	Posting	1.59	1.61	2.15	2.15	–
2	Special Allowance	–	–	0.21	0.32	–
3	Tax Reference Value	1.59	1.61	1.94	1.83	1.57
4	Technical Cost	0.10	0.15	0.71	0.90	0.30
5	Subtotal	1.49	1.46	1.23	0.93	1.27
6	Royalties	0.20	0.21	0.17	0.11	–
7	Taxable Income	1.29	1.25	1.06	0.82	1.27
8	Tax	0.65	0.63	0.53	0.41	0.76
9	Government Take (6 & 8)	0.85	0.84	0.70	0.52	0.76
10	Tax Paid Cost (4 & 9)	0.95	0.99	1.41	1.42	1.06
11	Realisation	1.25	1.31	1.70	1.70	1.57
12	Margin	0.30	0.32	0.29	0.28	0.51

Source: Shell Group of Companies, Malaysia

Figure 4.5: COMPARISON BETWEEN COMPANY MARGIN AND TECHNICAL COSTS BY COUNTRIES



source: Shell Group of Companies and from Table 4.4.

offshore crudes netting only US$0.29 ¢ per barrel in the case of crude from less than 150 feet of water depth and US$0.28 ¢ per barrel for crude in more than 150 feet of water. Therefore Malaysian crudes show having the highest technical costs per barrel and lowest in terms of net margins per barrel compared to Indonesia and areas in the Middle East. However, in the immediate aftermath of the worldwide inflation of 1973-74 and the associated quadrupling of petroleum prices, these costs have increased. Table 4.5 shows some relative costs associated with oil and gas finding and development in the North Sea, Saudi Arabia, Western Europe and United States "New Oil".

TABLE .4.5

OIL PRODUCTION COSTS BY COUNTRIES IN 1976

A	Oil Production Costs - Per Barrel Per Day (US$)		
	North Sea	Ekofisk Complex	US $4,736 barrels/day
		Forties Field	$7,352 " "
	Other North Sea Fields range from:		
		Argyll	$3,461 barrels/day
		Statfjord(UK Sector)	$17,682 " "
B	Oil Production Costs - Per Barrel (US$)		
	Saudi Arabia		$0.30¢ /barrel
	EEC Europe		$1.50¢ / "
	U S A "New Oil"		$6.12¢ / "
	North Sea		$2.00 to $3.00 per barrel

Source: Paper by Ward J and Murphy C L, Financial Aspects of Malaysian Petroleum Industry, p.140, slide 1, Sec. 4. A paper presented at the Seminar on the Oil Industry and its impact on National Development, organised by The Technological Association of Malaysia from 13-16 May 1976 in Kuala Lumpur.

Table 4.5 shows average relative costs in various sectors of the world with the low costs associated with the Middle East. The finding and lifting costs in (a) included all costs necessary to produce or process a barrel of oil per day over the life of the producing property. In (b), the actual costs per barrel after dividing by capacity assuring a certain productivity of the reserves. The size of the field is important as much as its closeness to the shore and the stage of development. The reason why Statfjord in the UK Sector is estimated at having project cost of US $17,682 for each daily barrel to be produced is largely the expected costs of the platforms, drilling expenses and transportation systems and also since the field is only in the preliminary development stage. Ekofisk and Forties are much more advanced platforms having been built and are in place; pipelines have been laid and oil has been transported and sold, because the costs are more certain. Also inflation has affected projects which cost more than triple from original estimates in certain offshore sectors, over the last 4 years. The relative oil production cost per barrel shows that Saudi Arabia is still as in the past the cheapest crude oil producing area with $0.30¢ per barrel compared to USA "New Oil" of $6.12 ¢ per barrel and North Sea with $2.00 to $3.00 per barrel. From an Oil company source, the cost of producing oil in Malaysia offshore areas is approximately US$3.00-$3.50 per barrel.

4.6 Crude Oil And Natural Gas Reserves

With the spate of oil discoveries in 1974, the proven commercial reserves of petroleum for Malaysia have been revised upwards from 1.5 million barrels in 1972 to 1.0 billion barrels in 1976 from 25 fields. The figure for gas reserves as it stood in 1976 has been put at 15 trillion cubic feet.[12] However, the final figure for reserves still cannot be accurately gauged until petroleum has been flowing for sometime and the particular reservoir characteristics are better known.

Three main factors tend toward upward revisions over time. They are the appreciation factor, recovery rate and future discoveries.[13] The appreciation factor is used continuously to upgrade estimates. Series of appreciations generally increase the periods between successive revaluations of the fields. Then there is the possibility of technological improvements in the recovery rate during the life time of a producing field. Finally, future discoveries will also add to reserves. Even with no discoveries of new fields beyond the current proven reserves, it is possible that new discoveries may be found and new reserves be added later on.

Besides the crude oil, there were potentially rich and natural gas accumulations discovered in the past. They are either associated or unassociated natural gas reserves.

12 OIL AND GAS JOURNAL, December 29, 1975 and THE NEW STRAITS TIMES, Wednesday, April 13, 1977.

13 Odell, P.R. and Rosing K.E, "The North Sea Oil Province-A Simulation Model of Development" in ENERGY POLICY, December 1974 p.3&9 - 329.

The largest potential of associated gas are found in offshore oilfields in Peninsula Malaysia. The unassociated natural gas reserves are mostly located in the offshore fields in Central Luconia fields in Sarawak (as described in Section 4.3 earlier).

Oil companies usually make reduced estimates of the extent of reserves that could have been given with the objective of suppressing potential competitors. Since 1970, the number of oil companies exploring for oil has been increasing so that at present there are 11 oil companies in competition with one another. It is suspected that oil companies make low estimates of the oil and gas reserves in their concession areas since high oil reserves would strengthen the pressure of the government in their effort to increase their share of the crude oil production under the new agreement developed in 1974.

In Peninsula Malaysia the biggest oilfields is that of Exxon's Tapis field which is rated to have a reserve of 320 million barrels. Pulai and Bekok fields each have more than 70 million barrels of reserves. In Sabah, the biggest fields are Semarang and South Furious with reserves of 85 million barrels and 40 million barrels respectively. And in Sarawak the biggest field is Baronia with reserves of more than 80 million barrels. Tukau and Temana each has reserves of more than 30 million barrels. The only gas field in Malaysia is located in the Centra Luconia Field, offshore

Sarawak, which has an estimated reserves of 15 trillion cubic feet.

According to Petronas the recoverable reserves of crude oil found in Malaysia today are in the region of 900 million barrels. Table 4.6 compares the relative positions of the recoverable reserves of some selected oil producing countries.

TABLE 4.6

RECOVERABLE RESERVES BY COUNTRIES

Country	Bil. Barrels
Norway	6.0
United Kingdom	9.0
Indonesia	12.0
Venezuela	18.0
United States	32.0
Kuwait	70.0
Saudi Arabia	107.0
Malaysia	0.9

Source: Petroliam Nasional Berhad (PETRONAS)

Out of the 70 oil producing countries in the world, Malaysia is rated number 30 in terms of the total size of its reserves.

Table 4.7 gives offshore offtake of Crude Petroleum Production from past and projected figures submitted by the different oil companies. From the figures, we build up the

TABLE 4 .7

PRODUCTION FORECASTS BY COMPANIES

(In '000 Barrels)

Year	Sarawak Shell(1) (SSB)	Sabah Shell(2) (SSPL)	Exxon(3) (EMI)	Total Per Year (Mil.barrels)	Total Per Day ('000 barrels)
1977	43.4	22.6	4.6	70.7	193.7
1978	48.2	22.3	20.4	90.8	248.8
1979	55.1	26.6	34.2	116.0	317.8
1980	51.8	30.0	38.7	120.5	330.1
1981	43.4	27.3	38.4	109.2	299.2
1982	35.0	25.2	35.8	96.0	263.0
1983	28.1	22.3	32.0	82.4	225.8
1984	16.9	14.6	23.5	54.9	150.4
1985	9.1	9.9	15.3	34.3	94.0
1986	6.2	6.9	10.3	23.5	64.4
1987	4.0	5.1	6.1	15.2	41.6
1988	2.6	2.9	3.5	9.0	24.7
1989	1.5	1.5	1.6	4.6	12.6
1990	1.1	0.4	0.7	2.2	6.0
1991	0.7	-	-	0.7	1.9
1992	0.4	-	-	0.4	1.1

Source: Private Communications with Oil Companies

(1) SSB Fields are Bakau, Baram, Baronia, Fairley Baram, Tukau, West Lutong, Betty, Bokor and Temana.

(2) SSPC Fields are Erb West, Semarang and South Furious

(3) EMI Fields are Pulai, Tapis, Bekok and Tembungo.

Curve of Expected Offtake in the future from recoverable proven reserves of 0.9 billion barrels given earlier. The curve in Figure 4.6 gives an impression of the potential amount of oil that what oil companies are saying they are likely to produce or expected until 1991/92. This curve pp assumes that the offtake from 1977 to 1992, is backed by a proven recoverable reserve of 0.9 million barrels (according to Petrona's estimate), the phasing of the field's development programme is expected to be 3 years build-up period followed by a year of peak production and then gradual run down with output falling rapidly each year, and the achievements of starting dates and production levels are contingent on the plans of the companies being realised.

The limits of the shape of the depletion curve are determined by 4 main factors. Firstly, full depletion of total reserves is expected to take place over a period of 20 years; secondly, majority of the reserves (75 percent) is expected to be depleted in the first half of full depletion years; thridly, the build-up period to peak production of each field is expected to vary between around 3 to 5 years depending upon the size of the field (Malaysia have smaller fields compared to other countries) and finally, the peak production rate is expected to lie within the range of 5 to 10 percent of the original total of reserves to be depleted.[14]

The 3 year period of build-up production from 1977

14 For comparison with the North Sea Oilfields see Odell, P.R. and Rosing, K.E, op. cit.

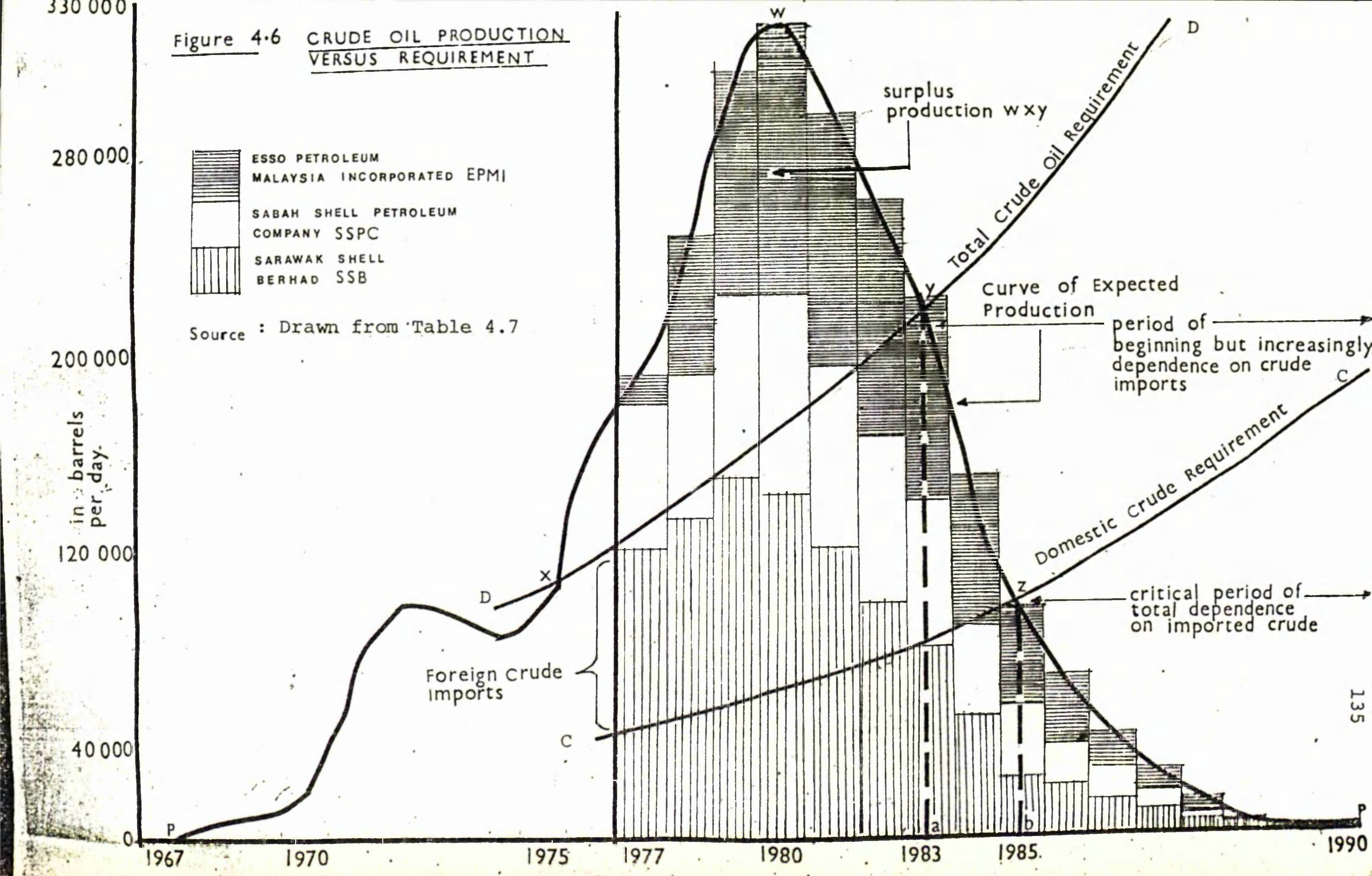


Figure 4·6 CRUDE OIL PRODUCTION VERSUS REQUIREMENT

Source : Drawn from Table 4.7

to 1979 is expected to come from all the main fields Temana, Baronia, Semarang, Pulai and Tapis operated by all the 3 companies - Sarawak Shell Berhad (SSB), Sabah Shell Petroleum company (SSPC) and Esso Productions Malaysia Incorporated (EPMI)(formerly Exxo Explorations) respectively. The one year peak period is expected to be reached by mainly new fields just brought into production by EPMI and partly by SSPC from their Pulai and Tapis fields and Semarang fields respectively. The extent of the rundown is held back somewhat by the new fields brought into production in late 1970s which are expected to reach their peak only sometime in early 1980s.

In order to give a clearer indication of home-produced petroleum's potential contribution to domestic demand for energy, the requirements curve is constructed and superimposed into the Figure 4.6. The DD curve is based on the future requirement for petroleum products from 1970-1990.

The curve DD which shows the domestic demand for petroleum cuts the Curve of Expected Offtake PP at Y. (Point X is the point of self-sufficiency in crude oils attained earlier in 1975). To the left of y was the period of continuing but rapidly diminishing 'dependence' on imported petroleum theoretically. Between x and y, is the period of surplus production (oil production exceeds oil consumption - domestic as well as imported 'available' for demand in future years when petroleum is exhausted).

We have included the line cc to show the demand of local crude as throughput of the refineries over the period, is expected to increase in the future. The differences between CC and DD indicate the proportion of crude throughput imported from the Arabian Gulf.

The area bounded by Dya in the diagram shows the period of beginning but increasingly dependence on imported crude petroleum as requirements in local refineries outstrip the total domestic crude oil production. As we move down to z, the problem becomes worse. The area bounded by Czb shows a 'critical' period has been reached where there is a total dependence on imported crude oil both from the Middle East as well as from crudes sources which produce similar quality as that of domestic crudes - perhaps Minas crudes from Indonesia.

If we allow the PP cruve to shift overtime due to new discoveries as indicated earlier, a series of PP curves can be superimposed on the diagram and thus prolonging the ultimate date of exhaustion of crude oil resources.

CHAPTER 5

REFINING CAPACITIES AND PRODUCT SUPPLIES

At present there are three refineries in Malaysia. The Lutong Refinery (Topping Plant) in Sarawak, has a capacity of 45,000 barrels per day. The two hydroskimming refineries in Peninsula Malaysia are the Esso Port Dickson Refinery (formerly Standard Vacuum) with a capacity of about 35,000 barrels per day and Shell Port Dickson Refinery with a capacity of about 67,000 barrels per day. With the increasing consumption expected between 1976 to 1990 as envisaged in Chapter 3 earlier, it is necessary now in this chapter to examine the capability of the present capacities of the refineries in Malaysia to cope with the growth of demand for petroleum products. To achieve this objective, this chapter will examine this in the light of the type of refiners and their current capacities, the characteristics of crude throughput in these refineries, the different refinery yield patterns, the market demand barrels, refinery costs, and refining capacity - demand relationship in future. Before this is done, it is best to trace the historical development of the different refineries before indicating how they will affect the future development of the industry.

5.1 The Earliest Refinery

The earliest refinery to be established in Malaysia, the Lutong Refinery in Sarawak (discussed earlier in chapter 2), was first built in 1917 by the Sarawak Oilfields Limited (now Sarawak Shell Berhad). At the beginning it had a crude throughput of about 7,000 barrels per day and operated with a crude distillation unit. Later in 1921 and 1924 two other crude distillation units were added. Before the Second World War, the total crude throughput processed by the refine-ery was about 25,000 barrels per day. However, when the Second World War broke out and Sarawak was invaded and occupied by the Japanese as discussed earlier in chapter 2, most of the equipment at the refinery was destroyed. The refinery was then rebuilt after the war in 1945 and started operating once again in 1946 and at present has a 45,000 barrels per stream day capacity.

The post-war Shell Lutong Refinery consists of two crude distillation units, one gasoline splitter and debutani-ser with capacities of 47,000, 14,000 and 5,000 barrels per stream-day respectively.

Since its inception in 1927 till 1931, the Lutong Topping Plant only processed the local Miri crude but with the increased production from Seria Oilfield in Brunei, the refinery also processed this crude along with the Miri crude till the early 1970s when this arrangement with Shell Brunei Petroleum Company ceases as Brunei starts to have a refinery of its own. The Lutong Refinery production from 1922 to 1972 is shown in Table 5.1 and graphed in Figure 5.1. Currently only one crude oil - the locally produced Miri crude - is being processed in this refinery.

TABLE 5.1

LUTONG REFINERY PRODUCTION FROM 1922 TO 1970 (In 000 long tons)

Year	Production From Miri Crude (1)	Production From Seria Crude (2)	Total Refinery Production (1 & 2)	Total British Empire	Sarawak Production As A % Of British Empire
1922	403	-	403	2,220	18.0
1923	508	-	558	2,400	22.8
1924	592	-	592	2,640	22.4
1925	603	-	603	2,660	22.7
1926	701	-	701	2,760	25.4
1927	701	-	701	2,860	24.5
1928	739	-	739	3,240	22.8
1929	748	-	748	3,430	21.8
1930	688	-	688	3,540	19.4
1931	527	-	527	3,380	15.6
1932	335	176	511	Data not available after 1931	Data not available after 1931
1933	321	281	602		
1934	278	372	650		
1935	254	442	696		
1936	222	452	674		
1937	210	567	777		
1938	200	696	896		
1939	166	769	935		
1940	150	855	1005		
1941	106	611	717		
1942	(a)	400	400		
1943	(a)	600	600		
1944	(a)	800	800		
1945	24	490	514		
1946	(a)	112	112		
1947	1	285	286		
1948	24	1700	1724		
1949	47	2645	2692		
1950	57	3337	3394		

continuation next page

TABLE 5.1 (CONTD.)

LUTONG REFINERY PRODUCTION FROM 1922 TO 1970 (In 000 long tons)

Year	Production From Miri Crude (1)	Production From Seria Crude (2)	Total Refinery Production (1 & 2)	Total British Empire	Sarawak Production As A % Of British Empire
1951	57	4051	4108		
1952	52	4892	4944		
1953	50	4994	5044		
1954	49	4804	4853		
1955	70	4710	4782		
1956	66	5133	5199		
1957	71	5547	5618		
1958	66	5459	5325		
1959	57	5089	5146	Data not available after 1931	
1960	55	5263	5317		
1961	59	4474	4533		
1962	59	4016	4075		
1963	57	3720	3777		
1964	51	3384	3435		
1965	48	3488	3536		
1966	48	3874	3922		
1967	47	4619	4666		
1968	45	5095	5140		
1969	200	5884	6084		
1970	440	6005	6445		

Source: STATISTICS OF MINERAL RESOURCES OF THE BRITISH EMPIRE (for various years from 1922 onwards) Imperial Institute Publications, London.

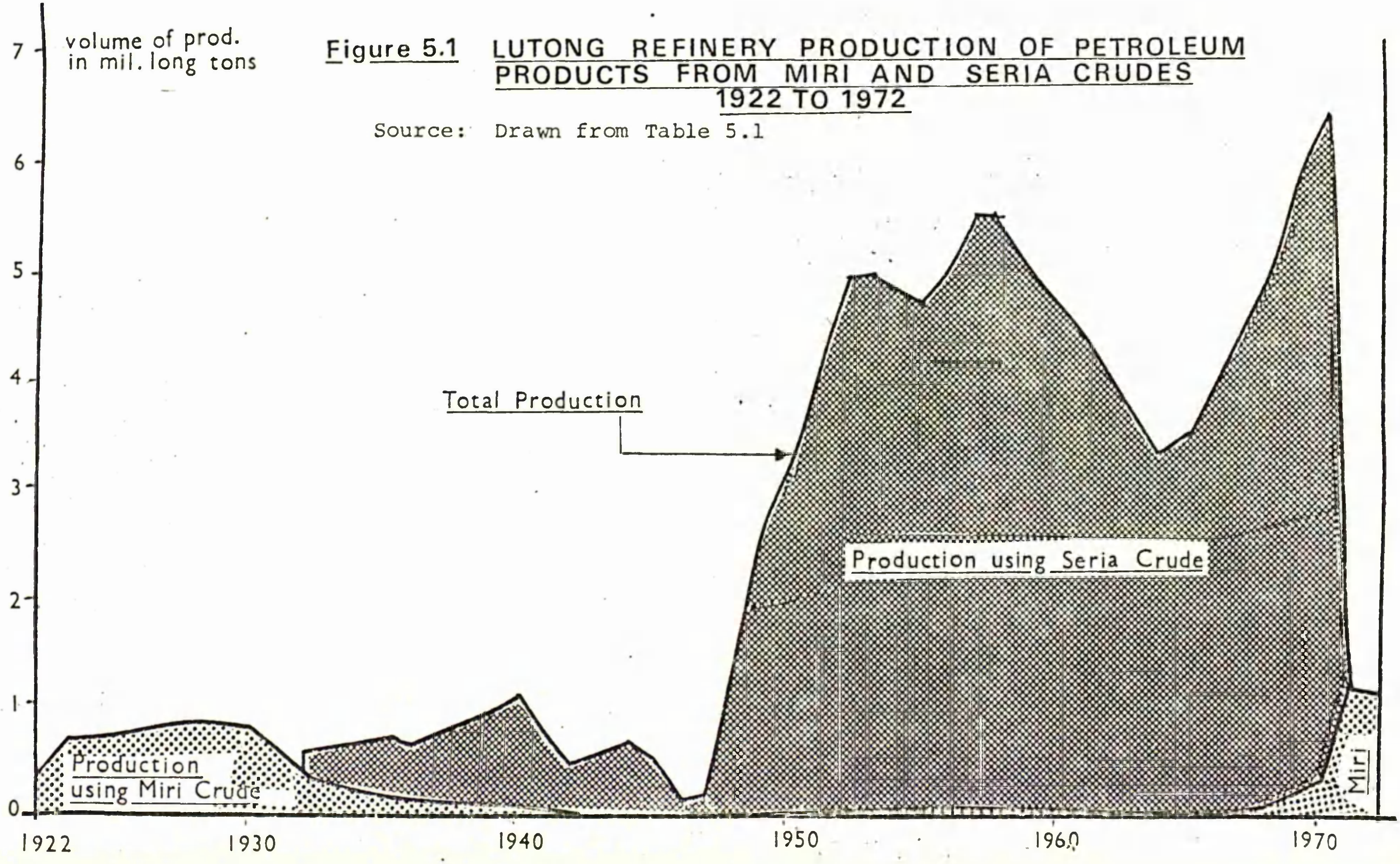


Figure 5.1 LUTONG REFINERY PRODUCTION OF PETROLEUM PRODUCTS FROM MIRI AND SERIA CRUDES 1922 TO 1972

Source: Drawn from Table 5.1

Being a simple topping plant, the Lutong Refinery does not have any treating units that are required to upgrade the quality of some of the raw-products before they can be consumed by the market. As a result of this simple operation, it produces only a limited amount of finished petroleum products - regular motor gasoline, diesel oil and light fuel oil and recently premiun motor gasoline for the markets in East Malaysia.

The products after distillation from the refinery are sent to storage without any further treatment and these are marketed in Sabah and Sarawak. Only a very small amount of gasoline is sent to storage in Miri town for local consumption. Most of the gasoline fraction is sent to the splitter and debutaniser to produce Miri tops and naphtha for exports and liquid butane is spiked back to the crude for export.

The refinery processing scheme is geared towards the supply of diesel oil to Sabah and Sarawak markets. The low demand for diesel in Sabah and Sarawak dictates a low crude throughput of the refinery. This is evidenced by the average refinery intake and production for 1970 to 1975. The average refinery intake in 1970 was about 72,500 barrels per stream day and it decreases gradually to 17,000 barrels per stream day in 1975. The explanation given for this phenomena is that probably there were more markets for finished petroleum products up to 1972. However, with the commissioning of the Shell Refinery in Brunei in 1972 as explained earlier, the Seria crude of Brunei started to be processed in the local refinery in Brunei instead of at Lutong.[1]

5.2 The Establishment of Refineries in Peninsula Malaysia

The increased consumption of petroleum products in the beginning of the sixties and the resultant expansion in market demand instigated the two big oil marketing companies in Malaya at that time, Shell and Standard Vacuum Oil to approach the Malayan Government to seek approval for the establishment of refineries in the mainland. During that time both the companies had refineries in Singapore.

The two companies mentioned above submitted separate proposals to the Malayan Government in 1960 which contained amongst other things design capacity, size and type of refinery, refinery intake and output, capital cost, financing and so on which are finally spelt out fully in the so called "Refinery Agreements" (See Appendix 5A).

In the case of Shell, in view of the expansion in their market demand in the 1960s, they based their design capacity on the estimated requirement of the main petroleum products in Malaya in 1965. In the case of the Standard Vacuum Company, the products to be manufactured by the

---

1 Private communications with Shell.

refinery were intended for sale by the company and marketed under brand names already familiar in the Malaysian market in 1959. The applications made by both the companies included the manufacture of all the main petroleum products except liquified petroleum gas (LPG), asphalt or petroleum naphthas and solvents in the refineries. The future Malayan market for these products was under study by the companies at that time.

Both the companies proposed to build their refineries of modern design integrating the three basic processes of distillation, catalytic cracking and thermal reforming in a single combination unit with integration and capital and operating costs low. The units to be constructed were of a size suitable for future development to meet increased market requirements.

The proposal of petroleum products output by Shell covered their estimated requirements for 1965. However, in the light of the changing pattern of product demand and to ensure that distribution within Malaysia is carried out in the most flexible and economic manner, Shell also proposed to import and export marginal quantities of the same products and to import such other products not economically produced in the refinery. In the case of Standard Vacuum, their refinery would be of sufficient size to meet more than their requirements in the Federation at the time the refinery commenced operations. The company anticipated that any refinery products surplus to the needs for their brand products in the Federation could be exported.

Shell estimated the capital cost of the refinery to be about \$64¼ million (about £7½ million) divided into four broad categories : processing plant (\$16.97 million), tankage and pipelines (\$12.73 million) utilities and facilities (\$24.72 million) and land and land preparation (\$1.3 million) and the remainder as miscellaneous items of expenditure. Shell raised this by means of share capital and loans. The total capital requirements of the Standard Vacuum Oil Refinery, on the other hand, involved a minimum of \$52 million (about US \$17 million) of which later turned out to be \$54.7 million (about US \$17.9 million) which included the manufacture of additional products. Their refinery project was to be financed partially by the issue of shares and the remainder through foreign loans. About 75 to 80 percent of the funds required was estimated to be foreign currency requirements and the remainder through shares offered to the Malayan public (the detailed set-up of the Refinery Agreements between the oil companies and the Government is set up in Appendix 5A).

The Shell Refinery Oil Company and the Standard Vacuum Oil Company commenced construction of their oil refineries in early 1963. The plant took about three years to build. The site chosen by both the companies was Port Dickson, about thirty miles south of Kuala Lumpur, the capital of the Federation of Malaya. The choice of Port Dickson was made on the basis of its deep sea harbour with adequate berthing facilities for ocean tankers as the refinery was designed to handle crude oil from the Middle East; it has all the required facilities of land, transport, utilities and accessibility from all directions; its closeness to the supply of labour, and possesses adequate housing facilities and amenities; and the refinery sites were capable of easy communication to the harbour by pipeline, and to transport products by rail to the inland areas or interior especially the rail link between Port Dickson and Kuala Lumpur (the main consumption area) is shortest than any other Malaysian ports except Klang.

The greater part of Kuala Lumpur area accounts for about 50 per cent of all petroleum products consumed in mainland Malaya and by locating near Port Dickson, Shell had the assurance that there was no other cheaper route from the coast to the major internal marketing area. Furthermore, the area between Port Dickson and Kuala Lumpur accounts for a comparatively large market area which should grow in importance in future. The established oil product pricing system in the mainland allowed Shell to recover its distribution costs when delivering inland from Port Dickson and there was probably very little additional cost involved (as compared with costs borne by other importing companies) when making ocean tanker deliveries of refined products from Port Dickson to other ports in Malayasia.

The above general review of factors affecting the location of a coastal 'market' refinery such as Shell and Standard Vacuum should be compared with the problems facing a "resource - oriented" refinery such as that of Lutong Refinery was built adjacent to the source of raw-material crude oil from the Miri oilfield. The Shell Port Dickson Refinery was built close to the main consumption areas in mainland Malaya. In both cases it was profitable to locate as near as possible to the raw materials source and to transport the finished products to the consumer, i.e. procurement costs - the costs of bringing the raw-materials to the chosen site of processing - were kept to the minimum. However, it must be accepted that each company endeavoured to keep the processing costs - costs of transforming the raw-materials into refined products - as low as possible, it would seem that Shell Port Dickson (as much as Standard Vacuum) had a distinct advantage over Shell Lutong where amortization of capital is concerned, particularly of relative output figures taken into consideration. Furthermore, when considering the question of distribution costs - costs of selling and delivering the products - Shell Lutong is at a disadvantage compared to Shell at Port Dickson as the latter can recover their inland distribution costs as the established price structure is based on costs plus rail/road transport costs.

5.3 The Current Refining Capacities in Peninsula or Mainland Malaysia

5.3.1 Shell Refinery at Port Dickson

The construction and commissioning of the Shell Refinery at Port Dickson has been discussed under section 5.2 earlier. However, the refinery underwent an expansion programme with a new crude distillation unit (CD2) and a new Liquified Petroleum Gas unit (LPG2) and the revamping of the existing platformer unit at a cost of M$45 million. This was completed at the end of 1974 and began to operate at the beginning of 1975.

Unlike the Lutong Topping Plant earlier, the Shell Refinery at Port Dickson takes in 2 types of crude oils namely, Kuwait Crude (imported) and Miri crude (local). The Shell Refinery at Port Dickson was designed with a given degree of "built-in" flexibility in order to be able to process a wide range of crude oils or blends. The Kuwait and Miri crude oils will have to go through a predetermined processing scheme in the refinery with the former being processed for a specific number of days in a month and the latter the rest of the month. The processing scheme of the refinery is so designed to meet Shell's market pattern for petroleum products in Peninsula Malaysia

Although Shell processed only Kuwait and Miri crudes in the past, but after April 1976, it took in some Iranian Light crude too. This is because in April 1975, Shell has entered into a processing arrangement with Mobil Oil Company Malaysia and in April 1976 it entered with British Petroleum (BP) for the same to meet their market requirements in Peninsula Malaysia. This processing arrangements between oil companies will be discussed in detail in chapter 7.

To achieve a maximum production of petroleum products, the two distillation units CD1 and CD2 in Shell Refinery at Port Dickson are utilised with Miri crude processed in CD1 and Kuwait in CD2. In the case of CD1 on Miri crude operation, there is no downstream limiting the Miri crude throughput. Hence the maximum crude throughput is the maximum design capacity of CD1 at 20,400 barrels per stream day (bpsd). And in the case of CD2 on Kuwait crude operation, the HDT unit is limiting the maximum crude throughput to 55,276 barrels per stream day (bpsd). Technically, therefore, the maximum crude throughput is 75,676 bpsd. However, when operating at this technical maximum crude throughput, there will be a lot of surplus Kuwait blending components which will have to be downgraded to less valuable products like fuel oil. A more realistic maximum production capacity according to Shell sources is estimated to be around 73,600 bpsd - 20,400 of Miri crude and 53,200 bpsd of Kuwait crude.[2]

5.3.2 Esso Refinery at Port Dickson

As in the case of Shell earlier, the construction

2 Private communications with Shell.

and commissioning of Esso refinery has been discussed in the earlier sections. Unlike Shell earlier, the Esso Refinery at Port Dickson processes mixed Middle East crudes namely Kuwait, Arabian Light, Arabian Medium, Arabian Heavy and Zuluf. Crude mix percentage varies from month to month depending on the availability of crudes.

The Refinery is currently operating very close to the theoretical or design capacity. For the first three quarters of 1976, the average crude intake was 32,610 barrels per crude day (bpcd) as compared to the design capacity of 35,520 barrels of crude per stream day (bpsd). The capacity factors for the various units were high (70-90 per cent) indicating that the units were operating at high throughput. It is believed that the refinery is capable of operating at a design maximum capacity of 35,500 bpsd of mixed Middle Eastern crudes. With some modification and addition to the basic refining factors the refining operation may be increased up to 50,000 bpsd.

5.4 Crude Oil Throughputs and Products Output From the Malaysian Refineries

a) Crude Oil Throughputs 1970-1975

The crude oils that enter as throughputs in the Malaysian refineries are made up of (a) Local crudes and (b) Imported crudes. Local crudes are made up of Miri Light, Miri Medium and Miri Heavy from Malaysian offshore oilfields.

TABLE 5.2: CRUDE INTAKE OF MALAYSIAN REFINERIES

REFINERY	1975 CAPACITY UTILISATION (BPSD)	CRUDES	VOLUME (BPSD)	% VOLUME
Shell Lutong Refinery (Sarawak)	18,800	Miri Light Crude (^{o}API = 40)	18,800	100.0
Shell Refinery Port Dickson (Peninsular Malaysia)	40,860	Miri Light Crude (^{o}API = 40)	15,731	38.5
		Kuwait Crude (^{o}API = 31.3)	22,759	55.7
		Iranian Light Crude (^{o}API = 33.5)	2,370	5.8
Esso Refinery Port Dickson (Peninsular Malaysia)	32,360	Arabian Light (^{o}API = 34.4)	16,762	51.8
		Arabian Medium (^{o}API = 30.8)	2,362	7.3
		Arabian Heavy (^{o}API = 28.2)	97	0.3
		Zuluf (^{o}API = 30.7)	2,653	8.2
		Kuwait Crude (^{o}API = 31.3)	10,420	32.2
		AI Special	65	0.2

Source: PETRONAS

TABLE 5.3: CRUDE OILS PROCESSED BY REFINERIES IN MALAYSIA 1971-1976
(Unit in US million barrels)

REFINERY	1971		1972		1973		1974		1975		1976	
	Qty	% vol.	Qty	% vol.	Qty	% vol.	Qty	% vol.	Qty	% vol.	Qty	% vo
1. SHELL LUTONG												
(a) Local crudes	20.10	93.2	19.29	100.0	15.52	100.0	11.11	100.0	6.23	100.0	5.34	100.
(b) Imported crudes	1.47	6.8	-	-	-	-	-	-	-	-	-	-
Sub-Total	21.57	100.0	19.29	100.0	15.52	100.0	11.11	100.0	6.23	100.0	5.34	100.
2. SHELL PORT DICKSON												
(a) Local crudes	0.11	0.02	2.55	24.03	3.44	34.68	3.40	31.37	4.48	33.33	6.30	39.
(b) Imported crudes	10.71	98.98	8.06	75.97	6.48	65.32	7.44	68.63	8.96	66.67	9.64	60.
Sub-Total	10.82	100.0	10.61	100.0	9.92	100.0	10.84	100.0	13.44	100.0	15.94	100.
3. ESSO PORT DICKSON												
(a) Local crudes	-	-	-	-	-	-	-	-	-	-	-	-
(b) Imported crudes	8.79	100.0	9.53	100.0	10.09	100.0	10.95	100.0	10.67	100.0	12.13	100.
Sub-Total	8.79	100.0	9.53	100.0	10.09	100.0	10.95	100.0	10.67	100.0	12.13	100.
GRAND TOTAL	41.18	100.0	39.43	100.0	35.53	100.0	32.90	100.0	30.34	100.0	33.41	100.
(a) Local crudes	20.21	49.1	21.84	55.39	18.96	53.36	14.51	44.11	10.71	35.3	11.64	34.
(b) Imported crudes	20.97	50.9	17.59	44.61	16.57	46.64	18.39	55.89	19.63	64.7	21.77	65.

Source: Basic Data obtained from private communications with the various oil companies.

Imported crudes are from the Middle Eastern countries and include Kuwait, Iranian Light, Arab Light, Arab Medium, Arab Heavy and Zuluf crudes.

Table 5.2 gives the various crude oils processed by refineries in Malaysia for the past six years from 1971 to 1976. Shell Lutong processes only local crudes, Esso Port Dickson only imported crudes and Shell Port Dickson processes both local and imported crudes.

In the case of Shell Lutong Refinery as shown in Table 5.3 its throughput was high in 1971 and 1972 because of the processing arrangement with Shell Brunei. However, throughput was lower in years after 1972 till 1976 because of the continued improvement in the refinery operation which resulted in a higher yield for gas oil. This product is the main consumption of the East Malaysian markets of Sabah and Sarawak. This effectively defines the refinery intake for the years. It is expected that improvements in the plant operation in subsequent years would result in plant modification.

The crude supplies for the Esso Refinery at Port Dickson come from Ras Tanura. The types of crude are divided into Arabian Light, Arabian Medium, Arabian Heavy, Zuluf and Kuwait crudes as shown in Table 5.3 earlier. In the case of Esso, the crude oil processed over the six year period shows an increase from 8.8 million barrels to 12 million barrels in 1976. The increase in the crude oil processed is due to the increase in demand for products in the Malaysian market over the years. However, the marginal decrease in crude oil processed in 1975 over 1974 figure was principally due to the major refinery turnaround in May for unit repairs and catalyst replacement[3]. The increase again in 1976 was in response to an unexpected decrease in refinery downturn and the increase in the market demand mentioned earlier.

In the case of Shell Refinery at Port Dickson, their crude supplies come from the Arabian Gulf (Kuwait) and Sarawak (Miri) with the former ex Mina al Ahmadi and the latter ex-Lutong. As shown in Table 5.3, the crude throughput showed increased from 10.8 million bands in 1971 to 15.94 million barrels in 1976 except in 1973 when it decreased to 9.9 million barrels due to refinery turnaround[4]. The increase in throughputs over the years was principally due to the

---

3 The Esso Port Dickson Refinery under normal conditions has a major shut down once every 18 months for the purpose of major services and maintenance work. The duration of each major shut down is approximately 21 days. Therefore the loss in refining output is in the region of 745,000 barrels. Source: Private communications with Esso.

4 The shut down days per year for The Shell Refinery at Port Dickson are given below

Platformer	20 days in a year for catalytic generation and maintenance
Hydrodesulphurizer	20 days in a year for service and maintenance
Distiller 1	- not running at the moment due to excess capacity
Distiller 2	10 days in a year for maintenance and repairs.

Source: Private communication with Shell.

increase in market demand. The increase in 1975 was principally due to (a) the expansion of refinery capacity from 30,000 b/d to 90,000 b/d when the M$50 million expansion programme was completed in later 1974 and (b) the commencement of the processing arrangement with Mobil in 1975. The increase in 1976 was due to another processing arrangement with British Petroleum in April 1976. With these processing arrangements the composition between imported and local crudes also changes. The composition between Imported and Local crudes shows that in 1974 it was 70:30; in 1975, 67:33 and in 1976, 60:40 in favour of local crudes because of the nature of markets of Mobil and B.P. Apart from importing and processing crude oils, the refinery also imports blending components such as motor spirit, diesel, fuel oil and base oils.

5.5 Characteristics of Crude Oil Throughputs in Malaysian Refineries

Crude oil, used in refineries throughout the world, is a mixture of a multitude of compounds (around 3000 of them). The majority of these compounds belong to a family of hydrocarbons. Some of these hydrocarbons only exist as gases and are in the form of compounds of sulphur, oxygen and nitrogen. The greater the presence of hydrogen relative to carbon in the crude oil, the lighter is the crude oil and vice-versa. And since crude oil occurs in significantly different conditions and geological environments throughout the world, it is not surprising that crude oils differ significantly in hydrocarbon content and in quality, e.g. the amount of impurities, like sulphur. Thus there are many different hydrocarbon combinations that a refiner can select as the raw-materials from which to manufacture his product requirements.

Crude oil is also characterised by its base, whether paraffinic, intermediate or naphthenic. Paraffinic crudes are light and on refining gives a relatively high percentage of white products. Its residue is used for the production of lubricants. On the contrary,naphthanic crudes yield a relatively high percentage of fuel oil and low percentage of gasoline and kerosene, and its residue yields a bituminous product. Intermediate or aromatic base varies between the two types of crude.

Some of these crude oil composition and quality differences are shown in Table 5.4. Incidentally the typical crude oils shown in the table are also the crude oils that are typically processed in Malaysia. From the table, it is evident that there is a considerable variation in the product yield.

Malaysian Miri Light crude is diametrically opposite to the Middle Eastern crudes. It is paraffinic, rich in gasoline and other white products whereas the latter is mostly napnthenic, rich in fuel oil. The former has very

TABLE 5.4: PRODUCT YIELD FOR CRUDES PROCESSED IN MALAYSIAN REFINERIES

PRODUCTS	PRODUCT YIELD (% VOL.)						
	Miri Light Crude (37^{o}API)	Kuwait Crude (31.2^{o}API)	Iranian Light Crude (33.5^{o}API)	Arabian Light Crude (38.8^{o}API)	Arabian Medium Crude (30.8^{o}API)	Arabian Medium (Zuluf) Crude (30.7^{o}API)	Arabian Heavy Crude (28.2^{o}API)
LPG	1.6						
Full Range Naphtha (Gasoline Range)	30.1						
Light Naphthas	-	7.34	18.1	10.5	8.9	9.4	7.9
Heavy Naphtha	-	12.03	10.1	9.4	7.7	7.4	6.8
Kerosene	13.9	18.20	10.5	18.4	14.5	13.5	12.5
Light Gas Oil	30.2	14.11	14.0	21.1	18.1	17.4	16.4
Heavy Gas Oil	23.2	26.59	26.8	30.6	30.9	30.5	26.3
Residual Oils	-	21.73	18.6	7.4	18.7	19.5	26.8
Loss & Fuel	1.0	-	1.9	2.6	1.2	2.3	3.3
	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Sulphur Wt. %	0.3	3.3		3.1	3.7		3.7

Source: Petroliam Nasional Berhad (PETRONAS) low sulphur content (0.3% by wt.) and are therefore "sweet" whereas Middle Eastern crudes are high in sulphur (3.1 to 3.7 percent) and therefore are "sour". Therefore Malaysian crude has an edge over the Middle Eastern crude in terms of yield and price.

If local refineries use only Malaysian crude, then the volume of fuel oil manufacture will not be enough to meet the demand for it and the kerosene/aviation fuel and automotive gas oil produced will not be suitable for direct use. This is only suitable to cater for the need of the East Malaysian market but not the one in the mainland or Peninsula Malaysia. Likewise the processing of only Middle Eastern crudes especially the Arabian crudes result in the substantial manufacture of fuel oil and less of light distillates. This is suitable to cater for Esso market in Peninsula Malaysia.

To comply with the product mix for Shell in Peninsula Malaysia, the Shell Refinery at Port Dickson processes imported Kuwait crude apart from the local Miri crudes and blend them together. As mentioned earlier, the Miri crude has only a small proportion of fuel oil and this does not match the relatively high demand for fuel oil in the Malaysian market and cannot be used at all for bitumen manufacture which is one of Shell's main markets. The Kuwait crude, on the other hand, has a high percentage of fuel oil and is excellent for bitumen manufacture. In the case of the local crude as mentioned earlier, the kerosene and gas oil produced exclusively from Malaysian crudes are not suitable for direct use as kerosene/aviation and automotive gas oil but Kuwait crude produces kerosene and gas oil with properties that supplement the properties of kerosene and gas oil from Malaysian crudes.

Basically, the combination of crude oils selected by a refinery must be economic and meet the market demand for the products manufactured, both in quantity and quality. The most favourable combination of crudes selected for processing in the refinery will vary with changes in the product demand from the refinery with any changes which occur in crude or product quality and with changes in the relative price differences between crude oils. The Shell Refinery optimises this by blending the two crudes Miri and Kuwait in the proportion of 70:30 in 1974, 67:33 in 1975 and 60:40 in 1976 in favour of the local crudes the reasons as explained in Section 5.4 earlier. This processing arrangement has 2 other advantages : the use of cheaper Kuwait crude adequate to meet the products required in the country and the export of the higher value Malaysian crude oil (see Chapter 7) and thus increases the country's revenue and balance of payments [5].

---

5 <u>BERITA SHELL (SHELL NEWS)</u>, Shell Malayasia Trading Berhad, 1976.

5.6 Refinery Yield Pattern

No one crude oil can provide a full range of finished oil products in the proportions and quantities that the market requires. The essential function of an oil refinery is to manufacture, as economically as possible, the necessary quantities of gas, gasoline, gas oil, lubricating oil, fuel oil, wax and bitumen from the crude oil or oils supplied to it. To do this, appropriate process must be applied and the necessary plant and equipment must be available.

Each major oil refining company in Malaysia has to meet its own market demand both in terms of volume and product patterns. Market requirements are generally met by processing adequate blends of different crude oils, since they could not meet the whole spectrum of market demand if processed individually by themselves. Therefore, crude oils when blended such as found in Shell and Esso Refineries at Port Dickson, compensate each other with respect to yield and quality, so as to bring overall total expense to a minimum.

In the course of analysing economics of oil refineries, the most important discussion that hinges on this is the nature of the input and the composition of output. In practice crude oil inputs are far from homogeneous and the output of a refinery consists of a range of products, the relative quantities of which are determined by the nature of the combination of crude oil processing units in the refinery, which are in turn geared, if possible to market demands and exports. The crude oil that is most suitable and best from the economic standpoint to be processed in a refinery is the one that can yield products in line with the existing processing capacity of the refinery and able to fulfill as much the structure of market supplied by it. The yield structures of the 3 refineries in Malaysia are given in Table 5.5.

Table 5.5 gives a comparison of the petroleum product yields on the basis of existing design capacity of the three refineries operating in Malaysia. There is a difference between the maximum throughput of each of the refinery in terms of volume of throughput per stream day (BPSD) and volume of throughput per crude day (BPCD). In the case of Esso Refinery at Port Dickson, the stream day is about 335 days in a year compared to Shell Refineries at Lutong and Port Dickson whose stream day is about 330 days in a year. The total crude days in a year is 365 or 366 depending on the number of days in a year. And the crude feedstocks used by the 3 refineries differ : Esso Refinery uses or utilises 100 per cent Middle East crudes, Shell Refinery, Port Dickson utilises 18,400 BPCD Miri Light (27.7 per cent) and 48,100 BPCD Middle East crudes (72.3 per cent) and Shell Lutong Refinery uses 100 percent Miri Light.

TABLE 5.5: COMPARISON OF PETROLEUM PRODUCT YIELDS ON THE BASIS OF EXISTING DESIGN CAPACITY (At Maximum Throughput)

(Unit in BPCD)

PRODUCT	ESSO MALAYSIA BERHAD Max. Thruput: 35,500 BPSD 32,610 BPCD	SHELL REFINING (F.O.M.) BHD., Max. Thruput: 73,600 BPSD 66,500 BPCD	SARAWAK SHELL BERHAD Max. Thruput: 45,000 BPSD 40,600 BPCD	TOTAL REFINERY PRODUCTION	PRODUCTION OF FINISHED PETROLEU PRODUCTS
Refinery Gas	380	-	-	380	-
LPG	985	1,260	120	2,365	2,365
Premium Gasoline	3,080	6,850	635	10,565	10,565
Regular Gasoline	1,544	4,520	-	6,064	6,064
Naphtha	946	3,920	7,270	12,136	
Dual Purpose Kerosene	2,810	6,720	4,180	13,710	9,530
Diesel Oils	6,609	11,570	11,570	29,749	29,749
Fuel Oil	14,741	21,750	-	36,491	40,121
Bitumen	617	1,060	-	1,677	1,677
Refinery Fuel	803	2,330	-	3,133	-
Miri Tops	-	-	3,625	3,625	-
Miri Residue	-	-	-	13,030	-
Sulphur Components	-	5,720	-	5,720	-
Flare/Loss	95	800	170	1,065	-
TOTAL	32,610	66,500	40,600	139,710	100,071 (100,100)

Source: Petroliam Nasional Berhad (PETRONAS)

Both the Esso and Shell Refineries at Port Dickson produces most of the petroleum products required for consumption in the country. It ranges from LPG, gasoline, naphtha, kerosene, diesel oils, fuel oil and bitumen. Shell Refinery at Lutong, however, produces a limited range of products - LPG, premium gasoline, naphtha and kerosene. Miri tops and Miri residue.

In the case of Esso Refinery earlier, the refinery gas produced by the refinery is used as a feedstock in its Nitrogen (NH_3) plant. The naphtha produced from the Shell Port Dickson Refinery is from the Kuwait crude and the surplus components from Shell Port Dickson refinery are made up of Kuwait sour kerosene, Kuwait Light Gas Oil and Heavy Gas Oil. In the case of Shell Lutong Refinery, all of the LPG components are spiked back into the crude for export. The refinery has started to produce premium motor gasoline to meet Sabah and Sarawak demand by importing platformate from overseas to meet the demand. In the past, the refinery only meets the regular motorgasoline needs of the nearby Miri town in Sarawak. The rest of gasoline fraction were used to produce tops and naphtha. These naphtha components are in turn used as feedstock in Shell Eastern Petroleum Limited Refinery at Pulau Bukom in Singapore. Similarly, the Miri tops produced by the refinery are used as feedstock in Port Dickson and Pulau Bukom refineries. The Miri Residue includes light fuel oil used for distribution to the East Malaysian market.

Taking the three refineries together, it can be seen that the total refinery production is aroung 14,000 barrels of crude per day - 32,610 being from ESMB 66,500 from shell Port Dickson and the remainder 40,600 from Shell Lutong Plant. This theoretical maximum capacity to produce finished petroleum products is vital when matched with the products demand forecast for 1976 to 1990 earlier in Chapter 3. This will determine the current and future capability of refineries in Malaysia to meet demand. This we will take up in the following section.

5.7 Malaysian Market Demand Barrel

The starting point for any oil company's logistic system is the product demand. Petroleum products are consumed in a wide variety of applications including household fuel, transportation, industrial fuel, mining and electrical power generation, to name just a few. The primary individual petroleum products required for these applications include LPG, motor gasoline, aviation turbo-fuel, kerosene, diesel oil, fuel oil and asphalt.

The product demand spectrum, the so called demand barrel of various countries,or even areas within the same country (West and East Malaysia for instance), vary significantly depending on factors like climate, degree and type of industrialization, availability of alternative fuels, etc.

Table 5.6 Typical Petroleum Products Demand (in %)

	Peninsula or West Malaysia	U.S.A.	Japan (Winter)	Western Europe*
LPG/Mogas Naphtha	19	50	23	23
Kerosene/ Diesel	42	27	27	45
Fuel Oil/ Asphalt	39	23	50	32

* Western Europe means United Kingdom, France, Germany, Italy.

Source: J.L Pfohl, "Petroleum Refining in Malaysia."

The above table gives an idea of the magnitude of these demand variations: the relatively high motor gasoline and low fuel oil sectors in the US demand-barrel with the opposite in the case of a developing country's demand like that of Malaysia. The US demand for fuel oil being low resulting from the usage of large quantities of natural gas and coal and its high motor gasoline demand resulting from the large number of automobile population. The winter demands shown in the table for the 3 groups of countries, USA, Japan and Western Europe, with significant climatic changes there are significant seasonal demand variations. Furthermore, the demand barrel of individual oil companies within the same country can vary even more dramatically depending on such things as their marketing philosophy, particular customers, raw-materials availability, refining flexibility, etc.

5.8 Supply-Demand Relationship in Refining Capacities

Having indicated the size and complexity, or equipment arrangement of the three Malaysian refineries, it is necessary to compare these with the Malaysian product demand forecasted for the next 15 years from 1976 to 1990.

In Table 3.3 of Chapter 3 earlier, the major components of demand are the heavier distillates such as diesel oil and fuel oils. This has led Malaysia to import all of its crude petroleum requirements from the Middle East-Kuwait, Saudi Arabia and recently Iran besides Miri crude for her refineries in Malaysia. In future, demand for lighter fuels will increase (along with the increase in heavier distillates) with the increase in the living standards of the population. For some years in future Malaysia will export its low-sulphur crude and low-gravity premium crude and in exchange import the relatively cheaper and heavier crudes from the Middle East.

Much of the domestic consumption of petroleum is consumed in the more populous urban areas of Peninsula Malaysia. However, the development of local industries and the infrastructure has resulted in a growth of petroleum products demand of between 9 to 10 per cent annually in recent years. It is anticipated that the pattern will be maintained at least until 1985, when on this basis absolute consumption will be more than double to about 180,000 barrels per day. As yet, the country is not geared to the use of natural gas in power generation.

Assuming the current refineries are running at full capacity and no additional refinery being constructed, the estimated surplus/deficit of petroleum products by categories in 1980, 1985 and 1990 to meet consumption are as shown in Table 5.7. It appears from the Table that from 1980 onwards, the refineries in Malaysia cannot produce the required consumption required in the country. In 1980 the amount of discrepancy (deficit) between projected demand and maximum refinery output is around 56,000 barrels per day and increases to 136,000 in 1985 and 254,000 in 1990.

Figure 5.2 shows the refining capacity in the past and present and the forecast for future capacity based on the future demand estimates for petroleum products in Malaysia.

Line AA' indicates the demand curve for petroleum products in Malaysia until 1975, A'A" indicates the forecasted requirements until 1990. The line above AA" i.e. BB shows the theoretical refining capacity needed to meet demand.

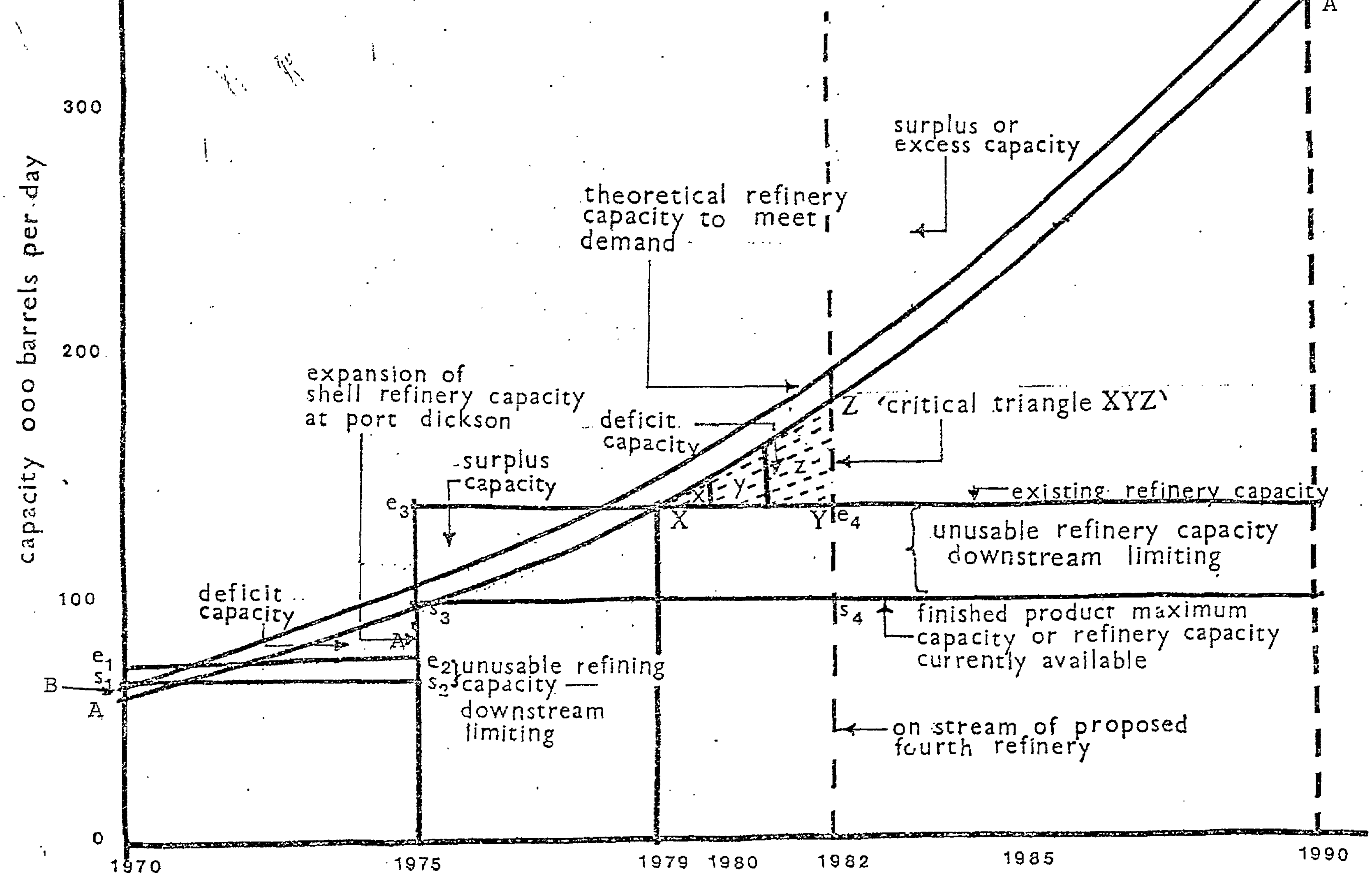
TABLE 5.7: ESTIMATED SURPLUS/DEFICIT OF PETROLEUM PRODUCTS ON THE BASIS OF COMPARISON BETWEEN REFINERY CAPACITIES & DEMAND FORECAST IN 1980, 1985 AND 1990 (IN BPCD)

PRODUCTS	MAXIMUM OUTPUT*	1980		1985		1990	
		DEMAND**	SURPLUS (+) or DEFICIT (-)	DEMAND**	SURPLUS (+) or DEFICIT (-)	DEMAND**	SURPLUS (+) or DEFICIT (-)
Aviation Gasoline	-	184	-184	222	-222	271	-271
Aviation Turbine Fuel) Kerosine)	9,530	16,452	-6,922	25,389	-15,859	38,668	-29,138
Mogas							
- Premium	10,565	18,375	-7,810	28,638	-18,073	43,890	-33,325
- Regular	6,064	7,874	-1,810	12,274	- 6,210	18,808	-12,744
Gas/Diesel	29,749	47,109	-17,360	66,386	-36,637	95,025	-65,276
Fuel Oil	40,121	56,127	-16,006	87,740	-47,619	134,712	-94,591
Liquified Petroleum Gas	2,365	4,619	2,254	7,890	- 5,525	12,753	-10,388
Total Fuel	98,394	150,740	-52,346	228,539	-130,145	344,127	-245,733
Total Non-Fuel	1,677	4,942	-3,265	7,126	-6,318	10,405	-8,778
Total Product	100,071	155,682	-55,611	235,665	-136,463	354,532	-254,511

Note: * Production of finished petroleum products on the basis of existing refinery design capacity (at maximum throughput) as shown in Table 4 earlier.

** From Table 3.6 in Chapter 3

Figure 5.2 REFINERY CAPACITY TO MEET PRODUCT REQUIREMENTS IN MALAYSIA



Source: Drawn from Table 5.7

The line $e_1e_2e_3e_4$ is the existing refinery capacity and the line $s_1s_2s_3s_4$ is the refinery capacity available to produce the maximum finished products. The difference between e and s represents the unusable refining capacity limited by downstream capacities in the refineries.

At the start of the refinery operation in Peninsula Malaysia in 1963 until 1974, the combined capacities were about 65,000 barrels per day but the available capacities were about 58,000 barrels per day. The sudden increase in capacity in 1975 was made available by the Shell Refinery at Port Dickson' and upgraded the total refinery capacities in Malaysia to about 139,700 barrels per stream day out of which about 100,100 barrels of products could be produced daily. For Malaysia as a whole, the total refining capacities is about 154,000 barrels per stream day out of which about 140,000 barrels of products could be produced daily (Table 5.5 earlier).

From Figure 5.2 it can be seen that the refineries passed through periods of undercapacity to overcapacity then to undercapacity and finally back to anticipated overcapacity in 1979 when matched with past, current and projected future demand.

Up to 1975, the refineries experienced periods of undercapacity as the domestic market was being supplied mostly by the 2 refineries and the remainder by imports. By 1975, most of the imports were replaced by local sources as a result of increased capacity by Shell Port Dickson. However, we predict that this excess capacity will be fully utilised by the end of 1980. Since demand tends to grow in a relatively smooth manner, all other things remaining constant, capacity expansion occurs in discrete steps $s_1 s_2 s_3 s_4$ s_5 shown in the diagram. From our earlier projection of future demand, it appears that the current refining capacity will only be sufficient to meet domestic demand up to 1980. If capacity, however, is taken to mean the actual maximum operating limit of production, then the present capacity will be exhausted earlier than 1980 and by 1979 we have to have another refinery operating to cope with the increase in demand[6].

Since by 1980, it is expected that the demand for light distillates such as petrol, kerosene and diesel oil, as shown in Table 3.6 in Chapter 3 earlier and in Table 5.7 of this chapter will outpace the capacity of the refineries to process, Pfohl[7] had suggested 4 alternatives to the supply problem;

i. An import option from neighbouring countries;

ii. An investment option in expanding or building new reformers and hydrofiners in the existing refineries;

---

6 Adnan, M.A. Critical Issues in Petroleum Development in Malaysia, a paper presented to the Fourth Malaysian Economic Convention, held at University of Malaya in Kuala Lumpur from 19-21 May, 1977.

7 See next page.

iii. A crude quality option, i.e. increase in intake of local crudes which when combined with the Middle Eastern crudes will produce yield spectrum and quality more closely related to the increase in market demand. This will allow increase in light distillates or 'clean' products.

iv. A combination of (i), (ii) and (iii) of above.

Amongst the options suggested above, it appears that option (iii) might seem to be the solution in view of the increasing availability of indigenous offshore crude petroleum (mentioned in Chapter 4). Indigenous or local Malaysian crude has a high yield of light distillates and low yield of heavy distillates. The demand barrel in Malaysia requires about 39 per cent fuel oil and asphalt whereas the main Malaysian crude produced only 13 per cent fuel oil and no asphalt. The two existing refineries in Peninsula Malaysia can only take limited quantities of local crude for refining. These two are limited by equipment and quality problems. With the combination of Middle Eastern and local crudes, a larger amount of clean products can be produced. There is thus a need for another refinery to be built in Peninsula Malaysia by 1980 to cater for the growing demand for petroleum products.

The shaded portion in the figure 2 shows the effect of postponing refinery expansion on the supply - demand

7. Pfohl, J.L., Petroleum Refining in Malaysia, a paper presented at the Seminar on the Oil Industry and Its Impact on National Development, organised by the Technological Association of Malaysia from 13-16 May 1976 in Kuala Lumpur.

relationship of products. This we refer to as "critical triangle" where we have to import products every year (above the current level) to satisfy the growing market until enough capacity is added to the existing refinery capability. A series of rectangles will be added to the critical triangle over the years[8].

8 If the Government had decided to build the refinery in 1977 (on the recommendation of the Consultant firms of C.Itoh), it will only be 'on stream' around June 1981. Usually it takes sometime for a company/government to make an effective decision about building a refinery, should the proposed refinery be built 2-years hence, it will be 'on stream' only in 1983 and two rectangles (Y and Z) have been added to X in the Diagram 5.2.

CHAPTER 6

OIL PRODUCTS MOVEMENTS AND DISTRIBUTIONS

The distribution of natures' storehouse of crude petroleum does not follow the pattern of the world demand for oil. The essential supply link has to be provided between sources and markets in many different parts of the world, and crude oils of widely differing quantities and product yields matched to customers' requirements. Oil has to be transported either by land or sea in right quantities and at the right times, and it has to be of the right type for the right destination at the lowest possible cost. Accordingly, there is a large and highly complex international movement of oil, both crude and refined end-products, which severly influences the oil industry of a particular country, and Malaysia is no exception to this.

This chapter will examine several aspects of oil movements and distributions in Malaysia. They include comparison between pattern of these movements and distributions before and after the establishment of refineries in Peninsula Malaysia, product distribution methods, distribution and ownership of receiving terminals and supply logistics of oil companies. These aspects will help the analysis on competitive behaviour of oil companies in Malaysia in Chapter 7.

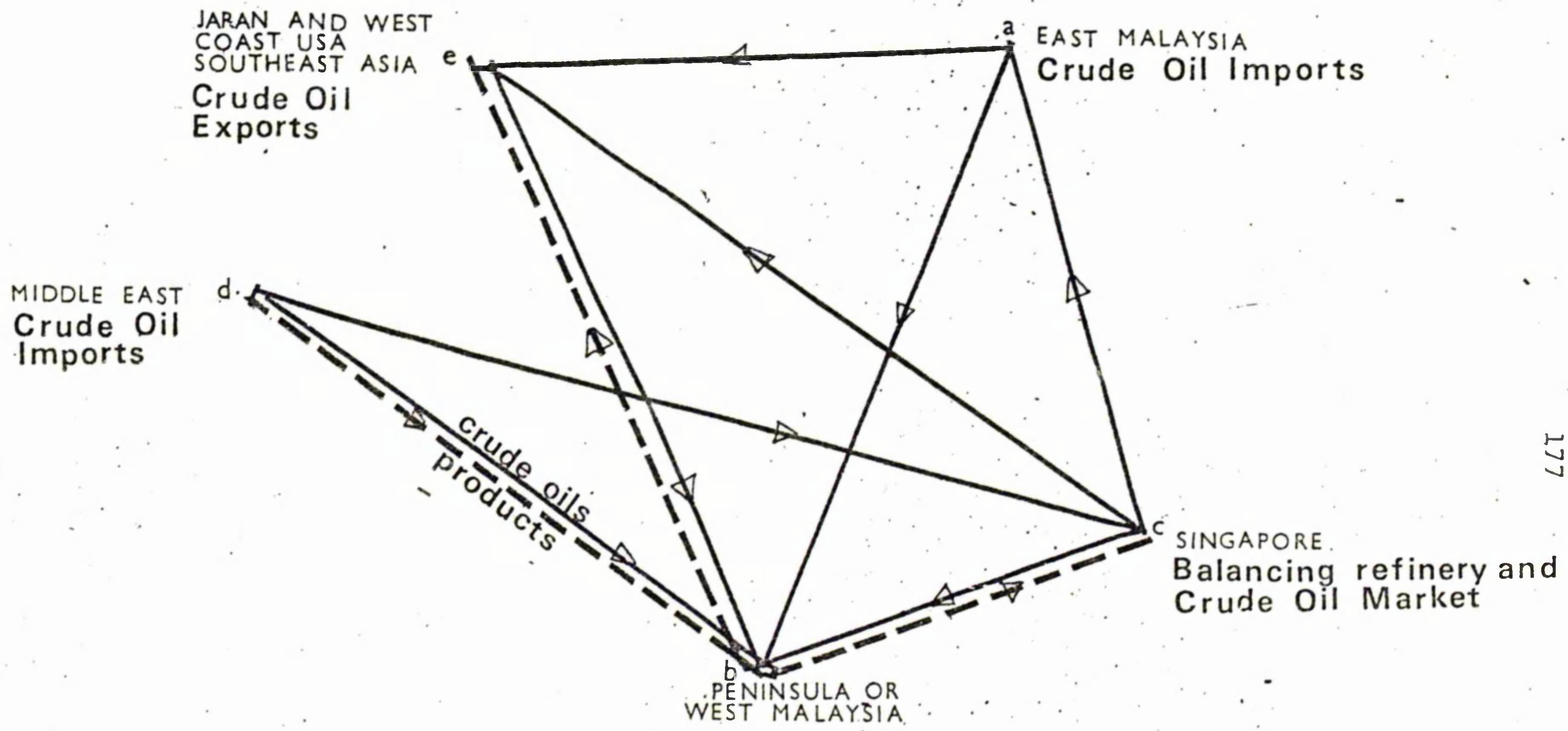
6.1 General Pattern of Oil Movements and Trade

Before 1963, most of the crude oil produced in Malaysia (with the exception of the small amount used by the Lutong Refinery in Sarawak) were exported and in return Malaysia imported most, if not all, of its requirements of petroleum products as the Lutong Refinery did not produce finished products for consumption. With the opening of the 2 other oil refineries in Malaysia, the pattern of crude oil and end-product movements and also oil trade have somewhat changed.

Figure 6.1 illustrates how the patterns of oil movements and trade have changed since the opening of the 2 refineries in Peninsula Malaysia.

Before the opening of the 2 refineries in Peninsula Malaysia, most of the crude oil production was exported to overseas market designated as e and some to c (mostly tops) in the diagram. In return, end-products of oil were supplied by sources d and c and sometimes e for Peninsula Malaysia and c for East Malaysia.

With the commencement of the 2 refineries in Peninsula Malaysia, the crude oils for the 2 refineries are supplied by sources a (20%) and d (80%) in the diagram. Some amount of end-products move both ways between b and c (Excesses being sent to Singapore where there is a balancing refinery and



<u>Figure 6.1</u> <u>OIL TRADE MOVEMENTS AND THE RELATIONSHIP BETWEEN MALAYSIA AND OIL EXPORTING AND IMPORTING COUNTRIES IN THE REGION</u>

Source: Drawn from information in Section 6.1

deficits being imported from it). The oil product movement for East Malaysia still remains the same as before. Singapore, being the major refining centre in the region, receives crudes from sources d and a and exports refined end-products to market e. Excesses from refineries in Peninsula Malaysia are also exported direct to the neighbouring market e as well as to Singapore.

The conclusion drawn from the diagram is that the pattern of crude oil movements and trade in Malaysia in the past shows rather 'weak' regional ties but much stronger links with the rest of the world; on the other hand that of products the reverse is true. However, with the Middle East conflicts and the oil price hikes and increased domestic production, the opposite trend has emerged in the case of crude oil movements but end product movements remain the same.

In the past, instead of buying crude oil from the producer (Shell) within Malaysia, oil companies (including Shell) look to the Middle East for the bulk of their crude oil needs. More than 80% of the crude oil comes from the Middle Eastern countries of Saudi Arabia and Kuwait as shown in Table 6.1. Sarawak, the only producer in Malaysia, contributes a relatively small portion (20%) to the Malaysian crude oil needs. Most of the crude oils from Sarawak are exported overseas as shown in Table 6.2. Over the last 6 years (1970-1976), local supplies have contributed more and

TABLE 6.1: CRUDE PETROLEUM IMPORTS OF MALAYSIA BY SOURCES 1965-1974

	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974
Brunei	51.5	-	492.4	5,768.4	5,979.6	6,273.3	6,270.2	1,476.2	902.4	368.4
Sarawak(1)	307.8	387.0	-	-	-	-	-	-	-	-
Kuwait	1,045.5	946.1	1,037.7	1,298.5	1,461.5	1,282.3	1,320.2	1,052.3	844.2	938.2
Saudi Arabia	819.8	1,312.1	1,353.9	1,539.6	1,407.2	1,418.0	987.4	1,249.7	1,457.8	1,475.0
Iran	-	-	-	-	-	-	-	-	-	-
Others	-	-	-	-	-	-	-	-	450.1	-
Sub-Total ('000 Tons)	2,224.8	2,645.2	7,316.0	8,606.6	8,876.4	8,977.1	8,577.9	3,778.3	3,204.8	2,781.7
Partly Refined Petroleum	n.a.	n.a.	52.4	49.6	41.5	46.1	34.4	41.0	233.7	313.2
Total	2,248.8	2,645.2	7,368.4	8,656.2	8,917.9	9,023.2	8,612.3	3,819.3	3,438.5	3,094.9
C I F Value ($/'000)	95,888.3	108,164.9	329,963.6	382,808.2	366,880	379,854.2	417,072.6	86,066.8	193,609.2	569,730
Average Value ($/Ton)	43.09	40.89	44.78	44.22	41.14	42.09	48.4	48.7	56.31	184.0[illegible]

(1) After 1967, crude oils from Sarawak were not designated as Imports into Malaysia as Sarawak by then was part of Malaysia.

Source: Department of Statistics, Bank Negara and Treasury Economic Reports.

TABLE 6.2: CRUDE PETROLEUM EXPORTS OF MALAYSIA BY SOURCES 1966-1974

	1966	1967	1968	1969	1970	1971	1972	1973	1974
Australia	-	904.0	1,240.9	1,198.4	842.3	314.9	-	-	-
Burma	-	154.7	109.0	112.6	228.4	247.9	51.2	-	-
Formosa	-	-	-	-	140.6	177.9	-	-	-
Japan	-	95.0	98.3	97.8	238.7	1,800.6	661.2	-	-
New Zealand	-	95.2	99.8	143.4	180.9	188.3	141.8	-	-
Philippines	-	799.0	1,154.5	1,206.7	1,395.4	1,498.2	723.2	-	-
Singapore	1,883.0	42.1	1.1	-	59.6	817.2	1,269.9	1,712.4	671.6
Thailand	-	-	-	-	305.4	972.0	230.8	490.0	309.1
United Kingdom	-	55.6	148.6	35.3	-	234.6	-	66.2	-
U.S.A.	-	-	-	96.6	110.8	167.3	9.8	3.3	220.5
Others	-	-	-	-	-	-	-	-	-
Sub-Total ('000 Tons)	1,883.0	2,150.1	2,852.5	2,995.6	3,584.5	6,419.4	3,088.3	2,839.2	2,290.3
Partly Refined Petroleum	-	47.5	945.8	980.8	1,037.5	1,382.1	1,099.8	927.1	827.6
Total	1,883.0	2,197.6	3,798.3	3,976.4	4,622.0	7,801.5	4,188.1	3,766.3	3,117.9
C I F Value ($/'000)	80,467	123,877.8	173,080.5	177,353.5	202,565.1	389,878.5	222,953.3	269,249.5	677,842.2
Average Value ($/Ton)	42.73	47.1	45.56	44.6	43.8	49.97	53.23	71.49	217.4

Source: Department of Statistics, Bank Negara and Treasury Economic Reports.

more towards local requirements as imports fell as has been discussed in Chapter 5 earlier.

6.2 Distribution of Imported Petroleum Products Before 1963

The distribution of imported petroleum products before the opening of the 2 refineries in Peninsula Malaysia in 1963 were made by 2 companies namely the Shell Marketing Company of Malaya and the Standard Vacuum Oil Company.

The two companies had been operating in Malaya since the 1890's. Prior to the operating of the Shell and Stanvac refineries at Port Dickson, Shell and the Standard Vacuum Oil Companies drew their requirements from their refineries in Singapore and from overseas sources.

The distribution of petroleum products at that time was governed by the Petroleum Ordinance of 1883. (See Appendix 6A). The Petroleum Ordinance of 1883 was amended by the Petroleum Ordinance of 1886 and served as a milestone to the petroleum industry of Malaysia. The Ordinance basically deals with the carriage of petroleum in bulk (imported) by sea and land into the country and its distribution (transport) within the country as specified in Section 8 of the Ordinance.

Sections 2 and 3 of the Ordinance specified that the only ports through which petroleum might be imported were the principal ports of Singapore, Prince of Wales Island (Penang), Malacca and Dindings (in Perak). In these harbours, ocean installations had been constructed for the reception and storage of products delivered there by tankers. The main reason for constructing ocean installations at every port was because it was cheaper for products to be brought into the mainland market areas by sea and then to send by rail for distribution over the entire country. If any one company attempted to cover the whole mainland from one part, say Singapore, it would have to incur extra transport costs in order to compete on a price basis in certain areas with products imported by a competitor through another port, say Penang.

6.3 Local Distribution and Export

Table 6.3 shows the distribution pattern of refinery products by areas in 1975. The figures includes oil refining companies distribution networks (Esso and Shell), other oil companies and direct sales. Lutong Refinery's own consumption and inputs to local affiliated companies in Peninsula Malaysia.

In 1975, the total volume of products distributed within Malaysia was around 26.8 million barrels. If this is combined with export figure of 3.9 million barrels, the total output from the 3 refineries in Malaysia in 1975 was recorded as 30.7 million barrels. In terms of percentage, domestic

TABLE 6.3: MALAYSIA - DISTRIBUTION PATTERN OF REFINERY PRODUCT BY AREAS IN 1975

AREA PRODUCTS	PENINSULA MALAYSIA			EAST MALAYSIA			TOTAL OUTPUT		
	Domestic(1) Distribution	Exports	Total Output	Domestic(2) Distribution	Exports	Total Output	Domestic Distribution	Exports	Domestic Distribution
LPG	664	4	668	5	11	16	669	15	684
Kerosene/Aviation Turbine Fuel	2,493	-	2,493	13	614	627	2,506	614	3,120
Premium Petrol	3,205	-	3,205	-	-	-	3,205	-	3,205
Regular Petrol	1,256	-	1,256	47	-	47	1,303	-	1,303
Automotive and Industrial Diesel	5,403	-	5,403	1,483	-	1,483	6,886	-	6,886
Fuel Oil	10,683	-	10,683	553	-	553	11,236	-	11,236
Asphalt/Bitumen	392	-	392	-	-	-	392	-	392
Lubricants/Others	226	104	330	-	-	-	226	104	330
Naphtha/Tops	-	173	173	339	1,543	1,882	339	1,716	2,055
Residual	-	-	-	33	1,435	1,468	33	1,435	1,468
Total	24,322	281	24,603	2,473	3,603	6,076	26,795	3,884	30,679

(1) Under this includes refining companies own distribution network, other oil companies (non-refiners or importing companies such as Caltex, BP & Mobil) and other direct sales.

(2) Under this includes the Lutong Refinery's own consumption and refinery inputs to its affiliated companies in Peninsula Malaysia.

Source: Private communications with PETRONAS.

distribution of products constituted 87.3% and exports 12.7%. Out of the total output distributed, Shell Group of companies' share was around 64.4% and the remainder 35.6% was by Esso.

The refineries of Shell and Esso in Port Dickson exported about 1% and 1.3% of their total output respectively whereas Shell Lutong's exports was around 59.3%. This was because the latter's production was mainly intermediate products which need further processing before they could be used.

Before the opening of refineries in Peninsula Malaysia, the pattern of distribution of the various petroleum products in Peninsula and East Malaysia was determined by the various company logistics such as the distribution and concentration of their markets, the different modes of transport and accessibility of the area and the costs of operations.

Before 1963, most of the supplies of petroleum products brought into Malaysia were supplied by the oil companies' refineries in Singapore and from their affiliated companies overseas. The methods of distribution were mainly by road, railways and water (sea) to the various depots inland and along the coastal areas. As figures on this type of distribution are not made available for analysis, we could not say which method predominate and the volume of products conveyed by the different modes of transport. Suffice to say water and road distribution were the cheapest amongst the methods used at that time.

6.4 Methods of Distribution of Refinery Products After 1963

Refinery products are mainly transported by 4 different modes of transport: road tankers, rail, coastal tankers and pipelines. The distribution from the individual oil depots to consumers experienced no change after 1963 except that currently they are being supplied mostly by products produced locally instead of imported products. Thus the oil supply logistics undergo drastic change at the base. Table 6.4 shows the various petroleum products distributed by the different modes - by oil companies' own distribution network, other contracting companies network and direct sales ex-refinery.

In 1975, out of the total of 26.8 millions distributed throughout the country, 4.8 million barrels or 15.5% were distributed by road tankers, 12.5 million barrels or 46.8% by coastal tankers, 6.5 million barrels or 24.0% were by pipelines and about 3 million barrels or 11.0% were by rail. In the different categories of distribution network, 13 million barrels or 48.8% were conveyed by the oil companies' own vehicles, 2.4 million barrels or 9% were by contracting companies' vehicles and 11.3 million barrels or 42.0% were conveyed by consumers' own vehicles. This is shown in Table 6.5.

TABLE 6.4: DISTRIBUTION METHODS OF PETROLEUM PRODUCTS IN MALAYSIA IN 1975
(in '000 barrels)

	METHODS OF DISTRIBUTION				
	ROAD	RAIL	SEA	PIPELINE	TOTAL OUTPUT
LPG	213	104	17	335	669
Kerosene/Avtur	684	198	875	569	2,506
Premium Petrol	649	468	1,423	665	3,205
Regular Petrol	202	76	681	344	1,303
Automotive and Industrial Diesel	956	969	3,695	1,266	6,886
Fuel Oil	1,447	1,066	5,452	3,271	11,236
Asphalt/Bitumen	322	70	-	-	392
Lubricants/Others	183	18	25	-	226
Naphtha/Tops	-	-	339	-	339
Residual	-	-	33	-	33
TOTAL	4,836	2,969	12,540	6,450	26,795
in % (rounded)	16.5	11	47	24	100

The total output distributed by the various methods are from the three refineries in Malaysia and the figures exclude exports. The figures for Naphtha/Tops and Residuals are refinery inputs for the use of local affiliated companies.

Source: Private communication with PETRONAS.

TABLE 6.5: REFINERY OUTPUT[1] - METHODS OF DISTRIBUTION 1975

Unit: '000 barrels

MODE OF TRANSPORT / PRODUCTS	ROAD TANKERS			RAIL			COASTAL TANKERS			PIPELINE			total Volume
	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)	
Liquified Petroleum Gas	-	56	157	104	-	-	12	5	-	335	-	-	669
Kerosene/Avtur	634	75	155	189	-	9	693	115	67	569	-	-	2506
Premium Mogas	-	149	500	468	-	-	1125	190	108	665	-	-	3205
Regular Mogas	2	41	159	76	-	-	547	78	56	344	-	-	1303
Gas/Diesel Oils	-	117	839	836	-	133	2990	478	227	1262	-	4	6886
Fuel Oil	-	620	827	42	-	1024	1762	105	3585	142	-	3129	11236
Bitumen/Asphalt	-	-	322	70	-	-	-	-	-	-	-	-	392
Lubricants/Solvents	156	18	9	18	-	-	25	-	-	-	-	-	226
Naphtha/Tops	-	-	-	-	-	-	-	339*	-	-	-	-	339
Residue	-	-	-	-	-	-	-	33*	-	-	-	-	33
TPTAL	792	1076	2968	1803	-	1166	7154	1343	4043	3317	-	3133	26795

(1) Total of three refineries i.e. Shell (P.D), Esso (P.D.) and Shell (Lutong). Excluding exports.

* Refinery inputs to local affiliated companies

Notation:
(1) Own Distribution Network; (2) Other Companies; (3) Direct Sales.

Source: Private Communications with oil companies and PETRONAS.

Within the category of road-tankers, 19% were supplied from oil companies' own-tankers, 26% were from contracting companies' lorries and 71.6% were made through direct sales and supplied by the consumers' own vehicles. In the rail distribution category, 60% were made by the oil companies' tankage facilities through the Malayan Railways and the remainder were made through direct sales to the consumer - the Malayan Railway. The companies' own distribution network conveys mostly kerosene, avtur, lubricants and solvents. The contracting companies convey by road all the products except bitumen. Bitumen is only conveyed by consumers' own vehicles.

In the case of rail transportation, all of the products are conveyed by the oil companies tankage facilities through the Malayan Railway. Direct sales made by the refineries are sent by rail for the own use of the Malayan Railway and their workshops. There is no delivery made through rail network by other contracting companies as there is only one railway system in the Peninsula Malaysia.

About 7 million barrels or 57% of delivery by coastal tankers were made by companies' own barges and boats and 1.3 million barrels or 10.7% were made through local contracting companies and 4 million barrels or 32.2% use by local sales to various fishing companies which provide their own boats or barges.

In the pipeline category, 51% of volume conveyed by this method is provided by oil companies'own distribution network (pipelines) as in Sarawak. Direct sales made through pipelines which constituted about 3 million barrels or 49% was for the Tunku Jaafar Power Station (owned by the National Electricity Board) at Port Dickson where Esso and Shell are responsible for piping Fuel Oil and Gas/Diesel oils to the power station. There is no private delivery by other oil companies through pipelines.

Table 6.6 shows the total Supply and Distribution costs in Malaysia provided by the Shell Group of Companies as incurred by them from 1972 to 1975. As there are no figures for the whole industry made available for analysis, this gives some insight as to how the costs have changed over time and to what extent they have changed.

Table 6.6 Unit Supply and Distribution Costs of Oil Products in Malaysia (in M$/barrel)

	1972	1973	1974	1975
Brunei, Sabah and Sarawak	3.46	3.70	4.42	4.91
Peninsula Malaysia	1.73	1.86	2.12	2.00
Average cost per(1) barrel from all operations	2.03	2.16	2.50	2.60

Source: Shell Malaysia Trading Berhad.

Note: (1) is obtained by averaging total costs from both their Borneo and Mainland Malaysia operations with total sales volume for the particular year.

According to Shell Group of Companies their unit supply and distribution cost in Peninsula Malaysia is approximately half of their Brunei and East Malaysian (or what they termed their Borneo operations). This reflects the relatively high cost of operations in Borneo. And this is inevitable in view of the topography of the area, its poor infrastructure, its remoteness from Bukom and Woodlands and the limitations of Lutong Refinery. This has necessitated the Shell Group of Companies to have 8 oil depot installations in Borneo compared to 10 in Peninsula Malaysia although it has a mere one fifth of trade. From oil company sources for operating in East Malaysia, they intended to cut down the spiralling of cost increases in depot operations by rationalization in water transportation.

The unit cost per barrel from both their operations has been rising steadily from M$2.03 per barrel in 1972 to M$2.60 per barrel in 1975, giving an average annual increase over the period of 9.5%. The main increase occured in 1974, due to the oil crisis, and the resulting freight hikes, increased surtax values, etc.

Surtax, a new cost element, was imposed in 1973[1]. This will most probably increase in proportion to total cost

---

1. Surtax element in cost-build up was imposed by the Government at 4 percent of landed price of products imported into the country as a penalty or disincentive for oil companies to do so. It is calculated after imported or custom duties have been calculated on the product price.

in the future with increased volumes. Import duties and intermediate storage costs, although continuing to increase in absolute amount, should progressively be of smaller proportion to total cost. According to Shell, however, the bulk of their total supply and distribution costs which is around 76% and gradually increasing is made up of marketing transport costs. Of this water transportation takes up around 50%, followed by road 35%, with the balance 15% for rail. This is shown in Figure 6.2.

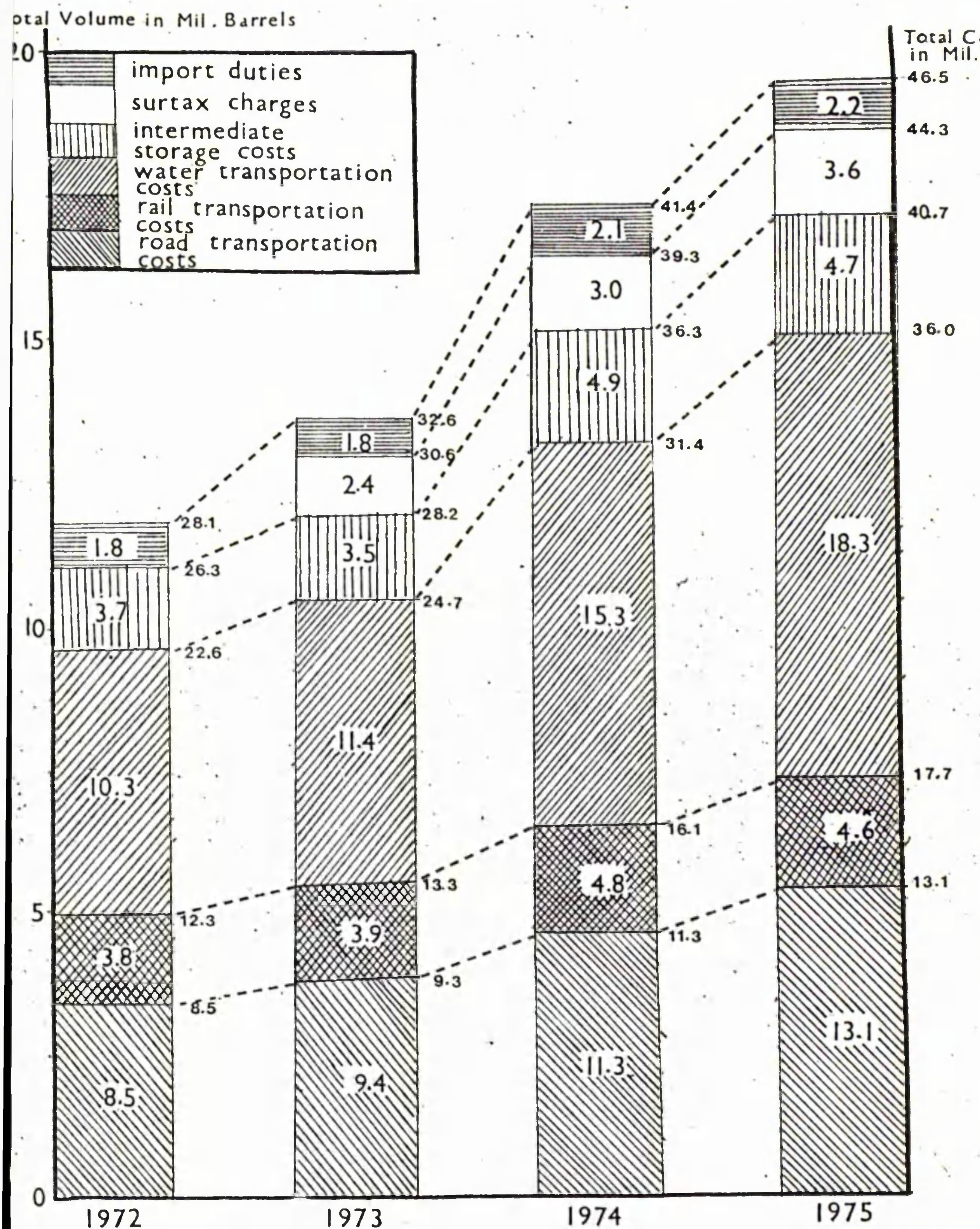
Table 6.7 shows unit marketing transport cost by mode of supply of Shell Group of Companies. From the table, it is observed that the increase in road transport cost from 1972 to 1975 is highest at 43% followed closely by water at 40%. The increase in rail is only 15%. This fits in well with Shell's plan to switch, whenever possible, to rail use. The Malaysian Government is also anxious to promote rail usage in Peninsula Malaysia and some M$500 million has been earmarked for investment in expanding rail networks and facilities in future.

Table 6.7 Unit Marketing & Transportation Costs in Borneo and Peninsula Malaysia($ per barrel)

	1972		1973		1974		1975	% 1975/78
Water	1.09		1.05		1.53		1.53	40
Rail	1.26		1.11		1.20		1.45	15
Road	0.97		0.96		1.15		1.39	43
Overall Average	1.06		1.02		1.32		1.47	39
Increase		(0.04)				(0.03)		0.15
% Increase		(4)				(29)		11

Source : Shell Malaysia Trading Co.Ltd.

Figure 6.2 : SUPPLY AND DISTRIBUTION COSTS INCURRED BY THE SHELL GROUP OF COMPANIES



source : Shell Malaya Trading Berhad

6.5 Distribution of Imported Petroleum Products

Although Malaysian refineries produce most of the petroleum products required in Malaysia, the amount is not sufficient to meet the needs of the domestic market. So a certain amount of each of the products are imported from abroad to complement local production. Table 6.8 shows the various products imported in 1975 into Malaysia, showing the countries of origin, destinations of imports, modes of transport and import volumes. In 1975, about 11.2 million barrels of various petroleum products were imported from various sources mainly Singapore (90.0%) Bahrain (6.9%) and Ras Tanura (2%). Out of these 83.3% were conveyed by sea, 16.3% by road and the remainder by rail. About 8.6 million barrels or 76.6% for the Peninsula Malaysia market were in the form received by various depots and terminals and direct sales. The remainder were distributed mostly by sea to the East Malaysian States.

Table 6.9 gives the total supplies of petroleum products made available in the Malaysian Market in 1975. Out of over 37 million barrels supplied during the year, 78.6 percent or about 30 million barrels are supplied by the Refiners (Shell and Esso) and the remainder by the Non-Refiners or importers (the remaining oil companies). In the case of the Refiners, 81.2 percent or 23.8 million barrels are supplied from their refineries and the remainder from imports as it is difficult for the refineries to produce

TABLE 6.8: IMPORTS OF PETROLEUM PRODUCTS IN 1975

PRODUCT	SOURCE OF IMPORT	VOLUME ('000 barrels)	PENINSULA MALAYSIA	EAST MALAYSIA	MODE OF TRANSPORT	TOTAL VOLUME OF IMPORTS ('000 barrels)
LPG	Singapore		130	83	P.Malaysia:Road E.Malaysia: Sea	213
Premium Petrol	Singapore Bahrain	948 111	731	328	P.Malaysia:Road & Sea E.Malaysia:Sea	1,059
Regular Petrol	Singapore Bahrain Brunei	593 35 3	443	188	P.Malaysia:Sea & Road E.Malaysia:Sea	631
Aviation Gasoline	Singapore	50	30	20	P.Malaysia:Sea & Rail E.Malaysia:Sea	50
Aviation Turbine	Singapore	482	326	156	P.Malaysia:Sea E.Malaysia:Sea	482
Kerosene	Singapore Bahrain	849 31	501	329	P.Malaysia:Sea & Road E.Malaysia:Sea	880
Automotive and Industrial Diesel Oil	Singapore Bahrain Ras Tanura Brunei	5,223 454 213 22	5,316	596	P.Malaysia:Sea & Road E.Malaysia: Sea	5,912

...2/-

PRODUCT	SOURCE OF IMPORT	VOLUME ('000 barrels)	PENINSULA MALAYSIA	EAST MALAYSIA	MODE OF TRANSPORT	TOTAL VOLUME OF IMPORTS ('000 barrels)
Fuel Oil	Singapore Bahrain Ras Tanura	1,369 84 11	1,459	5	P.Malaysia:Road & Sea E.Malaysia: Sea	1,464
Lubricants	Singapore Australia Britain Others	143 89 8 2	220	75	P.Malaysia:Sea, Road & Rail E.Malaysia:Sea	294
Bitumen	Singapore Britain	142 1	51	92	P.Malaysia:Sea & Road E.Malaysia: Sea	143
Residuals (Solvents & Others)	Singapore Australia	51 5	56	-	P.Malaysia:Road & Sea	56
Total All Petroleum Products		11,184	9,313	1,871		11,184

Source: Private communications with PETRONAS.

TABLE 6.9: SOURCES OF DOMESTIC SUPPLIES FOR PETROLEUM PRODUCTS IN MALAYSIA IN 1975 (Product figures in -000 barrels)

Suppliers	Refiners			Non-Refiners or Importers			Total Product Availability		
Products	From Domestic Refineries	Im-ports	Total Supply	From Domestic Refineries	Im-ports	Total Supply	From Domestic Refineries	Im-ports	Total Supply
LPG	608	90	698	56	123	179	664	213	877
Avtur	1,113	215	1,328	-	267	267	1,293	482	1,595
Kerosene	1,203	427	1,630	190	453	643	1,401	880	2,273
Avgas	-	50	50	-	-	-	-	50	50
Premium Petrol	2,870	323	3,189	339	736	1,075	3,205	1,059	4,264
Regular Petrol	1,185	380	1,562	119	251	370	1,301	631	1,932
Automative/ Diesel Oils	6,082	2,523	8,605	595	3,388	3,983	6,677	5,912	12,569
Fuel Oils	10,511	964	11,475	725	500	1,225	11,236	1,464	12,700
Lubricants	190	114	304	18	180	198	208	294	502
Bitumen	206	143	349	-	-	-	206	143	349
Asphalts	186	-	186	-	-	-	186	-	186
Solvents	-	-	18	-	-	-	18	-	18
Others	-	-	-	-	12	12	-	12	12
TOTAL	23,865	5,226	29,394	2,042	5,954	7,996	26,207	11,184	37,391
%			78.6			21.4			100.0

For Refiners include figures for Shell Malaysia Trading and Shell Marketing Borneo and ESSO (M) Bhd. and ESSO Borneo Sdn. Bhd.

Not equal to total refinery output because the Lutong Refinery in Sarawak's own consumption of 216,000 barrels and imports of local affiliated refining company of 372,000 barrels.

Source: Private communications with PETRONAS supplies exactly to match demand. In the case of Non-Refiners, 6.0 million barrels or 74.4 percent were supplied from their affiliated refineries in Singapore while the remainder were supplied from the local refineries in Peninsula Malaysia.

This results in 70 percent of the overall supplies made from domestic refineries in Malaysia and the remainder from imported sources. This ratio is expected to increase in favour of local sources over the years with the full implementation of the processing arrangements by Mobil, British Petroleum and Caltex.

6.6 Depot Network and Tankage Capacities

In order to examine the behaviour and pattern of oil product movements in Malaysia, locational patterns of depot network and their capacities are looked into. This will help to evaluate the supply logistics of oil marketing companies with which we will deal in the next section.

The base depots before the establishment of refineries in Peninsula Malaysia were around the main coastal ports in Malaysia and Singapore. There were also intermediate oil installations and depots in the hinterland. They play a vital role in the distribution of petroleum products throughout the country. At that time petroleum installations and depots were and are still located either along the coasts such as Bagan Luar, Telok Anson, Pork Kelang (formerly Port Swettenham) Kota Bharu or on railway siding such as Brickfields and lpoh. These depots are supplied and replenished with petroleum stocks in bulk carriers by ocean and coastal tankers, tank trucks and railways. Places which are not accessible by the first three modes of transport are distributed by means of road tankers to fuel consumers. In the case of East Malaysia, the most popular means of transport is by coastal barges as the nature of topography is not conducive to the use of road and rail in many parts of the country. In the case of Peninsula Malaysia too, the Malayan rail network could not in any case handle the enormous volume of products that would flow inland if there was only one port of entry for petroleum fuels. To ease the strain on internal transportation resources it is essential to use all harbours. There is also a strategic reason, in the national interest, for having a number of ports capable of handling petroleum products.

As in anywhere else, the ocean installations in Malaysia are essentially a facility for the reception in bulk, the storage and the inland dispatch of petroleum products brought from overseas refineries. As laid down in the Petroleum Ordinance Section 12 earlier, the only ports at which petroleum could be imported were the principal ports of Singapore, Prince of Wales Island (Penang), Malacca and the Dindings obviously the locations of these installations were in the ports mentioned. Here the products were stored in tanks which have to be of sufficient capacity to take contents of a tanker, although sometimes, if the vessel was a large one, the contents may be divided between Penang and Singapore. The installations at these ports contained facilities for loading products into rail tank cars for distribution to inland depots.

The ocean installations in Malaya and Singapore were generally situated adjacent to the docks. The arrangement dates back to the days when petroleum products were first imported in bulk and, at that time, land was relatively plentiful in the harbour areas. The facility to erect large bulk storage tanks near the tanker discharge berths made it easier and cheaper to conduct operations, there being only relatively short distances for the product to be pumped from the wharf to the storage tanks. Another advantage was that oil sites could usually be easily served with railway sidings taking off the harbour service lines.

Figures 6.3A & B show the various inland depots which were established by the oil industry for distribution to customers. It will be noticed that there is a close relationship between the presence of inland depots and ocean installations. The reason for this pattern of location was that a depot for local distribution mostly receives its supplies from the ocean installations before being redistributed to the retailers and final consumers. This procedure has not changed even when supplies from local refineries

Figure 6.3a P.MALAYSIA : DISTRIBUTION OF DEPOTS BY TYPES

DEPOT	LOCATION	TYPES
1	Bagan Luar	all except a
2	Bayan Lepas	bcd
3	Prai	efghi
4	Ipoh	acdefg
5	Tasek	adefghi
6	Batu Undan	deghi
7	Telok Anson	eghi
8	Port Kelang	defghi
9	Brickfields	bdefgj
10	Segambut	a
11	Subang AS	bc
12	Port Dickson	acdfghj
13	Batu Pahat	defgi
14	Singapore	all
15	Kuantan	all except acj
16	Kuala Trengganu	defgh
17	Kota Bharu	defg
18	" AS	bc
19	Tanah Merah	a

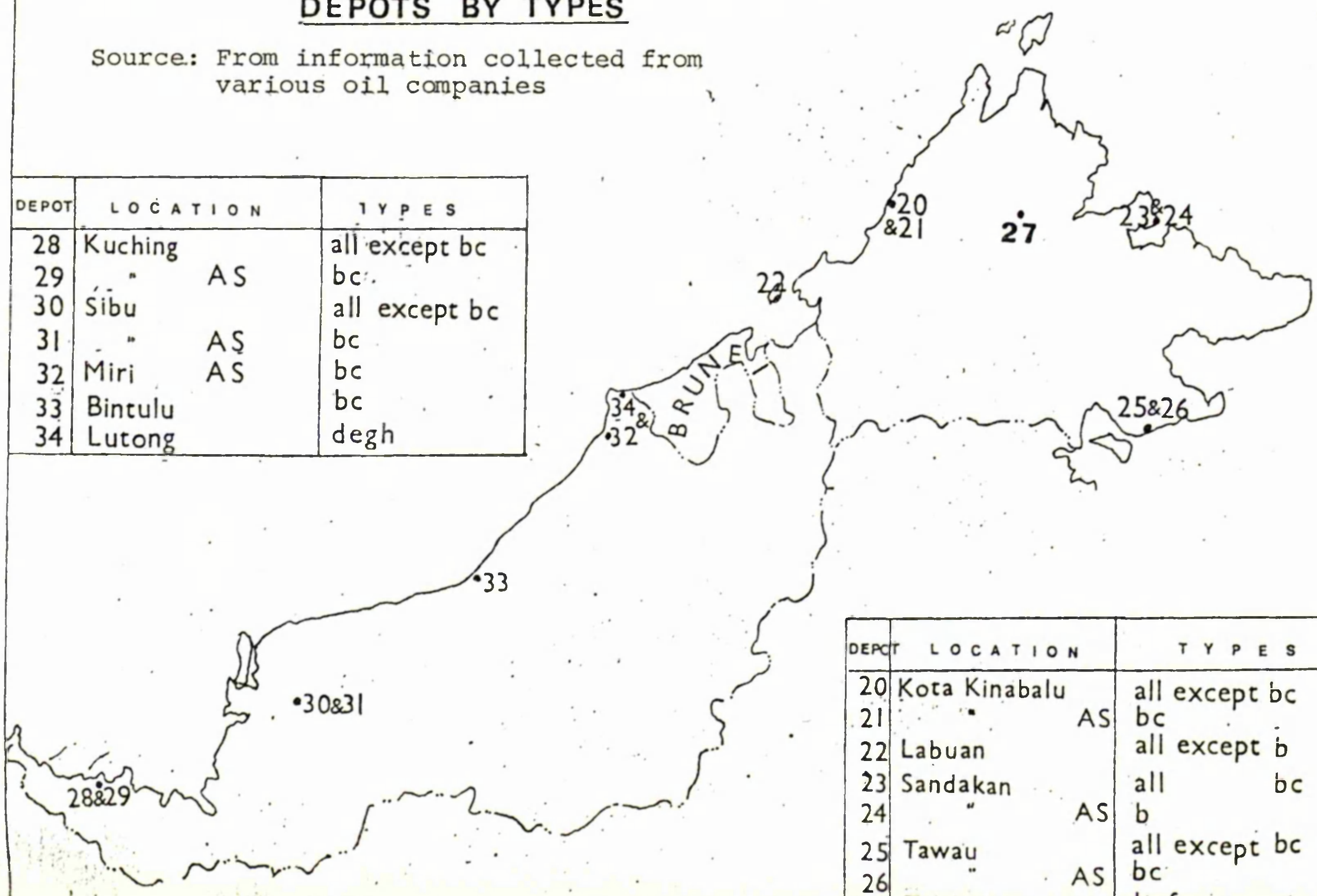
a LPG
b AvGas
c AvTur
d Kero
e R Mogas
f P Mogas
g Gas/Diesel
h F Oil
i Lubes
j Bitumen

source : From information collected from various oil companies

Figure 6.3 b E. MALAYSIA : DISTRIBUTION OF DEPOTS BY TYPES

Source: From information collected from various oil companies

DEPOT	LOCATION	TYPES
28	Kuching	all except bc
29	" AS	bc
30	Sibu	all except bc
31	" AS	bc
32	Miri AS	bc
33	Bintulu	bc
34	Lutong	degh



DEPOT	LOCATION	TYPES
20	Kota Kinabalu	all except bc
21	" AS	bc
22	Labuan	all except b
23	Sandakan	all bc
24	" AS	b
25	Tawau	all except bc
26	" AS	bc
27	Telupid	bcfg

replace most of the imported products. What has changed over the years have been the increase in the number of installations and sea-fed depots and inland distribution centres. The ocean installations are Bagan Luar (Penang), Telok Anson (Perak), Port Kelang (formerly Port Swettenham), and Woodlands (Singapore). In the case of sea-fed depots, they are Bagan Dalam (Penang), Batu Pahat, Kuantan, Kuala Trengganu and Johore Bharu. The Internal Distribution Centres and depots are Kuala Lumpur (Brickfields), lpoh, Kota Bharu, Palekbang (Kelantan), Seremban, and Jelutong (Penang). They are owned mostly by Shell and Esso .

The storage depots and installations mentioned earlier are owned by the individual marketing companies in Malaysia. Since Shell Group of Companies is the pioneer and the oldest company in Malaysia, they have the largest number of depots and installations distributed throughout the country. After the Second World War especially in the 1960s, a number of depots were established in view of the establishment of 2 other oil refineries in the country and the increasing consumption of petroleum products. Owing to these increases in capacity expansion in depots and installations, some depots were underutilised and some overutilised. Some oil companies found it more profitable to offer competing oil marketing companies their depots for 2 purposes : firstly the offer is made for joint-use for a fee based on the amount of oil stored and cost of operating the depot and secondly, 'hospitality' arrangements with regard to the use of throughput in depots in exchange for similar throughput in some other depots. Shell Trading Sdn-Bhd. in Peninsula Malaysia operates 16 terminals throughout the country. The Shell Marketing Company of Borneo operates terminal facilities in Sabah and Sarawak - 8 of which are in Sabah and 7 in Sarawak. Esso, like Shell, operates terminals both in Peninsula and East Malaysia. It has 6 terminals in Peninsula Malaysia and its terminals in Sabah and Sarawak are handled by its affiliates the Esso Borneo Sdn. Bhd. The other oil companies Caltex, British Petroleum and Mobil have 11 terminals altogether amongst them.

Table 6.10 Depot Operating Costs in Peninsula Malaysia and Borneo by Shell Group of Companies 1972-1975.

Year	Cost ($'000)	Throughput ('000) Barrels	Unit Costs ($/barrel)
1972	3667	358,459	1.02
1973	3865	386,065	1.00
1974	5071	414,029	1.22
1975	4693	453,364	1.04

Source : Shell Malaysia Marketing Co. Ltd.

Table 6.10 shows the extent of increase in depot operating costs in both the Malaysian states of Peninsula Malaysia and East Malaysia over the 4 year period. In spite of the unit transportation cost increases, depot operating cost has, on a net basis, been held remarkably steady, slightly above one dollar a barrel over the years. Total cost increases from $3.6 million in 1972 to $4.7 million in 1975 compared with an increase of throughput of 358.5 million barrels in 1972 to 453.4 million barrels in 1975. This is because of relatively low investments in the existing facilities inspite of increased depot throughputs because of excess capacities of depots in the past. And from Table 6.10 too in terms of unit cost of depot operating, it shows a steady increase except in 1974 ($1.22 ¢ per barrel) where unit cost increased tremendously due to the two-fold increase in plant charges and maintenance costs during that year.

6.7 Oil Companies Supply Logistics

As has been discussed in Chapter 4 earlier with the commissioning of additional capacities in Shell Refinery in Port Dickson in 1971, over the past years, local supplies have contributed more and more towards overall requirements as imports fell from 30 percent in 1972 to 23 percent in 1974. Further reductions are expected and it is envisaged that imports will account for not more than 15 percent of requirements.

Political factors on such questions as self-sufficiency and foreign-exchange savings may lead to a further penalty on imports in future. This point has been proven with the processing deal between Shell and Mobil and the Shell and Caltex buying arrangement with Esso which started sometime in 1972.

The movement and direction of supplies of petroleum products in Malaysia and thus the oil companies supply logistics are also determined by the structure of the various duties and taxes levied on petroleum products by the Government from time to time. Customs duties are imposed on crude oil and petroleum products imported into Malaysia. Excise taxes are imposed on gasoline, jet fuel, gas oil and automotive use and liquified petroleum gas sold domestically. (See Appendix 6A for the structure of Petroleum Taxes by the Customs and Excise Department of Malaysia).

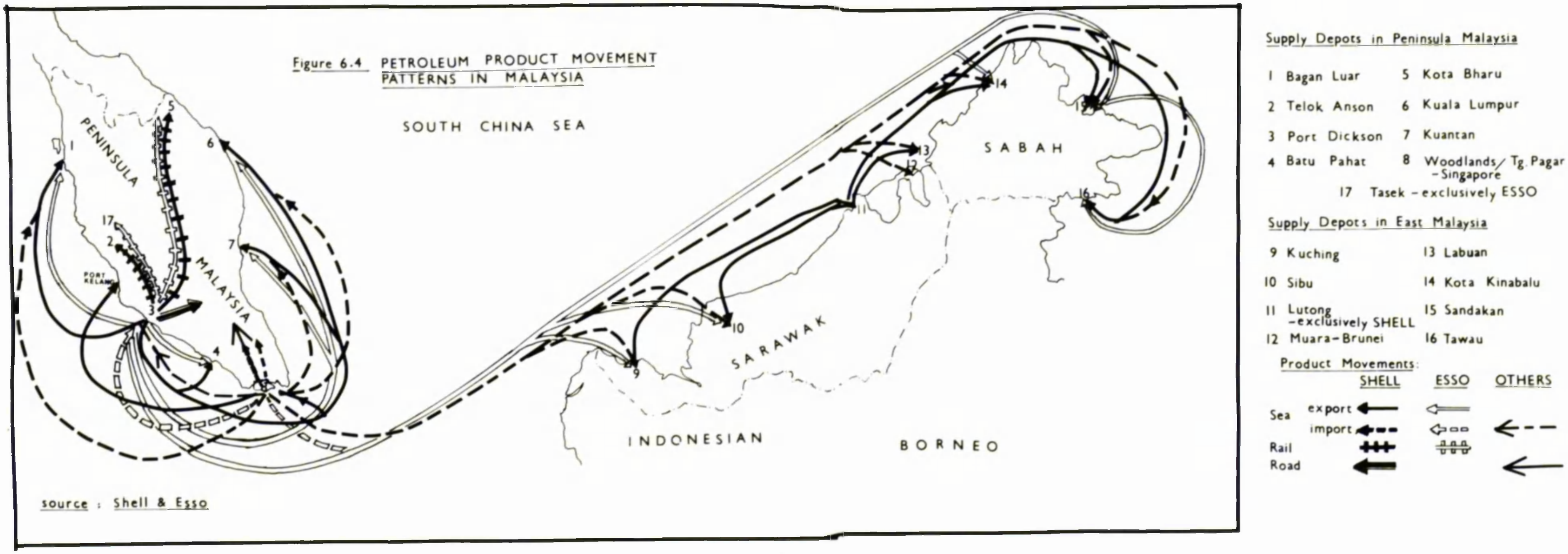
To avoid high duty differential, mogas and kerosene for East coast of Peninsula Malaysia are supplied from Port Dickson. Gas oil and diesel oil for the East coast are, however, drawn from Bukom in Singapore as there is no surtax and this enables the company to save on freights. If the surtax, lifted early in 1974, is re-imposed, then there is a strong likelihood that these products will preferably be supplied from Port Dickson subject to secondary capacity restraints especially when excess capacities are taken up by processing crude for a third party.

Prior to 1975, in spite of lower freight cost from Port Dickson, gas oil supplies to Bagan Luar in Penang were still drawn from Bukom. In the absence of surtax, this arises because of the optimization programme at the Shell refinery in Port Dickson. Any increase in gas oil production at Port Dickson will inevitably result in surpluses (fuel oil and regular mogas) which would have to be exported to Bukom. However, with surtax imposed after 1975, gas oil is supplied from Port Dickson instead of from Bukom.

In the case of East Malaysia, inspite of duty/surtax and freight penalties, supplies to Sabah and Sarawak are still determined largely by the refining limitations at Lutong Refinery in Sarawak because of the type of crude oil used (the local Miri type of crude). Only gas oil and fuel oil together with a small quantity of regular mogas are manufactured locally with the rest of products including liquified petroleum gas and bitumen being drawn from Bukom in Singapore. Since 1976, Lutong produces premium mogas and this gives savings on both freight and surtax. The petroleum product movement pattern is illustrated in Figure 6.4.

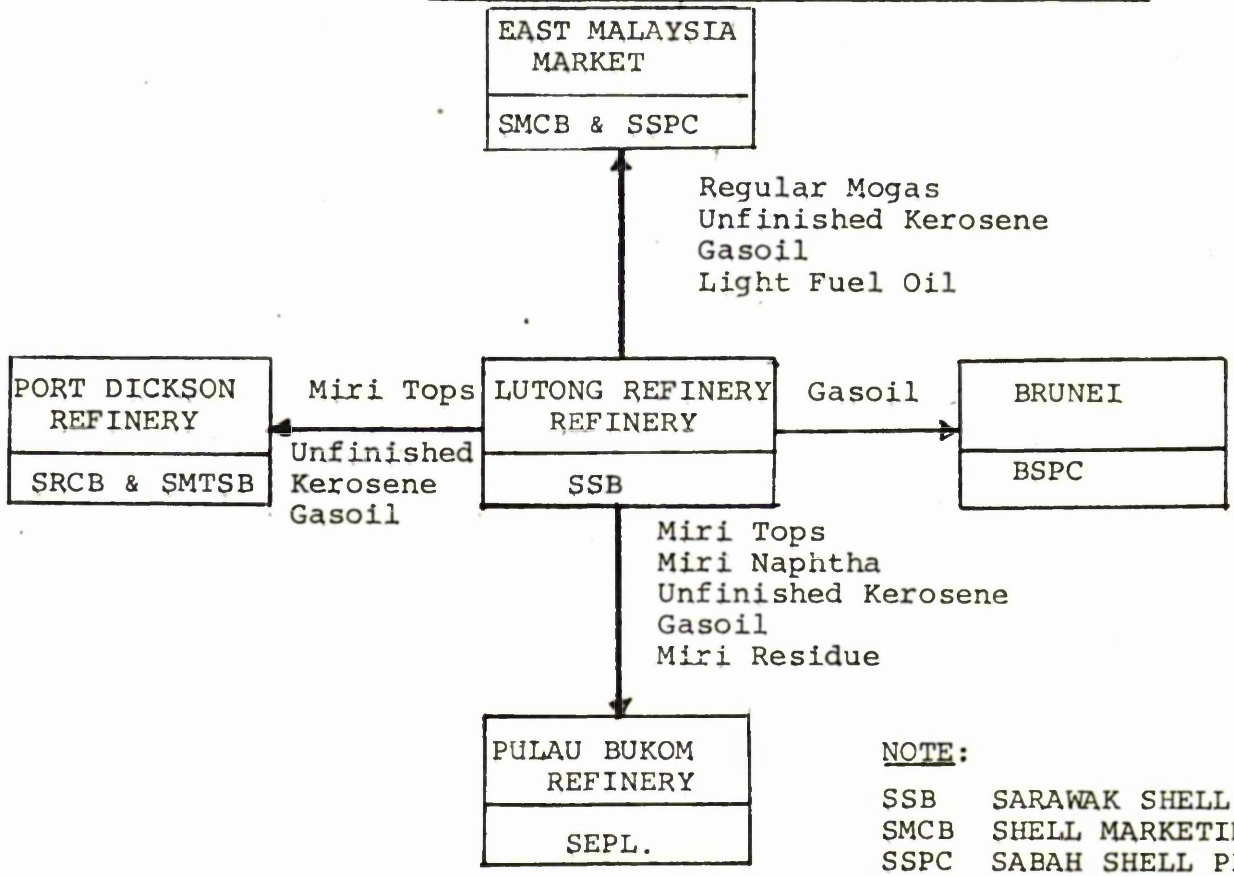
Figure 6.5 shows the products distribution pattern of Shell Lutong refinery in Sarawak. The regular grade of gasoline requirement in East Malaysia is very small; the surplus gasoline component is exported as Miri tops and naptha. Most of the kerosene and gas oil from the refinery is exported either to Pulau Bukom (in Singapore), Port Dickson or overseas refineries as local requirement is very small. In the case of diesel oil, the requirements for both the East Malaysian states are met solely from the refinery

Figure 6.4 PETROLEUM PRODUCT MOVEMENT PATTERNS IN MALAYSIA



source : Shell & Esso

FIGURE 6.5 : PRODUCT DISTRIBUTION PATTERN OF SARAWAK SHELL BERHAD AND LUTONG REFINERY



NOTE:

SSB SARAWAK SHELL BERHAD
SMCB SHELL MARKETING CO. BORNEO
SSPC SABAH SHELL PETROLEUM CO.
BSPC BRUNEI SHELL PETROLEUM CO.
SEPL SHELL EASTERN PETROLEUM LTD.
SRCB SHELL REFINING CO.(FOM) BHD.
SMTSB SHELL MALAYSIA TRADING SDN.BHD.

Source: Private communications with Shell at Lutong in Sarawak. The current level of diesel oil requirement in Sabah and Sarawak dictates the refinery crude processing level. As there is no storage or bottling facilities for LPG in Lutong, the LPG or liquid butane from the refinery is spiked back into the crude for export. A small amount of bottled LPG is imported from Singapore to meet the demand in both the East Malaysian states.

In the case of the crude oils produced by Sabah and Sarawak by the Shell Group of Companies, some are sold to Shell affiliate companies - the Shell Port Dickson Refinery - to be blended with Kuwait crude oil. Some of the crudes produced are also used in the Sarawak Shell's own refinery at Lutong. However, a greater proportion of the crude is exported to neighbouring countries. From Table 6.11, the volume of crude oils sold by Sarawak Shell and Sabah Shell (especially the former) to their affiliate the Shell Petroleum Refinery at Port Dickson has increased during 1974 to 1976 owing to the increase in the product requirements because of the processing arrangements with the other oil companies. The exports by the 2 companies have also increased over the years. The exports from Sabah and mainly sold to 4 countries: Singapore has increased its purchase of crude oil over the period twice their 1974 level; Philippines' imports have increased by 3 times in 1976 while Japan by 1½ times and Thailand by twice from their 1974 levels[2].

---

2 Private Communication with the Shell Malaysia Trading Co. Ltd.

Table 6.11 Disposal of Crude Oil by the Shell Group of Companies (in million of U.S. barrels).

	1974		1975		1976	
	SSB	SSPC	SSB	SSPC	SSB	SSPC
Sold to Affiliates and Associated Companies in Malaysia	3.2	-	4.0	0.2	4.0	-
Sold to Third Party Users in Malaysia	-	-	-	-	-	-
Used in Own Refinery or Other Internal Use	11.1	-	6.2	-	5.3	-
Exports	13.0	-	21.8	1.7	27,6	4.8
Stocks	0.8	-	0.9	0.3	-	-

SSB = Sarawak Shell Berhad; SSPC = Sabah Shell Petroleum Co.

Source : Privately secured from the oil companies concerned.

Other exports are increasingly made to Brunei and to United States, Taiwan and New Zealand. In the case of Sabah Shell Petroleum Company, their crude oils are marketed to Japan and the United States of America.

Since Mobil and British Petroleum purchase petroleum products rather than crude from Shell as a result of the processing arrangements earlier, there was no actual sales made to third party outside the Shell Group.

CHAPTER 7

THE STRUCTURE OF THE PETROLEUM PRODUCT MARKET

Having discussed the economics of the operations of the petroleum industry in the upstream (production of crude oil) and mid-stream (refining), it remains now to examine the operations of the industry in the downstream stage. This chapter will examine the competitive behaviour of the industry in the market place in terms of the marketing networks of the various oil companies and their interrelationships, product profile of these companies, their market channels, their sales volume and market shares, the competition posed by new competitors or entries into the market and co-ordination of supplies and output by 'hospitality' arrangement between companies leaving the discussion on crude oil and product pricing in Malaysia in the next two chapters.

7.1 Regional Consumption of Petroleum Products

The total petroleum products consumption for Peninsula Malaysia, East Malaysia and Total Malaysia are compiled from the annual sales figures of the various marketing companies in Malaysia. Table 7.1 gives a 6-year record of the consumption of petroleum products by the principal marketing regions of Peninsula Malaysia and East Malaysia and Malaysia in total. It is interesting to note that the consumption of petroleum products in Peninsula shows an increasing trend

TABLE 7.1: MALAYSIA - REGIONAL CONSUMPTION OF PETROLEUM PRODUCTS 1971-1976 (IN MILLION BARRELS)

	1971			1972			1973			1974			1975			1976		
	PM	EM	M	PM	EM	M	PM	EM	M	PM	EM	M	PM	EM	M	PM	EM	M
LPG	0.4	0.05	0.45	0.4	0.06	0.46	0.7	0.07	0.77	0.6	0.40	1.0	0.6	0.10	0.70	0.7	0.10	0.80
MOGAS	3.1	0.61	3.71	3.5	0.66	4.16	4.2	0.73	4.93	4.8	0.78	5.58	5.5	0.82	6.32	5.5	1.00	6.50
AVIATION FUEL	0.8	0.17	0.97	0.8	0.21	1.01	1.0	0.22	1.22	1.2	0.25	1.45	1.4	0.26	1.66	1.4	0.30	1.70
KEROSENE	1.4	0.25	1.65	1.5	0.27	1.77	1.6	0.30	1.90	1.7	0.32	2.02	1.8	0.36	2.16	1.9	0.40	2.30
DIESEL OIL	8.7	1.22	9.92	9.4	1.40	10.80	10.0	1.58	11.58	10.3	1.84	12.14	10.7	1.97	12.67	10.8	2.00	12.80
FUEL OIL	8.0	0.35	8.35	8.9	0.37	9.27	9.9	0.42	10.32	11.1	0.49	11.59	11.9	0.57	12.47	13.2	0.47	13.67
BITUMEN	0.4	0.1	0.50	0.5	0.10	0.60	0.5	0.09	0.59	0.5	0.10	0.60	0.5	0.10	0.60	0.5	0.10	0.60
LUBRICANTS	0.1	0.08	0.18	0.1	0.08	0.18	0.1	0.09	0.19	0.1	0.07	0.17	0.1	0.08	0.18	0.2	0.09	0.29
TOTAL CONSUMPTION	22.9	2.83	25.73	25.1	4.15	29.25	28.0	3.50	31.50	30.3	4.25	34.55	32.5	4.26	36.76	34.2	4.46	38.66
RATE OF GROWTH %				9.6	46.6	13.7	11.6	-15.7	7.7	8.2	21.4	9.7	1.3	0.24	6.4	5.2	4.7	5.20

Source: Compiled from date supplied by various oil companies through private communications.

Notation: PM = Peninsula or West Malaysia; EM = East Malaysia; M = Malaysia from 23 million barrels in 1971 to 34 million barrels in 1976; in the case of East Malaysia, the consumption too shows an increasing trend (except in 1973) from 2.8 million barrels in 1971 to 4.5 million barrels in 1976. This gives an overall increase for Malaysia around 13 million barrels from the past 6 years or an average of just over 2 million barrels per annum.

The share of petroleum products by region over the period as shown in Table 7.2 indicates that between 92 to 97 percent of all petroleum products are consumed in the more developed region - Peninsula Malaysia - and the rest in the less-developed region - East Malaysia. The share has not changed very much over the last 6 year period.

If market shares by products are considered, the biggest share of consumption has been diesel oil and fuel oil in Peninsula Malaysia and diesel oil and motor gasoline in the case of East Malaysia. In Table 7.3, diesel oil and fuel oil account for between 32 to 38 percent and petroleum products as a whole account for between 35 to 39 percent in consumption in Peninsula Malaysia. Over the same period, East Malaysia consumes 43 to 45 percent in diesel and fuel oils and between 21 to 22 percent in aggregate petroleum products. From this data it is of interest to note that the petroleum demand in both the regions of Peninsula Malaysia and East Malaysia is characterised by the relatively large consumption of diesel oil in both, fuel oil in Peninsula

TABLE 7.2: MALAYSIA - MARKET SHARES OF PETROLEUM PRODUCTS BY REGIONS 1971-1976 (IN %)

	1971			1972			1973			1974			1975			1976		
	PM	EM	M	PM	EM	M	PM	EM	M	PM	EM	M	PM	EM	M	PM	EM	M
LPG	88.9	11.1	100.0	87.0	23.0	100.0	91.0	9.0	100.0	60.0	40.0	100.0	85.7	14.3	100.0	87.5	12.5	100.0
MOGAS	83.6	16.4	100.0	84.1	15.9	100.0	85.2	14.8	100.0	86.0	14.0	100.0	87.0	13.0	100.0	84.6	15.4	100.0
AVIATION FUEL	82.5	17.5	100.0	79.2	20.8	100.0	82.0	18.0	100.0	82.8	17.2	100.0	84.3	15.7	100.0	82.4	17.6	100.0
KEROSENE	84.8	15.2	100.0	84.7	15.3	100.0	84.2	15.8	100.0	84.2	15.8	100.0	83.3	16.7	100.0	82.6	17.4	100.0
DIESEL OIL	87.7	12.3	100.0	87.0	13.0	100.0	86.4	13.6	100.0	84.8	15.2	100.0	84.5	15.5	100.0	84.4	15.6	100.0
FUEL OIL	95.8	4.2	100.0	96.0	4.0	100.0	96.0	4.0	100.0	95.8	4.2	100.0	95.4	4.6	100.0	96.6	3.4	100.0
BITUMEN	80.0	20.0	100.0	83.3	16.7	100.0	84.7	15.3	100.0	83.3	16.7	100.0	83.3	16.7	100.0	83.3	16.7	100.0
LUBRICANTS	55.6	44.4	100.0	55.6	44.4	100.0	52.6	47.4	100.0	58.8	41.2	100.0	55.6	44.4	100.0	69.0	31.0	100.0

Source: Calculated from Table 7.1 earlier.

TABLE 7.3: MALAYSIA - MARKET SHARES BY PRODUCTS 1971-1976 (IN %)

REGION	1971			1972			1973			1974			1975			1976		
PRODUCTS	PM	EM	M	PM	EM	M	PM	EM	M	PM	EM	M	PM	EM	M	PM	EM	M
LPG	1.6	1.7	1.6	1.9	1.9	1.9	2.2	2.1	2.2	2.3	2.3	2.3	2.2	2.3	2.2	2.0	2.2	2.1
MOGAS	14.1	21.4	14.9	14.4	21.1	15.1	15.0	21.0	15.6	15.6	19.4	16.1	16.7	19.0	16.9	16.0	22.4	16.8
AVIATION FUEL	3.1	6.1	3.4	3.0	6.6	3.3	3.6	6.4	3.9	3.8	6.4	4.1	4.1	6.1	4.4	4.1	6.7	4.4
KEROSENE	6.2	9.1	6.5	6.0	8.5	6.3	5.8	8.4	6.1	5.7	8.1	6.0	5.8	8.5	6.1	5.5	9.0	6.0
DIESEL OIL	37.5	43.0	37.1	36.6	44.5	37.5	35.1	45.1	36.3	33.4	46.4	34.9	32.6	46.4	34.1	31.5	44.8	33.0
FUEL OIL	34.6	12.4	32.1	35.0	11.8	32.5	35.0	11.8	32.5	36.6	12.4	33.8	36.3	13.4	33.7	38.5	10.5	35.3
BITUMEN	1.9	3.6	2.1	2.0	3.1	2.1	2.0	2.5	2.0	1.5	2.6	1.6	1.3	2.3	1.5	1.5	2.2	1.5
LUBRICANTS	1.0	2.7	1.3	1.1	2.5	1.3	1.3	2.7	1.4	1.1	2.4	1.2	1.0	2.0	1.1	0.6	2.0	0.7

Source: Calculated from data in Table 7.1 earlier.

Malaysia and motorgasoline in East Malaysia. This reflects the trend in dieselization, the requirements for electricity generation and petroleum demand for transportation fuels respectively. The high demand for these fuels especially for electricity generation results from the position of natural gas in the market which is not made available at present in Malaysia.

7.2 Oil Marketing Companies in Malaysia

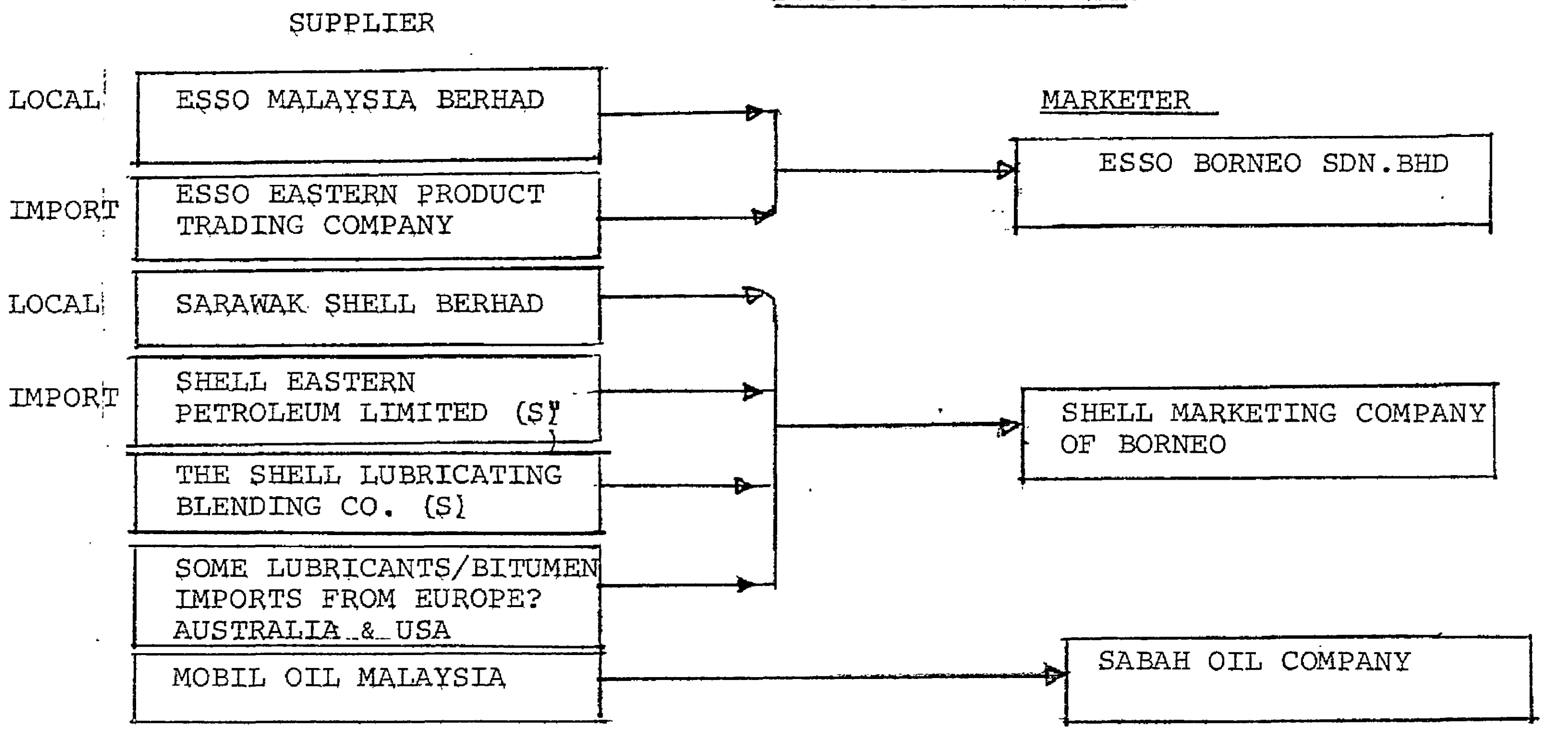
There are eight oil product marketing companies in Malaysia - 5 in Peninsula Malaysia and 3 in East Malaysia. Shell Malaya Trading, Esso, Mobil, British Petroleum and Caltex operate in mainland Malaysia while Shell Borneo, Esso Borneo and Sabah Oil operate in East Malaysian states of Sabah and Sarawak. The marketing network of these companies are shown in Figure 7.1 and 7.2.

Shell Refining Company supplies their products mostly to their affiliates the Shell Malaya Trading, Mobil Oil and British Petroleum - the latter two companies being the result of processing arrangement which started sometime in 1975 and 1976 respectively.[1] At the same time these 3 companies also rely for some of the products for their markets from imports from their affiliate refineries in Singapore.

Esso Malaysia Berhad is 'self-sufficient' in products for their market from their supplier the Esso Refinery.

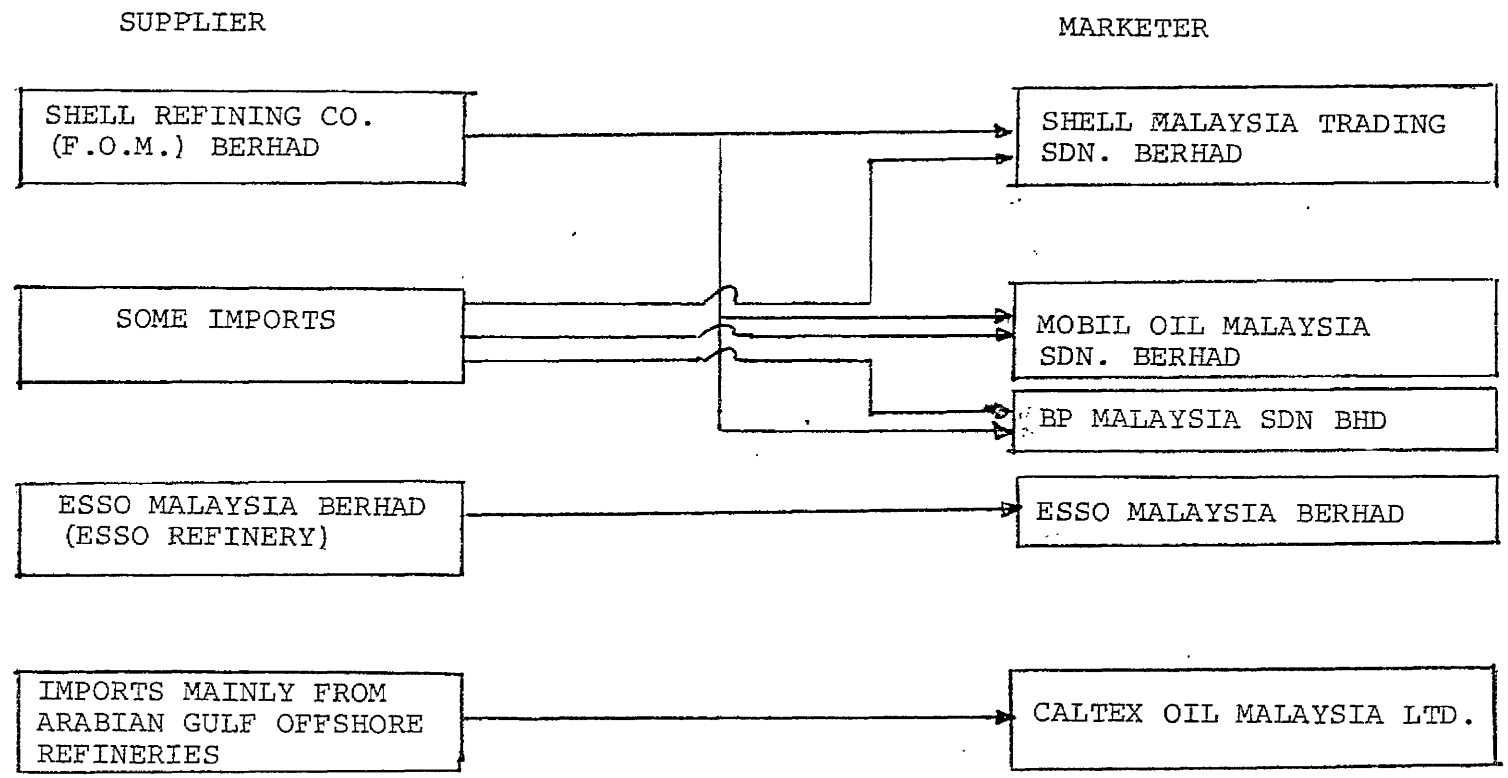
1. Private communication with Shell Refining Company (Malaya)

FIGURE 7.1 : MARKETING NETWORK OF OIL COMPANIES IN SABAH AND SARAWAK



Source: Information obtained from Private communications with PETRONAS

FIGURE 7.2 : MARKETING NETWORK OF OIL COMPANIES PENINSULA MALAYSIA



Source: Information obtained from private communications with PETRONAS

Before 1977, Caltex obtained their supplies wholly from their affiliate refineries in the Persian Gulf, but currently they do buy some of their products from Esso Refinery whenever there are surplus production.[2] However, the relationship shown in the network does not give the maximum product decided by the companies, and from time to time they enter into hospitality arrangements amongst them as will be discussed later.

In the case of East Malaysia, Esso Borneo and Shell Marketing Borneo obtain their supplies from their affiliates in the mainland and from overseas sources. Sabah Oil Company, owned by the Kwok Brothers, obtains its supplies[3] from Mobil Oil in Peninsula Malaysia.

7.3 Product Profile of Oil Companies and Their Market Classifications

Table 7.4 shows the various petroleum products marketed by the oil companies in Malaysia. The two big companies - Shell Malaya Trading and Shell Borneo on the one hand and Esso Malaysia Bernad on the other - market almost all the products in both the markets of Peninsula and East Malaysia. In the case of smaller companies Mobil, British Petroleum, Caltex and Sabah Oil market a limited number of products primarily because they are small in terms of capital investment and market share and in the case of Sabah Oil, their operations are managed by locally - managed business.

2 Private communication with Caltex Oil Malaysia.

3 Private communicatiom with Mobil Oil Malaysia Berhad.

TABLE 7.4 PETROLEUM PRODUCTS PROFILE OF OIL COMPANIES IN MALAYSIA

PRODUCT CATEGORY	PENINSULA MALAYSIA					SABAH AND SARAWAK		
	SHELL	ESSO	MOBIL	B.P.	CALTEX	SHELL	ESSO	SABAH OIL
LPG	X	X	X	X	–	X	X	–
PREMIUM MOGAS	X	X	X	X	X	X	X	X
REGULAR MOGAS	X	X	X	X	X	X	X	X
AVIATION GASOLINE	X					X		
AVIATION TURBINE FUEL	X	X	–	X	–	X	–	–
KEROSINE	X	X	X	X	X	X	X	X
AUTOMOTIVE DIESEL OIL	X	X	X	X	X	X	X	X
INDUSTRIAL DIESEL OIL	X	X	X	X	X	X	X	–
MARINE DIESEL OIL	X	X	–	X	–	X	–	–
FUEL OIL	X	X	X	X	X	X	–	–
BITUMEN	X	X	–	–	–	X	–	–
LUBRICANT	X	X	X	X	X	X	X	X

Source: Private communications with the oil companies concerned.

X Product is marketed by the oil company concerned

Product is not marketed by the oil company concerned.

However, ideally an oil company's product objectives are customer - oriented. Oil companies in Malaysia try to maintain a wide product range which can meet the needs of the consumer and industrial markets and simultaneously provide them with the required market. The oil companies' basic lines are made up of gas, gasoline, kerosene, gas oil, fuel oil, lubricating oil and petroleum residue or "bottom". The petroleum products marketed by each company is shown in Table 7.4.

The structure of the petroleum product market is basically divided into 2 : The Retail Market and the Non-Retail or Industrial Market. Although the objectives of the oil companies in the various markets are the same i.e. to sell their products and make as much profits as possible, there are salient features of differences between them.

The Retail or Customers Market, is aimed at the final consumers or public or some established customers who buy in small quantities rather than in bulk. The products developed are standard products for general usage such as motogasoline, kerosene and liquified petroleum gas.

The Non-Retail or Industrial market are confined or aimed at marketing products to industrial buyers which include the private commercial sectors, the government and quasi-government institutions which require the maintenance of a multi-product line and product varieties. In meeting the requirements of industrial market, two perspectives are viewed by the oil companies namely developing 'custom' products - products which are strictly based on customers' orders and specifications and secondly, developing 'standard' products for general application which are also used by retailers.

The most important characteristic of the industrial market is the relatively small number of buyers compared with the final consumer market. In addition to concentration by size, industrial markets are characterised by concentration in particular areas. Also the size of many industrial establishments makes the buying function extremely important.

Owing to the different stages of development, the industrial market in West Malaysia is larger compared to that of East Malaysia. The industrial market can be classified into 5 according to relevant buyer groups which include the Government Market, the Defence Market, the Commercial Sector, the Competitors' Sales Market and the Export Sales Market.

The Government market is the largest customer of all. The Federal and State governments buy almost all classes of petroleum products from oil companies. Government departments' purchases are made through either long-term or short-term contracts as well as through sporadic, occasional purchases.

The Ministry of Defence which monopolises the Defence market requirements purchases many classes of petroleum products especially aviation fuels. Local market sales direct to end-users or the Commercial Market includes sales to commercial and industrial accounts such as rubber, electrical and cement factories, steel mills, tin-mines and others. The Competitors' Sales Market, on the other hand, include sales of products amongst oil companies and other private large marketers. The demand from this market is infrequent depending on such occasions as when competitors run out of supplies (due to an increase in demand for products) for their terminal depots or service stations. Lastly, the Export Sales market are sales of products made by an oil company to a buyer outside the affiliates marketing areas e.g. Esso sales of asphalt and lubricants to Indonesia and Africa. The orders are mostly spot requests; the purchase volume for shipment has to be reasonably larger in order to justify the freight and insurance charges incurred during the shipment.

Table 7.5 gives the retail and non-retail[4] market configuration for petroleum products in Peninsula Malaysia. The Retail market accounts for only 28% compared the Non-retail market of 72%. The Government sector in the Non-Retail market is the biggest with 36.8% of all petroleum products followed by Industrial and Reseller sector of 34.1%.

---

4. For simplication, the inland Non-Retail markets for Peninsula Malaysia are divided into 3 categories as opposed to 5 in our discussion elsewhere earlier.

TABLE 7.5: RETAIL AND NON-RETAIL MARKET CONFIGURATION FOR PETROLEUM PRODUCTS IN PENINSULA MALAYSIA IN 1976 (IN '000 BARRELS)

PRODUCTS	RETAIL		NON - RETAIL						TOTAL MARKET
			INDUSTRIAL RESELLER		GOVERNMENT		MILITARY		
	QTY.	%	QTY.	%	QTY.	%	QTY.	%	QTY.
AVIATION GASOLINE	-	-	-	-	27.0	100.0	-	-	27.0
AVIATION TURBINE FUEL	-	-	-	-	1302.7	92.7	102.0	7.3	1404.7
KEROSENE	805.2	42.2	1083.0	56.7	20.5	1.1	0.6		1909.3
FUEL OIL	-	-	3575.6	27.3	9538.0	72.7	6.3		13119.9
MOTOR GASOLINE - PREMIUM	3927.9	94.3	90.2	2.2	91.3	2.2	57.2	1.3	4166.6
MOTOR GASOLINE - REGULAR	1241.0	83.8	40.6	2.7	107.8	7.3	91.0	6.2	1480.4
MOTOR GASOLINE - TOTAL	5168.9	91.5	130.8	2.3	199.1	3.5	148.2	2.6	5647.0
DIESEL OILS - AUTOMOTIVE	2970.7	29.3	6283.6	62.0	825.0	8.1	54.0	0.6	10133.3
DIESEL OILS - INDUSTRIAL	-	-	240.7	45.0	295.0	55.0	-	-	535.7
DIESEL OILS - TOTAL	2970.7	27.8	6524.3	61.2	1120.0	10.5	54.0	0.5	10669.0
LIQUIFIED PETROLEUM GAS	630.0	82.7	102.1	13.4	19.0	2.5	10.4	1.4	761.5
LUBRICANTS & OTHERS	-	-	191.3	39.3	295.2	60.7	-	-	486.5
TOTAL	9574.8	28.1	11607.1	34.1	12521.5	36.8	321.5	1.0	34024.9

Source: Private communications with Oil Companies.

7.4 Market Shares of Oil Companies

The structure of the market for petroleum products is characterised by an oligopolistic pattern of competition as there are only 5 firms marketing petroleum products in Malaysia. R. Armey defined oligopoly as "The oligopoly is imperfectly competitive with respect to all market criteria. To begin with, the oligopoly market is one in which there are a few sellers.....The test of fewness is that the number must be so small and each seller must be so large relative to the market that each seller is overly aware of interdependence between himself and the sellers...The oligopolist has considerable price discretion, but only with the competitive response to his pricing practices by other firms in the industry"[5].

The key feature in this type of market is that of recognition of interdependence amongst sellers. Each oligopolist realises that changes in pricing, advertising, product characteristics, etc., may stimulate responses by the rivals. And since competition amongst the 5 oil companies is very keen and the Malaysian market being not very large, the market shares amongst the marketing companies have not changed very much since the last seven years. Furthermore, with the present policy of the government of free

---

5. Armey R.K., Price Theory - A policy & Welfare Approach, Prentice Hall New Jersey, 1977 p. 305.

enterprise, it is unlikely that now competitors will enter the industry (except for a brief period between 1972 and 1973 by Singapore Petroleum Company of Singapore and Summit Petroleum Company of Thailand), and making the already stiff competition more unpleasant. However, the state oil company, PETRONAS, is making a move to enter the market sometime in 1979.

Up to 1960, Shell and Standard Vacuum Oil Company shared the petroleum market in Malaysia;being the only two companies in existence then. Shell being the earliest to arrive in the oil marketing scene after World War II was the leader and had an overall controlling share of 80% of the market, the remainder being by Standard Vacuum. After the dissolution of the partnership of Standard Vacuum between Scony-Mobil and Standard Oil of New Jersey in 1962, the Standard Vacuum operations in Malaya then was taken by Standard Oil Co. of New Jersey later known as Esso Standard Malaysia Berhad (ESMB). Subsequently, the market share of Standard Vacuum Oil Co. was transferred to Standard Oil Co. or Esso.

At about the same time in 1962, Caltex Oil Co. entered into the Malaysian market and a small part of Shells' and Esso's shares were gained by the newcomer. Shell still maintained the lead with around 75% of the market, Esso obtained most of the remaining 25% and the remainder went to Caltex. In 1966, however, Shell experienced a drop in its market share by about 15% from 75% while Esso managed to increase its share from some 20% to 28% and Caltex from 5% to 12%. By then British Petroleum and Mobil (the offshoot of Scony-Mobil earlier), two newcomers into the oil marketing scene in 1962 and 1963 respectively, had made their impact by sharing a small portion of the market. They gained from the other 2 companies. This resulted in further erosion of Shell's share of the market.

The annual sales of petroleum products by the various marketing companies in Malaysia from 1971 to 1976 are made available by the individual marketing companies. (There exists some discrepencies between the totals of Table 7.1 earlier and the Tables 7.6, 7.8 and 7.10 of Sales of Petroleum Products in Peninsular Malaysia and East Malaysia due to the process of rounding).

Table 7.6 shows that Shell and Esso has the biggest sales of petroleum products over the period considered with the former increasing its sale from 10 million barrels in 1971 to 14 million barrels in 1976 and the latter from 7.6 million barrels in 1971 to 11.5 million barrels in 1976. The three other companies of British Petroleum, Mobil and Caltex share between them 5.4 million barrels in 1971 and 8.4 million barrels in 1976. In Table 7.7 Shell and Esso share between them 75.5% to 76.6% while the rest of the market were shared amongst the 3 other companies. This is because both the companies are well entrenched in the market

TABLE 7.6 SALES OF PETROLEUM PRODUCTS IN PENINSULA MALAYSIA BY COMPANIES - 1971 TO 1976 (IN MILLION BBLS)

	1971					1972					1973				
	S	E	BP	M	C	S	E	BP	M	C	S	E	BP	M	C
LPG	0.2	0.2	*	*	-	0.2	0.2	*	*	-	0.2	0.3	0.1	0.1	-
MOGAS	1.4	0.9	0.2	0.2	0.4	1.6	1.1	0.3	0.3	0.5	1.9	1.1	0.3	0.3	0.6
AVIATION FUEL	0.5	0.2	0.1	-	-	0.5	0.2	0.1	-	-	0.6	0.2	0.2	-	-
KEROSENE	0.5	0.3	0.2	0.2	0.2	0.6	0.3	0.2	0.2	0.2	0.6	0.3	0.2	0.2	0.3
DIESEL OIL	3.7	1.6	1.1	1.1	1.2	4.1	1.5	1.1	1.4	1.3	4.3	1.6	1.2	1.4	1.5
FUEL OIL	3.4	4.2	0.2	0.2	*	3.7	4.8	0.1	0.3	*	3.9	5.4	0.2	0.4	*
BITUMEN	0.2	0.2	-	-	-	0.3	0.2	-	-	-	0.3	0.2	-	-	-
LUBRICANTS	0.1	+	+	*	+	0.1	+	*	+		0.1	-	-	-	-
TOTAL**	10.1	7.6	1.8	1.7	1.9	11.0	8.4	2.0	2.2	2.0	12.0	9.2	2.3	2.3	2.4

Source: Private Communications with the Various Oil Companies

Notation: S = Shell; E = Esso; BP = British Petroleum; M = Mobil; C = Caltex

* Less than 100,000 barrels.

** Totals not equal because of the process of rounding.

Continuation on next page

1974					1975					1976				
S	E	BP	M	C	S	E	BP	M	C	S	E	BP	M	C
0.3	0.3	+	+	–	0.3	0.3	+	+	–	0.3	0.3	*	0.1	–
2.3	1.2	0.4	0.3	0.6	2.5	1.5	0.4	0.4	0.7	2.6	1.4	0.4	0.4	0.7
0.7	0.2	0.3	–	–	0.8	0.3	0.3	–	–	0.8	0.3	0.3	–	–
0.7	0.4	0.2	0.2	0.2	0.7	0.5	0.2	0.2	0.2	0.7	0.5	0.2	0.2	0.3
4.5	1.7	1.2	1.4	1.5	4.9	1.9	1.3	1.2	1.4	4.7	2.2	1.2	1.3	1.4
4.4	6.2	0.1	0.4	*	4.6	6.4	0.3	0.5	0.1	4.9	6.5	0.8	0.8	0.2
0.3	0.2	–	–	–	0.3	0.2				0.3	0.2	–	–	–
0.1	*	–	+	*	0.1	*	+	*	–	0.1	0.1	*	*	*
13.2	10.2	2.4	2.4	2.4	14.1	11.1	2.5	2.4	2.6	14.4	11.5	2.9	2.9	2.6

TABLE 7.7 MARKET SHARES BY COMPANIES IN PENINSULA MALAYSIA 1971 TO 1976 (IN %)

	1971					1972					1973				
	S	E	BP	M	C	S	E	BP	M	C	S	E	BP	M	C
LPG	46.9	41.9	1.0	10.2	-	39.7	39.2	9.2	11.9	-	37.3	39.7	11.1	11.9	-
MOGAS	44.0	29.0	6.7	6.9	13.4	42.7	29.9	7.3	7.2	12.9	45.1	25.8	8.1	7.3	13.7
AVIATION FUEL	66.7	22.3	11.0	-	-	65.1	21.7	13.2	-	-	60.1	21.0	18.9	-	-
KEROSENE	36.5	20.7	15.3	13.1	14.4	36.8	21.2	15.2	12.8	14.0	36.8	20.5	14.4	11.6	16.7
DIESEL OIL	43.2	18.1	12.3	13.0	13.4	43.4	16.0	12.2	14.5	13.9	43.4	15.9	12.1	13.8	14.8
FUEL OIL	42.9	52.5	2.4	1.9	0.3	41.2	53.7	1.6	3.2	0.3	39.6	54.6	1.6	3.5	0.7
BITUMEN	55.6	44.0	-	-	-	57.3	42.7	-	-	-	57.5	42.5	-	-	-
LUBRICANTS	42.1	22.6	15.6	9.2	10.5	50.9	22.9	16.7	9.2	10.3	37.1	25.2	17.2	9.4	11.1
TOTAL	43.8	32.8	7.8	7.6	8.0	43.0	32.7	7.7	8.6	8.0	42.6	32.5	8.0	8.3	8.6

Source: Data derived from Table 7.7

continuation on next page.

TABLE 7.7. (Cont.)

-2-

1974					1975					1976				
S	E	BP	M	C	S	E	BP	M	C	S	E	BP	M	C
36.1	41.2	10.9	11.8	-	35.9	41.3	10.2	12.6	-	40.5	40.5	5.5	13.5	-
47.2	25.5	7.4	7.0	12.9	46.1	27.0	7.2	7.3	12.4	47.2	25.5	7.3	7.3	12.7
59.1	17.3	23.6	-	-	60.7	19.3	20.0	-	-	57.0	28.5	28.5	-	-
39.8	22.6	12.6	11.0	14.0	39.8	25.8	11.8	10.0	12.6	36.8	26.3	10.5	10.5	15.8
44.0	16.3	12.2	13.3	14.2	45.8	17.7	11.8	11.5	13.2	43.5	20.4	11.1	12.0	13.0
39.1	55.2	1.3	3.8	0.6	38.4	54.2	2.1	4.1	1.2	37.1	49.2	6.1	6.1	1.5
57.4	42.6	-	-	-	57.5	42.5	-	-	-	60.0	40.0	-	-	-
39.2	26.4	17.5	9.0	7.9	42.0	20.4	19.3	9.2	9.1	31.3	31.3	12.6	12.6	12.2
43.0	33.4	7.8	7.9	7.9	43.4	33.9	7.7	7.4	7.6	42.0	33.5	8.5	8.5	7.6

compared to other oil companies owing to their earlier entries into the market and therefore possess extensive depot networks (as in Chapter 6 earlier) and marketing channels (as in the subsequent section).

In the case of East Malaysia, there are 2 main oil marketing companies - Shell Borneo and Esso Borneo. (The third company Sabah Oil is a very small company compared to the two companies earlier).

As shown in Table 7.8, Shell's sales is around 2 million barrels in 1971 and increased by 56% to just over 3 million barrels in 1976. Esso's sales increased by 62% to about 1.2 million barrels in 1976 from its 1971 level of around 0.7 million barrels. Shell's share is around 3 times that of Esso as shown in Table 7.9 and this trend has not changed very much over the years.

Table 7.10 gives the total sales of products by companies in Malaysia over the 6-year period. In the overall Malaysia Sale's figures, Shell and Esso maintained their strong position (from a sale of 20 million barrels in 1971 to 30 million barrels in 1976) compared to the other companies (whose sales increased from only 5.4 million barrels in 1971 to 8.4 million barrels in 1976) owing to their entrenchment in the market in Peninsula Malaysia and their monopolistic position in the East Malaysian market. Both the companies account for about 79% of the Malaysian market both in 1971 and

TABLE 7.8: SALES OF PETROLEUM PRODUCTS IN EAST MALAYSIA BY COMPANIES 1971 TO 1976 (IN MILLION BARRELS)

	1971		1972		1973		1974		1975		1976	
	S	E	S	E	S	E	S	E	S	E	S	E
LPG	0.03	0.02	0.04	0.02	0.04	0.03	0.06	0.04	0.06	0.04	0.07	0.0
MOGAS	0.38	0.23	0.42	0.24	0.46	0.27	0.48	0.29	0.52	0.30	0.60	0.4
AVIATION FUEL	0.17	-	0.21	*	0.22	-	0.25	-	0.26	-	0.30	-
KEROSENE	0.13	0.12	0.15	0.12	0.16	0.14	0.18	0.14	0.22	0.14	0.25	0.1
DIESEL OIL	0.88	0.34	1.03	0.37	1.14	0.44	1.32	0.52	1.43	0.54	1.44	0.5
FUEL OIL	0.35	-	0.37	-	0.42	-	0.49	-	0.57	-	0.47	-
BITUMEN	0.10	-	0.10	-	0.09	-	0.10	-	0.10	-	0.10	-
LUBRICANTS	0.06	0.02	0.06	0.02	0.07	0.02	0.07	0.02	0.06	0.02	0.07	0.0
TOTAL	2.11	0.72	2.36	0.78	2.61	0.90	2.95	1.01	3.22	1.04	3.30	1.1

Source: Private communications with the various Oil Companies.

TABLE 7. 9 MARKET SHARES BY COMPANIES IN EAST MALAYSIA 1971 TO 1976 (IN %)

	1971		1972		1973		1974		1975		1976	
	S	E	S	E	S	E	S	E	S	E	S	E
LPG	64.1	35.9	60.5	39.5	59.4	40.6	59.9	40.1	61.6	38.4	63.6	36.
MOGAS	62.7	37.3	63.2	36.8	62.9	37.1	62.6	37.4	63.6	36.4	60.0	40.
AVIATION FUEL	100.0	-	99.5	0.5	100.0	-	100.0	-	100.0	-	100.0	-
KEROSENE	53.7	46.3	54.3	45.7	53.8	46.2	56.7	43.3	61.0	39.0	62.5	37.
DIESEL OIL	72.4	27.6	73.5	26.5	72.4	27.6	71.8	28.2	72.5	27.5	72.0	28.
FUEL OIL	100.0	-	100.0	-	100.0	-	100.0	-	100.0	-	100.0	-
BITUMEN	100.0	-	100.0	-	100.0	-	100.0	-	100.0	-	100.0	-
LUBRICANT	73.6	26.4	74.9	25.1	74.9	25.1	74.1	25.9	74.5	25.5	77.8	22.
TOTAL	74.6	25.4	75.1	24.9	74.3	25.7	74.6	25.4	75.6	24.4	73.8	26.

Source: Data derived from Table 7.9

TABLE 7.10 SALE OF PETROLEUM PRODUCTS BY COMPANIES IN MALAYSIA 1971 TO 1976 (IN MILLION BARRELS)

	1971			1972			1973			1974			1975			1976		
	PM	EM	M	PM	EM	M	PM	EM	M	PM	EM	M	PM	EM	M	PM	EM	M
SHELL	10.1	1.9	12.0	11.0	2.1	13.1	12.0	2.4	12.4	13.2	3.0	16.2	14.1	3.2	17.3	14.4	2.76	17.1
ESSO	7.6	0.7	8.3	8.4	0.7	9.1	9.2	0.8	10.0	10.2	1.0	11.2	11.1	1.0	12.1	11.5	1.17	12.6
MOBIL	1.7	-	1.7	2.2	-	2.2	2.3	-	2.3	2.4	-	2.4	2.4	-	2.4	2.9	-	2.9
B.P.	1.8	-	1.8	2.0	-	2.0	2.3	-	2.3	2.4	-	2.4	2.5	-	2.5	2.9	-	2.9
CALTEX	1.9	-	1.9	2.0	-	2.0	2.4	-	2.4	2.4	-	2.4	2.5	-	2.5	2.6	-	2.6
TOTAL	23.1	2.6	25.7	25.6	2.8	28.4	28.2	3.2	31.4	30.6	4.0	34.6	32.6	4.2	36.8	34.3	3.93	38.2

Source: Private communication with various Oil Companies.

1976. The market shares of the oil companies in Malaysia are graphed in Figure 7.3.

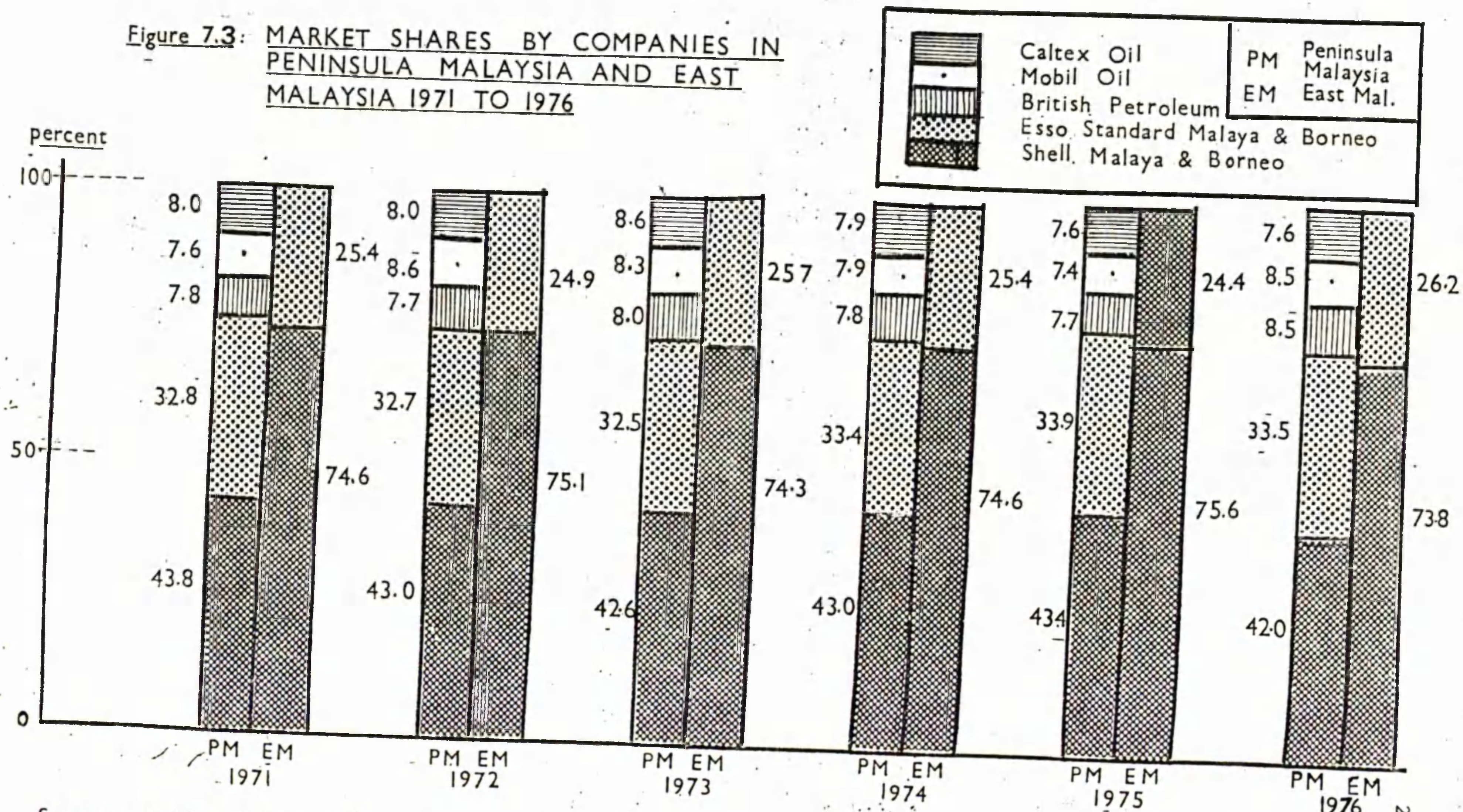
7.5 Competitive Structure in Product Marketing Channels

Petrol companies acquire strings of garages and petrol station with an object of creating tied outlets selling their products. No petrol company could expect to market petrol except perhaps in most unfavourable circumstances unless it controlled a group of petrol stations. The competition for petrol stations and sites became severe with the establishment of the 2 refineries in Peninsula Malaysia in the early 1960's.

The owner of land acquired by the oil company to build its station would be given a licence to operate the service station . The oil company builds the filling stations and supplies all the machinery and pumps. The filling station will then buy oil from the supplying company and sell it at fixed prices recommended by the company.

The rental structure of petrol stations owned by the owner-operator varies from company to company and over the years. The degree of variation reflects the competitiveness of the motor-gasoline business in Malaysia. As far back as the 1960's when the change in ownership structure of filling stations was adopted by oil companies, the rental charges for all filling stations in Malaysia had been fixed at a basic

Figure 7.3: MARKET SHARES BY COMPANIES IN PENINSULA MALAYSIA AND EAST MALAYSIA 1971 TO 1976



Source: Tables 7.6 and 7.8.

rate of $100 per month. However, it is the nature of their set-up that rental differs from company to company. Esso and Caltex, for instance, have the same rental structure with regard to service stations - $390 per month for a one-bay station and $390 per month for a two-bay station.[6] In addition Esso stipulates that for any additional bay after that, a rental payment of $80 per month is levied. However, British Petroleum based their rental according to the duration of operation of the filling station's business. The rental varies from $100 for the first month to $200 in the second month and to $300 in the third and subsequent months However, British Petroleum followed Shell's set-up by revising their policy on new service stations operating after 1966 with a flat rental rate of $300 per month on filling stations and $450 per month on service-stations but later charged a flat rate of $450 a month.[7]

Besides the strategy of different rental charges on filling and service stations earlier, oil companies' rental policy are also based on the monthly volume of throughput. This is to encourage indirectly sales volume by penalising low sales volume. For all companies, for the first 10,000 gallons of sales, the owner-operator has to pay the oil company $0.029 ¢ per Imperial Gallon (I.G.) as gallonage charge; the second 10,000 gallons of sales is reduced to $0.015 to 0.0125 ¢ per I.G. and the third 10,000 gallons at $.01 ¢ per I.G. and on subsequent gallons.[8]

6 Private communications with Esso and Caltex (Malaysia)
7 Private communications with British Petroleum (Malaysia)
8 Private communications with Shell Malaya Trading Berhad.

Another competitive strategy adopted by oil companies in Malaysia as anywhere else in the world in order to induce sales through their service-station operators is by giving commissions which again vary from company to company. The commissions vary from ∅0.145 ¢ to 0.175 ¢ /1.G. for premium mogas, ∅0.125 to ∅0.155/1.G. for regular mogas and ∅0.08 ¢ /1.G. for automotive diesel oil.[9]

Keen competition over years has forced the oil companies, however, to change their strategies and policies towards their agents or operators. In the middle of 1969 for instance, Esso gave rental reduction of 20% for all service stations in Kuala Lumpur area. In the middle of 1976, however, Esso revised their rental policy and currently base it on monthly volume of throughput. In the past, Esso dealers were charged fixed rentals based on locations. The rates levied in their new rental policy affected their rural and urban network of service and filling stations differently. In the Urban service station network, the rental is ∅0.15 ¢ /1.G. on premium mogas, ∅0.12½ ¢ /1.G. on regular mogas and automotive diesel oil, as compared to ∅0.10 ¢ /1.G. on all mogas (premium and regular) and ∅0.05 ¢ /1.G. on automotive diesel oil in the rural areas. In regard to filling station in both urban and rural areas, they are levied at ∅0.07½ ¢ /1.G. on all mogas and ∅0.02½ ¢ /1.G. on automotive diesel oil. And in enforcing the new rental policy, Esso has also revised their margins for the dealers as follows: premium mogas from ∅0.14½ ¢/1G to $0.17 ¢ /1G; regular mogas from

9 ibid

$0.12½ ¢/1G to $0.13½ ¢/1G, and automotive diesel oil from $0.07½¢/1G. to $0.06 ¢ /1G. on base volumes and thereafter $0.04 ¢ /1G. on volume in excess of the base.[10]

The degree of competitiveness amongst the oil companies can be seen by examining the rate of growth of retail outlets over the years from 1965 to 1976.

The figures in the Table 7.11 show that prior to 1972, there was no attempt on the part of the oil company to disaggregate the figures into Peninsula Malaysia and Singapore where the latter was classified as if it is part of the states of Peninsula Malaysia.

Before the disaggregation in 1971 it is found that there were 804 service stations, 340 filling station and 209 kerb pumps in Malaysia and Singapore. In terms of proportions, service-stations predominate with 59% of the total, followed by filling stations with 25% and kerb-pump with 15.5%. Cross-section analysis by companies show that Shell has the highest number of the 3 types of stations with 685 (or 50%), Esso with 299 (or 22%) and Caltex, British Petroleum made up the remainder.

From the above analysis, it can be generalised that the reason for the predominance of the service station category over others has been the facilities provided by their modern technology and equipment to motorists. The kerb

10 Esso, op.cit.

TABLE 7.11: OIL COMPANIES RETAIL OUTLETS FOR GASOLINE IN PENINSULA MALAYSIA 1965-1976 (selected years)

	1965				1967				1969				1972				1974				1976				%
	SS	FS	KP	T	SS	FS	KP	T	SS	FS	KP	T	SS	FS	KP	T	SS	FS	KP	T	SS	FS	KP	T	
SHELL	174	195	184	553	265	226	181	672	269	246	181	696	226	191	145	562	233	190	141	564	408	19	139	566	49.
ESSO	123	77	77	277	167	101	54	322	171	104	58	333	145	73	36	254	145	72	36	253	204	10	33	247	21.
CALTEX	91	18	18	127	120	32	7	159	130	33	11	174	122	36	8	166	123	35	8	166	154	6	20	180	15.
B.P.	-	-	-	-	44	2	-	46	63	5	-	68	62	4	-	66	66	4	-	70	72	-	-	72	6.
MOBIL	4	-	-	4	85	4	-	89	90	3	-	93	69	3	-	72	77	3	-	80	72	9	-	81	7.
TOTAL (NOS)	392	290	279	961	681	365	242	1288	732	391	250	1364	624	307	189	1120	644	304	185	1133	910	44	192	1146	100
%													55.7	27.4	16.9	100	56.2	26.8	16.3	100	79.4	3.8	16.8	100	

Source: Private communications with Oil Companies.

SS = Service Stations; FS = Filling Stations; KP = Kerb Pumps.

pumps, however, have declined in popularity and their remnants are found in the outlying rural areas and in some small establishments in the cities and small towns in Malaysia. No new kerb pumps have been installed in the last six years as evidenced by kurb pump figures in 1969 and 1972. In fact the numbers have been decreasing which go to show that oil companies are not interested in building this type of facilities any more except to maintain the existing ones only. On the other hand, service stations have been showing rapid increases over the years. However, in the second case earlier, it is easy to see the reason why Shell and Esso predominate in the additional or increasing petrol station investments as they are the biggest marketing companies in Malaysia and Singapore.

After the figure for Peninsula Malaysia and Singapore started to be separated,Shell still maintained the lead with 50% of all petrol pump stations, Esso at around 25% and the remainder are shared amongst the 3 other companies with Caltex owning about half of it.

If the growth figures are considered, then the results are more spectacular. The growth of service-stations over the past five years has been almost 50% as compared to filling stations where growth has been negative. The growth of kerb stations has been fluctuating but its number has showed a slight growth. The growth in the service stations reflects the increase in mogas diesel and kerosene consumption over the years and the competitiveness amongst oil companies in increasing their shares of the market in these products. The slight growth in the kerb pumps especially in rural towns and outlying areas also reflects the increasing trend of consumption in the rural areas. The decrease in the number of petrol filling stations has been replaced by the more modern service stations earlier.

7.6 Hospitality Arrangement between Oil Companies

An oligoplistic industry such as the oil industry is consistent with a variety of behaviour. The firm in the industry may be in competition with one another. There may be strong rivalries amongst them in pricing, advertisement and quality of products produced. They may obtain from a competitive course of action and decide together for the pursuit of a unified policy. It is difficult to predict, whether or not in a given country, in actual practice a competitive or collusive policy would be followed by firms operating under oligopolistic conditions.

In a situation such as that in Malaysia where a few big oil companies rule the market, and they are bound together in varying degrees of interlocking relationships, anti-competitive agreements can easily be reached.

In an effort to avoid 'excessive' competition they form an agreement between themselves - which in the industry is known as 'hospitality' arrangements. Hospitality here means a loose form of arrangement or 'contract' out of a long-established understanding. The firms or oil companies may come into agreements for one year and subject to renewal and there need not be any commitment in black and white but mere understanding.

According to one oil company source , hospitality arrangements made between oil companies dated about ten years back. The main reason behind such arrangement, was that a) the scale of operations of most companies except Shell was small, before the '60s. As their market shares and sales volume grew with the increase in consumption in the country, it was untenable for small oil companies mostly the non-refiners or importers to be individualistic and continue to import their supplies from sources outside the country. The smaller oil importing companies approached Shell for hospitality arrangements. The arrangement benefited both the companies. The smaller companies could get their supplies at sources nearer their market and Shell could dispose off the excess products from their refinery. The other reason for the conclusion of the agreement was that the smaller companies did not have storage depots in mainland Malaysia. On the other hand, being well entrenched in the business in Malaysia, Shell has depots well in excess of their needs to enable them to rent out to other oil companies. As the market volume for smaller oil companies increased, they entered into agreement with Shell for use of their depots.

The loose 'contractual' arrangement between oil companies take many forms: it can either be a 'borrow and loan' type of arrangement or that of direct sales. Whatever form it may take these type of arrangement have basically two aims:

a) one company helps the other in times of emergency, i.e. in terms of 'surplus' and deficit' of crude oil or products in relation to their refinery capacity in the case of the former and market sales in the case of the latter.

b) companies try to optimise supply and distribution facilities and sometimes in terms of saving transport costs when markets are scattered over a wide area.

On a very small and odd occasion, an oil company draws its emergency supply to meet its market requirements from its competitor's refinery. The company makes direct sales on the spot to the oil company by selling the products below market price. But in most times they charge at the prevailing market price. A well known hospitality arrangement was between Shell Marketing Company and Esso Standard Malaya in the latter part of 1960s. Although at that time both have refineries in the mainland Malaysia, they entered into 'spot' hospitality of 'borrow' and 'loan' in terms of petrol, kerosene and gas oil to help each other out when they run into trouble of shortage.

Up to the present time Mobil Oil has no refinery in mainland Malaysia. This is because Mobil has the smallest market share in Malaysia. It entered a processing deal with Shell sometime in the middle of 1975, to process 6,000 barrels a day of crude oil. For the services rendered, Shell receives an equivalent value of Arabian Light crude credited to their Bukom refinery in Singapore in addition to levying a fee of USO. 40 ¢ per barrel. This formal and written arrangement between Shell and Mobil is called the 'International Crude Exchanges'.

As a result of the processing arrangement above, Mobil has an entitlement of a certain volume of finished products at Port Dickson Shell Refinery. However, in recent years Mobil entered into another hospitality arrangement with Shell at Kuantan and Kuala Trengganu (two towns on the east of mainland Malaysia) and Bagan Luar in Penang. For these products Mobil gets its account debited by Shell from their entitlement in their processing deal mentioned earlier. For example Shell gives Mobil 10 tons at Kuantan and for this Mobil's entitlement of 10 tons will be less at Port Dickson.

Like Mobil earlier, recently British Petroleum entered into processing arrangement with Shell sometime in October 1976. British Petroleum draws the supply for its east coastal market from Shell depots in Kuantan for which it gets its entitlement debited at Port Dickson by Shell.

Some oil companies operate under the system of product exchanges, the specific aim of which is to minimise coastal tanker shipments by the elimination of cross-hauling. A good case for this type of arrangement is that between Shell and Esso. In this type of arrangement Esso Batu Pahat takes Shell products from Shell depot Batu Pahat for the Johore market. This is because if Esso were to supply south Johore from Port Dickson by road it would a) not be economical and efficient to do so, b) incur a long haul for the products and thus expensive and c) would be better to continue with the past source of supply from Singapore. Shell has an oil supply depot at Batu Pahat and Shell supplies Esso its products and charges Esso throughput fees on year to year basis. Shell charges Esso at Batu Pahat a) jetty fee at Port Dickson of $1.70 ¢ per ton, b) sea freight to Batu Pahat at $7.85 ¢ per ton and c) depot throughput fee at 2.4 ¢ per IG. In return Esso Port Dickson terminal pays hospitality volume by giving back to Shell via rail to Kuala Lumpur at their Brickfields installation for Kuala Lumpur Shell market. Such arrangements are also seen between Caltex and Esso and British Petroleum and Caltex.

Sometimes smaller companies make hospitality arrangements between themselves. In 1971, Mobil Oil Company negotiated with Caltex Oil on exchange agreements at Sandakan, Tawau, Lahad Datu and Kota Kinabalu. - all in Sabah. Caltex wanted to obtain Mobil's hospitality from their "scow" (a flat bottomed boat) and land facilities at Sandakan in exchange for hospitality from their landing craft and shore skid tanks at Tawau. At that time Caltex was trying to acquire land for their proposed depot in Tawau and use their Sandakan depot facilities for exchange hospitality with Mobil. At Lahad Datu, Sabah Oil (a 'subsidiary' of Mobil Oil) indicated their willingness to build the depot and give throughput to Caltex and at the same time agreed on replenishment by Caltex ex Philippines at Lahad Datu. Mobil, however, could not commit their hospitality at Kota Kinabalu as they were awaiting permanent land for the storage depots to be made available.

In the case of the first one, Mobil at first turned down Caltex's request for hospitality ex Mobil Sandakan scow and motor barge. The reason was because Mobil was unable to accommodate the products in their scow. However, later they agreed to have hospitality arrangements with Caltex at a monthly rate of $2,000/-. In the second case, however, Mobil agreed to 100% throughput for Caltex at Tawau in exchange for hospitality at their land tank facility at an increased throughput fee - from 1½ ¢ to 2½ ¢ per I.G.

Hospitality arrangements is not defined only to petroleum products; liquified petroleum gas (LPG) is also added to the list of petroleum products that come under this type of arrangement.

In the case of LPG, Esso draws its LPG from Shell Lutong Refinery and from Shell's Sandakan, (Sabah) and Kuching (Sarawak) depots for its East Malaysian market, and in return Esso returns LPG ex their Port Dickson refinery or Bukom refinery in Singapore to Shell. Esso takes from Shell depots in the two towns mentioned at 'nominal' price. In this case, Esso pays Shell a small fee in terms of transport cost and overhead charges.

7.7 New Competition and the Rise and Fall of the "Independent" Marketers

There are three distinct stages provided by the "independent" markets which to some extent poses severe competition to the relatively 'stable' (in terms of price) petroleum product market in the 1970's in Malaysia. The stages which we will consider here are, their rise and entry, their activities and their fall and exit out of the market.

7.7.1 Their Rise and Entry Into the Market

In the early part of the chapter, it has been mentioned that there are 5 oil marketing companies in Peninsula Malaysia and 3 in East Malaysia. But over the years mass marketing of petroleum products has been constantly subject to change - and notably the entry of new participants or the rise of "independent" marketers.

Towards the end of March 1973, there was a rumour in the Malaysian oil market that a Thai Petroleum Company namely SUMMIT was planning to market kerosene and LPG in the North of Peninsula Malaysia. In April of the same year, Caltex Oil Company confirmed the rumour and expressed concern about the matter.

At about the same time, Singapore government-sponsored SINGAPORE PETROLEUM COMPANY also entered the oil market and was ferrying kerosene from their refinery in Singapore into the southern part of Peninsula Malaysia (Johore and Malacca areas).

It was reported in the oil circles at that time that Summit would be carting their petroleum products between Songkhla in Thailand and northwestern states of Malaysia (Perlis and Kedah) via Chungloon (in Thailand). They would be setting up storage facilities in Province Wellesley in the state of Penang. Later Summit also intended to store and sell gas oil, automotive diesel oil and other petroleum products.

What concerned the oil companies operating in Malaysia most was that the kerosene market in the north Peninsula Malaysian area had been quite stable with regard to price and their market shares (which earlier had been plagued by price instability and price undercuting and stiff competition). The entry of Summit in the northwestern market would therefore disrupt the market balance for kerosene there. The oil circles were also informed that Summit would be ferrying diesoline besides kerosene into the market and the diesoline was to come from Singora in Thailand via Chungloon. They had also appointed a transport company and an agent to prepare their entry into the market.

Summit officially entered into the northwestern Peninsula Malaysia market towards the end of May, 1973.

The selling price of diesoline in Kedah area at that time was 2 ¢ /IG, higher than in South Thailand. Diesoline net-back price to Bagan Luar installation (the nearest depot in north of Peninsula Malaysia) was 40 ¢/I.G. for Consumer Sales and 43 ¢ /I.G. for Reseller market. This could be the strong reason for Summit to enter their kerosene and diesel oil into the Malaysian market.

The buoyant petroleum product market at that time prompted Singapore petroleum Company (SPC) to enter into the Malaysian market at about the same time as Summit. In fact SPC had made arrangements with Summit earlier whereby SPC would be handling bulk sales while Summit continue to handle retail sales. However, owing to some delay, SPC entered the Malaysian market 5 months later (sometime in early September 1973) at the same time as they entered their home market in Singapore. They had appointed dealers and a transport company in the Johore area - the state bordering Singapore.

7.7.2 The Activities of the Independent Marketers

Four months after they started business in Peninsula Malaysia, Summit had been expanding their market of kerosene and diesel oil as far as Penang and Perak (two states bordering west and south of Perlis and Kedah). Summit was offering kerosene in Kedah at net-delivered price of 61 ¢ /I.G. below the other oil companies except Mobil. In addition Summit indicated that they would consider giving laddered discounts for volumes of sales ranging from 1 ¢ /I.G. for the first 10,000 gallons up to 5 ¢ /I.G. for sales above 60,000 gallons.[10]

SPC's marketing strategy was aimed at marine diesel oil resale market on the east coast of Johore State in which they expected to sell about 60,000 I.G. per month. To achieve this target, SPC adopted a compaign of aggressive solicitation through price cutting in Johore by offering ADO at 63 ¢ / I.G. to Reseller's market. At the same time, SPC had started to market kerosene in Johore and Malacca, with an estimated monthly volume of 20,000 I.G. Their continued 'dumping' of automotive diesel oil and soliciting from all companies' distributors and service station dealers in Johore paid handsomely.[11]

As a result of their entries and activities in the Peninsula Malaysian market in the north and south, the price pressures offered by these new competitors affected

---

10 - 11 From Monthly Market Report of an Oil Company (confidential information)

most oil companies' sales to distributors as these new companies were seducing oil distribution in the areas affected from their old sources to that of theirs by offering attractive prices and terms.

7.7.3 Their Fall and Exit

Towards the end of 1973 and the beginning of 1974, Singapore Petroleum Company was badly hit by the Arab Oil Embargo and oil price hikes. They found themselves short of kerosene for the supply to their customers in the Johore area. By the month of March, 1974, SPC was reported to have notified their customers of their intention to discontinue selling kerosene and ADO in the Malaysian market at current prices as it had become uncompetitive for them.

Owing to the oil price hikes followed by the control of prices of kerosene and diesel by the Malaysian Government through the Control of Supplies Act of 1961, the Summit Oil Company of Thailand also withdrew from the north Peninsula Malaysian Market in the early part of 1974. It was more profitable for them to divert marketing activities back to Thailand where gas oil and kerosene commanded higher preimum than in Malaysia.

In respect to the nature of competition in the petroleum industry in Malaysia, we can conclude that this is far from "perfect". As in every other market situation, the "perfect" market with its characteristics of large number of sellers, homogenous product, mobility of factors and widespread of information is as lacking as in any other market situations. Actually there are relatively small numbers of oil marketing firms (oligopolists) in each market, so that the actitivities of any one affect the others. Moreover, in some instances, strong preferences develop for certain brands over others. Buyers and sellers (particularly the latter), do not flow in and out of the industry in the manner predicted in a competitive model. There is a fair degree of freedom of entry by competitors at distribution levels in the petroleum industry (Caltex, BP and Mobil in the 60's and Summit and SPC in the 70's). This takes the form of "invaders" from another market in the neighbouring countries. On the other hand, while intensive competition exists in the industry at various levels, some collusive activities (product exchanges, buy and loan policies and to some extent, price-making) may exist in certain markets from time to time.

It should be pointed out that Malaysia has no antitrust laws (like the Sherman Anti Trust Laws or the Clayton Act) controlling the degree of monopoly activities in industries such as that in the United States. With the problem of prices, supplies and hoarding of products (including petroleum) especially during and after the oil crisis of 1973, the Government has implemented the Control of Supplies Act of 1961 in 1974 to include the control on supplies and prices of petroleum products in Malaysia. However, there is no law or legislation to control active competition and collusive activities amongst the oil companies per se. With the passing of the Petroleum Development Act of 1974 (to be discussed fully in Chapter 9), the Government has established PETRONAS, the State Oil Company. PETRONAS was given the responsibility to take charge of all matters related to petroleum and vested into it not only the exclusive right to explore and extract oil within the country, but also the right to undertake and control all downstream activities including activities related to petroleum and its products. In compliance with the TMP and the NEP objectives, the Government through the Petroleum Development Act may "impose" conditions on the oil marketing companies of Malay participation in the distribution and marketing activities of the oil companies in line with the objectives of the NEP discussed earlier in the Introductory chapter.

CHAPTER 8

MARKETING PRACTICES AND PRICES OF IMPORTED AND DOMESTIC CRUDE OILS

8.1 Supply Arrangements of Imported Crude Oils to Malaysian Refineries

With the growth in inland consumption of petroleum products in Malaysia (then Malaya) after the Second World War, two refineries were established in Peninsula Malaysia beside the already existing Lutong refinery in Sarawak in West Malaysia. (This has already been discussed in detail in Chapter 5 earlier). As a result of the refinery agreements concluded in 1962 between the Malaysian government and the refineries concerned - Shell Refinery Malaysia and Esso Standard Malaya Berhad (formerly Standard Vacuum Oil Company) - the question of crude oil sources and prices became increasingly important. Since Malaysia produces a small percentage of her crude oil requirements from the Sarawak Miri fields (mostly used in the Lutong Refinery and a small proportion by the Shell Refinery in the mainland Malaysia, the rest for exports), her refining industry is heavily dependent on imports. Out of a total of 33.4 million barrels of crude oil used as throughputs in Malaysian refineries in 1976 only about 11.6 million barrels or 34.8 percent were supplied by domestic sources while the rest 21.8 million barrels or 65.2 percent from imports from the Persian Gulf area.

Except for the Lutong refinery in Sarawak which are totally based on domestic crude, the two refineries in Peninsula Malaysia were set up under refinery contracts between the Malaysian government and foreign oil companies. Each of these agreements contained provisions concerning the supply and price of imported crude oils. The agreements signed in 1962 with the two oil companies of Shell and Esso gave the companies freedom of choice as to the source of supply of crude oil and exempted the crude oil from import duties. As in the case of India,[1] the Malaysian refinery agreements did not make any reference to price although the crude was expected to originate in the Persian Gulf (See Appendix 5A). By implication, this was expected to be based on the posted prices of crude oils in the Persian Gulf although the 2 agreements gave priority to the use of domestic crudes in the refineries. Like the Indian Refinery agreements, each of these refiners is tied to a supplier or a number of suppliers and there is no option for the purchase of crude from the world market at competitive prices[2]. Since the crude supplying companies themselves are producers of crude in large amounts in the nearby Persian Gulf area, and since these arrangements were concluded at the time of the setting-up of the refineries and on a continuing basis, they are likely to continue for a long period.

---

1. Dasgupta, B. op.cit. p. 184
2. Dasgupta, B. ibid. p. 185

To feed or supply the refineries crude purchases are made on forward forecasts subject to confirmation within 30 days of actual receipts. These supply arrangements are made through their affiliated companies. In the case of Shell Refinery such arrangements are made through Shell Petroleum International in London to supply their Kuwait and Miri crudes (See Figures 8.1 and 8.2 in Appendix 8A) and in the case of Arab crudes for Esso Refinery through Esso Headquarters in Houston, Texas. These parties are not the original suppliers or producers. In both the cases, the procurement of crude oil is arranged by the oil companies headquarters through one or more intermediaries in the Persian Gulf and in Sarawak. Since the domestic refining companies do not have access to the original producers/ suppliers of crude oil and remittances of foreign exchange are settled by them on the basis of the invoices of their intermediate consignors, who are not the original producers or suppliers of crude oil, it is difficult to know precisely what transpires between the original producers or suppliers and the intermediate consignors and how their relations are governed in regard to remuneration and transactions passing through their hands. Whatever it may be, the intermediate consignors render the important services of finding a suitable source of supply at competitive prices, arrangement of shipping, payment to suppliers, billing amounts payable by the final consignors and short-term financing on behalf of the purchaser.

8.2 The Price of Imported and Domestic Crude Oils to Malaysian Refineries

8.2.1 Before the Oil Crisis

There are in general three different prices for crude oil: the transfer price, the market price and the posted price.

The largest part of oil production in the Eastern Hemisphere is controlled (except in Libya and Algeria) by the international majors[3] which have developed highly integrated operations including exploration, production, transportation, refining and marketing through various affiliates. The large part of this production (85 percent) is disposed of through integrated channels i.e. it never changes hands but passed from one affiliate to another (it is also the price at which crude oil is invoiced from producing affiliates to refining affiliates). Prices shown at such levels of transfer i.e. transfer price cannot be explained or justified by conventional economic considerations since they are insulated from

---

3. The 7 International majors are: Standard Oil Company (New Jersey)(EXXON), Socony-Vacuum Oil Company (now MOBIL), Gulf Oil Corporation (GULF), Texas Comapny (TEXACO) ,Standard Oil Company of California (SOCAL), British Petroleum Company (BP) and Shell Transport and Trading (SHELL).

the free competitive forces of market transactions[4]. The remaining 15 percent of crude production is sold in so-called "arm's length" transactions to third parties under the competitive conditions of supply and demand in a free market. Price effectively represents the commercial level at which ownership changes hands. They are usually called realised or market prices but their real significance and level can be blurred by non-price discounts[5]. Such non-integrated oil is produced and sold by both independent producers and the major oil companies. Posted price of an integrated oil company is, however, the 'public offering price by the seller, f.o.b. port of origin'. The posted prices for crude oil in the Middle East by the major oil companies before 1959 were not subject to the freeplay of the forces of demand and supply. Very little of crude oil was

4. The level of transfer prices is determined to maximise the company's consolidated net profits because of the different tax systems where affiliates are domiciled. Integrated oil companies "allocate overhead costs among their foreign branches, subsidiaries and affiliates, and adjust their transfer prices, in order to reduce their total tax outlays". See Penrose, E.T. THE LARGE INTERNATIONAL FIRM IN A DEVELOPING COUNTRIES, George Allen and Unwin 1968, London, 1968, p.43.

5. Non-price discounts include freight concessions, tied loans at favourable interest rates, generous terms of delivery and terms of payment, buy-back commitments, technical assistance and favourable currency treatment. See Rifai, T. THE PRICING OF CRUDE OIL (N.Y.: Praeger Publishers, 1974), p.33.

"sold" at posted prices as most of them were absorbed in the integrated network of the major oil companies at internal bookkeeping prices or transfer prices. The very few cases where crude oil sold was at posted prices involving independent oil companies who bought crude from the majors for their refinery operations. Until 1959 the posted prices were used as internal prices at which the producing affiliates of a major company transferred their crude oil to the refinery affiliates. But to the oil-producing countries, the posted price is the most important price since it serves as a bench mark or indicators designed to determine their revenues or the tax liability of the oil companies at the production stage. The main function of the posted price, therefore, was to serve as tax reference prices for both the producing countries and the oil companies in calculating the government oil revenues under the 50:50 profit-sharing arrangement. There are different posted prices for crudes: depending upon distances from the major markets and technical factors such as sulphur content and gravity of oil.

From the beginning of the operations of the two refineries, the refinery agreement provided price of crude oils to these refineries to be calculated on the basis of import parity formula with the Persian Gulf posted price as its base, AFRA ocean freight and other incidental charges being added to the Persian Gulf posted price. That is to say the purchase price of the crude oils was the suppliers' export price to the market from time to time at the ports of loading on the date the vessel commenced to load. The suppliers gave a discount which vary from time to time on supplies of their crude oils.[6]. Although there emerged a number of non-major crude suppliers in the market in competition with that of the majors in the early 1960's which in itself was an important factor in reducing the price of crude oil but this can be felt more in the markets where the refiners were independent companies than the majors. In a captive market, where the entire refining capacity is owned by the major oil companies, the competition in the crude oil market is not exploited by the local refiners since the latter were supplied with crude by their own parent establishments at prices dictated by their central organizations. In Malaysia, where

6. Before 1959 there was generally no discount available on f.o.b. crude prices in the Middle East, although there was evidence of discounts allowed on c.i.f. prices by way of reduced ocean freights, or allowances based on quantity purchased. See Dasgupta, B. op.cit, p. 187.

100 percent of the refining capacity isowned by the major oil companies, the pressure of competition did not operate here. This is because of the vertically and horizontally-integrated nature of the oil industry - the relation between an affiliate (Shell Refining Company) and its parent company (ROYAL DUTCH SHELL) resulted in the refineries in Malaysia, their immediate consignors, and crude oil suppliers all are a part of one and the same corporate organisation.

8.2.2 After The Oil Crisis

The advent of the profit-sharing agreement under the 50:50 arrangement introduced a new element in the relationship between the producing countries and the oil companies. Producing countries revenues depended not on fixed royalties alone as under the concessionary system but on oil price as well. They received half the difference between posted price of oil and its cost of production. However, even under this arrangement, the international majors could influence the amount of oil revenues to the oil-producing countries by changing the selling price of crude. The Organisation of Petroleum Exporting Countries (OPEC) was established by the major oil-producing countries in 1960 to prevent unilateral price reductions by the oil companies, and, if possible, to raise oil prices and thus increase government oil revenues. When OPEC was established there were five founding members - Iran, Iraq, Kuwait, Saudi Arabia and Venezuela - and they were joined later by 6 other countries: Qatar (1961), Indonesia and Libya (1962), Abu Dhabi (1967), Algeria (1969), Nigeria (1971), Ecuador and Gabon (1974) and United Arab Emirates (1974).

Up to 1970, the world oil industry had been operating on the basis of a modus vivendi between oil companies and OPEC members. Even though the posted prices were not reduced by the oil companies, the market prices of oil were largely determined by supply and demand, only the oil companies dictate the amount of oil to be produced. However, during the early 1970s, the international oil industry underwent drastic political and economic changes due to 3 main factors: (1) global price inflation in the late 1960s while oil prices remained constant, (2) rising nationalism among oil producing countries and (3) the Arab-Israeli conflict.(7) The oil crisis beginning in 1973 manifested itself in the dramatic increases in the prices of crude oil - imported and domestic - used as throughputs in the Malaysian refineries and subsequently shaped a new price structure for petroleum products in the country. To

7. Jacoby, N.H. MULTINATIONAL OIL (New York: Macmillan Publishing Co., 1974), p.27.

appreciate this development, the background of the crisis and its consequences on the prices of crude oil consumed in Malaysia are first discussed.

The oil crisis in 1973 precipitated by the Tehran and Tripoli Agreements which were signed by the Organisation of Petroleum Exporting Countries (OPEC) on February 14, 1971 and February 23, 1971 respectively. They were agreements made to settle matters relating to oil from the Arabian Gulf in the first instant and matters relating to Mediterranean crude in the second instant. However, the balanced situation achieved in Tehran and Tripoli was threatened by the United States decision to revoke the convertibility of the dollar on August 15, 1971[8]. This decision which amounted to defacto devaluation of the dollar, reduced the purchasing power of the oil exporting countries whose posted prices were in US dollars.

In the 25th OPEC Conference held in Beirut in September 1971, the Arab producing countries demanded the reopening of talks with the oil companies on the question of compensation and the immediate opening of renegotiations aimed at obtaining an effective share in the oil concession.

---

8. Park, Y.S. OIL MONEY AND THE WORLD ECONOMY, Wilton House Publications, London, 1976, p.22.

The Geneva Agreement on January 20, 1972 resulted in the posted price to increase by 8.5 percent. However, the increase in posted prices was not retroactive. It came into force on January 20, 1972 and provided no compensation for losses suffered during the five months since August 15, 1971.[9]

The US $ was devalued for the second time in February 1973. This devaluation led to producing countries to attempt to question the adjustments adopted in Geneva. Algeria, Venezuela and Indonesia decided on unilateral action to change their posted prices in relation to the damage suffered. The other OPEC countries and the international oil companies negotiated. The new Geneva Agreement (amended), signed on June 20, 1973 in Geneva, envisaged an immediate increase of 11.9 percent in posted prices in order to compensate for the second devaluation of the dollar and an amendment to the revision formula. This second Geneva Agreement still hold the disadvantage of compensating countries which had suffered different losses in identical manner. This led to another revision in posted prices in January 1, 1974.

9: Park, Y.S., ibid., p.22.

In the meantime crude free on board (f.o.b.) costs have been affected by 2 major developments since the previous price adjustment in 1973. Firstly, the change in posted prices made OPEC effective on January 1, 1974 correspondingly increased royalty/tax payments to producing states. For Arab Light Crude, the posted price increases from US $ 5.03¢ per barrel to US $ 11.651¢ per barrel with a resultant increase of US $ 4.01¢ per barrel in royalty/tax payments. And for Kuwait crude oil, its posting increased from US $ 4.822¢ per barrel to US $ 11.555¢ per barrel. At that time participation issue was still unresolved with provisional f.o.b. price US $ 8.25¢ per barrel subject to retroactivity. Sarawak's Miri Crude (Malaysia) increased from US $ 6.00 per barrel f.o.b. to US $ 10.80¢ per barrel f.o.b.[10]. Secondly, the change was the result of the ultimatum made by the producing states to revise terms of "participation" agreements signed in December 1972. These agreements provided that Gulf producing states will acquire 25% equity participation in oil production in 1973 to be increased progressively to 51% by 1982 and that certain portions of "participation" crude will be sold back to oil companies at specified prices. Producing states were then demanding that their equity participation entitlement share increase to 60% from

---

10. Information from Shell Trading Malaya Berhad.

January 1, 1974, and that the price of "participation" crude to be sold back to oil companies to at least 93% of the posted price or higher.

Revision in Government participation in Kuwait was then in the process of ratification by the Kuwaiti Parliament. Producing states also insisted that the changes in participation agreements retroactive to January 1, 1974. These demands substantially raised the cost of "participation" crude oil and oil companies were compelled to buy a major part of crude oil at these higher prices in order to be able to continue supplies to existing consumers.

As a result of these developments, the f.o.b. cost Arab Light which is the crude diet of Esso Port Dickson refinery in Peninsula Malaysia was increased to US $ 8.32¢ per barrel on an interim basis and a further increases of between US $1 to $2 per barrel.[11] The real price of US $ 9.00 per barrel, which was retroactive to January 1, 1974 was expected when participation terms were finalised. At that time, indications were that the Arab Light Crude cost f.o.b. effective January 1, 1974 would settle at about US $ 9.65¢ per barrel. However, in February 1974, the Kuwaiti Government obtained

11. Information from ESSO Malaya Sendirian Berhad.

from the international oil companies an increase in its equity share of oil from the 1972 Participation Agreement level of 25% to 60%. As a result of this, the f.o.b. cost of Kuwait crude, which is the Shell's Port Dickson refinery main diet, had been retroactively adjusted from US $ 8.25¢ to US $ 8.68¢ per barrel effective from January 1, 1974 to March 12, 1974[12]. In addition, effective from March 13, 1974 Kuwait crude was increased from US $ 8.68¢ to US $9.43¢ per barrel. Sarawak's Miri crude used in conjunction with Kuwait crude in the Shell refinery at Port Dickson remained unchanged at US $ 10.80¢ per barrel. However, the Sarawak crude increased to US $ 11.70¢ per barrel f.o.b. on April 1, 1974[13].

Crude prices contined to rise throughout 1974 reflecting the constantly changing and increasingly costly terms and conditions imposed by OPEC producing governments. Arab Light crude was increased retroactively to US $ 9.00 per barrel as of January 1. 1974 and subsequently increased throughout 1974 to reach US $ 10.46¢ per barrel by November 1974. The Kuwait Government increased royalty rate on crude from 12.5 percent to 14.5 percent resulting in the f.o.b. price to increase from US $ 9.43¢ to US $ 9.58¢ per barrel on July 9, 1974. Sarawak crude was increased from US $ 11.70¢ per barrel to US $ 12.60¢

12. Information from Shell Malaya Trading Berhad.

13. ibid.

per barrel on July 1, 1974. Three months later, Kuwait increased royalty rate from 14.5 percent to 16.67 per cent and income tax from 55 per cent to 65.75 percent. As a result of this f.o.b. price of Kuwait crude was increased to US $ 10.03¢ per barrel on October 1, 1974. Sarawak crude remain unchanged at US $ 12.60¢ per barrel. However, in November 1974, posted price of Kuwait crude decreased from US $ 11.545¢ per barrel to US $ 11.145¢ per barrel but royalty was increased to 20 percent and income tax increased to 85 percent. The f.o.b. price of Kuwait crude was increased from US $ 10.03¢ to US $ 10.36¢ per barrel on November 14, 1974 as a result.

In a move away from posted prices, OPEC announced in January 1975 a nine month price freeze with Kuwait crude as a "net price" of US $ 10.36¢ per barrel with Arab Light "Marker" crude at corresponding level of US $ 10.46¢ per barrel. Sarawak crude average export price fell from US $ 12.60¢ to US $ 12.35¢ per barrel with narrowing of quality differentials world-wide and slack demand.[14] And towards the end of the first quarter in April 1975 there was an erosion of light quality crude prices worldwide. The average price of Sarawak crude was falling to US $ 11.95¢ per barrel but average price of the crude rose to US $12.01¢ per barrel towards the middle of second quarter in July.

14. Information from Shell Malaya Trading.

Towards the end of the first quarter in April 1975 there was an erosion of light quality crude prices worldwide. With an average price of Sarawak crude falling to US \$ 11.95¢ per barrel but average price of crude rose to US \$ 12.01¢ per barrel towards the middle of second quarter in July 1975[15].

At the expiry of the 9 months price increase, OPEC announced a 10 percent increase in the price of Arabian Light Marker crude, the new price to be frozen for a further 9 months until June 1976. The price of other crudes were negotiated seperately between the producers and the oil companies with some changes in quality differentials. In the case of Kuwait crude, a firm invoice price of US \$ 11.30¢ per barrel was advised by the Shell Company from Malaysia's suppliers effective October 1, 1975. The average price of Sarawak crude was increased to US \$ 12.50¢ per barrel.

The first crude cost increase in 1977 was the result of the 48th Congress meeting at Doha on December 17, 1976 where Saudi Arabia and the United Arab Emirates increased their prices by 5 percent and 11 other members agreed to an increase of 10 percent plus an additional 5 percent six months later in July 1977. This meant that Arab Light Marker crude oil increased from US \$ 11.51¢ to US \$ 12.08¢ per

15. ibid

barrel (5 percent group), Kuwait from US \$ 11.23¢ to US \$ 12.42¢ per barrel (10 percent group) and Iranian Light from US \$ 11.62¢ to US \$ 12.81¢ per barrel (10 percent group). Malaysia, although not a member of OPEC, also increased its Miri Light crude from US \$ 12.59¢ to US \$ 13.85¢ per barrel - an increase of 10 percent from its January 1977 level.[16]

The changes in crude prices internationally affect the prices of crudes imported by the refineries in Malaysia. The changes in the prices of the main crude oil imports into Malaysia namely Arabian Light crude, Kuwait crude and domestic Miri Light crudes are shown in Table 8. 1 and is graphed in Figure 8.1. And as crude oil is internationally traded and Malaysia consumes about two thirds of its crude oil needs from import sources, international events discussed earlier have not escaped their influences on the structure of petroleum product prices in Malaysia. The impact of the oil price hikes earlier on the petroleum product prices and the national economy in shaping a new price structure for petroleum products will be discussed in the next Chapter.

16. ibid.

TABLE 8.1: CRUDE OIL COST INCREASES IN MALAYSIA from December 1972 to July 1977 (selected dates)

EFFECTIVE DATE	EXCHANGE RATE M $/US	IN US $ / bbl.			IN M $ / bbl.			AVERAGE PRICE (APPROXIMAT		
		ARABIAN LIGHT	KUWAIT	MIRI LIGHT CRUDE	ARABIAN LIGHT	KUWAIT	MIRI LIGHT CRUDE	YEAR	MIRI LIGHT	ARAB LIGHT CRUDE
1.2.72	2.8200	1.91	1.83	2.70	5.39	5.16	7.61			
16.10.73	2.4000	4.10	-	-	9.84	-	-			
1.11.73	2.3130	-	3.94	6.00	-	9.11	13.88	1973	4.10	3.78
1.1.74	2.4720	8.75	8.68	10.80	21.63	21.46	26.70			
9.7.74	2.4260	9.65	9.58	12.60	23.41	23.24	30.57	1974	11.98	10.80
1.10.74	2.4243	10.10	10.03	12.60	24.49	24.32	30.55			
14.10.74	2.4180	10.46	10.03	12.60	25.29	24.25	30.47			
1.10.75	2.5655	11.51	11.30	12.50	29.53	28.99	32.07	1975	12.17	10.99
1.1.77	2.5390	12.09	12.37	13.85	30.70	31.41	35.17	1976	12.66	11.51
1.7.77	2.4895	12.70	12.30	14.25	31.62	30.62	25.48	1977	13.95	12.09

Source: Shell Malaysia Trading Berhad.

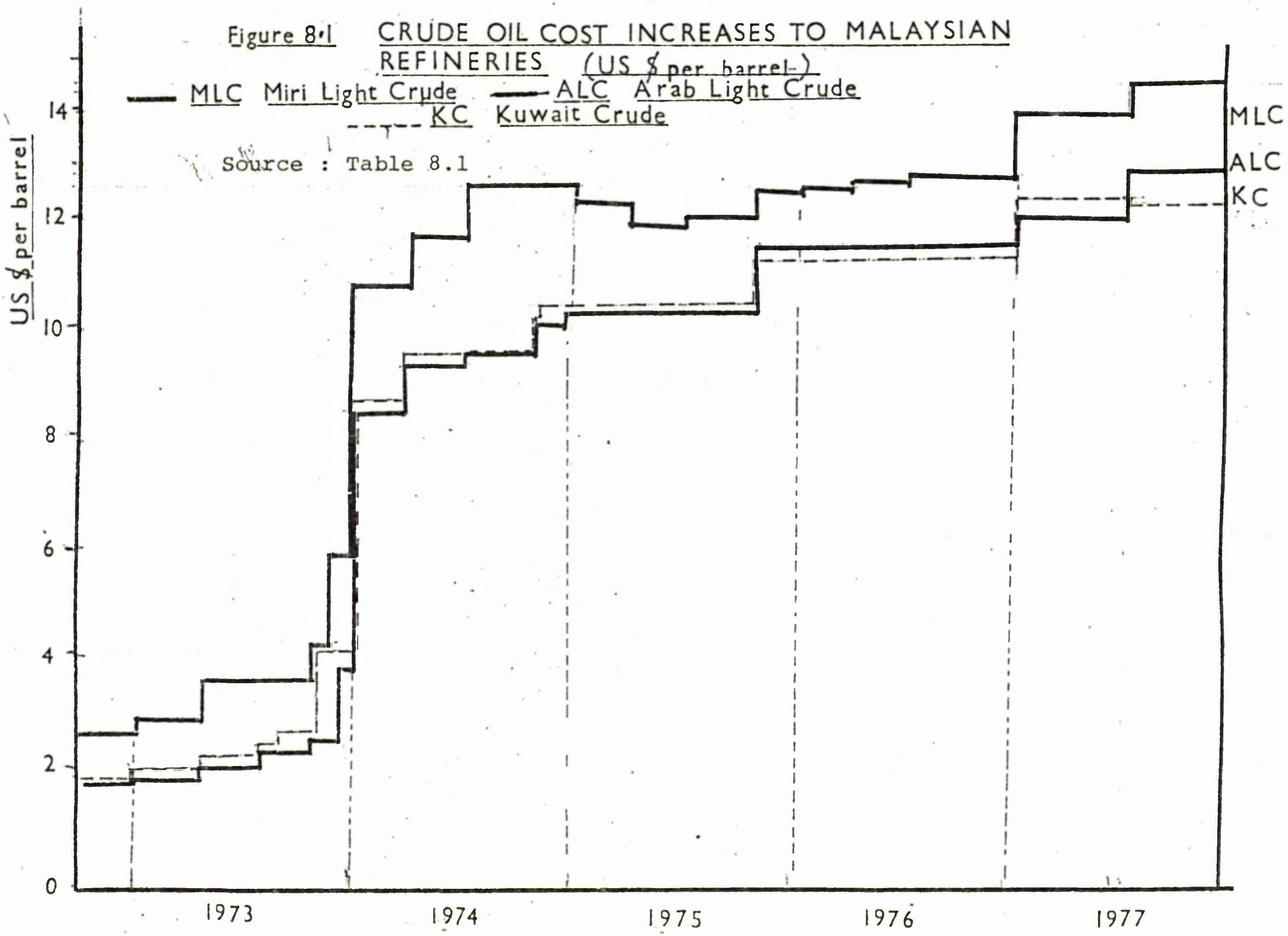


Figure 8·1 CRUDE OIL COST INCREASES TO MALAYSIAN REFINERIES (US $ per barrel)

Source : Table 8.1

8.3 Marketing Practices of Domestic Crude Oil Exports

There are at present three crude oil marketing companies in Malaysia. They are Sarawak Shell Berhad (SSB), Sabah Shell Petroleum Company (SSPC) and Exxon Malaysia Incorporated (EMI). These three companies are also the only crude oil producers in the country. Amongst the three companies Sarawak Shell Berhad is the most established crude oil producer and marketer having been the sole marketer since 1911. Sabah Shell Petroleum Company and Exxon Malaysia Incorporated began crude production and marketing only in 1975.

In the case of Sarawak Shell two types of marketing practices for crude oil are adopted: longer term or contractual sales and "spot" sales or contracts. In the former case, the oil is sold to affiliates overseas, especially in East Asia and the Pacific Areas, and internally to the Shell Refinery at Port Dickson. The affiliates which have contractual sales with Shell are the Philippines Shell Petroleum Corporation, Shell Eastern Petroleum (Pte.) Ltd., based in Singapore, Shell Sekiyu Kabushiki Kaisha and Shell Kosan Kabushiki Kaisha of Japan, Shell Oil of New Zealand, Mitsubishi Corporation, Shona Seikiyu Kobushiki Kaisha, Mitsubishi International Corporation - non-Shell consumers from Japan, Thai Oil Refining Company and Brunei Shell Petroleum Company Limited. Internally, they have long-term contracts with Shell Refining (FOM) in West Malaysia. These eleven companies make up about 75 percent of the total output of the Sarawak Shell Company. The remainder is mostly consumed by their refinery in Sarawak itself[17].

The "spot" sales type of arrangement is only recently undertaken by the Sarawak Shell Berhad whenever they have had excess of crude at their disposal. Spot sales are essentially opposite to contractual sales, as they are made available at any time and the purchasers are not necessarily their present customers. Most of Sarawak Shell's spot sales are made to the Chinese Petroleum Corporation, Philippines National Oil Company, Daikyo Oil Company Limited. Essentially they only contribute about 6 percent of the total output of Sarawak Shell at any one time[18].

The excess of production over contractual and spot sales are made available at Shell Refinery at Lutong to be processed into petroleum products, intermediate and finished, for the use of local markets and for exports.

According to Shell sources, the long-term contractual sales are generally covered by long term base agreements but prices will be set for a particular period or in some cases for a particular shipment. These prices are, however, prices which are negotiated between the parties in the light of prevailing market circumstances. The ability of the company (seller) to use specific market indicators depends on the bargaining power at any period. This depends on whether there is a seller's or buyer's market. The period between middle

---

17. Private communications with Shell Malaya Trading Berhad.

18. ibid.

1973 to middle 1974 was dominated by a seller's market and from middle 1974 onwards by a buyer's market. During the period of seller's market, Sarawak Shell Berhad was able to use the going price of Minas crude oil from Indonesia. However, during the buyer's market, comparison has in some cases been made with the alternative supplies open to the customers concerned from the Persian or Arabian Gulf which were cheaper than Minas by over one US $ per barrel during the period July 1, 1974 to September 30, 1975.

The published official prices for Indonesian crudes was in competition with the Malaysian crude oils. They were sold still somewhat above the true competitive level compared with Persian/Arabian Gulf crude costs (also African crude costs), in view of the low freight rates ruling currently especially for backhauls for African crudes to Japan. Thus Shell was still unable to sell their Malaysian crude oil unless they were prepared to have slightly lower prices than the apparent competitive level. But this situation somewhat improved after July 1, 1974.

In the case of arrangements for transporting their crude overseas, Sarawak Shell Berhad varied the proportions FOB and CIF charges for crude oil exported to countries outside Malaysia in the following percentage splits:

		1973	1974	1975
FOB[1]	(%)	47	61	64
C&F/CIF[2]	(%)	53	39	36

[1]FOB = free on board
2CIF = cost, insurance and freight.

Sarawak Shell Berhad acquired transport in order to enable them to make C&F/CIF sales under a contract of Affreightment, for which Sarawak Shell was to pay the Average Freight Rate Assessment (AFRA) rate for the size of the vessel involved in transporting the crude from Lutong to the respective destination of their customer. In the majority of their CIF sales, this was also the freight they recover. Thus Shell's netback to FOB equates with the FOB unit prices used in the build-up of their CIF selling prices. Shell mentioned that payment of each cargo concerned was made in US $ by telegraphic transfer, irrevocable letter of Credit or Bank sight draft at 30 - 60 days after the date of the Bill of Lading upon such maturity. In Shell's experience, since exchange gains and losses caused by short-term fluctuations in exchange rates largely compensated each other, the exposure was limited to a one to two month period of credit only and during this short span of time the relationship between US $ and the Malaysian Ringgit ($) remained relatively stable[(19)].

---

19. Private communications with Shell Malaya Trading.

All of Shell's crude is exported from their Lutong Terminal except for production from their Fairley-Baram fields which is exported directly to Brunei by pipelines for export overseas from there.

As in the case of Sarawak Shell Berhad earlier, the marketing procedure followed by Exxons Productions Malaysia Incorporated for crude oil sales is based on "spot" sales and long-term contractual arrangements.

According to Exxon, prices of their crudes are based on numerous regional and interregional factors in the current market such as prices of other crudes adjusted for quality, freight dirrerentials and other considerations. The price of their crude is not fixed for any future time period and represents a market value which can be influenced by different factors at different times and, therefore, is subject to a change from time to time.

Unlike Sarawak Shell Berhad, Exxon disposes of its crude oil through sales to affiliates outside the country especially in Singapore and Japan. There are no sales made to affiliates and associated companies and to third parties in Malaysia, nor for use in their refinery or other internal use.

Malaysian crude from Esso's offshore fields is sold

FOBat the Tembungo platform, and unlike Shell, the transport of their crude to the customer is provided by the purchaser. Credit notes in US $ are received for the FOB value of each export sale. The crude oil is exported directly from the Tembungo offshore platform[20].

The exported Tembungo crude is used for overseas refineries to manufacture primarily petroleum products. The ultimate yield varies from day to day with each refinery depending on the local supply situation and the feedstock mix.

Unlike the previous two oil companies, Sabah Shell Petroleum Company has only one method of marketing arrangements for its crude. It entered only into long term contractual sales with their overseas affiliates and the domestic affiliates of Shell Kosan Kaibushiki Kaisha of Japan and the Shell Refining (FOM) Berhad of Malaysia respectively for all their crude production. Sales were generally covered by a long term base agreement but prices varied from period to period, sometimes depending upon a particular shipment, especially in respect of the first trial cargoes. The prices are negotiated between buyers and sellers in the light of the prevailing market situation. Since the company came into the export market only recently, it started with first experiencing the buyer's market. Unlike Sarawak Shell, Sabah Shell's export price is wholly FOB[21].

---

20. Private communications with Exxon and ESMB.

21. Private communications with Shell Malaya Trading Berhad.

8.4 PETRONAS Involvement in Crude Oil Marketing

Long before PETRONAS's direct involvement in crude oil marketing, the Malaysian Government had began forward planning in the early 1970's to prepare for an active involvement of this nature in the future. Sometime in 1971, the Malaysian Government requested the only crude oil company, Sarawak Shell Berhad, to pay some of their royalties in kind besides the usual payment in cash[22]. The objective of this exercise was for the government through its agency to gain experience in crude oil marketing and to establish a foothold in the international oil business. This went on for a number of years till the establishment of PETRONAS in late 1974 when the function was transferred to the latter. Since then PETRONAS has been active in involving itself with the actual crude oil trade and in making its own price.

PETRONAS's early experience in crude oil marketing inherited from the government was in the form of "spot" sales and (buy-back oil) to the oil companies. Recently it had diversified itself in Long Term Contractual Arrangements with its buyers beside Spot Sales[23]. Most of PETRONAS crudes are sold to the Philippines National Oil Company, Japan and US West Coast refineries.

With the conclusion of the production sharing with the oil companies in 1976 and with the increase in the off-

22. Private communication with the Tax Division, the Treasury Ministry of Finance Malaysia, Kuala Lumpur.

23. Private communication with PETRONAS.

shore wells from different fields brought into production by PETRONAS (and the oil producing companies), it would have diverse types of crudes from different origins. From 1977 until 1981/82, PETRONAS would be selling its participation crudes from Tapis, Pulai and Bekok fields (Exxon offshore fields)(35.5°API and 0.07 percent sulphur) and Erb West crude (Sarawak Shell)(30.1°API and 0.05% weight sulphur) apart from the present crudes of Miri Light, Labuah Light and Tembungo.

For the purpose of price classification, PETRONAS has divided them into groups based basically on their API gravity due to the lack of crude assays. The classification is made into 4 groups - Group 1 comprises of the Very Light Crudes of Tapis, Pulai and Bekok; Group 11 Light Crudes which are made up of Miri Light and Tembungo crudes; Group 111 that of Medium Crudes comprising of Labuan and South Furious crudes; and Group 1V made up of Heavy Crudes of Temana and Erb West crudes[(24)].

8.5 Major Problems in Present Marketing Arrangements and Practices

A major problem which is at present faced by all the crude oil marketing companies (both private and state) in Malaysia with respect to the current marketing arrangements and practices is on pricing. The fundamental price deter-

24. Ibid.

minants in any market are without doubt the interaction of demand and supply forces. However, the move agreed by OPEC and accepted by suppliers unilaterally to increase crude prices and rationalise quality premium differentials amongst crude oils resulted in the creation of 'artificial' official prices and actual market prices. This put Malaysia, a small producer, in a difficult position to secure the best possible price for her crudes.

Related to the above, but inherent in crude oil marketing is the problem of the pricing method used. This arises because prices of Malaysian crudes are based on the Minas crude of Indonesia (marker crude). However, the actual market price depends upon various factors, both technical and economic. Technical factors are the intrinsic qualities of the indigenous crudes such as gravity, sulphur content, wax content and product assays. In the case of economic factors, they include freight, relative price of other crudes in general as well as specific market situation. Given the erratic nature of the political, social and economic variables and as the price level of world major crudes are determined by OPEC guidelines, it is hard to predict as to what price level that is probable in making a price forecast. The best way to look at it is to review the current and likely future trend in the world oil market.

8.6 The Future Price of Crude Oils

The OPEC Conference in Caracas Venezuela in December 1977 failed to reach an agreement on crude price which resulted in the crude oil freeze. Their "agreement to disagree" left the marker crude unchanged at US $ 12.70 a barrel till June 1978. Basically the price freeze was to be the result of economic rather than political terms. The oil market was in a depressed state since the middle of 1977 because of the oversupply situation. As a cartel, OPEC had developed no mechanism for collectively reducing output in time of slack demand. The trend of oversupply seemed likely to persist for at least till the middle of 1980's. Many studies(25) have drawn attention to the possibility of an energy crisis after the middle of 1980's though they had not been unanimous in their predicted timing.

There are three main reasons for the oversupply situation : (i) OECD estimate suggests that economic growth rate taken as a whole will average no more than 3½ percent in 1978 as against a target rate of 5 percent in June 1977; (ii) Non-OPEC oil production will continue to increase and Alaska's North Slope production is expected to reach 1.2 million barrels per day by June 1978 while Britain's North Sea oil output will be around 160 million tons in 1978; and (iii) The U.S. imports of oil are expected to fall back from

25. Exxon and Shell; Walter J. Levy, E.T. Penrose, J.E. Hartshorn and Rostow; The Congressional Research Service; The Workshop of Alternative Energy Studies (WAES) etc. A challenge to this expectation came from an article in New York Times January 18, 1978 which contended that oil supplies currently in abundance might remain adequate at least through 1990, thereby reducing the likelihood of sudden oil price increases in future.

8.6 million barrels per day in 1977 to 8.1 to 8.4 million in 1978[26]. Because of this surplus production and the availability of different types of crudes in the world markets (especially the lighter crudes from these new sources), the refiners will naturally choose those crudes which fit their particular requirements based on their market product-mix and maximise their profits accordingly. Since market demand dictates refinery requirements and determines profitability in different countries and over peridos of time, there is a continuous change in the preference for different crudes. The competitive forces of supply and demand will result in discounts at the spot market. Sellers will have to give discounts to adjust their relative prices of different crudes in relation to Saudi Arabian Light or 'reference' crude[27]. This has been due to the inflexibility of OPEC in dealing with the problems of differentials (differentials governed by specific gravity or ^{o}API (relative yield of valuable light products), sulphur content and loca-

---

26. See PETROLEUM ECONOMIST, January 1978.

27. As long as buyers are in a position to exercise their preferences it is perfectly natural for them to press for discounts on crudes which are worth less to them individually. While the general supply situation remains easy, relative prices cannot be the concern of the petroleum exporting countries alone. PETROLEUM ECONOMIST, February 1978, p. 53.

tion in relation to main markets[28]. This is best summed up by Professor E. Penrose in the following:

> "Since oil is not a homogeneous commodity and OPEC does not determine in detail the relative prices of different types of oil but only a price for a 'reference' crude, individual countries make their own price decisions for their own crude in the light of market reactions and their own situations. Since each country sees the relationship between its price and its sales, any country desiring to increase its sale can easily evade the OPEC guideline. Therefore, output decisions are made by individual countries within the framework of prices related to a standard price set by OPEC"[29].

---

28. In January 1974 when the posted price of the Arabian Light "marker" crude was raised by 130 percent, the gravity premium was raised to 6 cents per ^{o}API for crudes lighter than the "marker" (34^{o}API) while a penalty of 3 cents per degree was imposed on those below this level. Sulphur premium was around 7 cents per barrel for each 0.1 percent of sulphur 1.7 percent. As for location, Arab Light and Iraqi crudes at Mediterranean terminals were given a freight premium of almost $2 a barrel over Ras Tanura. Since then, the locational advantage has varied depending on the level of tanker freight rates. For all light African crudes the advantages of location, gravity and sulphur content have been eroded by the advent of North Sea and Alaskan North Slope Oil. See ibid, p. 53.

29. See Penrose, E. "Choices for the Oil Exporting Countries" in <u>MIDDLE EAST ECONOMIC SURVEY</u> January 16, 1978 pp. 2-3.

However, there is the prevailing belief amongst oil experts that there will be an oil shortage in the coming years because of several factors which include (1) low economic growth in the major industrialised countries but demand for energy continues to grow; (2) development of non-oil energy sources has been disappointing because of long lead times; (3) minor energy savings for conservation in major consuming countries; (4) the flow of oil from Alaska North Slope and the North Sea will stabilise after 1980; (5) shortage of oil in USSR and (6) increase reliace on OPEC oil[30]. In a study by Mabro that "there is a good chance that a demand for OPEC oil in 1985 consistant with the assumption about economic growth and conservation made here would exceed the amounts that OPEC would be willing to supply .... but be cautioned "there is nothing like a 20-25% probability that the demand for energy consistent with our assumptions about economic growth, conservation and alternative energy supplies would not imply imbalances by 1985[31]. According to Rahmani[32] unless massive and new efforts are made to conservation, serious oil shortages and sharply increased prices will occur sometime in the 1980's.

30. Rahmani, B.M. "Energy Conservation in Iran and Hedging Against Energy Crunch, MIDDLE EAST ECONOMIC SURVEY, January 23, 1978, p.7.

31 Mabro, R. "Energy Crisis in 1985", MIDDLE EAST ECONOMIC SURVEY, April 10, 1978, p. 4.

32. Rahmani, B.M., op.cit, p.7.

Any price increase may be best brought about by controls on the rate of supply imposed by the large exporters rather than by explicit increases in real prices by OPEC. However, there is a prevailing uncertainty concerning price. If there is indeed a shortfall in oil supplies, market forces will drive prices up thus invalidating the assumption about constant real prices. It is hard to know how responsive oil demand will be to such changes in price. Hartshorn showed that if oil demand were to fall by only 0.1 percent for every 1 percent increase in price the basic projection of demand for OPEC oil could be reduced from 44 to 39 million b/d by 1985[33]. Another doubtful favour concerns the level of production that OPEC governments will be willing to permit as oil reserves begin to run down. Since the existing glut of crude is bound to be temporary, while lead-times for new energy projects are so long, decision makers need to make the investments now.[34] And according to one forecast[35], when OPEC surplus producing capacity gradually disappears as demand rises and additional supplies of oil from outside the OPEC area are not forthcoming in significant quantities, crude oil prices will rise perhaps as much as $20 per barrel in 1976 dollars.

---

33. Hartshorn, J. "Energy Expectations and Uncertainties" MIDDLE EAST ECONOMIC SURVEY, November 14, 1977. p.5

34. Penrose, E.T. op.cit, p.8.

35 Parra, F.R., "Energy Perspectives Worldwide" in MIDDLE EAST ECONOMIC SURVEY, October 24, 1977, p.1

PETRONAS, being a small oil company, will have to gear its crude price forecasts along the guidelines mentioned and making adjustments in price from time to time according to market conditions of similar and competing crudes in both the scenarios of surplus and shortage.

CHAPTER 9

STRUCTURE OF PRICES AND COSTS OF PETROLEUM PRODUCTS

Having looked into the structure and trend of crude oil prices in Malaysia in Chapter 8, we turn now to discuss the structure of prices and costs of petroleum products marketed in Malaysia. In this Chapter, we trace the development of the structure from the historical, economic, social and political changes that have taken place in the country since World War II.

To trace this development of petroleum products' price and cost structures, one has to look into the historical developments in the petroleum market in Malaysia since World War II. Three scenarios of development will be appraised: (a) the period before the establishment of the refineries in Peninsula Malaysia, (b) the period after the establishment of the two refineries in Port Dickson and (c) the year after the Oil Crisis of 1973. These developments are important in determining the changes of petroleum product prices and costs since World War II in Malaysia.

9.1 Historical Development of Petroleum Product Prices

In order to be able to show the effect of crude oil processing in Peninsula Malaysia on petroleum product prices, the price scale before the opening of the refinery should be compared with the price determining factors in the domestic refineries in Peninsula Malaysia.

Before the opening of the refineries in Peninsula Malaysia in 1963, the price of petroleum fuels in Malaysia depended essentially upon the landed price, import duties and the cost of distribution in Malaysia. The landed price in Port Kelang, the main port of entry into Peninsula Malaysia, was determined by the posted refinery price in producing countries in the Middle East and in Singapore, by ocean freight from the supplying refineries to Malaysia, and by harbour dues and wharfage. The import duties and recently surtax on refined products imported from overseas, which are designed predominantly for the creation of fiscal income, are determined by the Malaysian Government in accordance with its objectives in economic policy.

In the case of motor gasoline, kerosene and gas oil for private domestic consumption the import duty exceeded the import value of the individual products. Gasoil and fuel oil designated for public or government consumption through its agencies on the other hand, are free of import and customs duties as they are used for public consumption. The basic inland price resulting in the main from the landed price and the relevant import duty, which the marketing companies operating in Malaysia can scarcely influence, form the basis in determining selling price of petroleum products in Malaysia.

The regional selling prices for premium and regular petrol, kerosene, gas and diesel oil, fuel oil and other products before and during this period had been fixed by "historical costs".[1] in the Persian Gulf area.

The historical costs were fixed by the oil companies and only allowed to vary from time to time. The variations in price amongst the cities were based upon several factors which include (a) changes in crude oil prices which led to changes in product prices, (b) changes in the exchange rate as between £ sterling and Malaysian dollars, (c) changes in government duties from time to time, (d) changes in transport costs and (e) improvement in the quality of petroleum products such as octane ratings in petrol.

Prices of petroleum products especially petrol, increased over recent years due to the steady rise in petrol taxation, the inflationary trend in costs and expenses, the two Middle East crises including the closing of the Suez Canal and the

---

1. Historical costs are based on "World parity price system" or "U.S. parity price system" evolved by the major oil companies operating in the Eastern Hemisphere. This was a kind of basing point system with the Persian Gulf as the basing point for pricing both crude oil and oil products. The price build up included - f.o.b. Persian Gulf price, freight from P. Gulf to a port in Malaya, leakage and insurance, import duty and other charges and margins to arrive at total ex-seaport installation price. An extra charge was made for inland transportation and distribution costs when the products were sold in the interior of the country. An example of this in the case of India, See Dasgupta, B., op.cit., pp 81-82.

unilateral declaration by the Organisation of Petroleum Exporting Countries (OPEC) on crude prices in and after 1973.

(a) Product Price Structure Before the Opening of Refineries in Peninsula Malaysia

Up to the middle of 1956, the price of most of the petroleum products particularly petrol was uniform throughout the country. The price of regular petrol on January 1, 1956 was $1.47 ¢ (including duty of $0.73 ¢) but was increased by $ 0.02 ¢ to $1.49 ¢ on February 2, 1956 because of the increase in freight. The increase in freight was uniformly distributed throughout the country irrespective of the distances from Port Kelang - the main port of entry into Malaysia[2].

The principal of keeping a uniform price of petrol throughout the country as prior to the end of August, 1956 was uneconomical and impracticable to the oil companies. A system of base point pricing with price "laddered"[3]

---

2. Private communications with Market Research Section, Shell Malaysia Trading Berhad.

3. This system enabled the oil delivered prices to different areas and locations away from the receiving ports of landing to be graduated according to distances from it. The different delivered prices in different locations reflected the different freight rates charged.

accordingly was developed by the oil companies in Malaya then to recover increased transportation costs incurred by them at that time. The system of laddered price came into being in Malaya on September 1, 1956 where some areas experienced an increase in price of between $0.01 ¢ to $0.04 ¢ and some a decrease in price of $0.01 ¢ in the period of transition between the old and the new system.

In the case of the former the increase mostly affected Kota Bharu (sea-fed depot) in the east coast of Malaya and Ipoh (inland depot) in the north-central of Malaya. In the case of the latter, Johor Bharu, at the southern tip of Malay Peninsula experienced a decrease in price from $1.49 ¢ to $1.46 ¢ per I.G. (including a uniform tax of $0.73 ¢ per I.G.) because it is the nearest stopping point from Singapore, which already had refineries.

As for Shell, the premium grade of petrol was first introduced into the market on October 30, 1956 following the system of laddered price set forth by the regular grade earlier. The difference in price between the 2 grades of petrol was $0.20 ¢ per I.G. to premium's favour.

Towards the end of 1956, the prices of petrol increased again with the increase in government duty of $0.27 ¢ per I.G. The increase was affected countrywide. However, there was only a slight price increase of $0.01 ¢ per I.G. for both grades of petrol and only in some selected areas where Shell had no depot at that time. Following from this, there were 2 other occasions of price changes for both premium and regular petrol in 1957. At the beginning of 1957, there was a$0.02 ¢ per I.G. increase in the case of premium and regular but there was a decrease in the middle of that year for premium of up to $0.05¢ per I.G. (See Appendix 9A).

As a result of the price adjustment for both regular and premium petrol effective February 15, 1958 as shown in the Table a and b in Appendix 9.A., the west coast of Peninsula Malaysia was carrying a small subsidy on behalf of the east coast of Peninsula Malaysia but the opportunity then was taken to reduce the subsidy and make the latter move realistic. According to Shell, until the real laddered prices were in existence, the Federation would not be achieving the profit margin the oil companies considered reasonable. This resulted in the increase of Kota Bharu price to M$2.00 ¢ per I.G. At the same time too, the oil companies strongly argued that their expenses had increased in Peninsula Malaysia at a time when trade had been levelling off and thus there was a necessery to make a small adjustment upwards in the motor-gasoline price.[4]

Towards the end of 1958, the government duty was increased by $0.20 ¢ to $1.20 ¢ per I.G. for both grades of oil; the government duty had been uniform for the past 2 years at $1.00 ¢ per I.G. As a result of the revision in Bukom posted prices, the following price change which

---

4 Private communications with Shell.

became effective on February 8, 1960 has been introduced in Singapore and the Federation of Malaya. The downward revision of price resulted in the price of petrol being reduced by \$ 0.20 ¢ per I.G. The same phenomenon was reported throughout the year where there were 2 other price revisions resulting in a further decrease of\$0.02 to\$0.03 ¢ per I.G. for both grades of petrol.

The different in prices of petroleum products amongst cities in Peninsula Malaysia at any particular point of time was being determined by the"basing-point" system of distances of the various cities from the nearest depot - inland or sea-fed. As a result, petroleum product prices vary depending on the "zones" where the products were delivered and sold.

The zone system was for a long period the one established by the Shell petroleum company in Malaya but since 1963 the system had been developed and amended to incorporate the effect on delivery costs of new refineries and storage centres in Peninsula Malaysia. Each company was free to adopt its own system and there were variations between companies, but on the whole the major companies appear to operate similar zoning boundaries.

According to Shell sources, their selling price had been based or determined by a zone system with each zone graduated at 18 miles distance apart from the base.Zone 1 was/ referred to as a ring up to 18 miles from the nearest basing point (depot); Zone 2 between the next 19 to 30 miles and Zone 3 between 31 to 43 miles away and so on. Zone 1 had a difference of$0.01 ¢ per I.G. in price to that of the base point;$0.02 ¢ in the case of Zone 2 and $0.03 ¢ per I.G. in the case of Zone.3 and so on. Also a significant point of difference in price between regions was seen in the case of different locations of the base points - whether they were inland or sea-fed depots. Variations in base point prices were due to the accessibility and cheaper transport costs expecially by sea.[5]

Premium petrol was first introduced as a 90 octane material in 1957. In 1958, the quality was increased to 93 octane until 1963 at which time octane ratings were further increased to 95. Again in 1964, the quality of premium petrol was further increased to 97 octane. During 1959, retail price for premium petrol was $1.00 per I.G. at which level it remained till 1961. In 1961, duty for retail price of premium petrol were dropped by$0.06 ¢ per I.G. Following this, there were a series of petrol price drops until 1964 when the retail price of premium petrol was at$0.89 ¢ per I.G. and this remained so for the next 2 years till October 1966. (See Appendix 9A).

In October 1966, Shell improved the quality of both regular and premium grades of petrol. At the same time, it was necessary from the point of view of the oil companies to increase the retail prices by$0.03 ¢ per I.G. for both

---

5 Ibid.

grades in order to recover the additional cost of manufacture.

During this time, petroleum products consumed in Peninsula Malaysia were largely produced locally from the Shell and Esso Refineries in Port Dickson. Crude oil processing in the Port Dickson refineries had influenced the regional differences in prices in different ways. Since after the opening of the refineries, the majority of the oil products consumed in Malaysia were no longer imported but produced within the country. There was a Port Dickson refinery cost in place of the landed cost at Port Kelang. As a result the price in 1966 for premium petrol at Port Dickson was $2.13 ¢ per I.G. while the highest price at Kota Bharu was $2.26 ¢ per I.G. The next cheapest place to Port Dickson was Port Kelang with $2.15 ¢ per I.G. and Kuala Lumpur at $2.16 ¢ per I.G. The laddered price since 1956 appeared to be complete and uniform to areas away from Port Dickson.

(b) <u>The Period of Continuous "Price Wars"</u>

Since the Second World War, competitive conditions in the Malaysian market had vastly changed as compared to before the war. Retail prices for petroleum products in any market varied greatly from time to time as market conditions changed. The conditions ranged from considerable uniformity in the prices of rival sellers or companies to wide variations in prices.

Up to the beginning of 1960s competition amongst companies supplying petroleum products in Malaysia continued to intensify as suppliers expanded their petroleum operations and made inroads into each other's marketing territories. At this time there were only two oil marketing companies in Malaysia notably Shell Oil Company of Malaya and Standard Vacuum Oil Company of Malaya. But mass marketing of petroleum products were subject to change notably by the entry of new participants into the market such as Caltex, Mobil and British Petroleum in the early 1960s and 2 "independent" marketers of Singapore Petroleum Company and Summit of Thailand in the early 1970s.[6]

Owing to the post-war developments in product price structure discussed earlier, one can expect a fair degree of uniformity in the prices of oil products at major oil company outlets in any particular market because of several factors such as a) oligopolistic market and "follow-the-leader" tradition, b) homogeneous products differentiated only by brands and thus the absence of "consumers preference" and c) attempts by major companies to have some sort of resale price maintenance. However, the above guidelines were seldom being adhered to, resulting in the historical price structure of petroleum products in the past characterised by deep-seated competition amongst companies resulting in depressed prices and shortages of some products. The main reason for this has been the different market characteristics between petrol on the one hand, and other products such as

---

6 Information obtained from private communication with Shell

kerosene, diesel, fuel oil and others. Petrol had all along been considered by the oil companies as a product with its attendant brand-conciousness on the part of consumers, unlike the rest which had been regarded as commodities. The newcomers in the 1960's Caltex, British Petroleum and Mobil had concentrated therefore their market penetration into the commodity markets which was not affected by brand conciousness.

The kerosene market after the Second World War was by far the most sensitive, unpredictable and unstable market amongst all the oil products. The market was disrupted by the price "war" in kerosene which started in the beginning of 1960s and continued into the 1970s with great intensity and impact. The price wars, which led to one or several oil companies dropping their prices, were waged in order to maintain their market in the case of the already established companies and capturing some markets in the case of new companies making inroads into the business. Some companies even increased discounts to their distributors to meet the competitors' price. For the well established companies, like Shell and Standard Vacuum then, they had either to cut prices of their products or face a reduction in their market shares.[7]

The price war amongst companies led to erosion of kerosene price in many areas where competition took place. This price problem spread to many parts of the country. Many oil companies found it difficult to meet their sales volume

7 Information from an Oil Company's Monthly Market Report (Confidential)

objectives and at the same time hold the line on price.

Despite the series of price wars waged by the various oil company distributors, all major distributors at some point of time managed to reach some sort of agreement to stabilise kerosene price.[8] However, this sort of arrangement was only good as a "stop-gap" measure and lasted only for a brief period as price war intensified again in the following year. The worst hit in this kerosene price wars were the new comers into the market. The newcomers being new and of small organization, experienced the difficulty of keeping a young organisation in competition with the much older, more experienced and better financed group when price erosion continued for an extended period of time.

As in the case of kerosene earlier, the post-war market for diesel oil was marked by competition amongst the various oil companies - established and newcomers. Competition between suppliers resulted in them to increase competitive allowance to their dealers.[9] Some oil companies made the competitive level worse with the offer of additional discounts. Another factor in the price competition in diesel was the "under the counter" offer made by the various oil companies to their competitive dealer in order to secure the market. This phenomenon was quite prominent amongst the newcomers into the industry. The decision taken by the established companies to counterbalance the offer to their dealers resulted in further price erosion in the diesel market.

---

8 - 9 Ibid.

Another feature in this competitive diesel market was the competition between retailers and wholesalers. This took the form of "cut throat" competition from both competitive service stations and wholesalers who sell through roadside skid tanks at low prices. However, in the middle of 1970, the government began to form pressure on unauthorised roadside retailers and by the end of 1971 their numbers had been reduced and diesel retail price through service stations managed to hold fairly stable. In the meantime, there was another reason for the price problems faced in the retail diesel trade with service stations selling low grade diesel imported from Indonesia towards the end of 1968. However, this did not last for very long.[10]

In studying petroleum product prices after the commencement of operation of the 2 Port Dickson refineries in 1963, it would be fruitful to provide a basis of orientation by showing the relationship between Port Dickson prices and those of other areas in Peninsula Malaysia. The inherent difficulty in this type of analysis is that the price data of petrol, and diesel oil which prevail at any point of time are the posted/pump prices of major oil companies and they do not reflect any variations for them by (a) major company dealers who may offer secret or open concessions from the prevailing price or (b) small company dealers who usually must offer their product at a discount if they are to compete successfully. From 1966 to 1970, oil companies in Malaysia engaged in a series of competitors programme

---

10 Ibid.

throughout the country using strategies such as coupons, stamps and giveaways.[11] In a moveaway from passive to aggress-ive campaign, the competitive reactions of oil company deal-ers to their rivals ranged from the offer of generous pre-miums to slashing petrol prices by discounting up to $0.10 ¢ per I.G. in the northwest Malayan markets, "hawking"(selling cheaply)their petrol "below cost" to rival branch dealers and to transferring their gasoline stocks from underground tanks into 46 I.G. drums in order to register meter sales.[12] These wars in price went on throughout the 60s and into the early 1970s and disappeared with the oil crisis and embar-goes and the intervention of the Government through the Control of Supplies Act in 1975. However, the problems of price instability and price wars gave way to product short-ages, dislocations and hoarding in the retail level as a result of the fixation of price by the Government after 1974 as we shall see later in Section 9.9.

9.2 Product Prices, Costs and Margins Between Domestic Refiners and Importers

In order to determine the price policy followed by the domestic refineries in structuring their product prices in the domestic market, we determine the price build-up of the different products imported into Malaysia by the non-refining/importing companies of Mobil, Caltex and British Petroleum which are in competition with the locally refined petroleum products in the Malaysian market.

---

11 - 12 Ibid

Table 9.1 shows the differentials between product price at Mobil's refinery at Jurong in Singapore (f.o.b. Jurong), and the Landed cost at Port Kelang between 1973 and 1974. (the periods before and after the oil crisis as a comparison).

Column 1 in table 9.1 shows Pulau Bukom cargo prices on which the Jurong refinery based their product postings for the various years and these are converted into the equivalent of Malaysian value at the exchange rates prevailing at that time (Column 2). Column 3 shows the actual costs for local shipping from Bukom or Jurong in Singapore to Port Kelang in Peninsula Malaysia with the appropriate duty (Column 4) and surtax (Column 5) added to give the landed cost at Port Kelang (in Column 6).

From the Table, the Average Product-mix for the 5 products show that the landed cost in 1974 is almost twice the landed cost in 1973 due to the oil crisis. From the two periods it can be seen that the landed cost at Port Kelang is between 10 to 15 percent higher than that of Singapore's Pulau Bukom. Since the oil refineries in Malaysia are bound by their respective Refinery Agreements (Appendix 5A) to price their products not higher than their import-parity price, one can infer from this that Shell and Esso's price ex-refinery are the same as the landed price of imported products at Port Kelang.

TABLE 9.1: LANDED COST BUILD-UP FOR IMPORTED PRODUCTS BEFORE AND AFTER OIL CRISIS OF 1973

PRODUCT	PORT KELANG - NOVEMBER 1973						PORT KELANG - FEBRUARY 1974					
	F.O.B. BUKOM or JURONG (US $/ US Gal) (1)	F.O.B. BUKOM or JURONG (M¢/1G) (2)	FREIGHT (M¢/1G) (3)	DUTY (M¢/1G) (4)	SURTAX (M¢/1G) (5)	LANDED COST (M¢/1G) (6)	F.O.B. BUKOM or JURONG (US $/ US Gal) (1)	F.O.B. BUKOM or JURONG (M¢/1G) (2)	FREIGHT (M¢/1G) (3)	DUTY (M¢/1G) (4)	SURTAX (M¢/1G) (5)	LANDED COST (M¢/1G) (6)
Premium Gasoline	20.4	58.8	1.8	10.0	2.5	73.1	34.0	102.0	2.1	10.0	4.4	118.5
Regular Gasoline	17.0	49.0	1.8	10.0	2.1	62.9	29.4	88.2	2.1	9.8	-	104.1
Kerosene	19.8	57.0	1.9	-	-	58.9	32.7	98.1	2.3	-	-	100.4
Diesel Oil	17.8	51.3	2.0	-	2.2	55.5	30.8	92.4	2.4	-	4.0	98.8
Fuel Oil	8.8	25.3	2.3	-	1.2	28.8	23.5	70.5	2.6	-	3.1	76.2
Average Product Mix M¢/1.G.	16.76	48.28	1.96	4.0	1.6	55.84	30.08	90.24	2.3	3.96	2.3	99.6
%	-	100.0	4.1	8.3	3.3	115.7	-	100.0	2.5	4.4	2.5	110.4

Note: (1) Pulau Bukom cargo prices as at Nov. 2 1973 for November 1973 costs; as at Feb.7 1974 for February 1974 costs.

(2) Converted from (1) on basis of 1.2 USG/1.0 1G and exchange rates of: November 1973 at 2.40 M$/1.00US$ and February 1974 at 2.50 M$/1.00 US$.

(3) Actual costs for local shipping from Jurong in Singapore to Port Kelang.

(4) Duty of 10M¢/1G on premium and regular gasolines.

(5) Surtax of 4% on 105% CIF value on all products except kerosene.

(6) Sum of items (2), (3), (4) and (5).

Source: Private communications with oil companies.

Table 9.2 shows the competitive margins between refiners and non-refiners or importers based upon Kuala Lumpur posted pump price of premium and regular petrol and automotive diesel oil sold at the retail level. Because the importing oil companies have to incur import duties and import surtax (4% on CIF value) on petrol and none on diesel oil (after 1974), and higher transport cost, the importers are at a little disadvantage in their net margins - 14 ¢ per I.G. in the case of premium petrol,and 13 ¢ per I.G. in the case of regular petrol (except 3 ¢ per I.G. in the case of automotive diesel*)- over the domestic oil refiners of Shell and Esso.

From the competitive margin figures earlier between the importers and domestic refiners, we can also calculate the net margins of each of the 3 products concerned. If our assumption that the landed costs or prices at Port Kelang are the same as the Port Dickson ex-refinery costs/prices, the net margins for each of the 3 products are as follows:

		Competitive Margins ($ per barrel)	Landed Price/ or Refinery Price/Costs	Net Margins ($/barrel)
Premium Petrol	Refiners	1.607	1.185	0.422
	Importers	1.4600	1.185	0.275
Regular Petrol	Refiners	1.2868	1.041	0.246
	Importers	1.1490	1.041	0.108
Diesel Oil (ADO)	Refiners	1.022	0.988	0.034
	Importers	1.050	0.988	0.062

* This is because the Government began to exempt ADO from the payment of surtax in 1976 to encourage imports to meet local requirements which were then in short supply. This made the product more competitive with local supplies.

TABLE 9.2: COMPETITIVE MARGINS BETWEEN DOMESTIC REFINERS AND IMPORTERS OR NON-REFINERS IN 3 SELECTED PRODUCTS (IN M$)

(Posted Pump Prices of Refined Oil Products based upon K. Lumpur Price)

	PREMIUM PETROL		REGULAR PETROL		AUTOMOTIVE DIESEL OIL	
	Refiners	Importers	Refiners	Importers	Refiners	Importers
Posted Pump Price (K. Lumpur)	3.10	3.10	2.75	2.75	1.10	1.10
Dealer Commission and Evaporation Allowance*	0.155	0.155	0.125	0.125	0.04	0.04
Gross Revenue	2.945	2.945	2.625	2.625	1.06	1.06
Less:						
** Import Duty		1.400		1.400	-	-
*** Import Surtax @ US $1 = M$2.55		0.075		0.066	-	-
**** Excise Duty	1.300		1.300	-	-	-
Transport from Port Kelang to Kuala Lumpur		0.01	-	0.01	-	0.01
Transport from Port Dickson to Kuala Lumpur	0.0382	-	0.0382	-	0.03818	-
Competitive Margin	1.607	1.4600	1.2868	1.149	1.022	1.05

* Assumed to be the same between domestic refiners and importers.

** If gasoline is refined in Malaysia the excise tax is $1.30¢ per 1.G. and the import surtax does not apply.

*** Import surtax is 4% on the landed cost of product but none on ADO.

**** On locally produced petrol of $1.30+ per 1.G. No excise duties are levied in the case of ADO.

Source: Private communications with Oil Companies.

The net margins above show that the local refiners have an edge of one and half to two times on the average to that of the importers except for ADO where the reverse is true.

Table 9.3 shows the differences in Retail and Non-Retail (Contractual and Consumer/Reseller Prices) in Malaysia both for domestic refiners and importers. The variations in price in each category reflect the different locations in which the products are sold. Consuming areas nearer to the refineries and landed port (in the case of imported products) are lower in prices than places in the interior.

Contractual and Consumer/Reseller prices are generally cheaper in most products as they are purchased in bulk and on long-term contracts. Contractual sales to Government departments and related institutions are tax-free. However, with the '<u>stickness</u>' of prices of some products in the upward direction (price control by the Government), the variations between Retail and Non-Retail may not be significant and at times may be to the Retail channel's favour.

TABLE 9.3: DIFFERENCES BETWEEN RETAIL, CONTRACTUAL AND CONSUMER/ RESELLER PRICES FOR MAJOR PETROLEUM PRODUCES ($/1.G.)

PRODUCT CATEGORY	RETAIL PUMP (1)	DEALERS SELLING PRICE (2)	CONTRACTUAL PRICES (3) (Escalation with Bukom Postings)	CONSUMER/ RESELLER PRICES (4)	OTHER CONTRACTS
Premium Petrol	1.77 - 1.95	1.66	1.75 - 1.85	1.56	1.77 - 1.87
Regular Petrol	1.32 - 1.62	1.33	1.25 - 1.52	1.20	1.27 - 1.55
Automotive Diesel Oil	0.97 - 1.13	0.93	1.09 - 1.19	1.15	-
Industrial Diesel Oil	-	-	1.01 - 1.19	-	0.42 - 1.15
Kerosene	0.78 - 1.08	0.76	1.15 - 1.20	0.66* (5)	0.42 - 1.15
Fuel Oil	-	-	0.90 - 0.94	-	0.33 - 0.96
LPG (6)	0.37 - 0.45	-	0.75 - 1.59	0.92	0.20 - 1.96

(1) varies with locations. Government Duty to be added accordingly = $1.30¢ to Premium Petrol, $1.30 for Regular Petrol, 0.07¢ per 1.G. for Fuel Oil, 0.11¢ per 1.G. to LPG.
(2) For Kuala Lumpur area. Exclude duty and dealer's margin. They may vary from location to location reflecting area differentials.
(3) These prices are net delivered prices for country-wide sales and exclude duty. As per the respective contract terms, they reflect escalation for the impact of the Oct. 1 1975 crude price increase.
(4) These prices are average net prices for non-contractual volumes. They exclude duty but include delivery expense in some areas.
(5) Price regulated at kerosene list price less reseller and retailer margins.
(6) $ per lb.

Source: Private communications with oil companies

9.3 Costs Components in the Malaysian Petroleum Industry

In Table 9.4, it can be seen that the costs components of the industry constitute the biggest share in the prices of petroleum products in Malaysia. Over the period considered, costs constitute about 74.7 percent on the average of all the total price; taxes and duties 22.8 percent and profit margins 2.45 percent. In a study on a major oil producing country, Iran, Fesheraki found that since 1962, costs have contributed about half of the price taxes and duties two third and profit contribution the remainder. The reason for this difference in costs between the countries is explained below.

Table 9.5 gives the breakdown of the various costs components which are made up of raw material costs which include costs of crude, transport or freight costs and other charges from one oilfield to the refineries; refinery costs; distribution and marketing costs which include costs of administration, selling, depreciation and other overhead. It is seen from the table that, during the period, raw-material costs were the largest cost component, constituting about 83.3 percent of the total costs in the period. This has been due to the oil-crisis which increases the crude oil costs to refineries in Malaysia as 80 percent of its crude requirements are imported from the Middle East. Refining costs, however, have generally declined over the period from 5.47 percent in 1970 to 2.10 percent in 1975

TABLE 9.4: COST COMPONENTS OF PETROLEUM PRODUCTS (Figures rounded)

YEAR	IN M$'000				%		
	PRODUCT COSTS	TAXES & DUTIES	PROFIT MARGIN	SALES VALUE	COSTS	TAXES & DUTIES	PROFIT MARGIN
1970	707,900	221,900	39,700	469,500	73.0	22.9	4.1
1971	757,900	240,600	11,900	1,010,500	75.0	23.8	1.2
1972	669,000	289,400	31,900	990,300	67.6	29.2	3.2
1973	787,600	335,400	33,500	1,156,500	68.1	29.0	2.9
1974	1,669,000	329,200	24,400	2,022,600	82.5	16.3	1.2
1975 (Up to 3rd Qr)	1,422,000	271,600	37,000	1,730,600	82.2	15.7	2.1
Average					74.7	22.8	2.45

Source: Calculated from the various Financial Statements of Oil Companies which were obtained from private communications with them.

TABLE 9.5: COST BREAKDOWN OF PETROLEUM PRODUCTS (Figures rounded) IN [illegible]. M$

YEAR	1970	1971	1972	1973	1974	1975	Average 1970-1975
(i) CRUDE COSTS INCL. FREIGHT (CIF)	581,400	618,100	517,800	628,500	1,494,200	1,272,000	
(ii) REFINING COST	38,700	42,300	40,000	36,200	33,400	29,800	-
(iii) TRANSPORT & MARKETING COST OF PRODUCTS	87,700	97,400	111,100	122,900	141,300	120,200	-
	707,800	757,800	668,900	787,600	1,669,000	1,422,200	-
PERCENTAGE SHARE (i)	82.14	81.56	77.41	79.80	89.53	89.45	83.31
(ii)	5.47	5.58	5.98	4.60	2.00	2.10	4.29
(iii)	12.39	12.86	16.61	15.60	8.47	8.45	12.40

Source: Calculated from the various Financial Statements of Oil Companies which were obtained from private communications with them.

as a result of low crude intake of refineries which registered an average of 4.29% of total cost. The increased utilization of refinery capacities reduces production costs and increases the operating efficiency. Also distribution and marketing costs, which constitute an average of 12.4% of total costs, have been reduced during the period from 12.4 percent to 8.5 percent because of 2 factors, firstly, rationalisation of cheaper means of transport as a result of fuel oil increase since the oil crisis and secondly, transport costs per unit fell as volume handled by oil companies increased during this period.

However, in the case of Iran the opposite conclusion emerges. In the first instant, all the crudes processed by her refineries were from local sources. During 1962-1972 transport costs were by far the largest component accounting for about 45 percent of the total costs. Product and transport costs have generally declined over the period of study from 32 percent of the total in 1962 to 28 percent in 1972. Unlike the Malaysian case earlier, the distribution costs in Iran constitute about 25 percent of all costs.

9.4 Profitability of the Petroleum Industry

The profitability of the petroleum industry is governed by 2 main factors (a) internal factors such as raw-material, refining, transport and distribution costs and (b) external factors such as taxes and duties and government policies.

Profit margins of the oil industry are, therefore, governed by the changes in the above variables. Contrary to Fesheraki's findings on the Iranian oil industry, where he showed that profits on product sales rose from 8.6 percent in 1962 to 20.3 percent in 1973 of the average price, in the case of Malaysia, our study shows the opposite. Profit margins, as shown in the Table 9.6 and graphed in Figure 9.1, have fallen from $1.59 ¢ per barrel in 1970 to $1.01 ¢ per barrel in 1975. This has been due to 2 main reasons, (i) the series of crude oil price increases since 1973 made the raw-materials and crude costs in the Malaysian refineries to increase considerably, and (ii) the limitations or control on price increase and supply of petroleum products forthcoming into the market by the government under the Control of Supplies Act of 1961 in 1973 whereby increases on petroleum product prices allowed by the government at the retail level were small and thus oil companies could not recover their cost increases fully. (This will be discussed fully in Section 9.7).

TABLE 9.6: PROFIT MARGIN PER BARREL OF PRODUCTS

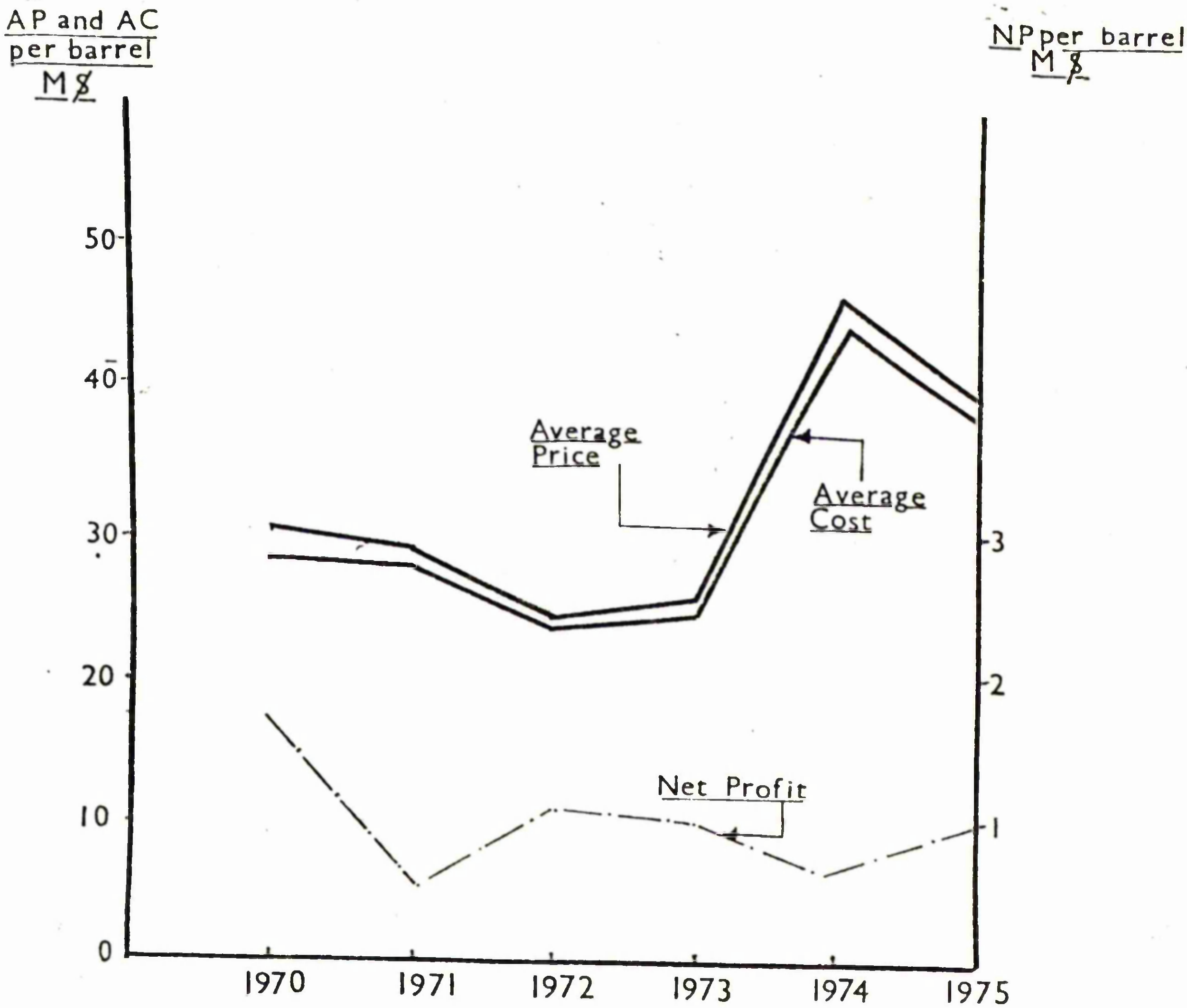
	1970	1971	1972	1973	1974	1975 (1)
Sales Revenue[2] (Net) (M$'000)	747605	769709	700868	821130	1693406	1459034
Sales Volume (Net) ('000 bls.)	24925	26271	28763	32206	36504	36380
Expenses (Raw Materials, Refining Cost, Freight, Depreciation Marketing and Distribution Costs (M$'000)	707905	757858	668991	787610	1669006	1422013
Net Profit	39700	11851	31877	33578	24400	37021
Average Price (AP) (M$ per barrel)	29.99	29.30	24.37	25.50	46.39	40.1
Average Cost (AC) (M$ per barrel	28.40	28.80	23.26	24.46	45.7	39.09
Net Profit Margin	1.59	0.50	1.11	1.04	0.69	1.01

(1) Figures for the first 3 quarters of the year 1975.

(2) Taxation has been deducted from the Figures.

Source: As for Tables 9.5 and 9.6 earlier.

Figure 9.1 : RELATIONSHIP BETWEEN AVERAGE PRICE, AVERAGE COST TO NET PROFIT



source : Table 9.6

9.5 Refinery Production Costs and the Problem of Joint Costs

The analysis obtained in the earlier section shows the relationship between average price and average cost of all petroleum products sold in Malaysia by the various oil companies from 1970 to 1975. In that analysis there is no indication of therelationship between individual product costs and prices.

The common approach used in getting closer look at individual petroleum product prices is by looking into the refinery production costs. Table 9.7 shows the refinery production costs in Malaysia from 1970 to 1975. In the first stage, a computation is made of the average refining costs for all the three refineries. Owing to the simple processing unit of Shell refinery at Lutong and the limited finished products produced by it, the average figures earlier do not reflect the true average cost of refining. Since the two refineries at Port Dickson in Peninsula Malaysia are of modern design and operating at technical efficienvy and producing an array of finished products, their average costs are considered here.

From the Table, the movements of costs and prices showed a regular pattern of increase over the 6 years and to some extent indicate some policy of cost and pricing

TABLE 9.7: REFINERY PRODUCTION COSTS IN MALAYSIA FROM 1970 TO 1975 (1)

	1970	1971	1972	1973	1974	1975 (2)
REFINERY PRODUCTION('000 bls.)						
E S M B (ESSO)	10699	8786	9533	10065	10950	7638
S R C (SHELL)	11604	11767	11301	10724	11429	10142
REFINERY COSTS ($'000)						
E S M B	23400	22100	22600	22500	33200	37900
S R C	22052	22740	21928	27398	34814	33438
PRODUCTION COST PER BARREL (M $)						
E S M B	2.19	2.515	2.37	2.24	3.03	3.72
S R C	1.90	1.93	1.94	2.55	3.05	3.30
AVERAGE COST PER BARREL	2.04	2.18	2.14	2.40	3.04	3.51

(1) Shell Lutong Refinery not included.
(2) till the end of 3rd Quarter.

Source: Data on Refinery Production and Refinery Costs obtained from private communications with the refineries concerned as that of Tables 9.4, 9. 5and 9.6.
Production cost per barrel is then calculated thereof.

in Malaysia. However, this analysis does not show any relationship between individual costs and prices of products. This apportining of prices and costs is important. For a successful operation, the industry must operate profitably, i.e., total revenue must exceed total cost. However, allocating costs to individula products poses several problems. This problem of allocation appears in the industry as it enters into the downstream operations - refining, transportation and marketing.

The costing of reginery products has been a perpetual controversy and exist since the existence of the modern refining industry. There have been as many suggestions to solutions as there are problems. However, none can provide an adequate and satisfactory answer.

In the petroleum industry, the problem of joint-costs i.e., apportioning costs amongst products enters into the downstream operations particularly at the refinery operations stage. It is difficult to estimate the cost of refining a gallon of product out of a given crude oil. This is because each is a joint-product. It is made along with other products, e.g., petrol, diesel, kerosene, fuel oil and even 'residuals' such as asphalts and bitumen. The essential difficulty inherent in the joint-product costing is the allocation amongst them the costs of raw materials, equipment, salaries, depreciation, etc.

In the refinery, for a barrel of crude oil input several products are produced as output. They are produced whether some of them are desired or not by the oil company. The production function of a refinery can only vary these proportion to a very limited extent. It is possible to increase the output of one product while decreasing the other a little. Although kerosene, for example, is considered to be undesirable by an oil company in Malaysia because of its low price in the market the production of a certain amount of this product is unavoidable. This is also true in the case of furnace oil in some countries. In these two cases, no cost has been incurred in order to produce kerosene or furnace oil, since they were not desired by the refining companies concerned, and to attribute a part of the total cost of refining either equal to its proportion in the total volume of oil production or to a proportion in the total sales would be wrong. And any attempt in allocating costs in this fashion is meaningless. Stigler in The Theory of Price[13] and Porter in Petroleum Accounting Practices[14] pointed out the fallacy of allocating joint-costs. In the case of firms, Stigler wrote that the principle of profit maximization is where Price is equal to Marginal Cost (P=MC) and it is at the minimum. Porter pointed out the impossibility of

---

13 G.J. Stigler, THE THEORY OF PRICE (New York: Macmillian, 1966), pp. 162-65.

14 M. Porter, PETROLEUM ACCOUNTING PRACTICES, (New York, 1966), p. 419.

attributing particular operating costs to particular products because of the complexity of costs in refining. According to Porter, the closest that one could get is by an arbitrary fashion.

From the economic point of view, however, although it is impracticable to allocate total costs to individual products in a joint-cost industry on an average cost basis, it would be better to decide prices on the basis of marginal cost basis to overcome the joint-cost problem. It is possible to compute the marginal cost of production of certain individual oil products. If a refinery decides to increase the proportion of light distillates such as petrol because of the increased market demand and high price, it can do so by installing a catalytic cracking unit. The marginal cost of installing the new unit is roughly equal to the total cost of installation of the unit and the discounted value of the loss of earnings over the whole life of the unit because of a fall in the proportion of other oil products. This estimated marginal cost of increased production in petrol plays a decisive role in determining whether the unit is to be installed or not. Unless the additional earnings over the whole life of the cracking unit, resulting from the increase in the proportion of motor spirit, less the discounted present value of the loss in earnings over the whole life of the cracking unit is at least equal to the cost of installation and the future discounted cost of maintenance of the cracking unit, it would not be economically feasible for a refinery to install a cracking unit.

9.6 The Structure of Oil Product Prices After the Oil Crisis of 1973.

9.6.1 Rationale for Product Price Increases by Oil Companies

In Malaysia and elsewhere any proposal for product price increases by oil companies will have to be submitted to the Government for approval. For the past 4 years (1974 to 1977) after the oil crisis, there were 4 price increases approved by the Malaysian government. The arguments for and rationale of product price increases advanced by both the Government and oil companies are discussed below.

Following the substantial crude oil price increases imposed by OPEC producing countries/governments on January 1, 1974 proposals for consumer petroleum product price increase in Malaysia were discussed by the oil companies in Malaysia with the Government. The oil companies involved were Shell Malaysia Trading Company, Esso Standard Malaysia Limited, Caltex Oil (Malaysia), British Petroleum and Mobil Oil Malaysia Limited.

Before going into the arguments for and the rationale of product price increases advanced by the oil companies, there is a need first of all to look at the method of calculating Crude Cost Build-Up and Recoveries (or in short CCBR). This is the central or key issue in the whole argument of product price increases.

There are several steps involved in the calculation of Crude Cost Build-Up and Recoveries. The first step is that of calculating the weighted average cost (F.O.B.) of the actual crude oil processed at the company's refinery. The second step is by adding the actual costs for local shipping (freight at LR AFRA) of the weighted average of the crudes earlier from overseas sources to Port Kelang - the port of handling in West Malaysia. This gives the Landed Cost of Crude in US \$ per barrel, (CIF crude price) which is the third step. This is subsequently converted into the Malaysian equivalence of crude value (M\$) on which a factor of 1.055 is multiplied to it to take into account ocean losses and standard refinery loss which together account for about 5.5%. The next step is to deduct the recovery settled in the last round of price increase (if available) in order to get the Net Cost Recovery required at that time (in M\$ per barrel). Three other considerations have been added into the crude cost build-up. For importers, the element of surtax - a sort of penalty tax imposed on importers, has to be added on to the cost of crude to get the Landed Cost of crude at Port Kelang. Two other items were included especially in the recent submissions for price increases. They were Freight Cost Increase and increases in financing and operating costs of oil companies during the period.

(i) <u>Price Increases of January, 1974</u>

As a result of the development in the crude oil price negotiation between OPEC and oil companies stated earlier in section 8.2.2 OPEC decided to increase the posted price of crude oils from January 1, 1974. They were raised to a level nearly 4 times higher than the prices that had been in force in early October 1973. Most of the price submissions by the oil companies made to The Government incorporated the cost of ocean freight. The oil companies felt that this item had not been given adequate consideration in the past price negotiations. They strongly felt that freight costs, being a major component of their landed cost must form part of the basis for determining the recovery of crude increases. This is because the long term trend is likely to be upwards due to increased cost of tankers and other operating costs.

Another argument put forth by oil companies in support of their application for product price increase was that of increases in financing and marketing operations costs which have not been considered in the past negotiations because increasing economies of scale had enabled them to absorb them. With the crude price hike, volume growth can no longer be assured and thus their ability to absorb these costs was negated. In addition, they argued that there had been substantial further increases in cost of labour, machinery and spare parts, and chemicals, catalysts, additives used in refining, as well as in land transportation and other marketing expenses. Financing costs were increasing substantially due to higher working capital requirements emanating from escalated crude costs and due to higher interest rates. The cumulative effect of these increases according to the oil companies was reaching proportions which can no longer be offset by efficiency improvements and therefore it was necessary to reflect these increases in product prices.

(ii) Price Increase of October 1975

The second application for product price increases by the oil companies was in October 1975. This followed the announcement by OPEC that effective October 1, 1975 the price of Arab Light Marker crude had been increased by 10 percent from its 1974 price. Other crudes also increased in price .

Sometime in December 1974 and more so during the early part of 1975, the U.S. $ weakened against the Malaysian ringgit so that the increased crude prices in January 1974 were largely offset by the lower Malaysian Ringgit (Dollars) cost of purchasing crude oil and petroleum products. However, in July 1975 the US $ began to strengthen rapidly so that by August 1975 the Malaysian Ringgit (M $) cost of purchasing crude oil and petroleum products had increased to levels higher than that of November 1974. This situation continued, so that the offset of a weak US $ is no longer available to cushion the effect of crude oil increases since January 1974.

With such large increases in the cost of oil companies' raw-materials, oil companies reiterated that they were still bearing the burden of under-recovery from the previous increases of January 1, 1974. They claimed that they cannot continue to trade normally without increasing the price of products they sell. The oil companies concerned applied for price increases in October 1975.

(iii) Price Increases of January 1977

Arising from the decision of OPEC to increase prices of crude oil with effect from January 1, 1977, the oil companies in Malaysia again submitted requests for retail price increases for the 4 main retail products. In view of the multi-tier price increase announced by OPEC, the various companies have requested different levels of price increases. The companies at the request of the Ad Hoc Committee subsequently submitted a joint application. The individual companies'requests were as follows : Shell 8.1 ¢ per I.G., Esso 7.9 ¢ per I.G., Caltex 8 ¢ per I.G., Mobil 8.1 ¢ per I.G. and BP 10.7 ¢ per I.G. The joint industry requests was on the average at 8.6 ¢ per I.G. The requests comprised crude and operating costs increases.

The applications made for product price increases by the various oil companies to the Malaysian Government from 1973 to 1967 is tabulated in Table 9.8 below:

Table 9.8 Product Price Increases Requested by the Oil Companies at Retail Levels (in ¢ per I.G. across the products)

Name of Company	1973	1974	1975	1977
Shell Malaysia Trading Sdn. Berhad	11.28	39.8	23.7	8.1
Esso Malaysia Berhad	11.28	46.6	33.6	7.9
BP Malaysia Berhad	12.8	37.30	33.6	10.7
Mobil Oil Malaysia Sendirian Berhad	11.34	36.70	23.1	8.1
Caltex Oil Malaysia Limited	14.7	46.7	35.0	8.0
Average Requested by Oil Cos.	12.28	41.42	29.8	8.56
Average Approved by the Govt.	13.2	29.4	27.2	1.525

Source : Private Communications with PETRONAS.

9.7 Government Approval for Product Price Increases

As a result of the oil companies' various submissions to the Government earlier, all petroleum products prices at all installations and depots in Malaysia were increased with a lag period of between 3-4 months after the submissions or requests. The various price increases for petroleum products at retail level approved by the Government from 1973 to 1977 are shown in Table 9.9 and graphed in Figure 9.2*.

The first price approval by the Government after the oil crisis was in December 22, 1973 when all petroleum products prices at all installations and depots in Peninsula Malaysia and East Malaysia were increased. Ex-pump prices for 4 products at all locations were also increased correspondingly and by the same amount as shown in the Table except kerosene which remained at the old level of $0.71 ¢ per I.G. For the East Malaysian state of Sarawak effective January 31, 1974 excise duties on petrol was raised from 90 ¢ per I.G. to $1.20 ¢ per I.G. in line with the import duties. (See Appendix 9A). Consequently the ex-pump price of regular petrol to their dealers were increased by 30 ¢ per I.G.

The second product price increase approved by the Government during this period was on May 9, 1974 about 5 months after the first approval. Two changes on approval were made this time compared to the price increase of December 1973. From the Table 9.9 earlier, kerosene was allowed a

*Product Price increases before 1973 are included in the Figure 9.2 for comparative purposes only. This helps to show the trends of the various product prices in Malaysia.

TABLE 9.9: PRICE INCREASES FOR PETROLEUM PRODUCTS AT RETAIL LEVEL APPROVED BY THE GOVERNMENT (M$ PER 1.G. KUALA LUMPUR PUMP PRICE)

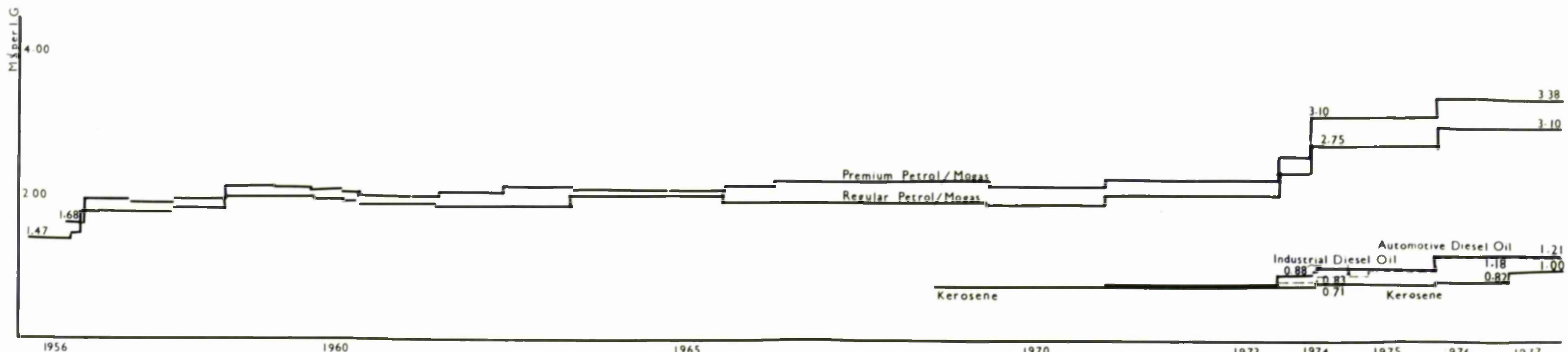
PRODUCTS	1971	In-crease	22.12.73	In-crease	9.5.74	In-crease	25.6.74	Duty In-crease	Realiza-tion Increase	17.2.76	In-crease	17.2.77
Premium Petrol	2.25	0.34	2.59	0.51	3.10	-	-	0.11	0.17	3.38	Duty in-cluded 0.03	3.38
Regular Petrol	2.08	0.24	2.32	0.43	2.75	-	-	0.11	0.14	3.00		3.00
Kerosene	0.71	-	0.71	0.05	0.76*	-	-	0.01	0.30*	0.82	0.18	1.00
Automotive Diesel (ADO)	0.81	0.11	0.92	-	0.92**	0.08	1.00	-	0.18	1.18	0.03	1.21
Industrial Diesel (IDO)	-	-	-	-	0.82	0.08	0.90	-	-	-	-	-
Fuel Oil	0.40	0.05	0.45	0.20	0.65	-	-	-	-	-	-	-

* Duty Reduction of 0.05¢ per 1.G.

** Duty Reduction of 0.20¢ per 1.G.

Source: Data obtained from PETRONAS.

Figure 9.2 PETROLEUM PRODUCTS PRICE HISTORY (M$ per IG)



source. Table Appendix 9A

revision of price upward by $0.05 ¢ per I.G. and automotive diesel oil was exempted from price increase. The allowance of kerosene increase to the oil companies was absorbed by the Government by reducing tax of similar amount of $0.05 ¢ per I.G. The Government gave a tax reduction of $0.20 ¢ to oil companies to enable them to reap the extra margin and at the same time allowing the diesel price to be at the old level. As a result of this announcement, prices of premium and regular petrol, kerosene and fuel oil rose up again at Kuala Lumpur pump-price registering the highest in the history of product price increases in Malaysia. However, the oil companies were dissatisfied as the price increases and duty reductions (except for petrol or gasoline) were far below the levels proposed by the oil industry and took no account of the industry's needs for retroactive recovery of crude and product cost increases incurred since January 1974.

For the next 2 years from the second price increases, the price of the 5 products mentioned earlier remained stable in the retail trade channel. However, following another price hike in October 1975, and subsequent application by the oil companies for product price increase, the Government announced price increases on February 16, 1976 and effective the following day. In this third price increase approval, the imposition of a nominal duty on kerosene was made and according to a Government source this was for control purposes and the oil companies could pass on the duty to the wholesalers but the retail price remained unchanged. The

Government instead promised to reimburse the oil companies by way of subsidy of $0.30 ¢ per I.G. for every gallon of kerosene sold. The Government would then use the increased duty revenue from gasoline to subsidise kerosene.

9.8 Effects of Product Price Increases on Trade Channels (Retail and Non-Retail)

9.8.1 Retail Trade Channel

The crude oil price hikes in 1973, 1974, 1976 and recently in 1977 together with the subsequent licensing of petrol, diesel and kerosene as controlled items in the retail market has led to an uneven distribution in the list price adjustments in individual products. The problems have been magnified as a result of the past price adjustments approved by the Government which were insufficient to allow for full recovery of increased 'crude' costs by the local refiners. The approved adjustment have led to a skewing of the price structure of rhese 3 products in the market, namely motor spirit known as petrol or mogas, diesel and kerosene. The past price revisions of 1973, 1974 and 1976 had been generally granted largely in the form of significantly higher petrol prices with only minimum adjustments to diesel and kerosene prices.

Table 9.9 shows the product price changes before and after the international oil crisis. Table 9.10 and 9.11 show the product prices and demand for petrol and diesel for the periods between 1971 and 1976.

Table 9.10 shows the widening of differentials between the Premium petrol and Regular petrol retail prices (the quoted price is the Kuala Lumpur pump price). The price

TABLE 9.10: PENINSULA MALAYSIA: PETROL PRICES AND DEMAND

	Kuala Lumpur Price M$/I.G.					
	1971 (June)	1972	1973 (Dec.)	1974 (May)	1975	1976 (Feb.)
(a) PRICES						
Premium Petrol	2.25	-	2.59	3.10	-	3.38
Regular Petrol	2.08	-	2.32	2.75	-	3.00
Difference	0.17	-	0.27	0.35	-	0.38
(b) DEMAND ('000 barrels)						
Premium Petrol	2240	2571	3193	3428	3829	2057 (½ yr
Regular Petrol	918	929	988	1369	1446	753 (½ yr
% Premium/Total Petrol	70.9	73.5	76.4	71.5	72.6	73.2 (½ yr
% Premium/Total Petrol (Retail Level)	41.5	44.3	43.7	43.9	42.8	42.6 (½ yr

Source: Data for prices obtained from Market Research Dept., Shell Trading Malaysia Berhad.

TABLE 9.11: PENINSULA MALAYSIA: DIESEL OIL PRICES AND DEMAND

	Kuala Lumpur Price M$/I.G.					
	1971 (June)	1972	1973 (Dec.)	1974 (June)	1975 (March)	1976 (Feb.)
(a) PRICES						
Retail	0.77	0.77	0.88	0.96	1.00	1.18
Commercial	0.64	0.64	0.81	1.01	1.10	1.28
Difference	0.13	0.13	0.07	(0.05)	(0.10)	(0.10)
(b) DEMAND ('000 barrels)						
Retail	1176	1286	1453	2101	2468	-
% Growth	8.7	9.4	13.0	44.6	17.5	-
Commercial	6056	6637	7005	7086	6932	-
% Growth	4.7	9.6	5.5	1.2	(2.2)	-
% Retail/Total	16.3	16.2	17.2	22.9	26.3	-

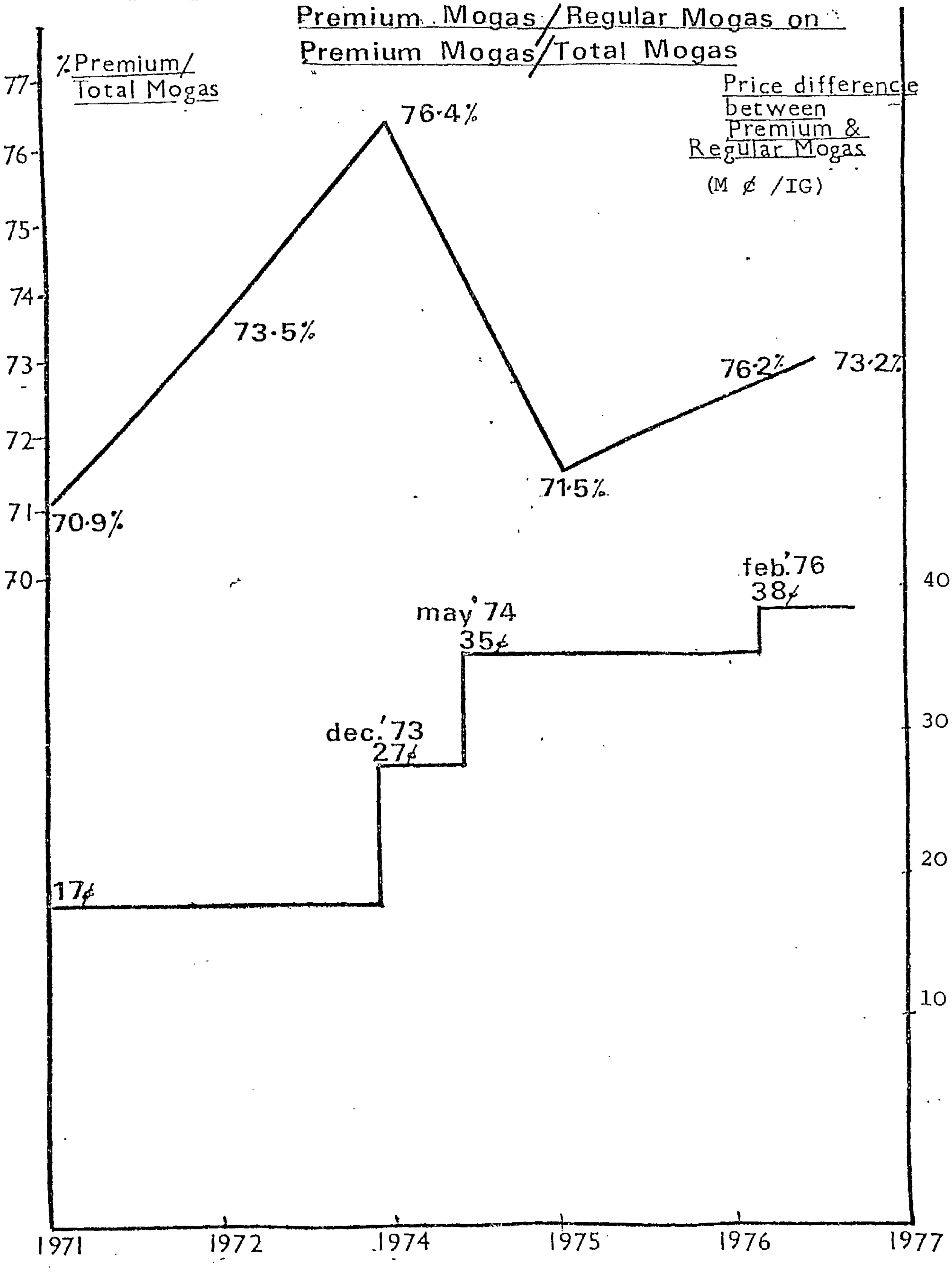
Source: As above.

differential has widened from \$0.17 ¢ in 1971 in favour of premium to \$0.38 ¢ in 1976 (February) having increased gradually through 0.27 ¢ in 1973 (December) and \$0.35 ¢ in 1974 (May). In the case of demand for premium in relation to total petrol, the ratio has increased from 70.9% in 1971 to 73.2% in 1976 hitting its peak at 76.4% before the announcement of price increase in 1973 (December).

The substantial fuel price increase at the end of 1973 (before the oil crisis) had not had any strong negative effect on the Malaysian motoring public. This was reflected in the maintenance of retail motor fuel sales at that time and only a little slow-down in sales of small and medium sized cars. However, there was a slippage in retail premium gasoline sales without any corresponding gain in the regular gasoline after the price increase became effective as shown in the downturn of the graph in Figure 9.3 after January 1973 - till the end of the year. This tended to support field reports that Malaysian motorists were becoming more and more travel conscious to save fuel expenditure in the early stage of crisis. However, the decrease in sales of premium petrol was small at around 5% over the period.

The conclusion from the above analysis is that the substantial price differential has an <u>immediate</u> but not sustained effect on the ratio. In the medium term forecast of one oil company, price differential was assumed to remain at the current level of \$0.38 ¢ per I.G. until the ratio

Figure 9·3 Effect of Price Differential Between Premium Mogas/Regular Mogas on Premium Mogas/Total Mogas



source: Shell and Table 9.10

gradually rises to 74.7 percent by 1978. In the short run the demand for petroleum products is very price inelastic and this is particularly true for certain products such as petrol for which no substitute is available. Some American studies suggest that the price elasticity of demand for petrol might be as low as 0.13 and in Malaysia it has been computed as 0.22.[15]

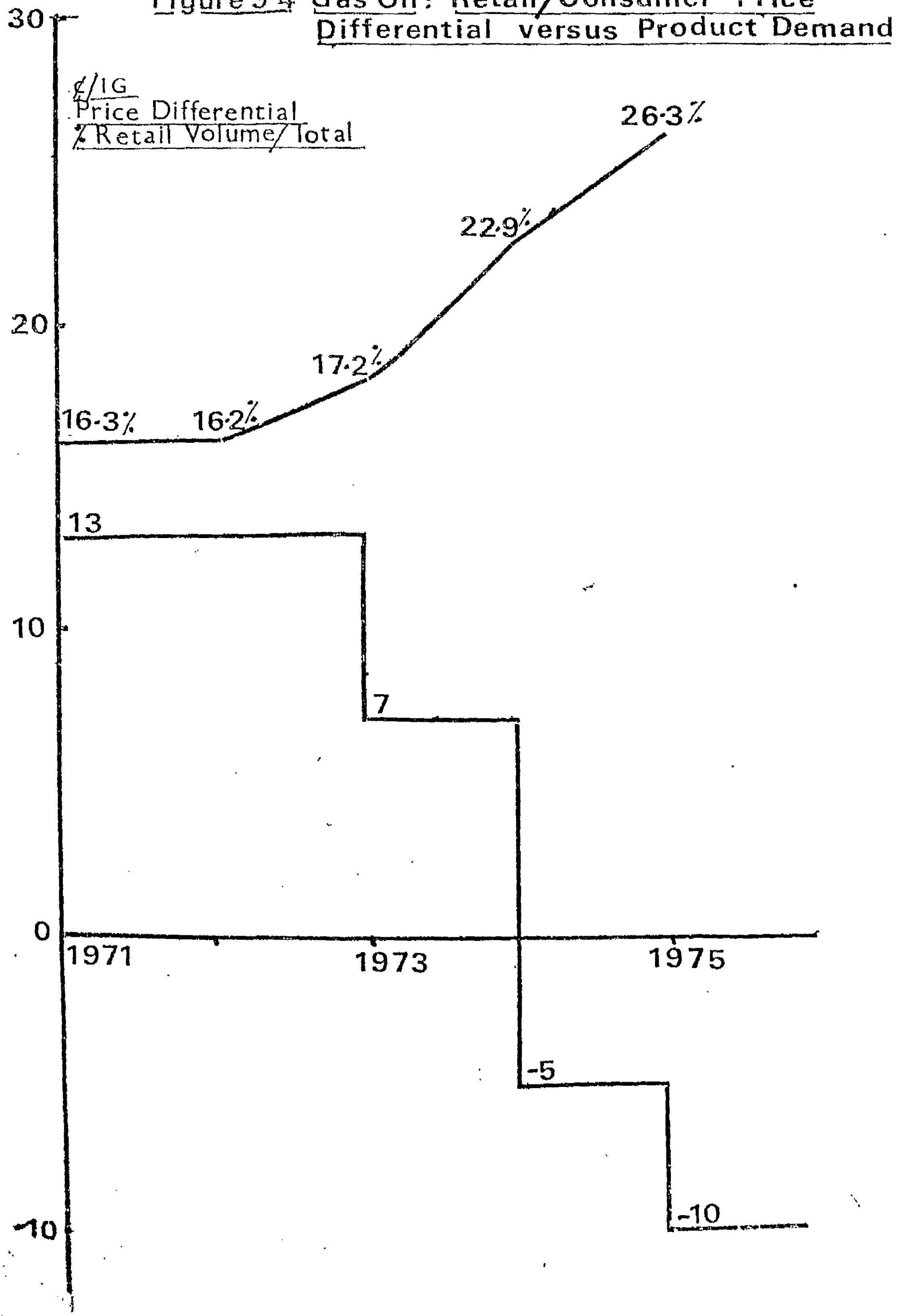
In the case of diesel oil, Table 9.11 shows the price differential between retail ADO and commercial ADO outlets widened very greatly in an opposite direction to the retail market's favour i.e. the commercial market has a price very much above the retail channel by $0.10 ¢ per I.G.

Market growth over the years has tended to favour the retail sales outlets which registered a 17.5 percent increase in 1975 compared to only 8.7 percent in 1971 (doubling the growth rate). Performance in the commercial channels registered a negative growth of 2.2 percent during the period as a result of the shifting of demand from commercial to retail outlets caused by the great difference in price. Despite measures taken by the Government and the oil companies to curb the flow of automotive diesel oil (ADO) to commercial sector, the same oil company quoted earlier forecasts percentage retail/total ratio to remain around the 1975 level. Figure 9.3 and 9.4 show the effects of the price differential on the demand ratio between products.

---

15 See Adnan, M.A. op cit.

Figure 9·4 Gas Oil: Retail/Consumer Price Differential versus Product Demand



Source : Shell and Table 9.11

However, amongst the controlled oil products mentioned earlier, kerosene sold at the retail for domestic lighting and cooking purposes showed the most sensitivity with regard to price and supply. For socio-economic reasons the Government has allowed only an absolute minimum in the increase of kerosene prices whilst placing higher increases on retail petrol and to a lesser extent on automotive diesel. Table 9.9 earlier shows that the increase in price of kerosens has been minimal from $0.17 ¢ per I.G. to $0.82 ¢ per I.G. over the period under consideration compared to non-retail market sales of between $1.10 ¢ and $1.15 ¢ per I.G. depending on the purchase agreement.

The two-tier pricing system adopted for diesel and kerosene has led to the free-flow from a low-price market to a high-price market leading to occasional shortages, hoarding, smuggling and profiteering of the two products. One obvious reason, however, lies in the much higher retail price of kerosene in Thailand, where this product could fetch as high as $ 0.50 ¢ per I.G. above the price than in Malaysia[16]. It is significant that the three States in the north of Peninsula Malaysia (Perlis, Kedah and Kelantan) which experience problems of shortage border on Thailand. Also since January 1974, Summit Petroleum Company of Thailand ceased their marketing activities in the states of Kedah and Perlis

---

16. Information from Monthly Market Report of an oil Company (Confidential)

where they have been supplying a monthly average of 100,000 I.G. of kerosene. Their sudden withdrawl affected the market.

For comparative purposes, it would be fruitful to compare diesel and kerosene prices in the neighbouring countries of Malaysia such as shown in Table 9.12.

Table 9.12 Diesel and Kerosene Retail Price in Selected Neighbouring Countries in 1975
(5 Asean Capital Cities and 1 Non-Asean City)

Location	M $ Equivalent per I.G.*	
	Diesel	Kerosene
Asean Cities		
1. Bangkok	0.84	0.87
2. Jakarta	0.58	0.47
3. Manila	1.51	1.40 to 1.63
4. Singapore	1.00	1.30
5. Kuala Lumpur	1.00	0.81
Non-Asean City		
1. Hong Kong	2.29	1.68

Conversion : * M$ 1 = 12.6 Bhats US $ 1 = MS2.56
= H.K. $ 1.94 = 7.5 Pesos
= S $ 1.00 = 415 Rupiah.

Source : Private Communications with PETRONAS.

The prices of kerosene were higher in the neighbouring countries compared to the price in Malaysia. This makes kerosene price in Malaysia to be the lowest in the region except Jakarta.

9.8.2 Non-Retail Trade Channels

Customer contract or non-retail prices are either tied to Pulau Bukom postings in Singapore or Ras Tanura in the Persian Gulf and the Government has no control or influence with regard to price level in this market. As a result of anouncement by OPEC of price increase for crudes and products on June 2, 1973, oil companies in Malaysia increased their contract prices to customers tied to Ras Tanura's posted prices effective June 8, 1973. The products affected were Regular Petrol or Mogas, Kerosene, Automotive Diesel Oil, Marine Diesel Oil, Light and Heavy Fuel Oil. And effective June 14, 1973 their contract prices to customers tied to Pulau Bukom posted prices on Premium Mogas, Regular Mogas, Kerosene, Automotive Diesel Oil, Industrial Diesel Oil, Marine Diesel Oil and Marine Fuel Oil were all increased.

The announcement by OPEC and the subsequent price increases in petroleum product postings in the non-retail channels have resulted in various reactions by the non-retail customers as well as the oil companies.

Sometime in October 1973, wholesalers in north and central Peninsula Malaysia obtained higher inventories than usual in anticipation of product shortage and price increase as a result of the Middle East Oil embargoes. At the same time, the wholesalers' selling activities in the market place were stepped up because of similar speculation by smaller resellers and sundry shop owners.

Most major oil companies increased prices for lubricating oils and greases as well as automotive specialities around November 1973. General discounts for wholesale automotive diesel oil were reduced by M6 ¢ per I.G. by all competing companies in early November. Other special discounts to distributors were withdrawn at the same time.[17] In conjunction with that, special automotive diesel oil discounts given to service stations were reduced by up to M6 ¢ per I.G. And effective from December 1, 1973 all discounts for ADO to service stations were eliminated and dealers were expected to sell at pump prices throughout the country. The November 2 and 27 increases in posted prices amounting to 12.3 ¢ per I.G. for ADO and 13.1 ¢ per I.G. for Light Fuel Oil (LFO) passed onto contract customers tied to these postings. Some oil companies were reported to have imposed a premium charge of 10 ¢ per I.G. for ADO sales to wholesalers which were above their historical average monthly volume. This move was believed to have been implemented to

17. Information from Monthly Market Report of an oil company.

ensure fair distribution of products and to prevent hoarding by wholesalers[18].

In the meantime, the product supply position in Malaysia remained "tight" particularly for the 3 importers - British Petroleum, Caltex and Mobil. One oil company was reported to have implemented a voucher - system for the sales of kerosene and ADO to wholesale market. Every customer was issued with vouchers concerning its monthly allotted volume. This was done to ensure effective policing of volume allocated to customers.

Again following January 1, 1974 crude price increases, and the February 1974 product posting increases in the Persian Gulf and Pulau Bukom respectively, the industry increased all escalating contract prices accordingly. Because increases in list prices at retail levels were awaiting Government concurrence at that time, contract prices were then substantially above list prices. This caused some contract buyers to protest their price increases but oil companies were firm in insisting they pay the escalated price. Some firm-priced contracts were converted to contracts with price-revision clause on 30 days notice. At the same time selling prices to these customers were substantially increased.

---

18. Monthly Market Report, ibid.

Towards the end of April 1974, all companies increased ADO, IDO and LFO prices to the commercial and wholesale trades. With this increase, wholesale and commercial ADO prices were 1 ¢ to 3 ¢ per I.G. above retail prices. The differential of 2 ¢ per I.G. between ADO and IDO, however, remained. At that level, LFO price were also revised upwards drastically to almost the same level as that of ADO and IDO to wholesale trade and non-contract commercial accounts. And effective April 15, lube oil prices were also increased upwards to recover increased costs. In the same period, all oil companies increased their ex-terminal kerosene prices to distributors by 7 ¢ per I.G., thus reducing distributor margins from 14 ¢ per I.G. to 7 ¢ per I.G.[19].

During this time ADO commercial bulk sale prices were already 1 ¢ per I.G. to 2 ¢ per I.G. above pump price ex-terminal. Competitors also increased dealer tank wagon prices by 3 ¢ per I.G. thus reducing the dealer margins from 7 ¢ per I.G. to 4 ¢ per I.G.

In the case of fuel oil, oil companies were ignoring the Government's announcement 20 ¢ per I.G. increase in fuel oil as the resulting list price quoted by the Government at 65 ¢ per I.G. was well below the level at which market prices for fuel oil had risen by the end of April 1974. The oil companies tried to maintain non-contract fuel oil prices within correct competitive levels of 92 ¢ to $1.00 per I.G.[20].

19. Monthly Market Report, ibid.
20. Monthly Market Report, ibid.

With the bulk ADO prices to wholesalers/commercial trades having been escalated above pump prices and with the increasing tighter credit, the convenience offered by service stations had become an attraction to commercial consumers such as vehicle operators, taxis and lorries. Also with a price differential of 10 ¢ per I.G. between service stations in Johore Bharu (the southern most town in Peninsula Malaysia boardering Singapore) and Singapore since March 1974, all trucks plying between the 2 countries were purchasing their ADO in Johor Bharu rather than in Singapore. In order to minimise ADO consumption at retail channels volume limitations at January - September 1973 average levels were reimposed since May 9, 1974 and dealer margins on ADO had been reduced from 7 ¢ per I.G. to 4 ¢ per I.G. to limit the incentive for dealers to sell ADO[21]. Thus the favourable retail performance reflected by substantial increase in retail offtakes or sales during this period was an artificial demand resulting from purchases from service stations by commercial/ industrial consumers who had to pay higher prices for bulk purchases from their traditional suppliers.

Following the price increase announced by the Government on February 17, 1976 various oil companies moved up their industrial gas oil (IGO) prices varying between $0.07 ¢ per I.G. to $0.08 ¢ per I.G. to $1.24 ¢ per I.G. (delivered). And on March 22, 1976 oil companies increased their dealer

21. Monthly Market Report, ibid.

prices for gas oil or ADO by a further 2 ¢ per I.G. to $1.26 ¢ per I.G.[22]

Sometime in January 1976, dyed kerosene was introduced both for domestic and industrial consumers. All oil companies in Malaysia since then were selling blue-dyed kerosene for domestic use and colourless kerosene for industries. Owing to the significant price difference between wholesale and commercial accounts as discussed in section 9.10 (a) earlier, the introduction of blue-dyed kerosene was to inhibit the wholesalers from selling kerosene meant for domestic purposes to the industrial sector where prices were substantially higher. Also this strategy would ensure adequate kerosene supplies for domestic users. The dyed kerosene was aimed at reducing adulteration of gasoline with kerosene.

9.9 Comparative Petroleum Product Prices Recoveries

Table 9.13 compares the 4 petroleum product prices in three of the Association of Southeast Asian Nations (ASEAN) member countries of Malaysia, Singapore and Thailand. The Table compares the retail pump price, duty, refund and recovery given to oil companies in their respective countries on the 4 products mentioned earlier.

---

22 Monthly Market Report, ibid.

TABLE 9.13: COMPARATIVE PETROLEUM PRICES IN SELECTED COUNTRIES

PRODUCTS	MALAYSIA					SINGAPORE				THAILAND			
	Retail Market Mix (%)	Pump Price (\$)	Duty (\$)	Refund (\$)	Recovery to Co. (\$)	Retail Market Mix	Pump Price	Duty	Recovery to Co.	Retail Market Mix	Pump Price	Duty	Recover to Co.
Premium Petrol	38.9	3.38	1.41	-	1.97	54.2	3.44	1.64	1.80	24.7	2.37	0.81	1.56
Regular Petrol	12.5	3.00	1.41	-	1.59	7.5	3.07	1.57	1.50	17.6	2.21	0.81	1.40
Diesel Oil	29.5	1.18	-	-	1.18	29.2	1.18	-	1.18	52.5	1.49	0.19	1.30
Kerosene	19.1	0.82	0.01	0.30	1.11	9.1	1.12	0.05	1.07	4.2	1.51	0.20	1.31
Weighted Recovery per l.G. (\$)					1.525				1.53				1.383

Source: Private communications with PETRONAS.

Before the oil crisis, petroleum product prices in Malaysia for the 4 petroleum products were almost the same as that of Singapore. As a result of the price increases in February 1976, comparative prices between the two countries differed especially with regard to premium and regular petrol. Prior to the price increases approved by the Singapore Government on April 21, 1977 the levels of recovery in Malaysia for the 4 products, except diesel, are higher than that of Singapore. In the case of Thailand, the levels of recovery are much lower than Malaysia despite the recent price increases approved by the Thai Government on March 17, 1977.

The factors affecting products price recovery among the 3 countries which border each other were due to the differences in local conditions. In the case of Singapore, the oil companies reasoned that the weighted average recovery obtained by the oil companies is more or less the same as that of Malaysia. However, in the case of Thailand, it was explained that the net recovery obtained by oil companies is higher due to lower investment in service stations and lower commissions given to dealers. Unlike in Malaysia and Singapore, dealers in Thailand build their own service stations and are only given $0.05 ¢ per I.G. commission, whereas in Malaysia the oil companies had to build their own service stations inspite of higher commissions given to dealers at between $0.15 ¢ to $0.17 ¢ per I.G. for premium, $0.14 ¢ per I.G. for regular and $0.13 ¢ per I.G. for diesel.

In view of the disparity in prices of petroleum products amongst the 3 countries discussed earlier, it would appear that the oil companies have benefited from the over-recovery in Malaysia, particularly the bigger companies with bigger market shares in the country. Despite the recent increase in prices of the 4 products in Singapore and Thailand, the levels of recovery obtained by oil companies from premium and regular petrol in these 2 countries are lower than the existing levels of recovery in Malaysia.

9.10 Actions/Measures Taken by the Government in Relation to Product Supplies

9.10.1 The Implementation of Control of Supplies Act of 1961

As with most other countries throughout the world during the early period of 1970's, Malaysia continued to experience pressure from the rapid pace of inflation and increasing shortage of certain products for her development since the turn of the 1973. During this period too, crude oil prices quadrupled as a result of rising "nationalism" among oil producing countries, and the Arab-Israeli conflict. After 1973, OPEC emerged as a powerful organization possessing the power to control and regulate the production volume of oil in their countries and "dictate" oil prices unilaterally. With this increases in material prices (crude) reflected in the product prices, there was an 'apparent' product shortages all over the country especially kerosene. This unsettled situation had been caused by the 'under-recoveries' in product prices approved by the Malaysian Government as a result of the crude price increases after 1973. This was compounded by the practice of hoarding, smuggling and profiteering.

In the light of the prevailing supply problem at that time, the Ministry of Trades and Industry (MTI) implemented the regulation under the Control of Supplies Act of 1961 . This followed the formation of the National Consultative Council in February 1974 by the Malaysian Government as a step to contain the increasing inflation in the country, it took amongst other things by announcing on March 8, 1974, that a special licence would be required for trading in such staple goods as sugar, wheat, flour, cooking oil, kerosene and fertilisers. This new licensing system, which was authorized by the control of Supplies Act of 1961, was expected to strengthen considerably the Government's legal position in the anti-hoarding campaign. Earlier to this too, the Government made petrol, diesel and kerosene as licenced items effective from March 1, 1974. Every manufacturer, wholesaler and retailers of any of these items declared licenced have to get a valid licence to trade. In the licence, all places of storage, business and quantities allowed to be stored at any one time are imposed mainly to ensure continuous supply of the 4 products

Kerosene was made a licenced article on March 21, 1974 and as such all manufacturers and distributors have to obtain licences to deal in the commodity quotas have been stipulated in the licenses allowing for a specific quantity to be kept at any one time and records of sales and purchases have to be maintained. Powers have also been provided for the direction of sales to areas affected by shortages. Unlimited purchases by industrial users from distributors and retail outlets have also been discouraged and new conditions imposed on the licensees to ensure continuity of supplies and to check the diversion of sales meant for domestic household consumption.

Before the declaration of control of Supplies Act of 1961 in October 31, 1973, there was no regulation pertaining to the control of supplies. The Ministry of Primary Industry then had the power of approving price increases with the approval and in consultation with the Prime Minister's Department. Later, this power was transferred to MTI. MTI took the initiative of setting up a Special Committee on Prices to deal with the ever increasing problems of petroleum product price increases. Since 1974, the first Price Committee was set up for kerosene in March, 1974 and the second one for diesel fuel at the end of October 1974. Since then the MTI is in charge of supplies of essential products including petroleum in Malaysia.

9.10.2 Government Policy Guidelines for Price Increases

As a result of the oil crisis of 1973 and the subsequent applications for product price increases by the oil companies in Malaysia, the Government has devised some policy guidelines in determining the new price structure for petroleum products at the retail levels in Malaysia. The basis on which the guidelines are based is on the social and economic set-up of the Malaysian community especially the effects of increases in these 4 controlled products on the rural poor and the low-income group.

As a result of this consideration, the Government had placed higher incidence of price increases mainly on retail petrol (premium and regular) used by the higher income group and to a lesser extent on automotive diesel sales through the pumps, with an absolute minimum on kerosene used by the lower income or poorer community in the rural areas leaving industrial or non-retail market prices which are mainly on contract and long term basis and subject to competitive bidding to find their own price levels.

These 3 products - petrol ,diesel and kerosene - and their marketing channels where final market prices are controlled by the Government are not to allowed to fluctuate normally, namely retail motor gasolines and high speed diesel (automotive diesel) sold through retail outlets and kerosene sold for domestic lighting and cooking purposes.

The market for kerosene, the most important of all the above products as shall be seen later, although estimated only to be around 88 million gallons per year or about 6.4 percent of the total consumption of petroleum products in Malaysia but 90 percent or 79.2 million gallons is for domestic use for household lighting, hawkers usage, padi drying and other similar uses. There are no chemical or physical differences between kerosene for domestic household usage and industrial use kerosene and this has led to some problems with regard to prices later on.

Also in the past, Government approval was based generally on the ratio of costs and returns expected from the sales volume of each individual products extracted from crude oil, i.e. petrol (both premium and regular), diesel oil, kerosene and fuel oil. In other words, it was based on product mix of the various by-products of crude oil on the basis of which an "over-recovery" was given for petrol (both premium and regular) and fuel oil with the expectation that the "excess" could be used to subsidize the relatively lower returns from the sales of domestic household-use of kerosene and diesel oil. Not withstanding this, the price of industrial use kerosene was allowed to find its own level by a process of competition amongst the 2 companies for industrial contract purchases.

The process of redistributing or rechanneling "excess" revenue collected from higher petrol prices to subsidise the relatively lower returns from the sales of kerosene and diesel oil in the above is called "cross subsidization". The principle or policy of cross subsidization is very popularly used in public enterprises or nationalised industries all over the world. In simple terms, it is a direct government intervention to provide a service for one group of people (the poor), which is subsidised by another group (the rich). In the United Kingdom, cross-subsidization is practiced in railways and coal production especially on production costs[23], in the case of the Iranian oil industry showed by Fesheraki's study, it operates on transport costs under the principle of "hidden subsidy"[24]. Like in Iran, in Malaysia, the principle of cross-subsidization also operates in the petroleum industry but it operates at the product levels as shown earlier.

9.10.3 Present Problems of Supplies and Prices of Petroleum Products

The four previous price revisions announced by the Government earlier have led to an uneven distribution in the list or retail price adjustments of the 4 controlled products. The problems have been magnified as a result of the cumulative effect of under-recoveries experienced by the oil companies.

---

23. W.G. Shepherd, "Cross-subsidization in Coal" in R. Turvey, ed., PUBLIC ENTERPRISES (London:Penguin Modern Economic Series, 1968). pp. 316-51.

24 F. Fesharaki, DEVELOPMENT OF THE IRANIAN OIL INDUSTRY - International and Domestic Aspects (New York : Praeger Publishers, 1976) pp. 288.

This has resulted in the further skewing of the price structure.

In the past, recovery of increases in raw-materials costs had been granted largely in the form of significantly higher petrol prices with only minimum adjustments to kerosene and diesel oil prices. Price disparities between retail diesel and kerosene versus commercial/international value of these products generates a false retail demand which "over-taxes" the retail facilities. The oil companies complained that they are incurring a loss of every gallon of automotive diesel oil sold through their service stations. Additionally, the oil companies pointed out that the extremely uneconomic situation with respect to the distribution of kerosene whereby they were loosing approximately \$0.60 ¢ per I.G. and even with the increase in price approved by the Government these would still be an absolute loss of \$0.25 ¢ per I.G.

The oil companies also proposed that price increases should be spread out over products on a basis which reflects the relative international market values of the products as typified by the prevailing Pulau Bukom (Singapore) product postings. The distortions in 1973 and 1974 alleged by them had led to some uneconomic product prices and uneven and inequitable cost recoveries among the oil companies. The result had been unstable product supply to those sectors of the community; this supply can only be assured by giving consideration to economic prices to all sectors of the community-rich and poor alike. They reiterated that should the Government wish to reduce the impact of overall price increase on any particular sector of the community (the rural poor), they believed that the Government should do so by way of direct subsidies rather than distorting price increase among products as in the past price revisions.

The rigid and skewed price structure imposed by the Government had resulted in the middle distillates of diesel and kerosene alleged by the oil companies to be marketed significantly below costs and consequently had discouraged sales of these commodities by some marketers resulting in recurring supply imbalances. Similarly, it had led to widespread illegal adulteration of petrol with low-cost kerosene, creating quality problems and loss of tax revenues to the Government. The oil companies argued that any further price skewing, resulting in greater losses on kerosene and diesel would only aggravate the situation. The oil companies wanted the Government to rebalance product prices but if this cannot be achieved then they suggested uniform price adjustments in both kerosene/diesel and petrol should be instituted.

9.11 Critique of the Present Arrangement

Three main weaknesses can be singled out from the above price arrangements.

Firstly, the agreement between the Government and the oil companies was based on a "goodwill" and understanding which does not provide any legal safeguard on the part of the Government should any break of agreement occur.

Secondly, the "over-recovery" in respect of petrol was a lop-sided decision. In the first instance while it brought immediate gains to the companies in terms of over-night increase in petrol and fuel oil prices, it did not guarantee that the price of domestic household kerosene ($1.00 ¢ per I.G.) will be maintained for as long as the prices of petrol and fuel oil are permitted to be sold at the over recovered prices of $3.00 ¢ per I.G. and $0.65 ¢ per I.G. respectively. In the second instance, the volume of sales of any domestic household kerosene is relatively small as compared to the total volume of premium and regular petrol marketed thus avoiding an apparent gain to the companies through their product-mix presentation. In the third instance, any "forced" increases in the prices of domestic household kerosene (resulting from further shortage) will not result in a downward readjustment of the "over-recovered" prices of petrol and fuel oil.

Thirdly, the decision on the two-tier pricing system of kerosene for industrial and domestic household users with distribution being undertaken by the same resellers did not anticipate the flow from low-price users (74 ¢ to 80 ¢ per I.G.) to the high-price consumers ($1.05 ¢ to $1.08 ¢ per

I.G.), thus causing acute shortages in the lower-price markets. This is currently the major source of the shortage problem in the domestic household-use sector with the existing price structure, the companies have claimed that although with the subsidy on the domestic household-use kerosene given by the Government, they still incur a loss in the region of $0.30 ¢ to $0.50 ¢ per I.G.

9.1.2 <u>Market Readjustment and Supply Problems</u>

As a result of the price arrangements earlier, what therefore followed over the ensuing years was the readjustment to the pricing structure namely by resellers diverting more and more supply meant for domestic household consumption to industries, a reaction motivated by the higher gain resulting from the price differential between the 2 sectors - resellers margin being around 8 ¢ per I.G. to the former channel compared to between 4½ ¢ per I.G. to 5 ¢ per I.G. depending on the industrial purchase agreements or contracts in the case of the latter. Secondly, the oil companies themselves established sales where lists or "quotas" on their distributors who have been supplying kerosene for domestic household consumption thus diverting a large volume to the direct industrial consumers from which they were fetching about $1.15 ¢ per I.G. by direct sales as compared to about 65 ¢ to 72 ¢ per I.G. for domestic consumers.

During the period too, the following practices were especially rampant among the manufacturers, importers and distributors of kerosene which contribute too to the symptoms of the underlying shortages. Deliveries of kerosene were made on a weekly basis and when the monthly allocation has been exhausted by the third week of the month, the particular distributor will not be given additional supplies by the companies. Deliveries were also stagerred and irregular especially to areas which were removed from the depots and main towns. And in the northern and southern states where supplies were largely supplemented by the amount brought in through foreign resellers, the volume of domestic household consumption was rapidly withdrawn and diverted to industrial consumers.

Over the years and with subsequent product increases and under-recoveries granted by the Government, other causes of supply shortages became apparent. The normal rate of commission granted to wholesalers of domestic kerosene by the oil companies was in the region of 1o ¢ to 13 ¢ per I.G. However, effective June 1976, one oil company had taken steps to reduce their commission from 13 ¢ to 11 ¢ per I.G. and subsequently to 9 ¢ per I.G. on October 1, 1976 on normal purchase. It is further reduced to 3 ¢ per I.G. on additional volume. The objective of the company in doing so was to reduce their sales of kerosene which had increased substantially in May 1976.

From June 1, 1976, an oil company had increased its transportation costs to wholesalers between \$ 0.01 ¢ to \$0.09 ¢ per I.G. depending on the distance from the main supply depot. These increases had caused reductions in commissions to wholesalers which indirectly have resulted in reduction of domestic kerosene in south of Peninsula Malaysia as they were the main supplier in the region.

Deliberate restriction on the increase in kerosene supply during the first 10 months of 1976 was made by all oil companies (except one). Most oil companies had not been supplying the required additional quantities to meet the increase in consumption.

By this time the Government had instructed oil companies to introduce "blue-dyed" kerosene for non-industrial or household use and "water white" kerosene for industrial use to curb the flow or rechannelling of kerosene from the former to the latter. The plan was thwarted by the ability of certain wholesalers and retailers in removing the blue-dye in domestic kerosene by the use of "Fuller's earth".

Lastly "excessive" buying above normal requests by consumers had further aggravated the supply situation. This was due to the feeling of uncertainty with regard to the price of domestic kerosene because of the number of price increases in the past.

At any rate, it must be emphasised that the allocations in supply over the past 4 years (1973 to 1977) are essentially symptoms of the underlying problems and not the actual causes. Although the pricing structure had been shown to be a major cause of the present problems, one cannot rule out the existence of other causes, such as (i) increases in demand due to the growth of new industries and household consumption, (ii) the substitution of kerosene for gas and diesel oil as a cheaper source of fuel, (iii) the inherent inefficiency of the distribution system including transportation difficulties and payment problems on cash basis instead of credit, and new distributors operating over wide areas and failing to maintain regular deliveries.

As a collolary, it can be deduced that although supply has expanded, it has not fulfilled the entire requirements of demand especially for domestic household consumption. The total volume supplied has indicated an increase but the more significant proportion of this increase has been to industrial users.

9.13 "Deskewing" of the Product Price Structure

Sometime in November 1975, the Malaysian Government decided to form Cabinet Sub-Committee on Price Review. At the same time the Ministry of Trade and Industries (MTI) also suggested the formation of a working committee comprising of officers of the various government departments to (i) verify the facts and figures submitted by the oil companies and (ii) to consider the proposed pros and cons of the present two-tier pricing system of kerosene and diesel.

There are 2 methods to overcome the present problems. Firstly to develop some policy guidelines in granting recoveries to oil companies as a result of crude oil price increases and secondly, to offer solutions to the present problem -i.e. to deskew the price structure at the same time minimising the burden of the general consumers and unloading some of the burden from the oil companies.

After experiencing some hard negotiations in the past with oil companies, the Price Committee (thereafter the Committee) has developed some guidelines in evaluating oil companies requests for price increases. They include the evaluation of (a) Market Configuration and (b) Cost Increases.

Market Configuration of petroleum products of the individual companies is a significant factor in deciding the actual recoveries of the industry and the individual companies. To be consistent with past price increase exercises the retail market configuration was considered as the basis for a recovery to be allowed.

Having set the quantum of recovery, the Committee looked at oil companies cost increases which consist of (a) crude cost increase, (b) operating cost increase. The basis of determining crude cost increase is by a starting/chosen "base" period, different exchange rates US $ to M$ (the different between the exchange rates at the base year and the current year recovery is sought), fuel and refinery loss factor of 5.5% (the internationally recognised measurement). The last item had been disregarded by the Government in the previous submissions before 1977.

The crude cost recovery is not being determined on the basis of marker crude (Arabian Light). The quantum of recovery is based on the weighted average of the industry, since oil companies obtain their crudes from different sources.

The determination of recovery on the basis of market crude is inappropriate since it would result in an inequitable levels of recovery. If the Government, on the other hand, decides to give the necessary recovery to oil companies while keeping and maintaining the present retail prices, the Committee suggested 3 ways out of the problem. viz. duty reduction on petrol (premium and regular), cash subsidy (such as the kerosene subsidy) and duty exemption on petrol. Each of the alternatives have their advantages and disadvantages.

Duty reduction of petrol involves reduction at a level in line with the quantum of recovery to be granted. Since different companies have different market configuration, such reduction would result in an inequitable recovery of the various companies. Some companies would over-recover when they have larger petrol or mogas market and companies which have larger diesel oil market (and small mogas market) would under-recover. This would discourage companies to expand their kerosene and diesel sales and thus reduces the sales of these products in the market. This would result in the supply problems from retail kerosene and diesel oil with the present increased differential between their retail and industrial market price.

The second alternative is of cash subsidy which involves cash payments to oil companies as presently done to domestic kerosene. By extending the scheme to include diesel as well, it would place the Customs and Excise Department a heavier burden, complication and additional manpower to do so.

Duty exemption on petrol would mean that the amount of recovery to be given to each company would be determined by the monthly sales of domestic kerosene at retail diesel. The oil companies would be exempted from payment of duty on mogas for that amount. The tax exemption would only be given after verification by the Customs and Excise Department.

With the continuation of depressed or low price for the 2 sensitive retail products of diesel and kerosene to continue in the future and thus dislocating supplies from time to time, the Price Committee proposed that prices on these products be revised (minimum increase) and deskewed (reduction of kerosene subsidy and excise duty on mogas be increased) without increasing the prevailing weighted level of recovery obtained by oil companies. This is done by looking at the increase approved by the governments of the neighbouring countries. And above all, the Committee recommended the price of kerosene be fixed at 0.20 ¢ per standard one litre bottle.

Earlier in a meeting in early 1977 to find means to minimise the impact of oil price increase to the consumers, both industrial and non-industrial consumers and the economy as a whole, the Committee had put forth 4 alternative suggestions which include (a) direct subsidy, (b) issuing of coupons to certain consumers, (c) Petronas to buy essential products and to resell them at the controlled prices and (d) stabilization fund.

In (a) above, the Committee felt that direct subsidy was distasteful from the economic and political viewpoints. If this alternative is introduced, all consumers will benefit and it would be too costly. The second alternative is for the government to tax exempt certain products and hence these products will be sold to identified consumers at a relatively lower price. This system could be implemented by the issuing of "coupons" to the identified consumers. The operation of this system is complicated. The "tax exemption" aspect will further burden the Customs Department which is already complaining to the Government of their administrative difficulties.

The final alternative is for PETRONAS to undertake the distribution of essential petroleum products at the controlled prices and this system is expected to alleviate the kerosene supply problem. However, it may not be advisable for PETRONAS to undertake this exercise because the likely adverse economic effects to PETRONAS. The Oil companies will be more than willing to let PETRONAS undertake domestic distribution of diesel and kerosene and leave the oil companies concentrating on the more profitable activity.

Lastly MTI also suggested (d) that a stabilization fund be created to lessen the impact of increases in oil prices. A conservative figure of M$100 million is envisaged to operate this fund. They felt that the source of fund would be derived from "cess"[17] imposed on the export of crude oil.

---

17. This is to be similar to the rubber "cess" levied on rubber exports in Malaysia. The collection from the rubber cess or tax is used to provide grants and subsidies for rubber smallholder farmers for replanting purposes, buying seeds and fertilisers. Similarly petroleum cess could be used back for the development of the oil industry - subsidies for products, research and development and so on.

CHAPTER 10

GOVERNMENT LEGISLATION, STATE INTERVENTION AND PARTICIPATION AND INDUSTRY CONTRIBUTIONS TO GOVERNMENT REVENUE

10.1 The Development of Oil Legislations and Policies in Malaysia

There are three basic stages in the development of the legal framework for the petroleum industry in Malaysia to be considered in this chapter. The first is that of the Concession System which governed the oil legislation in the constituent states of East Malaysia and that of Peninsula Malaysia up to 1965. The second phase in the development of the legal framework of the petroleum industry is related to the standardization of the petroleum legislation in all the states of Malaysia as a result of the passing of the Petroleum Mining Rules of 1966 which changed the Concessionary System to that of Profit Sharing on Equal Basis between the Companies and the Government in Malaysia. Later in 1974 the Profit Sharing System was replaced by the Production Sharing System with the passing of the Petroleum Development Bill in Parliament in 1974. The subsequent Petroleum Development Act established PETROLIAM NASIONAL BERHAD (PETRONAS) the state oil company as the Principal.

To appraise these developments in the legal framework of the industry over the past 66 years, this section traces the development scenarios of oil legislation and policies in Malaysia from 1911 till the present. It is against this background that, the various contributions of the industry to the economy are unfolded in the following sections.

10.1.1 The Concessionary System

The first concession granted to any oil company operating in Malaysia was in Sarawak on March 19, 1909 called the Sarawak Prospecting Licence for the rights to explore for petroleum. The Concession was made between the Rajah Brooke of Sarawak on behalf of the Sarawak Government and the Anglo - Saxon Petroleum Company. They were the legal pre-requisite under which the oil companies could gain the first general view of promising structures in a country largely unexplored geologically. The exploration licences were issued for a 75 year period on the conditions agreed upon by the Government of the day and the oil company. This was the foundation stone for concessionary terms between the Government and the oil companies.

After April 29, 1921 the granting of concession had been standardised by the Mines and Minerals Enactment of 1921. It was a one-paged document which granted permission to explore and produce crude oil. It was called the Prospecting Licence. After World War II and following the British colonial influence over the Borneo Territories, another amendment was made to the earlier Mines Enactment of 1921. This was called the New Lease and was passed on June 23, 1952 in the state of Sarawak. This applied only to the state of Sarawak because it was the only area where oil activities had been going on for a longer period than in West Malaysia. In 1954, however, an Order in Council extended the mineral rights of Sarawak to include the area of the Continental Shelf, which was then formally incorporated into the Shell Oil Mining Lease under the terms of the Supplementary Deed made in 1956.

Before 1966, the Sarawak Government under the terms of the Sarawak Mining Ordinance adopted in 1958 granted a new oil prospecting right. The Ordinance did not affect Shell's rights under its 1952 oil mining lease except to the extent that any regulations issued to implement the 1958 Ordinance would apply to Shell provided that they were not in conflict with the terms of the existing lease. The 1958 Ordinance was essentially an enabling Act which specified the basic conditions under which the Government might grant oil exploration and prospecting licences. Licensee and Lessees must pay an annual rent which increased with the age of the right. Royalties for licences and leases remained the same: 12½ percent for oil and 5 percent for natural gas. Both rates were lower for offshore production.

Under the Concessionary System there were two sources from which any Governments of the producing states get their oil revenue - royalties and income tax. In Malaysia, the only revenue from oil producing operation (crude oil) was that received by the Government of Sarawak from their oilfields which started production in 1911. This revenue was obtained from royalties on crude oil and natural gas and latterly income tax on profits made by the Sarawak Shell Oilfields Limited in selling refined products processed from their Lutong Refinery.

In the case of Sabah there was no crude oil or natural gas production prior to 1966 although legislation stipulating provisions for the payment of royalties and income tax on crude oil and natural gas had been enacted under the 1958 Oil Prospecting Agreements.

In the case of Peninsula Malaysia, no royalties and profit tax legislation on crude oil had been made as there was no oil prospective areas yet found in the area but the Government reaps revenues from profits or income tax on locally produced petroleum products by the domestic refineries.

In the case of Sarawak, the Sarawak Oil Mining Ordinance of 1958 and in Sabah, the Sabah Prospecting Licence provided for the payment of royalties on crude oil and natural gas production. Crude oil found on land (onshore) in Sarawak the royalty rates was fixed at 10 percent and in Sabah it was 12½ percent. In the case of crude oil found offshore the royalty rate in the 2 countries were fixed according to the distance from the coast or landfall. On the territorial waters within 3 miles from the coast the rate for Sarawak and Sabah was at 12½ percent; between 3 and 10 miles from the coast at 8 percent and more than 10 miles 5 percent both for Sarawak and Sabah. In the case of natural gas, the royalty rates fixed varied between offshore and inland and the distance from the shore. On land and in the territorial waters in Sarawak i.e. less than 3 miles from shore the rate was M 0.07¢ per 1,000 cubic feet, between 3 and 10 miles from the coast at M 0.048¢ and more than 10 miles at 0.028¢. In the case of Sabah, the rates on land as in territorial waters was 5 percent, between 3 and 10 miles from the coast 4 percent and more than 10 miles from the coast 3 percent.

All the oil companies operating in Sabah, Sarawak and Peninsula Malaysia were subject to a general corporate income tax on their profits from crude oil and natural gas sales. This was set at 40 percent of taxable profits in all the states. Expenses were deductables from income but rates of depreciation of capital investment allowed for tax purposes varies between Sarawak, Sabah and Peninsula Malaysia. Royalty payments on crude oil production was allowed as a deductable expense in calculating the taxable income.

10.1.2 The Profit Sharing Arrangement or the 50:50 model

As a result of merger between the states of Borneo and Malaysia, and the need to standardise the petroleum legislation in Malaysia, W.J. Levy Inc. was commissioned by the Malaysian Government in 1965 to review the petroleum policy of Malaysia. The terms of reference of the Commission was to make recommendations on the policy which should be adopted by the Malaysian Government to promote oil exploration in Malaysia and the effective exploitation of existing and potential discoveries and to ensure an equitable share of the value of any oil for the Malaysian Government. The Commission was to recommend the legislation governing oil prospecting and mining licences, the prospecting terms and conditions and taxation system to be adopted[1].

The oil policies adopted by the two East Malaysian states of Sabah and Sarawak in the past 55 years till 1965 had provided the fiscal framework for petroleum exploration and exploitation in the states. However, the terms of prospecting licences and mining leases were either inflexible or needed modifications as they did not establish comprehensive fiscal framework within which all such petroleum exploration and developments would be carried out uniformally throughout Malaysia. A new petroleum mining and income tax legislation was, therefore, needed and made to accomplish 2 main objectives (1) to encourage the most rapid and effective search for and development of the country's oil resources and (2) to provide

1. Levy, W.J. A REVIEW OF THE PETROLEUM POLICY OF MALAYSIA, W.J. Levy Associates, April 1965.

a maximum contribution to Government revenue[2]. In the light of these objectives, the Levy Report recommended that the basic principles of the arrangments determining Government revenue from oil production in Malaysia should be related to those in force, from time to time in the major oil producing countries of the Middle East[3]. While this being so, the Report took into account the fact that physical conditions for oil exploration and development and the prospects of finding oil were less favourable in Malaysia then they were in the Middle East[4]. Basing on the fundamental changes in oil exploration and production laws such as in crude oil producing countries of Libya, Algeria and Nigeria in the 1950s, the Levy Commission found the 50:50 profit sharing model appeared to provide a sound framework both its effects on the Malaysian Government revenue and oil companies return on investment[5]. The other reason for adopting this model was because most of the Middle East crude oil, produced under such arrangements, were also the crude oils produced in Malaysia directly competed for delivery to refineries either in Malaysia or in the Far Eastern countries.

In Malaysia where the risk of incurring heavy exploration expenditures without finding any oil was much greater than in an established producing country in the Middle East or North Africa assurance in terms of incentives for explo-

---

2-3. Levy, W.J. ibid., p.15

4. Levy, W.J. ibid., p.18

5. Levy, W.J. ibid., p.19

ration was given prime importance by the Levy Committee. To achieve this objective, modifications were made to the profit sharing model, not by changing the basic principles of the agreement, but by incorporating special "incentive allowances" into the tax rules[6].

Another area of significant development in any profit sharing arrangements was the Petroleum Income Tax Enactment. This was separated from the general corporate income tax legislation. The Petroleum Income Tax Enactment would apply to the upstream activities of the petroleum industry in the exploration, development and production of crude oil and natural gas. The general corporation income tax governed the downstream activities of the industry - transportation, refining and marketing of petroleum products. The Petroleum Income Tax Enactment applied uniformly throughout Malaysia provided the fiscal framework within which the new legislation was drawn and the terms on which prospecting licences and mining leases were based[7].

Based on Levy's recommendation, a close cooperation and co-ordination between the State Government and the Malaysian Ministry of Lands and Mines was made in administering and implementing the petroleum agreements. The State Government had the power to issue prospecting licences and the Federal Government the right to supervise petroleum mining leases[8].

6. Levy, W.J., ibid. p.24
7. Levy, W.J., ibid. p.30
8. Levy, W.J., ibid. p.34

The fundamental provisions of the Profit Sharing Agreement between the Malaysian Government and the oil companies operating in Malaysia is given in Appendix 10(A).

10.1.3 Petroleum Development Act and the Concept of Production Sharing

The oil legislation in Malaysia underwent a change once again for the second time in 1974. This stems from the fact of the discovery of substantial petroleum reserves/deposits in the offshore areas of Malaysia in the early 1970's which resulted in a significant increase in the production of crude petroleum. Although speculation about the existence of those deposits occured long before 1973, it was only about this time that the potential importance of petroleum became a serious political consideration. The passing of the Petroleum Development Bill in Parliament in 1974 and the announcement by the late Prime Minister, Tun Abdul Razak, of the establishment of PETRONAS (Petroleum Nasional Berhad), the National Petroleum Corporation Limited, changed the whole political atmosphere. Apathy was replaced by a feeling of euphoria but also by a concern that the newly found resource should be locally controlled.

The Petroleum Development Act spells out the framework for PETRONAS's operations and the role to be played by the National Petroleum Advisory Council (now reduces in status to Petroleum Development Unit in the Prime Minister's Department). The Act makes no specific mention of production sharing for this is spelt out in a separate agreement between PETRONAS and oil companies.

The Petroleum Development Act of 1974 came into force with the establishment of PETROLIAM NASIONAL BERHAD (PETRONAS) on October 1, 1974[9]. Section 2(1) of the Act vests the entire ownership and the exclusive rights, powers, liberties and privileges of exploring, exploiting, winning and obtaining petroleum whether onshore or offshore of Malaysia in PETRONAS which was incorporated under the Companies Act of 1965.

Section 3(1) of the Act spells out petroleum is subjected to the control and direction of the Prime Minister. PETRONAS is subjected to both Federal and the various State Governments in financial matters. Section 4 stipulates that the Corporation has to make relevant cash payments to the Federal Government and the relevant State Government(s) from which the oil is produced. And to make effective control of PETRONAS in Section 3(1) earlier, the National Petroleum Advisory Council was established with the duty to advise the Prime Minister on national policy, interest and matters pertaining to petroleum, petroleum industries and energy resources and their utilisation as spelt out in Section 5 (ii) of the Act.

---

9. except sections 6(3), 6A, 7A, 7B and 7C which came into force on May 1, 1975.

The Act gives sweeping powers to PETRONAS over the oil activities in Malaysia. Section 6(i) advocates that the business of processing and refining of petroleum or manufacturing of petro-chemical products from petroleum could only be carried out by PETRONAS and no other oil companies. And Section 6(ii) establishes that companies which existed to carry out such business before the operation of the Act will have to get the permission of the Prime Minister in order to continue operation.

Any other company besides PETRONAS which gets the licence to continue the business, are obliged to keep 2 types of shares - Management Shares and the Ordinary Shares (Section 6.1(a). These Management Shares can only be issued to PETRONAS (Section 6.1(b)). Further to this, in Section 6.2(a) if the shares of the company in question are quoted on the Stock Exchange in Malaysia or elsewhere, the company will have to issue for cash at a price which is equivalent to the market price of the ordinary shares prevailing at the date of issue of the shares. The Act values that the Management Shares issued to PETRONAS is equal to one percent of its issue and paid-up capital. Section 6(6) of the Act puts the privileges of the holder of the Management Shares. The holder of such shares are entitled to 500 votes (500 votes to one management share) in matters relating to the appoinment or dismissal of a director or any member of the staff of the company.

Further to the implementation on October 1, 1974 of Petroleum Development Act earlier, the Act gives the power to the Prime Minister to make regulations for the purpose of carrying out the provisions of the Act. The first set of regulations made under the Petroleum Regulations, 1974 (Section 7) were signed by the late Prime Minister on December 3, 1974. These Regulations are called the Petroleum Regulations of 1974.

With the Regulations being put into force, all existing oil companies which have been issued with exploration licences or have entered into petroleum agreements under the Petroleum Mining Act of 1966 have to submit to PETRONAS all data, information and records pertaining to survey, study, research, exploration and production carried out by them. The application in terms of continuing any business or service 3(a) licence to commence or continue business of processing or refining petroleum or manufacturing petrochemical products from petroleum and related business 3(b)(i) and equipment and facilities pertaining to petroleum activities 3(b)(ii) Sec. 6 spells out 15 conditions relating to Section 3 above which include royalties, bonuses, work and investment programme, employment and training, fixing of prices, distribution, marketing etc.

After a heated controversy and the unwillingness of the oil companies to enter the Petroleum Development Act and production sharing, the Government repealed the Petroleum Development Act of 1975, governing the provisions involving the issue of the Managment Shares by oil companies to PETRONAS. The Act also amended section 6 of the Petroleum Development Act of 1974 so as to enpower the Prime Minister to exempt certain business activities relating to petroleum and petrochemical products from the requirement that they be licenced. The amendment also provides for the payment of compensation to oil companies in the event of nationalization of oil companies by the Malaysian Government in line with Article 13 of the Malaysian Constitution.

10.2 The Production Sharing Arrangement

In December 1976, after a series of negotiations regarding the production-sharing agreements and issues in the Petroleum Development Act, PETRONAS finally reached agreement on fiscal terms with Sarawak Shell Berhad, Sabah Shell Co. Ltd. and Pecten (Malaysia) Company and Exxon Production Incorporated (now Esso Productions). With the signing of the production sharing agreements, Malaysia has ushered in a new era in its petroleum development history.

The Malaysian production-sharing-contract is basically the same with other production-sharing contracts in other countries. However, it is believed that the Malaysian production-sharing contracts have two new features - a royalty clause and a built-in provision for the Government to benefit from an increase in world oil prices - which are uniquely Malaysian and a new contribution to petroleum legislation.

The basic production sharing formula of 70:30 agreed between PETRONAS and the oil companies means in practice the Government will get 68.5% of the oil produced while the companies take 31.5%. That is to say for every 100 barrels of crude oil produced, the split between PETRONAS and the oil companies are as follows: the companies get 20 barrels for cost recovery and the Government gets 10 barrels as royalty. This leaves 70 barrels to be split in the 70:30 formula. At 70 percent, the Government will get 49 barrels, the companies get 21 barrels. Out of the 21 barrels received by the oil companies, they will have to pay the petroleum income tax of 45 percent or 9.5 barrels. This leaves the oil companies with 11.5 barrels. On adding the 20 barrels earlier which they get for cost recovery their total take becomes 31.5 barrels. The present agreement in addition incorporates the latest Indonesian-initiated features of production-sharing such as production bonuses. Although the production sharing ratio after cost recovery is 70:30 in PETRONAS's favour, the actual after tax-ratio is 83.5:16.5 which is only a little less favourable than Pertamina's 85:15 split. This new agreement offered a new package deal which represents a M $258 million (US $101.98 million) annual revenue concession by PETRONAS, assuming an average daily production of crude of 175,000 barrels at a base price of US $12.72¢ per barrel - a figure agreed by both the oil companies and PETRONAS.

Under the original production sharing proposal by PETRONAS to the oil companies, it consisted of a 10 percent cost-recovery and 80:20 split in production sharing. Royalties would have stayed the same at 10 percent. Under this original formula, the after tax split would be 89:11 rather than the present 83.5:16.5 assuming complete cost recovery in both formulae. Malaysia's total share of the oil produced would be 81.2 percent under the original scheme instead of the 68.4 percent under the present agreement. In money terms, the original proposal would have brought in M $1,644.3 million in 1976 for Malaysia while the new agreement leaves the country with M $1,386.07 million. At the same time on the assumption of a 45 percent income tax, oil companies have managed to increase their after tax profits by 30 percent under the final scheme to M $233 million from M $178.2 million under the original proposal.

The basic contour of the agreement has taken its inspiration from Pertamina with several modifications. The contract for crude oil according to the new contract lasts for 20 years, with another 4 years possible extension. The limit for cost recovery, which includes the oil companies' exploration, production and development expenditures, and can be carried forward each year, was set at 20 percent of total oil production. Another 10 percent royalty will be evenly split between the Federal and State Governments in which the oil is found. Previous oil legislation around the world has incorporated either royalty payments or production sharing, but not both. After cost recovery and royalties, the remaining oil will be split 70:30 before taxes. On the other hand, the agreement for natural gas differs only in having a 14 year extension rather than 4 years in the case of oil earlier. Additionally it has a 25 percent cost recovery compared to 20 percent in the case of oil because gas production and development is inherently more expensive.

Another amendment made by the Government from the original production sharing formula was in the area of taxation. The standard 50 percent income tax rate under the original formula was revised to 45 percent for oil producing companies in the revised and agreed formula. This means that a total of about M $21 million less taxes for the oil companies each year based on daily production of 175,000 barrels and the 1976 base price. PETRONAS will also be taxed at 45 percent.

In later years of production, after the heavy capital investments in exploration and initial production are recouped the oil companies may not have to pay annual costs which amount to 20 percent of the oil produced. The ratio of cost to total production may even decline over time due to economics of scale and rising production levels. Instead of making the entire 20 percent going to oil companies under cost recovery termed as "cost oil" which is non-taxable, actual annual costs will be tax deductable, and the rest of the cost oil will be taxed at the same rate as the "profit oil" i.e. the 30 percent going to companies from production sharing ratio. In the case of Sabah Shell this technicality will be less important than for Sarawak Shell because Sabah Shell's heavier capital investments will make its annual actual costs equals to the maximum 20 percent recovery for many years whereas for Sarawak Shell, annual costs will be a fraction of total recoverable costs within a shorter time.

Following Pertamina's initiative in 1975, the new Malaysian agreement contains discovery and production bonuses. Upon the discovery of any new, commercially viable oilfield, the oil companies concerned - known in the agreement as the contractors - will pay PETRONAS M $2.5 million. For existing fields off Sabah and Sarawak there will be a production bonus - when production increases beyond present levels by a quarterly increment of 50,000 barrels a day, the contractor will pay PETRONAS a flat M $5 million. Each oil company will also contribute 0.5 percent of the proceeds of sale of its oil - both "cost" and "profit" oil - to a petroleum research fund.

To ensure that Malaysia will benefit from windfall profits because of oil price increases, PETRONAS has incorporated a formula in the contract that 70 percent of the increase in the price of crude beyond the fixed base price of US $12.72¢ per barrel will go to PETRONAS. However, the base price index will be increased by 5 percent each year, in the hope that oil companies will not be adversely affected by inflation in their own costs.

As a result of the new agreement between oil companies and the Government, PETRONAS will not take over equity in the existing oil companies. In the case of the Shell Group of Companies, their corporate structure will remain unchanged, i.e. in Sarawak, the production sharing contractor will be Sarawak Shell Berhad (SSB), a wholly-owned Shell Group of Company and in Sabah the production sharing contract has been signed by the 50/50 Sabah Shell/Pecten partnership for which Sabah Shell Petroleum Company (SSPC) is the Operator. The production-sharing contracts apply only to exploration and production, and not equity participation in the downstream activities of oil companies; i.e. refining, supply and marketing operations. Lutong Refinery in Sarawak is, therefore, not affected by the new arrangements, although it is still part of Sarawak Shell Berhad.

10.3 The Methods used by the Malaysian Government to Intervene in the Oil Industry

Just as there are several reasons why governments may wish to intervene in oil affairs, so this intervention may take several forms, ranging from the imposition of protective duties, to the establishing of national oil companies.

As producing and consuming countries have different aims so they use different methods to influence the industry. Malaysia is both a producer and consumer country and, therefore, the aims are wide-ranging.

Since Malaysia imports most of its crude oil needs from the Middle East countries and exports most of its low-sulphur/sweet oil the Government express reason for giving a close attention to the industry particularly to these countries from which it imports its oil and to those countries which consume large quantities of its oil. The importance of the industry in this context arises from the fact that political instability in any of these countries may affect both prices and supply and thus affect the revenues to the Government. This is so, since we depend for a great deal of our crude oil from the Middle East as our domestic demand requires the crude from the Gulf sources to be blended with domestic crudes. As has been elucidated earlier, in Section 3, oil accounts for about 90% of Malaysia's energy requirements and the likelihood of getting alternative sources of energy is small. Since we rely heavily on our oil imports from overseas, we need to increase the security of our supplies. Although these considerations do not apply to producing/exporting countries in general but Malaysia, also preoccupied with obtaining markets for its oil, is perhaps a close parallel. Malaysia, like other producer countries, may act to secure markets in the same way as it tries to secure supplies.

10.3.1 Crude Oil Exports and Earnings

In the past up to 1972, various agricultural and mining products had dominated the export volume and value of Malaysian trade. The most important of these were rubber, tin, palm oil and timber in that order. Since 1972, with the spate of offshore oil discoveries and production, the structure of Malaysia exports had changed somewhat. The export volume and later value as a result of the upward revision in petroleum prices in the world market increased annually since 1974 and in 1976 reached M $1,747 million from a mere M $318 million in 1972 as shown in Table 10.1. The proportion of crude oil in the total value of export of the country increased from 6.6% in 1972 to 17.6% in 1976. In such a short span of 4 years, the crude oil exports has climbed to become the third largest export earner for Malaysia. More important still is that, the rate of growth of crude oil exports exceeded the rate of growth of the total commodity exports.* It is projected that crude oil will play a very significant role amongst the exports of Malaysia in the future. However, this depends on our estimates of the future crude oil exports on the basis of the production prognosis earlier - "with conservation off". However, it looks as if the Government have opted for some policy of conservation but neither the Government through PETRONAS nor the oil companies make information available on the programme-production strategy of conservation. Such being the case, we have to opt for a lower estimation of crude oil development. However, the proportion of crude oil in the total export will increase con-

* For the first quarter of 1977 petroleum has moved into second position after rubber.

TABLE 10.1: MALAYSIA- EXPORT PERFORMANCE OF MAJOR PRODUCTS 1970 - 1977

(Q in '000 long tons and V in M$ million)

PRODUCT	1970		1971		1972		1973		1974		1975		1976		1977[1]	
	Q	V	Q	V	Q	V	Q	V	Q	V	Q	V	Q	V	Q	V
RUBBER	1324	1724	1368	1460	1343	1298	1613	2507	1545	2887	1417	2016	1620	3098	463	917
TIN AND CONCENTRATES	91	103	86	906	88	924	80	897	84	1515	77	1217	82	1524	18	428
PETROLEUM	7533	359	9346	496	5552	318	4870	371	3645	823	4087	976	7144	1747	2002	521
PALM OIL	394	263	569	384	734	393	850	523	978	1251	1130	1375	1346	1220	297	328
TIMBER	7249	844	7100	833	7635	865	8667	1548	7976	1469	6952	995	—	2359	—	205
GROSS EXPORTS Of THE 5 MAJOR PRODUCTS		5163		5017		4854		7372		10189		9089		9948		2419
RUBBER (%)		33.4		29.1		26.7		34.0		28.3		22.2		31.1		38.7
TIN AND CONCENTRATES (%)		2.0		18.1		19.0		12.2		14.9		13.4		15.3		17.7
PETROLEUM (%)		7.0		9.9		6.6		5.0		8.1		10.7		17.6		21.5
PALM OIL (%)		5.1		7.7		8.1		7.1		12.3		15.1		12.3		13.6
TIMBER (%)		16.3		16.6		17.8		21.0		14.4		10.9		23.7		8.5

1 Figures for the first quarter of 1977.

Source: Data between 1970 and 1975 are obtained from Government of Malaysia: THIRD MALAYSIA PLAN 1976 - 1980 Government Printer 1976, pp.20 - 21. Data for 1976 are obtained from ASEAN BUSINESS QUARTERLY, Vol.1 No.1.pp 28-30.Data for 1976 are obtained from ASIAN BUSINESS QUARTERLY, Vol. 1 ,No.3, p.67

tinually until 1980 that is the peak production period.

The development of crude oil exports since 1974 when it showed an (Exports over Imports) has somewhat changed the structure of exports of Malaysia. In 1967 when Malaysia was formed the proportion of primary exports of agriculture and forest products in the total export amounted to 75%. In 1973 it was still 62.1%. However, because of the offshore oil developments in the South China Sea sector of Malaysia, the percentage of oil exports to total exports increased from 5.0% to 14.5% in 1976. With the development of the crude oil industry a new export product contributed enormously to the export proceeds and was significant in revenue contribution. This diversification of exports help to stabilise the fluctuations from the sale of Malaysia's export of tin and rubber as a result of changes in world prices of these products - the traditional pillar of export earnings.

10.3.2 Taxation and Duties

There are basically two types of taxation that the Government levies on the oil industry. They are profit and consumption taxes. The taxation of the oil industry is particularly important to the exporting as well as the importting or consuming countries. Taxation contributes a large proportion of the producing countries national revenue - it contributes about 95% of the revenues of Kuwait, 66% of Venezuela's, 75% of Libya's and 65% of Iran's. In Malaysia petroleum taxation contributes about 17 to 18% of all the national revenue collected by the Government.

There are two types of taxation under the classification of profit taxes imposed by the oil producing and exporting countries on the petroleum industry. They are royalty taxes and income or corporation taxes.

The first type of payments under the Profit Taxes category is that of Royalties. Royalties are payments made by the producing companies to the host Governments as compensation, in return for the right to dispose of the oil. Although this is a form of Government take, it is not 'tax' in the true sense of the word. In historical perspective, it is the left over from the days before the introduction of income taxes. It originated from the times the Crown claimed all mineral wealth. In the United States the land owner take the place of the Crown since in that country he is the owner of the sub-surface mineral wealth. In other words, royalty in the United States refers to landowner's royalty which very commonly is one-eight or 12½% of the value of the oil and gas produced. However, in all the exporting countries including Malaysia the sub-surface mineral rights are owned by the nation and the royalty is, therefore, payable to the Government.

The usual level of royalty in many countries especially in the Middle East is 12½% of the value of the oil (at posted prices) which is sold. In the past, these royalty payments were credited against the taxes on profits in the producing countries of the company. OPEC ruled this out and stipulated royalties should be 'expensed' i.e. deducted as cost in arriving at taxable profits. Since January 1, 1964 the general rule has been that they should be treated as a cost against income and, therefore, ceased to be regarded as a 'tax'. However, in Malaysia with the passing of the Petroleum Development Act, royalty is not expensed against income but it is separate from taxation and deductable.

TABLE 10.2 ROYALTIES FROM PETROLEUM 1969-1976 (in M $'000)

Year	Federal	Sabah and Sarawak	Total
1969	-	1,197.7	1,197.7
1970	1,803.5	2,745.0	4,548.5
1971	14,814.0	2,775.2	22,592.2
1972	24,735.8	1,937.6	26.678.4
1973	36,877.8	1,475.7	38,353.5
1974	63,473.8	919.0	64,392.8
1975	62,096.2	52,909.7	165,005.9
1976*	44,858.9	44,633.3	89,492.2

* figures from 1/1/76 till 30/6/76.

SOURCE: Private communications with The Treasury, Malaysia. (figures are not published)

Table 10.2 shows the amount of royalties collected by the Governmant for the period between 1969 till the first half of 1976. In the 7½ year period, a significant change has been the increase in the amount collected by the Federal Government with the decline of the royalty collection by the states for the greater part of the period except in 1975 and in 1976. The Federal Government collection from royalty was nil in 1969 but it jumped to 62 million in 1975 and is expected to reach 90 million in 1976. With the expected increase in crude oil production in future, royalty collection will increase accordingly.

The Malaysian Government collects royalties twice in a year - the first half is usually received in March and the second in August. The figure in Table 10.2 shows the actual amount of royalty (accrued for the year) collected by the Government for the period. In 1969, the oil companies were still under the concessionary system and the Federal Government had no royalty collected from petroleum under the Income Tax Act of 1966. Under the Concessionary system before 7th November 1969 from all producing wells offshore 3 nautical miles from landfall the royalties went to the State Government near which the wells were located (in this instance Sarawak); beyond three nautical miles the royalties of wells in production go to the Federal Government. Since all producing wells were then within the 3 nautical mile limit, the Federal Government did not get any royalty entitlement. With the extension of the Continental Shelf Act of 1966 by Emergency (Essential Power) Ordinance, the Federal Government obtained royalties for wells in production beyond 3 nautical miles after November 7, 1969. Even though it was passed in November 1969, the Federal Government did not receive any royalty in that year because only in 1970 were offshore wells beyond 3 nautical miles brought into production.

Royalties are also determined by the distance of the producing wells from the shore (from mean low water mark). The rates are graduated in several ways; for wells offshore up to 3 nautical miles the rate is at 12½%; beyond 3 nautical miles but less than 10 nautical miles offshore, the rate is 10% and beyond that the rate is 8%. This applies to Shell Sarawak. But for Exxon, the royalty rate is 12½% flat.

Subsequently, with the implementation of the Continental Shelf Act of 1966, the Federal Government collected some $78.2 million worth of royalty for the period between 1970 till the end of March 1973. Only one Company was paying royalty at that time i.e. Sarawak Shell Berhad but after 1973 when the oil wells in Sabah were brought into production, Sabah Shell Berhad and Exxon started to pay royalty to the Federal Government. Under the concessionary agreement which was applied to the Petroleum Mining Act, the Government had the option of taking royalty in cash or in kind. In 1973, the Government started to receive royalty both in cash and in kind. The reason behind this move was that the Government wanted to develop an independent marketing outlet and expertise with the formation of a state oil company in future in mind. The royalty as agreed under the profit sharing of 50:50 as confirmed by the Petroleum

Income Tax Act of 1966 was tied to the posted price in the case of the crude oil which was exported and realised price for crude consumed locally. As a result of this agreement and with the establishment of PETRONAS, the Federal Government, in the middle of 1974 opted for royalty in cash after that date and the Treasury gets cash payment as royalty from PETRONAS.

Another significant feature in the royalty figures in the above table is that from 1972 to 1974 royalties to the Federal Government increased rapidly by 45 times, since 1971 at the expense of the State revenue which declined by the same extent as its 1971 level. This has been due to the fact that most of the new oil fields are found beyond the 3 nautical mile limit offshore and the decline of the onshore Miri field and its complete shutdown in 1972. Most of its revenue comes from a small offshore field less than 3 nautical miles. But after 1975 with the production sharing agreement, the revenues for both the Federal and State have picked up steeply.

Included in the 1975 royalty figures is also the royalty from gas resources found offshore Sarawak and Sabah, which is equally shared between the Federal and the State Governments at 5% each. The gas royalty for the Federal Government in 1975 stood at approximately $286,000 and for the State at $95,000.

The royalty payments received by the Government earlier were incurred in the upstream phase of the development of the oil industry. In addition to these, the oil operating companies in Malaysia as elsewhere were charged with income tax usually at the rate of 40% of net earnings (previously it was at 50%) of all the phases of their operations. This tax is usually a flat rate on net earnings regardless of size, but in some countries it is progressive up to a certain point, depending on the total size of income, and a flat rate above that point. In most of the major concessions in the Middle East, the tax was levied on net income calculated on the basis of the posted prices less an agreed discounts. However, this was changed after late 1973.

TABLE 10.3: OIL INDUSTY INCOME TAXATION 1970 to 1975

Year	Income Tax	Rate of Growth	Net Profit	Ratio I.T/N.P.	%
1970	17.0		39.7	0.4	40
		-21.2			
1971	13.4		11.85	1.13	113
		+16.4			
1972	15.6		31.8	0.5	50
1973	29.2	-87.2	33.5	0.87	80
1974	5.7	-80.5	24.4	0.2	20
1975	14.1	+147.4	37.0	0.4	40

Sources: Figures in column (1) and (2) derived from sources for Table 9.4.

From the above Table 10.3 , during the period under review, there are two occasions of falling tax and three occasions of tax increase. The first drop in tax collection was in 1971 when as a whole the profitability and thus performance of all companies have been affected. By 1972 and 1973 the sales of these companies have picked up again and thus their profitability except one company which showed negative profit. The crude oil price hikes in early 1974 and the subsequent implementation of the Control of Supplies Act pertaining to supply of petroleum products and the regulation of price, discussed elsewhere earlier, have depressed the profit levels of companies in the industry and the tax collection registered the lowest for the period. In 1975 with the recovery of the industry slowly from the world depression in general, profitability of the industry picked up again and thus revenue collected from this source began to rise again and this is expected to increase progressively over the period and into the future.

If a comparison between the net profits gained by the oil companies in the industry and the payments of taxes to the Government for the period 1970 to 1975 are made, on average payments to the Government were almost equal to half the profits earned by the industry. From the above table 10.3, the payments gained by the Government equal (in fact exceed) the net profit of the industry in 1971 but in 1974 were only about a quarter of the industry's net profit of that year. In the case of Indonesia, Arief (10) showed that the ratio between the two was almost equal to the industry net profit in 1973 but fluctuated

10. Arief, Sritua THE OIL INDUSTRY IN INDONESIA - A Study of Resource Management in a Developing Economy , Sritua Arief Associates, Jakarta, 1966.

around one and half times in 1974 in favour of Government tax take.

If these results are compared to the seven major international oil companies (Standard Oil of New Jersey, Shell, Texaco, Mobil, British Petroleum, Standard Oil of California and Gulf Oil) operating in the Eastern Hemisphere in 1967 - 70 period, it was found that it was steady above 2:1 in all the years, i.e. 2.2:1 in 1967, 2.1:1 in 1968, 2.4:1 in 1969 and 2.6:1 in 1960[11].

While indirect taxation levied on basic consumer goods, taxation on petroleum products form a substantial part of Malaysia's internal budget revenue. Contrary to the profits tax earlier, the burden of these taxes are shifted on to the consumers of petroleum products.

Essentially, the taxation of oil products is no different from any other indirect taxation. The burden is largely shifted on to the final consumers by the sellers (oil companies). The collection of these taxes has to be financed by the oil companies themselves.

The important of this kind of sales tax on the level of demand for the products have been varied. It is often suggested that for many products, especially petrol, the demand in price

11. Arief, Sritua, ibid.

is elastic as has been discussed earlier in Chapter 9. However, elasticity is greater for middle distillates and fuel oils. There is a tendency for motorists to switch to cheaper grades as tax progressively increased the retail price of petrol and this suggests that for this product price levels can be reached at which demand becomes fairly price elastic. The increase in taxation has the same impact as that of increase in price.

From before 1947 till 1959, there were no taxes levied on the consumption and sales of heavy fuel oil in Malaysia except for petroleum - mogas and diesel. The total import duties from petroleum over the 2 years increased steadily from $12.9 million in 1947 to $67.6 million or about 5 times its 1947 level. In terms of % of the petroleum revenue to total import revenue during these years they have also increased steadily from 15.5% in 1947 to 22.5% in 1959. Since 1960 to 1976 - over a period of 16 years the revenue for petroleum has increased from its 1959 level of $67.6 million to $80.0 million (18%) but the ratio of % of petroleum revenue to total import revenue has increased and in 1975 it is only 7.9% compared to 22.5% in 1959. This has been due to the lessening of imports and thus import taxes due to the local refinery started to produce petroleum products locally since 1963 despite the introduction of HFO tax since 1960. The divergence has also been aggravated by the number of other imported products during these years that come into the market as a result of the pace of development and increase in the standard of living in Malaysia after independence in 1957 and especially with the formation of Malaysia in 1963.

TABLE 10.4a: MALAYSIAN GOVERNMENT REVENUES FROM PETROLEUM (1947 - 1976) (M$) (A) IMPORT DUTIES

H.F.O.	PETROLEUM	TOTAL IMPORT DUTIES FROM PETROLEUM	TOTAL OVERALL IMPORT REVENUE	% OF PETR. REVENUE TO IMPORT REVENUE
	12.9	12.9	83.4	15.5
	18.3	18.3	105.0	17.4
	20.2	20.2	116.2	17.2
	23.1	23.1	148.6	15.5
	27.5	27.5	214.7	12.8
	31.0	31.0	206.5	15.0
	33.2	33.2	198.4	16.7
	36.8	36.8	205.9	17.9
	39.7	39.7	250.0	15.9
	46.0	46.0	270.0	17.0
	56.3	56.3	294.7	19.1
	59.3	59.3	282.0	21.0
	67.6	67.6	300.7	22.5
18.2	70.9	89.1	n.a.	n.a.
20.4	71.5	91.9	n.a.	n.a.
23.2	73.5	96.7	n.a.	n.a.
22.3	66.9	89.2	n.a.	n.a.
13.3	29.5	42.8	n.a.	n.a.
13.3	31.9	45.2	n.a.	n.a.
15.2	29.3	44.5	n.a.	n.a.
28.3	35.7	64.0	n.a.	n.a.
30.7	38.0	68.7	n.a.	n.a.
31.1	37.6	68.7	n.a.	n.a.
33.6	40.7	74.3	557.1	13.3

YEAR	H.F.O.	PETROLEUM	TOTAL IMPORT DUTIES FROM PETROLEUM	TOTAL OVERALL IMPORT REVENUE	% OF PETR. REVENUE TO IMPORT REVENUE
1971	35.2	46.1	81.3	581.8	14.0
1972	41.0	42.0	83.0	588.9	14.1
1973	48.8	50.4	99.2	746.3	13.3
1974	35.8	50.1	85.9	893.3	9.6
1975	20.1	43.3	63.4	800.8	7.9
1976	30.0	50.0	80.0	n.a.	n.a.

HFO Heavy Fuel Oils.

Source:
Private communications with Tax Division, The Treasury, Ministry of Finance Malaysia (data not published).

After 1963, when the refineries of Shell and Esso started to produce petroleum products locally, the Government imposed excise tax on locally produced HFO and petroleum sold in this country. The value of the HFO tax has increased from \$3.1 million in 1963 to \$34.0 million in 1976 an increase of over ten times since 1963, in the case of petroleum the value of tax collected in 1963 was \$13.6 million and in 1976 it increased to \$205.0 million - thus registering an increase of fifteen times over the past 13 years and much more then that of HFO. However, over the years the two locally produced products have also undergone export expansion and sales and thus the total excise duties have also increased but not as steeply as that of duty revenue from imported petroleum products. Thus the ratio of petroleum revenue to total excise revenue collected or received was around 47% a little over the 1963 period.

If the total value of indirect taxes collected by the Government in petroleum products is compared to that of the indirect taxes on all products it is seen that from 1947 to 1959 this was on the average around 17.2% having increased from 15.5% in 1947 to 22.5% in 1959. However, from 1970 till 1975, the average percentage of petroleum revenue to total import revenue decreased to 12% on the average. This was due to the decreasing imports of most petroleum products after the operation of the refineries in Peninsula Malaysia in 1973.

TABLE 10.4b: MALAYSIAN GOVERNMENT REVENUE FROM PETROLEUM (1963 - 1976 (M$) (B) EXCISE DUTIES

YEAR	H.F.O.	PETROLEUM (PETROL)	TOTAL EXCISE DUTIES FROM PETROLEUM	TOTAL OVERALL EXCISE REVENUE	% OF PETR. REVENUE TO TOTAL EXCISE REVENUE
1963	3.1	13.6	16.7	36.6	45.6
1964	17.3	51.5	68.8	90.3	76.2
1965	22.6	53.8	76.4	102.3	74.7
1966	21.9	67.2	89.1	133.9	66.5
1967	36.9	68.3	105.2	151.3	69.5
1968	41.6	71.9	113.5	165.3	68.4
1969	44.1	76.1	120.2	181.6	66.2
1970	40.6	76.9	117.5	248.7	47.2
1971	49.3	94.4	143.7	306.7	46.9
1972	61.2	126.7	187.9	366.0	51.3
1973	56.6	136.0	192.6	406.7	47.4
1974	45.2	154.2	199.4	442.5	45.0
1975	31.0	183.6	214.6	449.9	47.7
1976	34.0	205.0	239.0	453.0	52.8

Source: Private communications with the Tax Division, The Treasury, Ministry of Finance, Malaysia.

In Table 10.4, in the case of the Malaysian Government Revenue collected as excise duties from locally produced petroleum from 1963 - 1976 of $1,884.6 million out of a total of $3,534.8 million again showing that petroleum contribution is on the average about 50% to total excise duties.

If both the indirect taxes on petroleum are taken together and compared to the overall excise duties we see that total excise duties from petroleum average around 5.7% over the past 14 years.

10.4 PETRONAS Financial Arrangements with the Government

In return for the vesting of the ownership of all hydrocarbon resources below the land and sea in PETRONAS, PETRONAS is required to pay a certain percentages of its gross income as royalties to the State and Federal Governments. PETRONAS is required to pay the Federal Government and State Government each an annual cash payment of 5% of the value of the petroleum won, saved and sold by PETRONAS or its agents or contractors during the period provided in Clause 2 of the Agreement. The value to be supplied for the purpose of sub-clause 1 must be the realised 6 monthly average FOB price obtained by PETRONAS or its agents.

Any petroleum which is used by PETRONAS, its agents or contractors for the purpose of carrying on drilling and production operations shall be deemed to be sold for the purpose of calculating the cash payment under this clause.

However, PETRONAS unlike many other oil companies, was not obligated to reimburse the Government for indemnification payments on the expropriated properties, as there was no such event taken place. PETRONAS is authorised to issue securities and to make certain contracts for operations within the industry based upon percentage of production or participation in profits as agreed.

Unlike many national oil companies which emerge after expropriation and nationalisation such as the Mexican and Libyan oil industries, the task that faced by PETRONAS was non-monumental. The industry's background in technical knowledge has not been impaired with the new arrangment with the oil companies; international markets for Malaysian crude oils exports were not blocked as experienced by other nationalised oil companies. The internal transportation system for supplying the domestic market was more than adequate. The only difficulty faced by the new state oil company has been the financing of the establishment and the financing of its activities. Large expenditures were required to set up the organisation and to recruit staff and maintain administration. However, maintenance of production and conducting exploratory activities are met by the oil companies themselves. In short, PETRONAS was caught between, on the one hand, the problem of 'controlling' foreign oil companies and having no experience in the industry at all and initially to raise capital from domestic sources. However, PETRONAS was fortunate in this in that the Federal Government provided some sort of subsidies and aids as a stop-gap measure in the early development years of the state oil company. PETRONAS ultimately will be forced to seek investment capital overseas either through long term loan or joint ventures with foreign firms for all the future projects.

10.5 The Distribution of Crude Oil Production between the Malaysian Government and PETRONAS and the Oil Companies

Having elucidated the nature of the production-sharing formula in the earlier section, we are thus able in this section to determine the distribution of shares of the crude oil production expected from offshore fields in Malaysia for the next 6 years from 1977 to 1982.

The Malaysian Government's share of the crude production are made up of Royalty and 'Equity' or 'Participation' oil as they are sometime called, and the latter is vested by the Government in PETRONAS. The oil companies crude oil shares are made up of 'Expense' or 'Cost' oil and 'Profit' oil.

In Table 10.5, the total share of the Government over the next 6 years is expected to be increased by 37.3 percent from 41.7 million barrels in 1977 to 56.6 million in 1982 while the oil companies share over the same period increased by 36 percent over its 1977 level to 39.0 million barrels in

1982.

Our next objective or purpose is to match the increasing availability of the Malaysian crude oil against the increasing requirements of crude oils - imported and domestic - for the use of local refineries. This latter objective will determine the state of the Oil Account in the next 6 years.

In order to achieve this objective, the Saudi Arabian Light Marker crude (ALC) is used as the representative crude for oil imports into Malaysia and this is matched with the local Miri Light Crude (MLC) as representative of all local crude oils as shown in Table 10.6. This exercise will help to determine the "surplus" available for exports from 1977 to 1982.

In Table 10.6, the net balance or "surplus" from the oil account increase progressively from 41.5 million barrels in 1978 to 61 million barrels in 1980 and falls again to 26 million barrels in 1985, a little above its 1977 level. If the total balance is taken over the 6 year period, it is around 261 million barrels. This is also the amount of oil available for exports to the world market from 1977 to 1982*. Part of this will find their way into the integrated channels of the oil companies (oil companies' shares of crude) and the remainder will be offered for sale in the "open" market.

* No attempt is made here to forecast the revenues that will flow into the country as a result of the increase in "surplus" oil for exports as any attempt at this time at forecasting oil price even in a short period is difficult and misleading.

TABLE 10.5: THE DISTRIBUTION OF CRUDE OIL PRODUCTION BETWEEN THE GOVERNMENT AND PETRONAS AND OIL COMPANIES FROM 1977 TO 1982 (in Thousand of Barrels)

YEAR	AVERAGE CRUDE OIL PRODUCTION PER DAY* (1)	TOTAL CRUDE OIL PRODUCTION PER YEAR (2)	GOVERNMENT SHARE OF CRUDE OIL (3)		OIL COMPANIES SHARE OF CRUDE OIL (4)		SHARE OF CRUDE OIL BY CATEGORIES (5)	
			ROYALTY	PETRONAS 'EQUITY' OR PARTICIPATION OIL	'EXPENSE' OR COST OIL	'PROFIT' OIL	GOVERNMENT/ PETRONAS	OIL COMPANIES
1977	193.7	70,700	7070	34643	14140	14847	41713	28987
1978	248.8	90,812	9081	44498	18162	19071	53579	37733
1979	317.8	116,000	11600	56840	23200	24360	68440	47560
1980	330.1	120,500	12050	59045	24100	25305	71095	49405
1981	299.2	109,200	10920	53508	21840	22932	64428	44772
1982	263.0	96,000	9600	47040	19200	20160	56640	39360

Source: Column (1) and (2) calculated from Table 4.1
Column (3), (4) and (5) calculated from the Production Sharing Formula in Section 10.2

TABLE 10.6: THE MATCHING OF ESTIMATED CRUDE OIL AVAILABILITY WITH CRUDE OIL REQUIREMENTS TO DETERMINE BALANCE IN THE OIL ACCOUNT FROM 1977 TO 1982 (in '000 barrels)

YEAR	CRUDE OIL AVAILABLE (1)	CRUDE OIL REQUIRED (2)			BALANCE (1) - (2)
	TOTAL CRUDE OIL VOLUME ('000 Bls.)	IMPORTED MIDDLE-EASTERN CRUDE ('000 Bls)	DOMESTIC CRUDE OIL ('000 Bls)	TOTAL CRUDE OIL VOLUME ('000 Bls)	SURPLUS (+) or DEFICIT (−) in ('000 barrels)
1977	70 700	29251	15751	45002	+ 25,698
1978	90 812	32033	17248	49281	+ 41,531
1979	116 000	35053	18875	53928	+ 62,072
1980	120 500	38413	20684	59097	+ 61,403
1981	109 200	41807	22512	64319	+ 44,881
1982	96 000	45475	24487	69962	+ 26,038
TOTAL FROM 1977 TO 1982	603 212	222032	119557	341589	+ 261,623

Source: Result in column (2) found from information in Chapter 3 and Chapter 5.

The usefulness of this type of projection depends on the trade prospects of Malaysia's crude oils in the international market. The extent of demand and price for the crude oils will enhance the surplus revenue that Malaysia can expect in the future.

10.6 The Future Trade Prospects in the Petroleum Market

10.6.1 Markets for Malaysian Crude Oils

There are two recent forecasts made by CIA and WAES on world energy demand and supplies for crude oils in 1985.

Table 10.7 relates worldwide energy demand in 1985. The data are either for OECD countries or for the world outside Communist areas (WOCA) which comprise all countries other than the USSR, Eastern Europe and China. In the table CIA assumes a rate of economic growth of 4.3 percent per annum between 1976 and 1985 for OECD, while WAES offers two alternative rates of growth for WOCA - high (5.2 percent) and low (3.4 percent) projections.

Table 10.8 relates to energy supplies for the same period as that of demand. The CIA estimates that WOCA would need 68 to 72 million barrels of oil per day in 1985, and non-OPEC oil supplies would amount to 24 to 26.5 million b/d. The demand for OPEC oil another 3.5 to 4.5 million barrels per day representing estimates of Communist Countries

TABLE 10.7: DEMAND FOR ENERGY 1985

(Million Barrels Daily of Oil Equivalent)

	CIA	WAES (High)	WAES (Low)
Rate of Economic Growth 1976 - 1985	4.3%	5.2%	3.4%
World Outside Communist Areas (WOCA)		123	114
OECD (Excl. Australia & New Zealand)	99	97	93
Other Developed Countries	2	3	2
OPEC		4.9	4.2
Non-OPEC Developing Countries		18.2	14.9

TABLE 10.8: ENERGY SUPPLIES WOCA 1985

(Million Barrels Daily of Oil Equivalent)

	CIA	WAES (High)	WAES (Low)
Gas		21	18.4
Nuclear		12	10.1
Hydro-electric		7.8	7.3
Coal		19.3	19.4
Geothermal, Others		0.6	0.4
Total Non-Oil		60.7	55.6
Oil Required	68 - 72	62.5	58.2
Non-OPEC Oil	24 - 26.5	24.7	22.0
OPEC Oil for WOCA	41.5 - 48.0	38	36
Communist Countries Requirements	3.5 - 4.5	1	
Total Oil Requirements from OPEC	45.0 - 52.5	39	36

Source for Tables 10.7 and 10.8: Mabro, R. "Energy Crisis in 1985 " in MEES, April 10, 1978, p. 6.

requirements. On the other hand, WAES estimates that oil requirements in WOCA at 62.5 million b/d in the high growth case and at 58.2 million b/d in the low growth case. WAES expects the Communist Countries to be roughly in balance.

OPEC oil supplies come from 3 main groups of countries: Group I, comprises of Algeria, Nigeria, Indonesia, Iran, Gabon and Ecuador, Iraq and Qatar which could produce a maximum production of 14.5 to 16.0 million b/d in 1985; Group II, are group of countries likely to restrict output between 7 and 9 million b/d in 1985 which include Kuwait, Abu Dhabi, Libya and Venezuela and Group III - Saudi Arabia. If Groups I and II supply a total of between 25 to 27 million b/d and if Saudi Arabia is willing to supply the 15 million b/d making total supply of OPEC oil to be 4.2 million b/d, enough to meet demand from WOCA in 1985. If extra demand from Communist countries are considered, by 1985 there would be a deficit of OPEC oil in the range of 3 to 10.5 million b/d. This will result in a crisis or shortage.

Between 1977 and 1985 oil will remain the dominant fuel in the Pacific Basin, and the region as a whole (excluding China) will continue to consume about three times more oil than it produces[12]. At present, total production is around

12. A Caltex study pointed out that the Asean group of countries (Indonesia, Malaysia, Philippines, Thailand and Singapore) will generate faster growth through 1985 than any other area in the world except the Arabian Gulf with projected growth of GDP at 7 percent per annum to 1980 and 6.5 percent for 1980-85, it will still remain heavily dependent on oil as its main energy source. See Zingaro, W., "New Patterns of Demand for Oil - Part III" in ASEAN BUSINESS QUARTERLY, 1977 (3rd Qr.), Vol.1, No:3, pp. 28-30.

2 million barrels a day; most of it from Indonesia, with smaller volumes in Australia, Brunei and Malaysia[13]. Against this, some 7 million barrels a day is consumed mostly by Japan.

By 1985, oil production could be around 4 million barrels daily and demand between 10 and 12 million. This demand depends largely on the Japanese ability to develop its nuclear power programme which will have tremendous effect on oil and coal requirements, and the ability of other countries to substitute other fuels for oil[14]. On the supply/production side, it depends on how much more oil will be found and where. Indonesia is hoping to increase its production to well over 2 million barrels a day in the next five to ten years although at the same time, its consumption is expected to rise considerably thereby limiting increment available for new exports. Malaysia's output could be around 250,000 according to our projection earlier (one estimate put it at 500,000 barrels a day by 1985[15])

13. In East Asia, amongst the oil producers in the region, Indonesia is the biggest producer producing about 1.6 million per day in 1975 accounting nearly 60% of all crude oils produced in the region. See Carr, W.I. & Sons & Co. (Overseas), FAR EAST OIL RESEARCH, 1976

14. The major sources of power will be nuclear from zero in 1975 to a combined output of 8,000 MW in 1985 or at an average rate of 9.7% a year for the Philippines, Indonesia and Taiwan. See Zingaro, W. op.cit.

15. Wagner, G.A. "Energy Prospects for the Pacific Region" a paper addressed to the Indonesian Petroleum Association, Jakarta on 7 June 1976, p.4.

but Australia's existing fields would by then be declining, and Brunei's production would probably also have peaked near its 1976 level.

China could become a significant oil exporter by 1985, as only in this way could it meet rising internal energy requirements and at the same time increase exports. According to Shell, there is no evidence to support estimates made by many forecasters that China could be producing 8 to 10 million barrels a day by the early 1980s. A more probable figure would seem to be around 3 to 4 million barrels a day by 1985 which suggests that exports could be doubled to 400,000 b/d (or even 800,000) over the same period[16].

On the demand side of the equation, it seems that there will not be a large market in North America in the medium term for oil from the Western Pacific, although appreciable quantities of low-sulphur Indonesian crude (and recently Malaysian crude) are already moving to the United States[17]. Currently there are some competing exports from North America (Alaskan North Slope oil) with the surplus of Alaskan production

16. Wagner, G.A. ibid., p.6.

17. The West Coast became a major buyer of Indonesian oil when Canada sharply limited exports following the 1973-74 oil price crisis, and as California encountered a natural gas supply problem. The US now buys 43% of Indonesia's oil exports, outstripping Japan's share of 41% in 1974, the US was only 25%. Currently, Indonesia is the West Coast's major supplier and has looked to the US in the recent past to ease the pressure created by Chinese competition in the Japanese market.
See Hiatt, F. and Shapiro, M.A. "Don't fret over Alaskan crude Union tells Indonesia" in PETROLEUM NEWS SOUTHEAST ASIA, Nov., 1977, p. 11.

have to find markets elsewhere. The West Coast of the United States will, therefore, be largely self-sufficient and the balance of Alaskan oil availability will probably be transported to other parts of the country, primarily to the East Gulf Coasts[18].

Latin America as a whole is expected to remain broadly self-sufficient in oil, with exports to the United States offset to a large extent by imports into major markets on the Atlantic side of South America.

At present Japan is the main buyer of Chinese crude. The heavy characteristics of the Chinese crude could pose some constraints in the Japanese market for the crude. China will have to export her crude to other countries in the far eastern countries. Since the Malaysian and Chinese crudes differ in qualities, there would be no keen competition between the two crudes. The only competition that Malaysian

---

18. The influx of Alaskan oil would appear to threaten the safety valve, at a time when California may also be increasing its own production through tertiary techniques. Since Alaskan crude is considerably lower in sulphur than Middle Eastern crude (approximately 1.6% versus 2.5%), less Indonesian oil, which is lowest in sulphur, would be needed for blending purposes. According to Hartley there are several factors which when combined to protect most of Indonesia's share of the market: (i) California still faces the prospect of a natural gas shortage, and if Alaska cannot meet its gas needs, demand for the relatively clean sulphur crude will increase; (ii) the surplus Alaskan crude will finally be piped to the central and east coast of US; (iii) stringent air pollution standards in Los Angeles (where the maximum sulphur permitted is now 0.25%) and San Francisco give Indonesian crude a strong and continuing advantage in the competition against Alaskan crude oil. See Hiatt, F. and Shapiro, M.A., ibid, p. 11.

crudes will face is that of Indonesian crudes which are low in sulphur too.

The Malaysian import-export situation in terms of crude oil in future can be looked from two points of view. The first is that in order to meet the domestic demand for petroleum products, Malaysia will have to import and refine the Middle Eastern crude oil in combination with the domestic crude and exporting some large portion of her crude to foreign market. Secondly, because of its light and low-sulphur characteristics, the position of the Malaysian crude will be more or less complementary with the other exporters of crude oils in the Pacific market. And in the final analysis, Malaysia in the foreseeable future has a broad range of flexibility in her choices of crude-mix to be refined in the country as shown in Chapter 8; importing necessary amounts of crude from the Middle East as at present, while exporting surplus domestic crude to mainly Asia-Pacific area especially in the Asean regional market.

10.6.2 Markets for Petroleum Products

In the case of petroleum products, the domestic market is expected to more than double in the 15 year period between 1975 to 1990 as shown in Table 3.5 in Chapter 3. However, as pointed out in Chapter 5, the present refinery capacities to meet future product requirements are not sufficient. There is a need to have another refinery in Malaysia by 1983, the conclusion reached in Chapter 5. However, it is not possible to produce all of the products in sufficient quantities because of the discrepency between characteristics of the crude oils to be refined and the pattern of demand for each of the products. There is bound to be some surplus for export and some deficits which have to be imported. Moreover, it is difficult to expect a stable export market for refined products refined in Malaysia in overseas countries due to the competitive forces operating in the world oil market.

In the international scene, the market for petroleum products is determined mainly by the pattern of international trade as a whole, past and present worldwide refining capacities, operating rates of new refinery projects coming on stream in future and projected demand for oil products.

Since the oil crisis in 1973, average operating rates of refineries in the world have been cut by 12% from 85% in 1972 to 73% in 1975. This relatively low operating rate is predicted not to have been improved very much after 1977 through 1985. This is because refinery capacity will increase at least 40% per annum whereas demand for oil products will grow at most by 5% per annum(19).

The petroleum product movements and trade in the past and present are mostly between the Western countries and the Middle Eastern and Latin American countries. The position of

19. Cited in the Preliminary Draft of the Master Plan by C. Itoh for the Government of Malaysia, 1976.

Asian countries in this trade as exporters has been minor (5% of the world's exports). And almost all of these exports are made to Asian countries. This trend of regional concentration of petroleum trade is not likely to change in the foreseeable future. Self-sufficiency in petroleum products is regarded as a common feature in the countries around the Asian Pacific region with the exception of Hong Kong.

The total potential figure for the region in Table 10.9 does not mean that the sufficiently large market is ready for Malaysia to capture the surplus from her new refinery. This is because the potential regional market has to be shared with Singapore, Indonesia and the Middle Eastern countries. In 1974, 80 to 90% of the markets for products in this region was keenly contested by the three countries earlier and it is expected that the competition for the market will be keener and more competitive than in the past. So there is a need to look into ways of exporting surplus products from the new refinery project in Malaysia earlier such as the fixing of lower FOB price, not to provide some provisional size of promising overseas market.

TABLE 10.9: POTENTIAL EXPORT MARKET FOR PETROLEUM PRODUCTS IN THE FAR EAST

PRODUCTS	POTENTIAL MARKET	TOTAL POTENTIALITY (Million barrels per year)		
		1974*	1980	1985
LPG	Japan	19.5	30.0	30.0
Gasoline	Hong Kong	2.0	2.2	2.5
Naphtha	Japan	40.0	25.0	25.0
Kerosene	Indonesia, India, Hong Kong	17.0	20.0	20.0
Gas Oil	Hong Kong, Indonesia, Philippines, Thailand and India	25.0	30.0	33.0
Fuel Oil	Hong Kong, Japan, Australia, Taiwan, India	120	130	140

* Actual figures.

Source: Extracted from Preliminary Draft of the Master Plan by C. Itoh for the Government of Malaysia, 1976.

10.6.(3) Market for Natural Gas

Japan is already receiving 1 million tons a year of liquified natural gas from Alaska and almost 5 million tons from Brunei. By 1985 the Pacific will see a considerable increase in this highly sophisticated trade. Indonesia will be the largest exporter, with plans to export a total of 10 million tons annually, of which 7 million will go to Japan and 3 million to California. Total exports of liquified natural gas from Pacific countries could thus be up to some 28 million tons annually in mid-1980[20]. According to Shell, it seems unlikely that China will become a major

20. Wagner, G.A., op.cit., p.5.

energy exporter in the near future. Its own internal needs must grow enormously; and should the Chinese oil industry achieve only a moderate level of success during the 1990s, it is even possible that China could face the alternative of restricting its own development or becoming a net oil importer. Also the year 1985 would appear too early for gas exports from Russia's Yakutsk region in Eastern Siberia. This mean too that any new Russian energy supplies are unlikely to enter the Pacific market until well beyond 1985[21]. Although there has been a spate of gas discoveries associated with the exploration for oil in Malaysia, from oil company sources, the existence of big and commercial gas finds is limited at present and in the future. The present gas discoveries indicated in Chapter 4 earlier are small and are only confined to the offshore areas of the east coast of Peninsula Malaysia. Except for the big and commercial gas fields in Bintulu, Sarawak (also known as the Central Luconia fields) there are no gas finds of that extent in Malaysia. The gas reserves found in offshore Pahang on Esso and Conoco concessions may prove to be commercial later on but this has not been confirmed as yet. The existence of these reserves would not find big marketing outlets as the states which border the South China Sea sector of Malaysia (which are under-developed) do not have many industries which consume a large amount of energy from gas at present and in the foreseeable future. Moreover, the local or domestic distribution of natural gas by pipeline network presupposes the need of big and concentrated consumers whose level of

21. Wagner, G.A. ibid, p. 6.

consumption is stable throughout the year. In the gas producing areas of Sabah and Sarawak there is no big consuming market. There is no likelihood that the situation may change in the foreseeable future. This is also true in the case of Peninsula Malaysia since it is not feasible to construct a submarine gas transmission line from Sabah and Sarawak. Even in a big city such as Kuala Lumpur, the setting up of a town gas network is not economical. The distribution of natural gas in Peninsula Malaysia is still difficult to consider, even the oil and gas finds in offshore Malaysia is developed in the future.

The most probable big consumers of natural gas would be the power generating installations and units such as National Electricity Board (N.E.B.) in Peninsula Malaya, Sabah Electricity Commission and Sarawak Electricity Commission. However, according to NEB sources, the power plants projected by the board within the next decade are all envisaged to be fired with fuel oil. From reliable sources too, there are no plans at hand for the setting up of industries in the future that will be powered by natural gas. This is also true in the case of residential use of natural gas because of the high cost of constructing pipeline networks and the popularity of liquified petroleum gas in steel containers and kerosene amongst the population. However, with the increase in the living standard and modernization, city gas piped to residential complexes may also be conceived in the future.

CHAPTER 11

SUMMARY OF MAJOR CONCLUSIONS AND POLICY IMPLICATIONS

11.1 Summary of Major Conclusions

Despite some limitations described earlier in Chapter 1, this study met all the objectives of the study on the economics of petroleum industry in Malaya with varying degrees of success. This study produced several major findings.

Malaysia depends between 85 to 90 percent of her energy consumption from petroleum sources. The development of local industries and infrastructure since the attainment of independence or statehood in 1957 and the subsequent formation of Malaysia in 1963 had resulted in the growth of petroleum products demand of between 9 to 10 percent annual growth in recent years. It was anticipated that the pattern would be maintained at least until 1985 when on this basis absolute consumption would be more than doubled.

With the spate of oil discoveries in 1974 from the offshore fields in Malaysia, the proven commercial reserves of petroleum for Malaysia had been revised upwards from 1.5 million barrels in 1972 to 1.0 billion barrels in 1974 from 25 fields. The figure for gas reserves as it stood in 1976 had been put at 15 trillion cubic feet. Using the past and projected figures, the curve of expected production from the proven reserves was constructed which indicated the potential amount of oil that could be expected and made available under the present circumstances until 1992. The assumption behind this expectation had been the realisation of the plans of the oil companies with respect to production dates and production levels. With new discoveries of new oilfields, we anticipated that the date of exhaustion of the oil resources would be prolonged beyond the 1990s.

From our study of the refinery capacities in Chapter 5, we concluded that the excess capacities experienced by the three refineries in Malaysia after 1975 would be fully utilised by the end of 1980. From the projected product requirements made in Chapter 3, it appeared that the current refining capacity was only sufficient to meet domestic demand up to 1980. The best alternative available to meet the supply problems were either investment in expanding the existing refineries or by building a new refinery in Malaysia. The first alternative was found to be of a short-term nature and the latter was more feasible as a long-term solution to meet the requirements. This solution seemed to be valid in view of the increasing availability of indigenous offshore crude petroleum.

The crude oil price hikes in 1973, 1974, 1976 and recently in 1977 together with the licensing of petrol, diesel and kerosene as controlled items by the Government led to an uneven distribution in the list or retail price adjustments for individual products which were insufficient to allow full recovery of increased crude costs to the local refiners. The approved adjustments had also led to the skewing of the price structure of these products in the market namely motor spirit, known as petrol (premium and regular), diesel and kerosene. The price increases of 1973, 1974, 1976 and 1977 had been granted largely in the form of higher petrol prices with only minimum adjustments to diesel and kerosene prices.

With the conclusion of the production sharing agreement between PETRONAS and the oil companies concerned, over the 6 year period from 1977 to 1982, PETRONAS's share of crude oil was expected to be around 296 million barrels; oil companies share was expected to be around 248 million barrels. On the other hand Government's share of royalty was expected to be around 60 million barrels. This was matched with the volume of crude oil required over the same period from imports and domestic sources by the refineries in Malaysia. It was expected that the surplus or net balance from the oil account would be around 41.5 million barrels in 1978 and was expected to rise to 62 million barrels in 1979 and fall rapidly to 26 million barrels in 1982 (giving net balance of 26i.6 million barrels of crude oil from 1977 to 1982) as local production started to fall and import requirements increased.

11.2 Policy Implications

The main issues faced by the petroleum industry in Malaysia with long-term implications are thus clearly - crude petroleum production, refinery capacities and end-product price developments. And in this Chapter we shall try to consider these issues.

Six major policy implications are derived from the major findings. More detailed studies are required for each of the five areas to put them into practice. The six major policy implications based upon the findings of this study are as follows.

11.2.1 Conservation and Depletion Policy

As a consequence of the international oil crisis of 1973, the Malaysian government announced its intention to control the country's hydrocarbon resources - petroleum and narural gas. The objective of the control is to secure for the nation a large share of the oil produced by the multinational oil companies in Malaysia as well as to obtain increased benefits through ancillary services and oil facilities. To achieve these objectives, the Government drafted legislation to effect its production - sharing policy. The Petroleum Development Act amongst other things, vests ownership of petroleum and natural gas resources in PETRONAS.

The Petroleum Development Act which gives the Government sweeping powers of control over the petroleum industry was enacted by the Malaysian Parliament in October 1974. Together with the production sharing policy (amended), the provisions of the Act presented the companies involved in oil exploration and development with a completely changed operating environment. A major issue deriving from the Act concerns depletion policy and the extent of control by conservation policies on the rate of production in individual fields.

The term "conservation" has been applied to many programmes concerned with the protection of public interest in the development of varied types of natural resources with two strands of objectives: firstly, much economic waste would occur and many social benefits would be foregone unless public regulation were introduced and, secondly, long-range planning of resource development was required to eliminate the wastes and secure the benefits. And within the broad areas to which the conservation concept was applied, mineral resources, especially oil, were assigned a special place because they were exhaustible and non-renewable. According to Lovejoy and Homan, "The rationale behind conservation is that there should be some restriction or postponment of present use in order to have a larger supply available for the future and economically efficient methods of recovery should be required in order to assure the fullest possible utilization of underground supplies"[1] Under the Act, PETRONAS could have insisted that, on the grounds of conservation in the national interest, production should be cut back to any specified level; on the other hand, when the Government insists on operators stepping up production in the national interest, they will not be expected to invest more than the cost of one new well[2].

As has been discussed in Chapter 9, the current expectations are that there will be supply scarcity of oil in the world sometime in the middle of 1980's (or a little later) especially in the non OPEC countries. Under this circumstances, "there is a need to use oil as efficiently as possible (by conservation), to develop alternative sources of energy and to conserve the present oil resources in the expectation of higher prices in the future, ceteris paribus, such expectations reduce the optimum rate of depletion"[3]. Malaysia being an exporter as well as importer of oil will experience an energy gap of "unmet" demand in the early 1980's (under present proven reserves) if no proper and effective conservation measures are undertaken by the Government from now. If our hunch on the situation of supply - demand for oil in Malaysia in Chapter 4 is correct, then Malaysia will

1. Lovejoy, W.F. and Homan, P.T. ECONOMIC ASPECTS OF OIL CONSERVATION REGULATION, John Hopkin's Press, Baltimore, 1967, p.8.

2. See "National Oil Policy", a paper addressed by the Chairman and Executive of PETRONAS to the Rotary Club of Gombak, Kuala Lumpur on January 20, 1977 extract of which found in NADA PETRONAS (Petronas News), February/March 1977, P.2.

3. Penrose, E.T. op.cit., p.4.

be experiencing a net importer at the time when the world is just about to experience another energy "crisis" when price of oil begins to rise dramatically.

Following from this, "it is not true that in all circumstances present revenues are preferred to future revenues, especially if the expected rate in oil price exceeds the expected rate of interest. The oil in the ground may be preferred to the foreign assets which have to be held if the rate of receipt of oil revenues exceeds the desired rate of consumption of imports plus the rate at which the economy can transform important resources into productive investments"[4].

Another main benefit from the conservation exercise is that the development of economically recoverable and proven reserves would not be compressed in terms of time. It would give the country time to develop indigenous expertise in offshore technology which may be encouraged by a slower and steadier build-up of production. Since PETRONAS will be responsible for all aspects of the oil industry, no doubt in time it will take part in the exploitation and production of crude petroleum and natural gas. It is expected that PETRONAS will apply for its own exploration zone in Malaysia's offshore waters. Execution of this function will greatly assist the development of local capabilities and experience that will

4. Penrose, E.T., ibid. 4

permit PETRONAS to take a more active role in its partnership with the contractors.

11.2.2. Opportunities For Upstream Investment

If the estimates of the future recoverable reserves and production in Chapter 4 are correct, perhaps we may be able to conjecture or surmise the future direction of upstream development especially in terms of investment potential in petroleum exploration and development.

The discovery and production of crude petroleum rather than natural gas appears likely to be the major activity of the oil industry and success in exploration remains the most important factor in operating revenues of oil companies in general. It determines the future degree of activity of the myriad contracting companies allied to the industry. It also determines a potentially valuable source of income for the Government and local participating companies. This is a factor which may have considerable bearing on the objectives and goals of the New Economic Policy (NEP). On a regional basis, the opportunities opened would have a lasting spread effect on the less-developed regions affected.

The size of financial and industrial opportunities relating to offshore exploration and development to be undertaken until 1985 are massive, but perhaps slowing down after then. In 1974 it was estimated by Carr in Table 11.1 (Appendix) investment would be in the region of US $2 billion - US $230 million in exploration, US $1,100 million in development and US $600 million in operating investments.* A large proportion of the estimated expenditure will accrue to the large international servicing, supply and contracting companies, but it is entirely possible that domestic markets will be to an increasing extent be served by local companies. For obvious reasons, both avoidable and unavoidable, the Malaysian share of the offshore developments will be much less than the sums estimated. It cannot be derived that Malaysian involvement to date has been disappointing and thus has been and will remain a major political issue in the future. However, we will indicate the possible future areas of local participation.

There are 9 area categories where there is some potential scope for participation by Malaysian companies in offshore development. They are drilling contractors, fabrication and construction, transport services, engineering and surface production facilities, subsea - engineering, catering, workovers, supply boats and shore support, and specification and inspections. The most promising of these are perhaps: drilling contractors, engineering maintenance and surface production equipment, catering, specifications and inspections, and workovers. The total investment expenditure in these 5

* The estimated expenditures over the period in exploration development and operating were based on their projected production profile which is much higher than ours. Carr believes a high degree of optimism that this would be achieved. See Carr, op.cit.

categories is around US $600 million. Possibly the most promising area for government or state participation is perhaps in the areas of supply and shore support and communications.

In Malaysia, initial efforts will be concentrated on developing the logistical capabilities of the service sector particularly in the following categories which account for almost 50 percent of the total potential market in value. They are sub-sea engineering, transport services, supply bases and shore support, engineering and surface production facilities and drilling contractors. Of these expenditures, a large part involve local services rather than local goods. Hence there appears to be a little scope for the exploitation of scale economies. Moreover, most of the firms supplying the petroleum industry are foreign owned and managed and were established prior to the growth of Malaysian offshore oil production. The payment to these suppliers mainly constitute an addition to foreign incomes rather than the employment of underutilised domestic resources.

11.2.3 Strategy for Expanding Refiney Capacity

From our analysis of Chapter 5, we found that the refinery capacities in Malaysia would not be able to cope with the increasing demand for products after 1979. The earlier but unsuccessful move by Caltex Oil Malaysia to establish a refinery in Malaysia at Lumut sometime in 1973 was an indication of such need. We also envisaged that the projected requirement growth for all petroleum products would be around 8 to 9 percent per year from 1977 onwards. And by 1985, we also predicted that the requirement of these products would double the 1975 demand figure.

In order that the "critical triangle" mentioned earlier does not become larger and larger, we recommend that PETRONAS should go into the refinery business as soon as possible. Perhaps it is not too optimistic to have the refinery constructed in or around 1979 (reasons explained earlier) the best possible time under the prevailing circumstances, and should be on stream sometime in 1983. If our hunch is correct, then the unavoidable "critical triangle" in Figure 5.1 would only be from 1979 until 1982. PETRONAS should give this venture a top priority and should not divert to other prestigeous investment projects.

The second consideration advanced is the urgent need for PETRONAS to enter into the refining business is the size of public sector demand for petroleum products, such as fuel oil and diesel fuel for the use of National Electricity Board (LLN), Malayan Railway (KTM) and Public Works Department (JKR); jet fuels for Malaysian Airline System (MAS) and the Ministry of Defence, and bitumen for JKR. These products constitute about 40 percent of total product demand in Malaysia. It is estimated that LLN spends about $400 million on fuel oil and MAS is spending $30 million on jet fuel for domestic flights out of the $65 million spent annually on jet fuel. These two examples alone suffice to show the size of the government market.

Following from the above argument, one significant event that will have great bearing and impact in future is the contract entered into by LLN with the two big oil companies in Malaysia as the suppliers of fuel oil. The Board entered a five-year contract with Esso for the supply of boiler fuel oils for its power stations in 1968 with the contract effective from January 1, 1969, and towards the end of 1973, another 5 year contract was signed for the same. The Board also entered into contract with Shell and Esso to supply boiler fuels to its Port Dickson power station for the period between September 1968 to end of August 1978. The two 5 year contracts signed after 1973 had escalation clauses built into them compared with the previous contracts. As a result of escalation of fuel prices provided for in the contract and no fuel variation charges applied to industrial and commercial tariffs, for the period 1974/75 to 1978/79, the Board will be subsidising the commercial and industrial sector by about $500 million, or $100 million a year. Half of the subsidy will come from the government in the form of rebates of fuel oil and duties, custom duty, surtax and sales tax (around $150 million) and reduction in corporation and development tax (around $100 million). And in the years

1978/79 when the present contract for the Port Dickson Power Station terminates, the annual amount of subsidy will be increased to over $200 million. Since about this time too, the refinery capacities are at their maximum output and since only 2 companies are supplying fuel oil to the Government, the Government may not be able to get the best price and an adequate and continuous supply later on.

The most pressing longstanding problems have been of product dislocations, shortages, hoarding etc., and this situation seems to continue. The present kerosene subsidy is 30¢ per l.G. and has been operative since 1973. The kerosene retail market volume is about 88 million gallons per year. This is going to increase in the future especially with the increase in population. Taking the present rate of subsidy and demand, the subsidy incurred by the Government is to the tune of $26.4 million. If we look back 3½ years, the total subsidy given by the Government amount to around $29.4 million! Although diesel oil has no subsidy but if the duty foregone is accounted for (price increase resulting in absorption of tax of 20¢ per l.G.) then the total subsidy for both kerosene and diesel would cause a larger reduction in Government revenue. And the kerosene retail market is projected to grow at 6 percent per annum (Government's estimate is 11 percent per annum) and diesel oil at 5 percent, one can imagine the amount of subsidy to be incurred by the Government in future. The kerosene subsidies which are adopted for socio-economic reasons, e.g. kerosene and the poor people and, therefore, constitute a transfer of income from taxpayers of petrol consumers (mainly the rich) to kerosene consumers. This is feasible for a short-time but in the long-run it becomes more and more of a problem as many countries have discovered. And if PETRONAS is required to go into the refinery business and make the products available in continuous supply, the present subsidy scheme for kerosene should be eliminated and the product concerned should be charged proper economic prices. Otherwise PETRONAS would get deeper and deeper into trouble and becomes a continuing drain on the state through the need for subsidies; for Petronas to survive and competitive with other established oil companies, it must be guided by commercial considerations, i.e. making profits.

The Master Plan which is in the process of preparation by C. Itoh of Japan for PETRONAS will provide the lists of investment projects (or project package) deemed appropriate to be undertaken in Malaysia during the coming decade concerning the ulilisation of hydrocarbon resources. The project package includes individual projects such as LNG, petroleum refining, petrochemical complex and nitrogenous fertiliser. These linkages would give the best and maximum benefits to the industry and country in future in the areas of industrial, regional and skilled-employment generation.

Beside involving itself actively as individual or partnership with foreign oil companies on the above projects, PETRONAS would involve itself more and more in the downstream activities in the future. For a start, PETRONAS will have to acquire shares by "buying-in" (as opposed to "buying-out" or nationalisation) of the present oil refineries in Malaysia. With the "buying-in" of these companies, PETRONAS refinery due to be on stream in 1983 as suggested earlier would have total if not some effective control of the market for future petroleum products in Malaysia.

With the growing market, employment and income gained from the petroleum business will be significant. Transport agencies, service stations etc. would be amongst the opportunities created. Since it is a growing market, it opens up opportunities for all Malaysians to participate in the industry. If all other avenues have not shown satisfactory results in achieving the NEP, then this area is one left fpr the Government to depend on. The growing market would not infringe upon the competitor companies (existing oil companies) to expand and pick up part of the growing market and impair the investment climate in this country.

During the critical period underlined earlier between 1979 to 1982, PETRONAS would seek the opportunity to participate in the importation, distribution and marketing of petroleum products in the country. In the meantime, PETRONAS MARKETING AND DISTRIBUTION COMPANY LTD. should be established to prepare for eventual operation of PETRONAS REFINING CO. LTD. to gain experience and expertise before 1983. It is also envisaged that by that time Asean Council for Petroleum (ASCOPE) would be more purposeful for member countries especially in sharing crude and products in time of shortage and in getting technical assistance.

11.2.4 End Product Development

From the viewpoint of the economic performance of the industry in the future, several major conclusions regarding the possible trend of the industry could be forcussed.

In terms of oil companies operations, we can expect that the immediate future would not be too different from the past and present. Shell and Esso will continue to enjoy more profit margins per barrel than the other oil companies. This is because the two companies have local refineries and will continue to process products for the non-refiners of Mobil, British Petroleum and to a limited extent Caltex charging them the necessary processing fees.

Shell followed by Esso will continue to be the leaders in the oil industry in the immediate future because of their early entrenchment in the market and having the most extensive network of distributors and resellers. In the past Shell and Esso have invested a large amount of capital in storage facilities, terminals and depots in strategic locations throughout the country. This has resulted in a large market shares than the others and this is likely to continue in the immediate future. However, over a longer period, it may be that with the active involvement of PETRONAS in the marketing fields there would be some erosion in the market shares of the oil companies especially the bigger ones by PETRONAS and this will increasingly threaten their position if PETRONAS is competitive and efficient enough in the field that is new to them.

Because of the present operation of the Control of Supplies Act and the price control of the 4 essential products at retail level, the oil industry is expected to concentrate in only the most profitable and non-controlled products in the future to justify their growth, profitability and investment in the country. There is the likelihood that the oil companies would concentrate in products like petrol or motor spirit, liquified petroleum gas and lubricating oils and less of diesel oil and kerosene. According to one oil company sources, liquified petroleum gas has a gross margin of around $1.70¢ per l.G. but investment in LPG cylinders is very high although LPG itself needs a small investment. It is estimated that the oil industry has to invest around M $40 per cylinder and the total investment per year in cylinders alone is around M $20 million. In this type of investment Shell and Esso will dominate for sometime. This is because they have the refineries from which they get their

LPG. Mobil and British Petroleum have a limited amount of LPG to sell in the market because of the nature of fixed entitlement from the barrels of crude they process in the Shell refinery at Port Dickson.

Similarly in the case of lubricating oil manufacturing, Shell, Esso and British Petroleum and recently Castrol are the leading manufacturers and marketers and they have an edge over the other companies. Since this product does not come under the controlled product category under the Control of Supplies Act, from the same oil company sources, the present product margin is between M $3 to M $4 per barrel and this proves to be a very profitable investment in the future.

There is the likelihood that the price control imposed by the overnment under the Control of Supplies Act and the alleged unprofitability of some products marketed by oil companies, the production and marketing of these products are bound to be reduced in quantity especially in the retail market in future. This will aggravate the present problem of product shortage in the market. Facing with such problem of supply in the market place, PETRONAS may be urged by the Government to undertake the marketing of these products. To help the attainment of this supply objective, the Control of Supplies Act pertaining to the controlled products should be repealed by the Government. Only then that the present price skewing in the product structure be discontinued and instead the price structure would be reverted to its original form with competitive price determined by the free forces of supply and demand in the market place.

11.2.5 Recycling the "Surplus" Oil Revenue

Oil revenues can come from two sources: income from foreign exchange or surplus oil revenue and income from the internal operations of the oil industry through taxation. It is misleading to lump foreign exchange and domestic income together in determining the Government's income from the oil industry. This is because foreign exchange is only received for foreign sales and can only be used to import foreign goods or finances the import content of a plan and also helps to keep down inflation due to excessive domestic spending. Foreign and domestic income are not economically comparable, particularly in view of the fact that the quantity and value of the domestic money may be determined by the Government.

The fiscal influence of the oil revenue has a two-fold effect on the economy: first, it provides a source of income for a government to supplement its budgetary expenditures and second, the oil revenues are channeled for investment in various development projects.

Several oil exporting countries are being concerned about the rate at which they have been attempting to speed their revenues to finance their development plans[5]. This is especially true for countries too heavily reliant on oil revenues alone such as in the Middle East. Any increase in revenue required would tantamount to incurring a fast rate of depleting their exhaustible oil resources. However, this is unnecessary because elasticity of demand implies that prices and thus revenues could be reached with little effect on the rate of output in the short to medium term[6]. Since it is probable that crude oil prices can be raised still further in real terms yielding increased revenues to the exporting countries (at the same time only a small reduction in the rate of depletion) while producing an acceptable substitution for even the countries with the large reserves, and according to Penrose, it should seem producing countries should raise them[7].

---

5. With the advent of non-OPEC oil from the North Sea, Alaska and Mexico, Nigerian crudes have become increasingly difficult to sell at the high price asked in a situation of oversupply. The three main African producers (Nigeria, Libya and Algeria) faced a cut in their combined output. For Nigeria, an agreement on pro-rata cuts is of greater significance than for Libya and Algeria which have smaller populations and accordingly less pressing problems of internal development. They are, therefore, reluctant than Nigeria to boost current income (to the detriment of their long-term gains) by cutting prices. Nigeria, on the other hand, is committed to very heavy current expenditure under the Third National Development Plan which is intended to result in a self-sustaining economy by 1980. A considerable share of the oil income (95%) will be needed to service her $1,000 mil. loans borrowed abroad. See <u>PETROLEUM ECONOMIST</u>, March 1978, p. 105.

6. Penrose, E.T., op.cit. pp. 5-6

7. Penrose, E.T., ibid. , p.6

Owing to the expected increase of oil production forthcoming from its offshore fields between 1977 to 1980 under the production prognosis based on current proven reserves of under 0.9 billion barrels, Malaysia is estimated to have a "surplus" (exports exceed imports of crude oil) in the oil account as shown in Chapter 10 earlier. This is by no means big compared to surpluses of big oil producing countries like Iran, Saudi Arabia, Libya to quote a few, but it is significant in terms of less-developed countries. The question here is whether Malaysia has the "absorptive capacity" to channel the excess funds into investment avenues available in the country and how fast it can absorb to a level sufficient to contain the oil connected surpluses without creating inflationary pressure in the economy.

Public current expenditure of the Government is estimated to amount to about $42.5 billion over the period of the Third Malaysia Plan (TMP) 1976-1980. In contrast, the Federal and State Government revenues is estimated to exceed current expenditure by M $800 million. Together the current surplus of the Federal and State Governments and Public Authorities amount to $1.7 billion for 1976-80. And under the Third Malaysia Plan, development and defence expenditure is targeted at $18.6 billion resulting in a deficit of $16.9 billion - twice higher than under the Second Malaysia Plan 1971-1975. This gives rise to the need for a substantial higher level of borrowing from external and internal sources.

The Government estimated that $11 billion would be financed from domestic or internal sources and the remainder $100 million from accumulated assets[8].

It is expected that the heavy expenditures for the TMP would be financed from Malaysia's export earnings of rubber, tin, palm oil, timber and petroleum whose volume of exports is projected to grow by 8.4 percent per annum yielding an annual increase in export earnings of 13.4 percent during the period of the Plan. Most of the expenditure is expected to be financed from the oil revenues[9].

11.2.6 Research and Development in Alternative Energy Sources

The revival in oil demand has awakened fears, prevalent before the 1973/74 crisis, of a possible future shortage of oil, if consumption continues to grow at its customary rate as evidenced by a number of reports on this. The first warning on this is found in an OECD report WORLD

---

8. THIRD MALAYSIA PLAN, 1980-1985, p. 244

9. If this development expenditure fails to meet the necessary foreign exchange needed to finance the plan then Malaysia can turn to foreign sources of borrowings. Her external debt service ratio was never less than 4 percent of export earnings in 1975. By 1980 the Third Malaysia Plan envisages that the ratio will be increased to 7 percent. This level of debt service ratio is about the lowest amongst the countries of similar levels of development. See THIRD MALAYSIA PLAN, ibid.

ENERGY OUTLOOK.[10] who concluded that if industrialised states took no new steps about energy balance and consumption, there might be rough parity between OECD's exportable oil surpluses and world demand for OPEC oil by 1985. In another study by CIA[(11)] it foresaw that world oil demand would approach productive capacity by the early 1980's, and exceed it by 1985. The OPEC's study[12] forecasts that industrial expansion based on oil export revenues could, by 1985, result in a rise in OPEC oil production from 1 million barrels daily in 1976 to over 8 million b/d with OPEC oil output declining in the 1990s. The WAES Report[(13)] points out the major energy problem facing the non-communist world sometime after 1985 will indeed be the shortage of oil at the time when energy demand would still be growing. WAES found that it would be difficult to satisfy energy demand after 1985 <u>even if</u> all the alternatives - conservation, coal, nuclear, natural gas, solar and other renewables are developed with the utmost vigour. Coupled with this we have analysed in Chapter 9 several recent studies in the past 12 months which have drawn attention to the possibility of an energy crisis, though they have not been unanimous in their predicted timing. The latest of such study [(14)] pointed out that the present oil surplus is largely due to the poor economic performance of the

---

10. OECD, <u>WORLD ENERGY OUTLOOK</u>

11. CIA, <u>INTERNATIONAL ENERGY SITUATION: OUTLOOK TO 1985</u>

12. Organization of Petroleum Exporting Countries (OPEC).

13. Workshop on Alternative Energy Strategies (WAES), <u>GLOBAL PROSPECTS 1985-2000</u>, McGraw Hill, N.Y., 1977.

14. ROCKEFELLER FOUNDATION; <u>INTERNATIONAL ENERGY SUPPLY: A PERSPECTIVE FROM THE INDUSTRIAL WORLD</u>, cited in <u>PETROLEUM ECONOMIST</u>, May 1978, p.178.

industrialised nations - itself partly the result of the high price of oil - coinciding with the advent of North Sea and Alaskan supplies which are sufficient, temporarily, to take care of the growth of consumption and that crisis may arise in the late rather than the middle 1980's. They suggested that there must be continued efforts to restrain the growth of oil consumption, by more efficient use, conservation measures and the development of alternative forms of energy. This being the case, there are 2 forms of approach to the problem suggested by Rahmani[15]: (i) a systematic increases in crude oil prices and (ii) the calls for simultaneous incentives to encourage greater international trade in natural gas. All these entail costly increases in delivered energy prices which at present are no longer cheap anyway. In the first case, this would bring awareness to the consuming public the need for serious energy conservation[16], remove the uncertainty over prices and bring the price of oil on par with the alternative energy sources and encourage the private sector to make much needed investments in such sources. In the second case, its proven reserves worldwide, including gas found dissolved in or lying over crude oil (associated gas), and gas found in independent formation (non-associated gas) are sufficient to support a large expansion in its present

---

15. Rahmani, B.M., op.cit. pp. 8-9.

16. Decisions about energy saving may be easier to make even during the period of energy shortage than decisions to develop new energy production. See Hartshorn, J. op.cit, p.6.

trade[17]. Since the first alternative has been discussed at length in Chapter 9 and in the earlier section of this Chapter, we will discuss only the various alternative energy sources available in Malaysia such as water (hydropower), gas, nuclear power, solar energy and coal resources particularly in Sabah and Sarawak.

Since Peninsula Malaysia has been endowned with a certain amount of hydro-potential, research should be done to examine the feasibility of developing this potential as early as possible in view of the continuing increase in price and the diminishing availability of oil (fuel oil for power generation). However, since rainfall in the country is seasonal, it would be necessary to provide simultaneously steam generation back-up facilities to ensure that electrical energy would be available to the growing industries at all times.

Research should be made in the economies of using gas turbines for peak power generation unit. The rise in fuel oil prices as a result of the successive oil price hikes since 1973, it has been found that electricity generation using gas turbines would be extremely expensive. Since gas has been found along the east coast of Peninsula Malaysia, it may be necessary to introduce generation with gas turbines if gas is permitted to be used for electricity generation.

The very rapid rise in the price of fuel oil follow-

17. Rahmani, B.M. op.cit. p.9.

ing the war in the Middle East has made dramatic changes in the acceptance of nuclear generation as an economic form of power generation. Up to the end of 1972, it had been considered that nuclear power generation would be economical only in large units of the order of 600 MW to 1000 MW[18]. Recent studies have shown that smaller-sized units could prove to be acceptable to developing countties which are entirely dependent on imported fuel oil.

The National Electricity Board of Malaysia (LLN) recognised the fact that petroleum has been found within the territorial waters of Malaysia and that residual fuel oil obtained from these finds could be used for power generation. But in view of the high quality of the fuel oil, it would be extremely uneconomic to use this oil for firing in their boilers, in view of the very high market prices this oil would fetch for use in the petro-chemical industries[19]. So the alternative fuel which would be attractive for serious consideration is nuclear fuel.

CONCLUSION

For the past four years, the petroleum industry has exercised an increasingly pervasive influence on the economy

---

18. Ramanath, A. "The Development of Electricity Generation Facilities in Peninsula Malaysia", a paper presented at the workshop on Energy Resources and Environment, Penang, Malaysia, February 21-23, 1975

19. Ramanath, ibid.

of Malaysia. There are two strands to the influence. Firstly, the actual effect of the petroleum industry on the growth of domestic investment and the creation of employment. Secondly, its role in supplementing Government revenue to enable it to continue to achieve The New Economic Policy. Between the two, the Government could rely on the latter influence to achieve a potentially more valuable and lasting economic regeneration. Up to now, it has to be admitted that these dreams have suffered some 'hard knocks'. With the current small size of reserves, the people who see the petroleum resources as a continuing bonanza should be contented with only a bonus. The South China Sea discoveries cannot be regarded as the magical wand or panacea to cure the country's ills or woes. Many of the problems today in the industry such as those elucidated in this paper can be regarded as the growing pains in the development process of the industry. The rate at which these pains can be cured depends on the ability and speed at which PETRONAS grows. This is largely determined by how deep is its involvement in upstream activities, and how soon it ventures into downstream business like refining and petrochemicals on fully commercial lines, i.e. no subsidies. What is perhaps required more than anything in the present circumstances is the development of harmonious relations amongst the integral parts of the industry from PETRONAS, as the arm of the Government, to the international oil companies and the various contracting enterprises. Only then will the consumer and Nation gain the most in the long run from the efficient exploitation of this diminishing natural resource.

AREAS FOR FURTHER RESEARCH

There has been several omissions in the present study. Since the study only concerned the petroleum industry in Malaysia, industries like natural gas and petro-chemicals which are related to the oil industry have been barely mentioned. No attempt has been made in the study of the methods of crude oil pricing before 1970 as information on this was not made available by oil companies and nowhere could be found in Government documents. There has been no attempt to trace the effects of the industry on the balance of payments, forward and backward linkages to the various regions affected by it and employment generation. This is because it is difficult to do so since it was a relatively small industry before 1970 and its impact after 1970 yet to be seen. The purpose of this study will be served if it has been able to stimulate interest amongst Malaysian researches in the economics of the petroleum industry for further research in the above areas where we stopped.

APPENDIX 3A

TABLE 1: MALAYSIA: GROSS DOMESTIC PRODUCT 1970-1990
(in Million M$)

Year	GDP at Factor Cost	Average Annual Growth Rate
1970	10708	
1971	11589	
1972	12349	
1973	13867	
1974	14797	
1975	15315	1971-75 : 7.4%
1976	16650	
1977	18060	
1978	19600	
1979	21260	
1980	23070	1976-80 : 8.5%
1981	24850	
1982	26870	
1983	29040	
1984	31400	
1985	33940	
1986	36690	
1987	39660	
1988	42870	
1989	46340	
1990	50090	1981-90- : 8.1%

Source: Third Malaysia Plan 1976-80

APPENDIX 3.B

The linear function ax + b is assumed to be an approximation of a function y.

Given the values of y at the points x1, x2, x3 ....xn we aim at minimising the sum of the squared errors.

Consider: Yt approximated by axt + b

$$\text{error } e_t = Y_t - (ax_t + b)$$

squaring errors ÷

$$e_t2 = (Y_t - (ax_t + b))^2$$

Summing all errors at the n points.

$$\sum_{t=1}^{n} e_t2 = \sum_{t=1}^{n} (Y_t - ax_t - b)^2 \ldots 1$$

derive the normal equations by differentiating the R.H.S. with respect to a and b and equating to zero.

$$\sum_{t=1}^{n} 2 X_t (Y_t - ax_t - b) = 0 .. - 2$$

$$\sum_{t=1}^{n} 2(Y_t - ax_t - b) = 0 \quad \ldots - 3$$

from 2

$$\sum xy = a \ x^2 + b\sum x \quad \ldots - 4$$

from 3

$$\sum y = a\sum x + nb \quad \ldots - 5$$

Solve for a and b to obtain the linear equation.

YEAR	GDP	LPG			
	x	y	x^2	xy	S
1970	10.708	3.20		34.2656	.0062326
1971	11.589	3.99		46.24011	.0660078
1972	12.349	5.42		66.93158	.1142798
1973	13.867	6.97		96.65299	.0484858
1974	14.797	7.77		114.97269	.0000026
1975	15.315	8.12		124.3578	.0487314
	78.625	35.47	1047.258	483.42077	.28374

$$483.42077 = 1047.258a + 78.625b \qquad .4616061 = a + .075077b$$

$$35.47 = 78.625a + 6b \qquad .4511287 = a + .0763116b$$

$$b = -8.486149$$

$$a = 1.0987203$$

$$LPG = -8.486149 + 1.0987203\ GDP_{FC}$$

1980	23.070	16.861328
1985	33.940	28.804417
1990	50.090	46.54875

YEAR	GDP	ATF			
	x	y	x^2	xy	S
1970	10.708	8.52		91.23216	.8160068
1971	11.589	9.05		104.88045	.0075663
1972	12.349	9.48		117.06852	.9379825
1973	13.867	12.51		173.47617	.3114331
1974	14.797	14.37		212.63289	.0917702
1975	15.315	16.58		253.9227	1.0265073
	78.625	70.51	1047.258	953.21289	3.1912662

$$953.21289 = 1047.258a + 78.625b \qquad 0.9101987 = a + .075077b$$

$$70.51 = 78.625a + 6b \qquad 0.8967885 = a + .0763116b$$

$b = 10.86181$

$a = 1.7256705$

$$ATF = -10.86181 + 1.7256705\ GDP_{FC}$$

1980	23.070	28.949408
1985	33.940	47.707446
1990	50.090	75.577025

YEAR	GDP x	KEROSENE y	x^2	xy	S
1970	10.708	14.69		157.30052	.4105759
1971	11.589	16.82		194.92698	.1337174
1972	12.349	17.99		222.15851	.3208372
1973	13.867	19.41		269.15847	.0025479
1974	14.797	20.23		299.34331	.0995894
1975	15.315	21.18		324.3717	.0006863
	78.625	110.32	1047.258	1467.2594	.9679541

$$1467.2594 = 1047.258a + 78.625b \qquad 1.4010486 = a + .075077b$$

$$110.32 = 78.625b = 6b \qquad 1.403116 = a + .0763116b$$

$$b = 1.6745504$$

$$a = +1.275328$$

$$\text{KEROSENE} = 1.6745504 + 1.275328\ \text{GDP}_{FC}$$

1980	23.070	31.096366
1985	33.940	44.959182
1990	50.090	65.555729

YEAR	GDP x	MOGAS y	x^2	xy	S
1970	10.708	35.88		384.20304	.8769254
1971	11.589	38.54		466.64006	.5496309
1972	12.349	43.24		533.97076	.0469103
1973	13.867	49.50		686.4165	.9953015
1974	14.797	53.63		793.56311	1.446725
1975	15.315	59.66		913.6929	4.1321863
	78.625	280.45	1047.258	3758.4863	8.0476794

$$3758.4863 = 1047.258a + 78.625b \qquad 3.5888828 = a + .075077b$$
$$280.45 = 78.625a + 6b \qquad 3.5669316 = a + 0.0763116b$$

$b = 17.77984$

$a = 4.923739$

$$MOGAS = -17.77984 + 4.923739\ GDP_{FC}$$

1980	23.070	95.81081
1985	33.940	149.33186
1990	50.090	228.85024

YEAR	GDP	GAS/DIESEL			
	x	y	x^2	xy	S
1970	10.708	88.26		945.08808	3.6650539
1971	11.589	95.03		1101.3026	.5286787
1972	12.349	103.72		1280.8382	9.9034831
1973	13.867	111.85		1551.0239	2.7483008
1974	14.797	115.69		1711.8649	.1563174
1975	15.315	117.60		1801.044	3.1251168
	78.625	632.15	1047.258	8391.1616	20.126948

$8391.1616 = 1047.258a + 78.625b$ $\quad$ $8.0125065 = a + .075077b$

$632.15 = 78.625a + 6b$ $\quad$ $8.0400635 = a + .0763116b$

$b = 22.320589$

$a = + 6.336743$

GAS DIESEL = 22.320589 + 6.336743 GDP_{FC}

1980	23070	168.50924
1985	33940	237.38963
1990	50090	339.72804

YEAR	GDP	FUEL OIL			
	x	y	x^2	xy	S
1970	10.708	73.50		787.038	.0153784
1971	11.589	83.14		963.50946	.0266701
1972	12.349	92.73		1145.1227	2.8397979
1973	13.867	103.68		1437.7305	2.109564
1974	14.797	117.04		1731.8408	.0000528
1975	15.315	124.28		1903.3482	3.0561682
	78.625	594.37	1047.258	7968.5896	18.04763

$$7968.5896 = 1047.258\ a + 78.625\ b \qquad 7.6090033 = a + .075077b$$

$$594.37 = 78.625\ a + 6b \qquad 7.5595548 = a + .0763116b$$

$$b = -40.05183$$

$$a = 10.615974$$

$x10^{-2}$

$$\text{FUEL OIL} = -40.05183 + 10.615974\ \text{GDP}_{FC}$$

1980	23.070	204.85869
1985	33.940	320.25432
1990	50.090	491.7023

YEAR	GDP x	TPF y	x^2	xy	S
1970	10.708	22.648		242.51478	.0061976
1971	11.589	24.910		288.68199	.0139709
1972	12.349	27.485		339.41226	.2222387
1973	13.867	30.663		425.20382	.0999274
1974	14.797	33.143		490.41697	.0705385
1975	15.315	35.069		537.08173	.0943816
	78.625	173.918	1047.258	2323.3114	.5072545

$$2323.3114 = 1047.258a + 78.625b \qquad 2.2184709 = a + .075077b$$
$$173.918 = 78.625a + 6b \qquad 2.2119936 = a + .0763116b$$

$$b = -5.246233$$
$$a = 2.612342$$

$$TPF = -5.246233 + 2.612342\ GDP_{FC}$$

1980	23.070	55.020496
1985	33.940	83.416654
1990	50.090	125.60598

YEAR	GDP x	TPP y	x^2	xy	$St=(Y-Yd)^2$
1970	10.708	234.18	114.66126	2507.5994	3.5330841
1971	11.589	258.50	134.30492	2995.7565	1.5063634
1972	12.349	258.95	152.4978	3531.1965	33.704875
1973	13.867	319.26	192.29368	4427.1784	2.7716589
1974	14.797	342.87	218.95120	5073.4473	9.246343
1975	15.315	361.83	234.54922	5541.4264	4.012009
	78.625	1802.59	1047.258	24076.603	54.774332

$$24076.603 = 1047.258a + 78.625b \qquad 22.990135 = a + .075077b$$
$$1802.59 = 78.625a + 6b \qquad 22.926422 = a + .0763116b$$

$b = 51.60618$

$a = 26.864572$

$$TPP = -51.60618 + 26.864572\ GDP_{FC}$$

1980	23.070	568.15949
1985	33.940	860.17739
1990	50.090	1294.0403

APPENDIX 5A

THE REFINERY AGREEMENTS AND THE BASIC PRICING OF PETROLEUM PRODUCTS

According to the Refinery Agreements, the prices of refined petroleum products for Shell Petroleum Company Limited and Standard Vacuum Oil Company Ltd., were based on imported parity. The refining companies were permitted to establish the prices of refined products at any level not higher than that at which they could sell or make available for sale equivalent imported products subject to consultation with the Government before they alter the prices of any products. The cost would be built up from posted prices of products at overseas supply sources plus recognised freight costs to the ports in the Federation such as Bagan Luar, Telok Anson, Port Swettenham and so on.

On the principal of 'import parity' laid down in the Refinery Agreements above, the price of products ex-refinery should not be higher than the landed cost in Malaysia, i.e. such prices should be the ceiling. The landed cost of the imported products into Malaysia would depend on the following:

(i) arrangements between the oil companies with their suppliers of finished products,

(ii) manner of determination of prices of bulk refined products,

(iii) discounts prevalent from time to time on the posted prices of bulk refined products at the sources of supply, and

(iv) alternative sources of supply for import of such products.

On this basis, the ex-refinery prices for products for consumption in the mainland should not exceed the sum of:

(i) the F.O.B. posted price for products of similar quality from regular sources of supply for export to world markets which sources are competitive in relation to Malaya,

(ii) ocean leakages of marine insurance,

(iii) freight according to AFRA applicable to General Purpose Size Vessels,

(iv) import duties, landing charges and other applicable charges.

It was assumed that the Government would levy excise duties on imported products displaced by domestic refinery production. This excise duties to be imposed on products manufactured locally destined for inland consumption in mainland Malaya would not be greater than import duties chargeable on imported products of similar quality.

The Malaysian consumer would, therefore, pay no higher price for refinery products than he would otherwise pay for equivalent imported products. Prices would, however, fluctuate with world market petroleum product prices and world freight rates.

According to Section 5 of the Refinery Agreement, the refining companies were given the freedom to import crude oil and other feedstocks from sources and vessels of their own choice provided that the value thereof should not be more than the sum of:

(a) the F.O.B. posted or assessed price for crude oil and other feedstocks of similar quality obtainable from regular sources of supply for export to world markets which sources are competitive in relation to Malaya,

(b) freight according to AFRA applicable to large vessels,

(c) marine insurance.

Moreover, the refinery agreements contained the assurance that for the importation of crude oil, foreign exchange either sterling or dollars would be provided as required. The Refinery Agreements of the two companies further contain assurance to the effect that no import duty would be imposed on crude oil imported for the refinery use unless and until this was required for the purpose of protection to indigenous crude oils. Assurance was also given for regulation of the inward and outward wharfage rates on crude oil and products. By virtue of another assurance which provided uniformity in the two agreements, the product prices of refineries had to be kept at par and in the event of any other refinery producing similar products from imported crude oil being granted terms more generally favourable than those granted to a particular refinery, those terms would also be made applicable to these refineries.

The selection of the types of crude oil to be obtained for processing at any refinery was mainly dictated by:

(a) the price of crude oil,
(b) the refinery design,
(c) the outlets for the products manufactured.

The considerations of (b) and (c) of above were being somewhat of technical nature. However, the cost aspects in (a) included:

(i) arrangement in the crude supplies
(ii) manner of crude price determination
(iii) discounts off posted price
(iv) utilisation of crude supply alternatives and
(v) types of crude to be processed, i.e. the crude oil selected by the refineries to suit their individual requirements.

Section 9 of the Agreement further stated that crude oil and other feedstocks should be imported duty-free. Similarly equipment, machinery, materials and supplies for non-construction operation, and the expansion of the refinery should be imported and duty free and re-exported free of duties, charges etc., if found surplus to requirements.

Both the companies mentioned earlier applied for the benefits under the Pioneer Industries Legislation for the maximum period provided. The Government was prepared to enter into this formal agreement with the two companies but would deal with the applications within the framework of the Pioneer Industries Legislation. Section 4 of the Pioneer Industries (Relief from Income Tax) Ordinance 58 applied here whereby, the Ministry of Commerce and Industry, in pursuance of the Pioneer Industries (Relief from Income Tax) Gazette Notification December 24, 1959 Nos. 5142 and 5232, declared certain industries and products to be classified under Pioneer Industries.

PI No. 3 Ordinance 1960 declared pioneer status for Mineral Oil Refineries to produce:

(i) Motor Gasolines (all types)
(ii) Aviation Turbine Fuel (ATF)
(iii) Diesel Oils (all types)
(iv) Kerosene
(v) Gas Oils
(vi) Bitumen and Asphalt
(vii) Petroleum Naphtha and solvents
(viii) Liquified Petroleum Gas (LPG)
(ix) Refinery Gas
(x) Butane
(xi) Special Boiling Point Spirits
(xii) Fuel Oils (all types)

Items (vi), (vii), (viii) and (xi) products were declared pioneer products under PI (Relief from Income Tax) (No.3) Order 1960 dated February 3, 1960.

Before further approval was sought, the Government stipulated two other conditions on the oil companies. Firstly, they should allow a reasonable participation of the refinery by Malaysian investors if sufficient interest was shown by them. In this connection, it was suggested that the enquiries should be carried out by the companies to determine the degree of interest of local investors. Secondly, the Government was satisfied that vigorous and realistic efforts were made by the companies to train local personnel to replace to the maximum extent practicable of foreign personnel recruited for the project.

In the beginning of 1961, the Government agreed to meet most of the proposals in the "Heads of Agreement" by both the companies which include:

(i) the right to offset replacements and additions to the existing refineries
(ii) free importation of crude oil and feedstocks from any sources
(iii) the ex-refinery price not exceeding the import-parity price
(iv) to freely determine export price and destination
(v) the proposal agreements on foreign exchange to finance the refineries and their operations
(vi) equal treatment in every respect all their shareholders.

In addition, the Government had given the assurance that the tax relief period was not to be limited to five years subject to the conditions that the construction day for Shell Petroleum Company of Federation of Malaya be January 1, 1962 and production day March 1, 1964.

On July 27, 1963, Pioneer Certificate No. 64 was given to the Shell Petroleum (Refining) Company of Malaya allowing an authorised capital of M$50 million and with an initial paid-up capital of M$30 million - M$7½ million contributed by the Malayan investors and M$22½ million from foreign sources. And in the case of the Standard Vacuum Company of Malaya Limited, Pioneer Certificate No 60 was issued on April 24, 1962. However, on April 19, 1962, the name of the Standard-Vacuum Refining Company of Malaya was changed to Esso Standard Refining Company of Malaya and subsequently on May 16, 1962 to Esso Standard (Malaya) Limited. The authorised capital was M$150 million with paid-up capital of M$50 million. Foreign capital constituted M$33½ million with the remainder from local sources.

According to the agreements between the Government and the Shell Petroleum (Refining) Company and Esso Standard (Malaya) Limited the capacities of the two refineries were to be adjusted so that their output meet the inland demand requirements of gasoline and fuel oil.

The average capacities of the two refineries of 20,000 (Shell) and 26,000 (Esso) barrels per day would be more than sufficient to meet the whole inland requirements of motor gasoline and fuel oil required by the Government. The

Shell refinery's capacity was expanded to 90,000 barrels per day in 1974 and Esso to 35,500 barrels per day. The capacities were necessary for meeting Malaysia's future requirements in motor gasolines and fuel oil. The refineries were initially designed to meet Malaysia's inland oil requirements and were never intended to be an export refinery like Shell's Pulau Bukom and Esso's Pulau Ayer Cawan Refineries in Singapore.

APPENDIX 6 A

STRAITS SETTLEMENTS.

Paper laid before the Legislative Council by Command of His Excellency the Governor.

THURSDAY, 23RD FEBRUARY, 1893.

RULES

MADE BY

HIS EXCELLENCY THE GOVERNOR IN COUNCIL

UNDER

"The Petroleum Ordinance 1883," as amended by Ordinance XVIII of 1886, and "The Petroleum Ordinance Amendment Ordinance 1892."

Ord. XII of 1883. Ord. IV of 1892. 1. All words and expressions used in these Rules and defined in "The Petroleum Ordinance 1883," or "The Petroleum Ordinance Amendment Ordinance 1892," shall in these Rules have the meanings respectively assigned to them in those Ordinances, and Interpretation.

(1)—"petroleum in bulk" means petroleum in any vessel or receptacle having a capacity of three hundred gallons or upwards;

(2)—"transport" means to remove from one place to another within the Colony;

(3)—"import" means to bring into the Colony by sea or land, and "importation" means the bringing into the Colony as aforesaid.

2. No quantity of dangerous petroleum equal to or less than twenty gallons shall be landed, stored, or transported without a license. Landing, storage, and importation of dangerous petroleum not exceeding 20 gallons.

Provided that nothing in this section shall apply in any case when the quantity of the petroleum transported by any person does not exceed three gallons, and the petroleum is placed in separate glass, stoneware, or metal vessels, each of which contains not more than a pint and is securely stopped.

3. (1)—No quantity of dangerous petroleum exceeding twenty gallons shall be landed, stored, or transported by any one person or on the same premises, except under, and in accordance with, the conditions of a license from the Governor granted as next hereinafter provided. Landing, storage, and importation of dangerous petroleum exceeding 20 gallons.

(2)—Every application for such a license shall be in writing, and shall declare:—

(a) the quantity of the petroleum which it is desired to land, store, or transport as the case may be;

(b) the purpose for which the applicant believes that the petroleum will be used; and

(c) that petroleum other than dangerous petroleum cannot be used for that purpose.

(3)—If the Governor sees reason to believe that the petroleum will be used for that purpose and that no petroleum other than dangerous petroleum can be used for the purpose, he may grant the license for the landing, temporary storage, or importation (as the case may be) of the petroleum, absolutely or subject to such conditions as he thinks fit.

4. Dangerous petroleum— Conditions of temporary storage of dangerous petroleum.

(a) which is kept at any place after seven days from the date on which it is landed, or

(b) which is transported, or

Note:—Any person guilty of any breach of, or disobedience to, Rules 2, 3, 4, 5, 6 and 7 shall be liable to a penalty not exceeding five hundred dollars and if such breach or disobedience be of a continuing nature to a penalty not exceeding five hundred dollars for each day or part of a day during which such breach or disobedience continues. (Section 8 (2) of "The Petroleum Ordinance 1883" as amended by Ordinance XVIII of 1886.)

16. Every special license for the transport of petroleum shall specify the places from and to which, respectively, the petroleum is to be conveyed, the quantity of petroleum covered by the license, and the time for which the license is in force. Particulars to be specified therein.

17. (1)—Applications for special licenses for the transport of petroleum shall specify the description and quantity of the petroleum to be transported, the places from and to which, and the route by which, the petroleum is to be conveyed, and shall describe the receptacles in which the petroleum is to be contained. Applications for licenses for transport of petroleum;

(2)—Applications for licenses for the transport of dangerous petroleum shall also contain the particulars required by sub-section (2) of section 3 of these Rules. of dangerous petroleum.

18. Licenses for the transport of petroleum otherwise than in bulk shall only be granted if the petroleum to be transported is packed in air-tight tins, air-tight tanks or drums of steel or iron, or other air-tight vessels not easily broken, or is contained in stoppered bottles carefully packed so as to avoid the risk of breakage. Vessels in which petroleum transported is to be packed.

19. No larger quantity than four cases of petroleum other than dangerous petroleum shall be kept or stored in any place outside the limits of any Municipality except under and in accordance with the following conditions:— Conditions of storage outside Municipality of non-dangerous petroleum.

(1) No such quantity of such petroleum shall be stored in any wooden building.

(2) All petroleum shall be stored within the licensed place in a brick, stone, or iron receptacle.

(3) No goods of a combustible nature shall be stored in the licensed place.

(4) Subject to the provisions of section 11 of these Rules no cask or other receptacle containing petroleum shall be opened, or the oil drawn off, within the building in which the petroleum is stored.

(5) No smoking, light, or fire in any form shall be permitted at any time within such building.

(6) Such materials or appliances for extinguishing fire as shall be approved by the Licensing Authority shall be kept ready for use in every such building.

(7) On the outside of every place licensed for the storage of such petroleum there shall be conspicuously affixed a sign-board of a pattern approved by the Licensing Authority bearing the words "Licensed Petroleum Store" and the number of the store.

(8) If the Licensing Authority calls on the holder of a license, by a notice in writing, to execute any repairs of the licensed place which may, in the opinion of such Authority, be necessary for the safety of the place, the holder of the license shall execute the repairs within such period, not being less than one week from the date of the receipt of the notice, as may be fixed by the notice.

20. No quantity of petroleum other than dangerous petroleum exceeding 20 cases or 160 gallons shall be kept or stored in any place outside the limits of any Municipality except under and in accordance with the following conditions:— Additional conditions of storage outside Municipality of non-dangerous petroleum in quantity exceeding 20 cases or 160 gallons.

(1) A plan of every building intended for the storage of such petroleum in such quantity shall be furnished by the applicant for a license to the Licensing Authority on which plan shall be shewn the position and description of every building within 60 feet of the building for which a license is applied for.

(2) There shall be affixed to every such building a lightning conductor leading into a pit or well, or into a river or the sea.

(3) All the doors of every such building shall be of the thickness of not less than one inch and a half, and all the windows shall be fitted with external shutters. The sills of all external doors and windows on the ground floor of every such building shall be at a height of not less than 3 feet from the ground, and all the floors shall be of stone, concrete, or brick.

(c) which is sold or exposed for sale,

shall be contained in steel or iron drums marked with a broad band painted white round the centre of the drum having attached thereto a label in conspicuous characters stating the description of the petroleum, with the addition of the words "highly inflammable".

Licenses for storage of dangerous petroleum.

5. Every license for the temporary storage of dangerous petroleum in any premises shall specify the maximum quantity of such petroleum which may be stored in those premises.

6. Every license for the temporary storage of dangerous petroleum shall be in force for three months from the date of the grant of the license.

7. Every application for the renewal of a license for the temporary storage of dangerous petroleum shall be made in the same manner as an application for an original license.

Every such application shall be made at a date not less than fifteen days before the date on which the original license expires. The same fee shall be charged for the renewal of a license as for a new license.

License required to transport petroleum.

8. No quantity of petroleum shall be transported except under, and in accordance with, the conditions of a license granted under these Rules.

Provided that no license shall be necessary for the transport of any quantity not exceeding five hundred gallons of petroleum other than dangerous petroleum.

Landing petroleum.

9. When petroleum imported otherwise than in bulk is landed within any port—

(1) it shall be landed only after sunrise and before sunset, and only at such place or places as the Conservator of the Port shall direct;

(2) no smoking, fire, or light of any description shall be allowed in any boat during the time that the petroleum is on board the boat.

Petroleum landed to be carried at once to licensed premises.

10. All petroleum while being landed shall be conveyed at once from the ship in which the same was imported to the place of landing, and thence shall be carried at once to premises in respect of which a license for the keeping of petroleum has been granted.

Petroleum imported in bulk.

11. When petroleum is imported in bulk, its removal from the ship shall be effected by means of a hose and a wrought-iron pipe between sunrise and sunset. Petroleum so imported shall be pumped into storage-tanks and when the ship has finished discharging the pipe shall immediately be emptied by means of a supplementary pump on shore. When the ship has not finished discharging by sunset, arrangements must be made by means of a valve for effectually preventing any of the oil in the pipe from escaping.

Ports and places for import of petroleum.

12. The only ports at which petroleum may be imported are the principal ports of Singapore, Prince of Wales' Island, Malacca, and the Dindings as defined under "The Harbours' Ordinance 1872," and at such other places as shall be fixed for that purpose, from time to time, by the Governor in Council. Ord. VIII of 1872.

Licenses for transport of petroleum;

13. (1)—Licenses for the transport of petroleum other than dangerous petroleum in quantities exceeding five hundred gallons may be either general or special.

of dangerous petroleum.

(2)—Licenses for the transport of dangerous petroleum shall be special only.

Yearly general licenses for transport of petroleum.

14. (1)—General licenses for a period of twelve months may be issued for the transport of petroleum in bulk by road or by water and for the transport of petroleum otherwise than in bulk by cart only. Such licenses shall authorise the holders to transport any petroleum *bonâ fide* their own property without restriction as to destination or quantity.

(2)—The holder of a general license shall, with each consignment of petroleum conveyed under cover of his license, issue a pass in form *F* appended to these Rules, specifying the places from and to which the petroleum is to be conveyed and the quantity of petroleum covered by it.

Special licenses for transport of petroleum.

15. Special licenses for the transport of petroleum shall be in force for such period not exceeding six months from the date of the grant of the license as may be specified in the license.

(4) The floor area of every such building built after the passing of these Rules shall not exceed 1,700 square feet, and the height of such building from the floor level to the under-side of the roof tie-beams shall not exceed 12 feet. The walls of every such building which is of brick shall be solidly built of bricks throughout well bonded together with freshly made mortar and shall be of a thickness of not less than 14 inches.

(5) No quantity of petroleum exceeding 10,000 cases or 80,000 gallons shall be stored in any one compartment of any licensed place, and where more than such quantity is stored in any such place the walls between each compartment of the building shall be solidly built of bricks throughout well bonded together with freshly made mortar, and shall be of a thickness of not less than 14 inches, and shall be carried at least 2 feet above the roof of the building. There shall be no communication between one compartment of the building and any other compartment thereof.

(6) No license will be granted for the storage in any one compartment of more than 10,000 cases or 80,000 gallons.

(7) An embankment not less than 3 feet in height shall be raised round every place licensed for the storage of such petroleum in such quantity and at a distance of at least 10 feet from such licensed place. The roads or paths on such embankment shall be made of brick, stone, concrete, or cement.

(8) Outside such embankment, or within a similar separate embankment, a detached building of brick, stone, or cement shall be erected within which all leaky tins shall be repaired, and within which not more than 25 cases of such petroleum shall be kept at any time.

(9) All drains leading from the licensed place shall lead into catch pits which shall be provided with iron plugs or doors capable of being closed in case of fire.

Licenses for storage or transport of dangerous petroleum,

21. (1)—Licenses for the temporary storage or transport of dangerous petroleum in quantities exceeding twenty gallons may be granted subject to the provisions of section 3 of these Rules under the signature of the Colonial Secretary or of a Resident Councillor on the recommendation of a President of Municipal Commissioners if the license applied for is for such storage or transport within the limits of any Municipality, or if the license applied for is for such storage or transport outside the limits of any Municipality on the recommendation of a District Officer or Magistrate.

(2)—Applications for such licenses should be made to the President of the Municipal Commissioners or to the District Officer or Magistrate, as the case may be.

and of other petroleum by whom granted.

(3)—Licenses for the temporary storage or transport within any Municipality of dangerous petroleum in quantities not exceeding twenty gallons, and licenses for the transport of other petroleum, may be granted if the license be for such storage or transport within the limits of any Municipality by the Municipal Commissioners of such Municipality, and if the license be for such storage or transport outside the limits of any Municipality by the District Officer or a Magistrate, or by such other person as the Governor may from time to time by an order in writing appoint in this behalf.

(4)—Licenses for the storage of petroleum other than dangerous petroleum outside the limits of any Municipality may be granted subject to the provisions of sections 19 and 20 of these Rules under the signature of the Colonial Secretary or of a Resident Councillor. Applications for such licenses should be made to a District Officer or a Magistrate.

Forms of licenses.

22. Licenses granted under these Rules shall be in the forms and shall have endorsed on them the conditions respectively prescribed for them in the Schedule hereto annexed.

Every such license shall, on the breach of any such condition, be liable to be forfeited.

A. P. TALBOT,
Clerk of Councils.

COUNCIL CHAMBER,
Singapore, 3rd February, 1893.

Source: PROCEEDINGS OF THE LEGISLATIVE COUNCIL OF THE STRAITS SETTLEMENTS FOR THE YEAR 1893, Government Printing Office, Straits Settlements, 1894, pp 87-90.

APPENDIX 6 B

DUTY STATUS ON PETROLEUM PRODUCTS IN PENINSULAR MALAYSIA

	Products	Excise Duties	Import Duties	Surtax	Sales Tax	Tariff Code
1.	Premium Mogas 90/Oct. and above (Locally refined)	$1.41/ IG	NIL	NIL	NIL	C1
2.	Premium Mogas 90/Oct. and above (Imported)	NIL	$1.51/ IG	5%	NIL	2710211
3.	Regular Mogas (Locally refined)	$1.41/ IG	NIL	NIL	NIL	C2
4.	Regular Mogas (Imported)	NIL	$1.51/IG	5%	NIL	2710219
5.	Kerosene (Locally refined)	$0.01/IG	NIL	NIL	NIL	C3
6.	Kerosene (Imported)	NIL	$0.01/GI	Exempted	NIL	2710299
7.	ADO (Locally refined)	NIL	NIL	NIL	NIL	C4
8.	ADO (Imported)	NIL	NIL	Exempted	NIL	2710410
9.	Other Diesel Fuel (Local Ref.)	NIL	NIL	NIL	NIL	C5
10.	Other Diesel Fuel (Imported)	NIL	NIL	Exempted	NIL	2710490
11.	Aviation Spirit 100/Oct. and above (Local Ref.)	$1.30/	NIL	NIL	NIL	C6
12.	Aviation Spirit 100/Oct. and above (Imported)	NIL	$1.40/	5%	NIL	2710221
13.	Aviation Spirit, other (Locally refined)	$1.30/	NIL	NIL	NIL	C7
14.	- do - (Imported)	NIL	$1.40/IG	5%	NIL	2710229
15.	Other Petroleum Spirit Having a Flash Point BELOW 73°F (Locally Refined)	$1.30/	NIL	NIL	NIL	C8
16.	- do - (Imported)	NIL	$1.40/IG	5%	NIL	2710291
17.	Vapourising Oil (Locally Ref.)	$0.05/IG	NIL	NIL	NIL	C9
18.	- do - (Imported)	NIL	$0.05/IG	5%	NIL	2710330
19.	Aviation Turbine Fuel, having Flash Point 73°F or over (Jet Fuel) (Locally Refined)	$0.05/	NIL	NIL	NIL	C10
20.	- do - (Imported)	NIL	$0.05/IG	5%	NIL	2710310

...2/-

	Products	Excise Duties	Import Duties	Surtax	Sales Tax	Tariff Code
21.	Residual Fuel Oils (Locally refined)	$17.00 /L.T.	NIL	NIL	NIL	C11
22.	- do - (Imported)	NIL	$17.00/LT	5%	NIL	2710500
23.	Lubricating Oil containing at least 70% Petroleum Products (Locally manufactured)	$1.00/ IG	NIL	NIL	NIL	C12
24.	- do - (Imported) Including Lube base oils for direct sales	NIL	$1.05/IG	5%	NIL	2710610
25.	Lube Base Oil imported for Manufacture of finished lubes	NIL	Exempted	5%	NIL	2710610
26.	Lubricating Grease Containing at Least 70% Petroleum Products (Locally Manufactured)	$10.00 /cwt	NIL	NIL	NIL	C13
27.	- do - (Imported)	NIL	$10.00/cwt	5%	NIL	2710620
28.	Lube Oil containing less than 70% Petroleum Products (locally manufactured)	$1.00/ IG	NIL	NIL	5%	C14
29.	- do - (Imported)	NIL	$1.05/IG	5%	5%	3404100
30.	Lube Grease containing less than 70% Petroleum Products (Locally manufactured)	$10.00 /cwt	NIL	NIL	5%	C15
31.	- do - (Imported)	NIL	$10.00/cwt	5%	5%	3404200
32.	Paraffin Was, Micro Crystalling wax, slack wax, Ozokerite, Lignite Wax, Peat Wax, and any other mineral wax, whether or not coloured (Locally manufactured)	$0.03 /lb	NIL	NIL	NIL	C16
33.	- do - (Imported)	NIL	20% ad. va.lorem	5%	NIL	2713000
34.	Other Petroleum Spirit having a Flash point of 73°F or over Including White Spirit (Locally Refined)	$0.03 /IG	NIL	NIL	NIL	C17
35.	(a) - do - (Imported) (b) White Spirit (Imported)	NIL NIL	$0.05/IG $0.05/IG	5% 5%	NIL NIL	2710299 2710340
36.	Petroleum Gases and other Gaseous Hydrocarbons (Locally Refined)	$0.02 /lb	NIL	NIL	NIL	D36

...3/-

	Products	Excise Duties	Import Duties	Surtax	Sales Tax	Tariff Code
37.	Petroleum Gases and other Gaseous Hydrocarbons (Bulk Import)	NIL	$0.03 /lb	5%	NIL	2711000
38.	LPG if imported in cylinders, additional import duty imposed on cylinders	NIL	$15.00 /cyl	5%	5%	7324900
39.	Additives for Petrol (Imported)	NIL	NIL	5%	5%	3814100
40.	- do - Lubes (Imported)	NIL	NIL	5%	5%	3814200
41.	Crude Oils (Imported for Refining)	NIL	NIL	NIL	NIL	270900

12/10/76

Source; Mobil Oil Company.

APPENDIX 8A

(a) The Royal Dutch Shell Group of Companies

The Royal Dutch Shell Group of Company was formed on June 16, 1890 with an initial capital of fl.1,300,000 to operate an oil concession in North-Eastern Sumatra. The company was established in Hague, Netherlands with the title "NETHERLANDSCHE KOLONIALE PETROLEUM MAATSCHAPPIJ" or "Royal Dutch Company for the Working of Petroleum Wells in Netherland Indies". Over the years the name was simplified to its present title of "Royal Dutch Petroleum Company".

When the managment of the company was taken over by HWA Deterding, the policy was to seek cooperation with other petroleum companies operating in Indonesia. Among the companies which responded was one which the entire share capital was held by the "Shell" Transport and Trading Company Limited". It was only in 1907 that the full association of Royal Dutch "Shell" Transport now known as the Royal Dutch/Shell Group of Companies materialised.

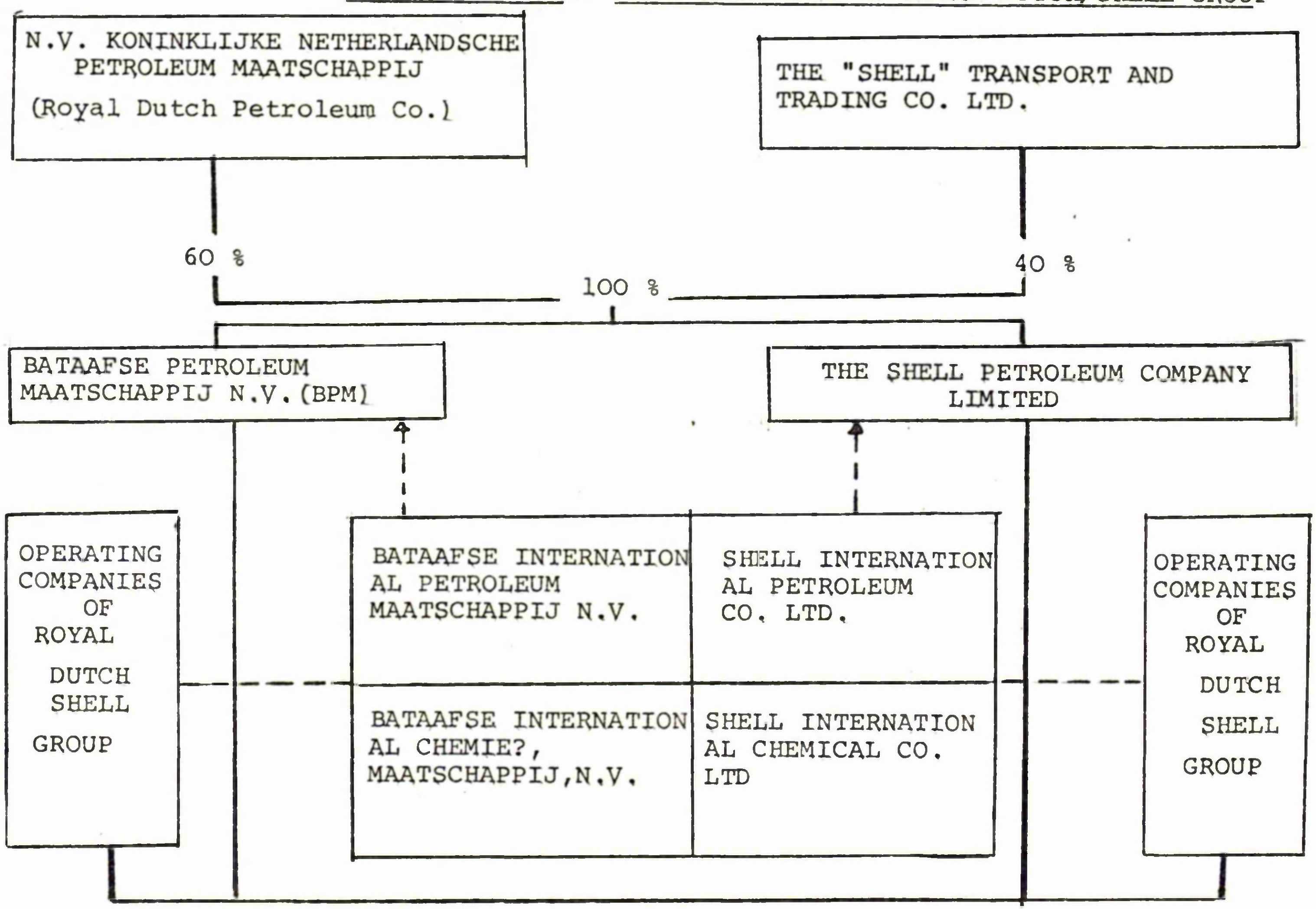
The "Shell" Transport and Trading Company was formed in 1897 with an initial capital of £1,800,000 to take over the oil interest of Marcus Samuel and Company, including a producing field in Dutch East Borneo. These oil interests were becoming increasingly important to remain part of the firms general merchandising business. Among the mechandise which they traded were ornamental shells which were popular in Victorian England; this was where the trade make "Shell" originated.

The first step in merging of interest of the Royal Dutch and "Shell" Transport was the formation of joint marketing company called the East Asiatic Petroleum Co. Ltd., The next step was in 1907 when the 2 parent companies transfered all assets to the two companies namely the Anglo-Saxon Petroleum Company Limited (London) and N.V. De Bataafsche Petroleum Maatschappij (B.P.M.) now Bataafse Petroleum Maatschappij N.V., the Hague.

Royal Dutch took 60% and Shell Transport 40% of shares in both these two companies and then withdrew from active operations and functions only as entirely holding companies. At the same time Royal Dutch and "Shell" Transport transferred their shares in the Asiatic Petroleum Company (renamed the Shell Petroleum Company Limited) to the Anglo-Saxon Petroleum Company Limited in 1955 as a result of structural simplification the business of the Anglo-Saxon Co. Ltd. was vested in The Shell Petroleum Co. Ltd. and the number of parent companies was thus reduced to two: BPM and Shell Petroleum. This is shown in Figure 8A(1).

The main feature in which Shell differs from the other major international oil companies is in its special corporate structure and the uniquely international character of the

FIGURE 8 A (i): MAIN STRUCTURE OF ROYAL DUTCH/SHELL GROUP



——— Shareholding Relationship
- - - - Service Relationship

Source: Shell Malaysia Trading Berhad.

Group. The basic structure of the Royal Dutch/Shell Group of Companies can be represented by a block diagram of the type shown.

This structure does not resemble that of the other international oil companies, and is unusual as the Group does not exist as a corporate body. The three essential elements in the Group are the holding companies, the operating companies and the service companies. Surmounting these units and not strictly part of the Group are the parent companies. They are the vehicle by means of which investors may hold shares in the Group.

Directly or indirectly BPM and Shell Petroleum hold a proportion or all of the several hundred operating companies throughout the world. And a notable operating company which supply the Group oil requirements in the East Asia region is the Shell Group of Companies in Malaysia and Brunei. The Shell Group of Companies are divided into various exploration and producing, refining and marketing companies.

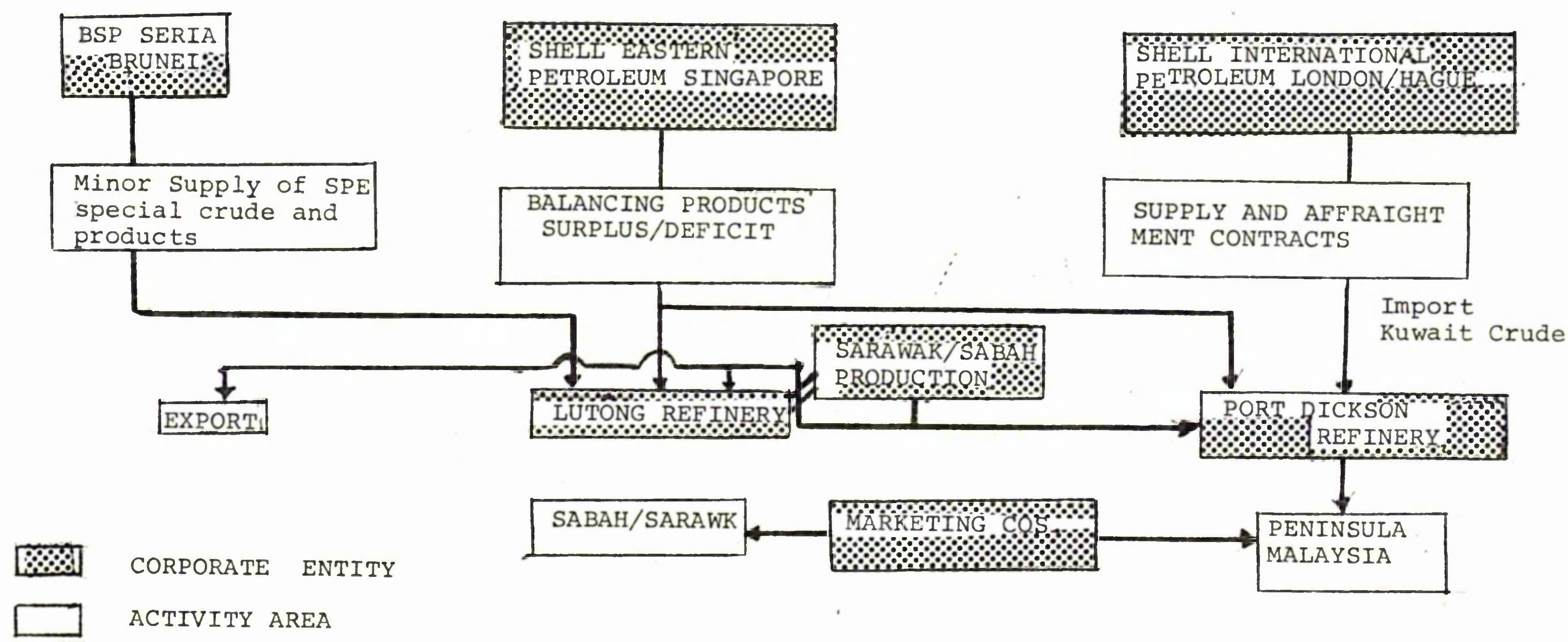
The two parent companies, Royal Dutch and "Shell" Transport and Trading are public companies. These two companies hold the entire interest in BPM and Shell Petroleum in the ratio of 60:40 percent. BPM and Shell Petroleum in turn hold a proportion or all of several hundred other operating companies throughout the world which are collectively known as the Royal Dutch/Shell Group.

The Figure 8A (ii) shows the flow relationship amongst the various Shell Group of Companies in London, Singapore, Brunei and Malaysia.

Shell International Petroleum at London has a supply and affreightment contracts with the Shell Refining Company of Malaya in providing Kuwait crude to its refinery at Port Dickson. The Shell Eastern Petroleum Refinery at Singapore acts as a balancing of products (surplus/deficit) to the Sarawak Shell Lutong Refinery and the Shell Refinery Company of Malaya. The crudes for both the refineries are supplied by the Sarawak Shell Company's production. The Sabah Shell Company's production are wholly exported overseas. The Lutong refinery also draws a minor supply of special crude and products from the Brunei Shell Petroleum Company in Seria. The Lutong Refinery supplies products to markets in Sarawak and Sabah, and the surplus for exports.

The ownership of the Exploration and Producing Companies of Sarawak Shell Berhad and Sabah Shell Petroleum Company are vested fully in the hands of the Shell International Petroleum Company in London. The Sarawak Shell Lutong Refinery, the Shell Borneo Marketing Company and the Shell Malaya Trading Berhad are also owned fully by the parent company in London. However, Shell Refining company is

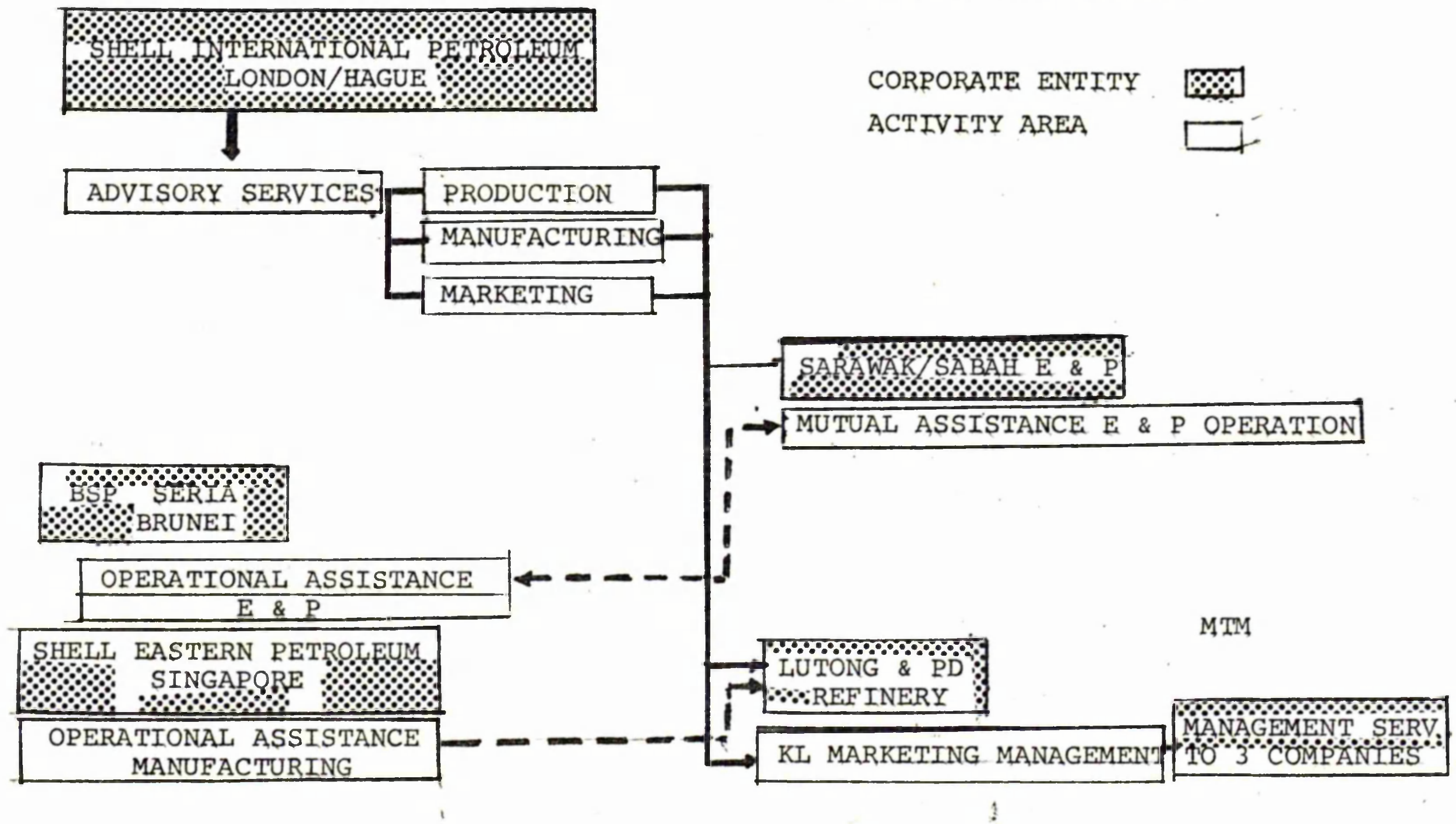
FIGURE 8 A (ii): FLOW OF OIL SHELL COMPANIES IN MALAYSIA



Source: Private Communications with Shell a public company: 25% of the share owned by the public and 75% held by Shell International London.

In terms of services, Shell International Petroleum in London/Hague provides advisory services in production, manufacturing and marketing to Sarawak/Sabah Exploration and Producing Companies. The Kuala Lumpur Marketing Management provides management services to 3 Shell companies - The Shell Trading Malaya Berhad, Shell Borneo Marketing Company and Shell Refining Malaya especially in manufacturing, trading and marketing activities. Shell International Petroleum also provides production manufacturing and marketing to the Lutong and P.D. refineries. The Shell Eastern Petroleum in Singapore provides a back-up operational assistance in manufacturing to both the above refineries. Both the Sarawak/Sabah Exploration and Producing Companies as well as the Brunei Shell Petroleum Exploration and Producing Company provide mutual operating assistance in exploration and production with one another. This is shown in Figure 8A (iii).

FIGURE 8.A (iii) FLOW OF SERVICES IN SHELL COMPANIES IN MALAYSIA



Source: Private communications with Shell.

(b) Esso Standard Malaya Berhad

Brief History

ESSO Standard Eastern of which ESSO Standard Malaya Limited forms a small section, engages in all phases of the oil industry from exploration to marketing in the Eastern Hemisphere. The Company's area of explorations extends from South to South Asia and Australia and northwards to Japan and Korea. It is an affiliate of the Standard Oil of New Jersey, the oldest as well as the largest international oil company. Being a wholly owned affiliate of the parent company, it has direct access to petroleum - petroleum products, processing plants, transportation facilities and technical sources.

ESSO Standard Malaya Limited, an offshore of this huge organization, was established primarily as a supplier of fuel for kerosene lamps more than 80 years ago. Since then, the company has expanded to be a leading refiner and marketer of all forms of petroleum products as well as an important manufacturer in the national chemical industry.

In the first 30 years or so of its business history in this area ESSO marketed petroleum products imported from the United States of America. By 1926, following the discovery of important oilfields in Sumatra and the construction of refinery at Palembang, ESSO in 1933 entered into a partnership with Socony-Vacuum Oil Company (now known as Socony

Mobil Co. Inc.) to form Standard Vacum Oil Co. The Standard Oil Co. combined all phases of the oil industry from exploration to marketing in South East Asia, the Far East, Australia, South East Africa and India.

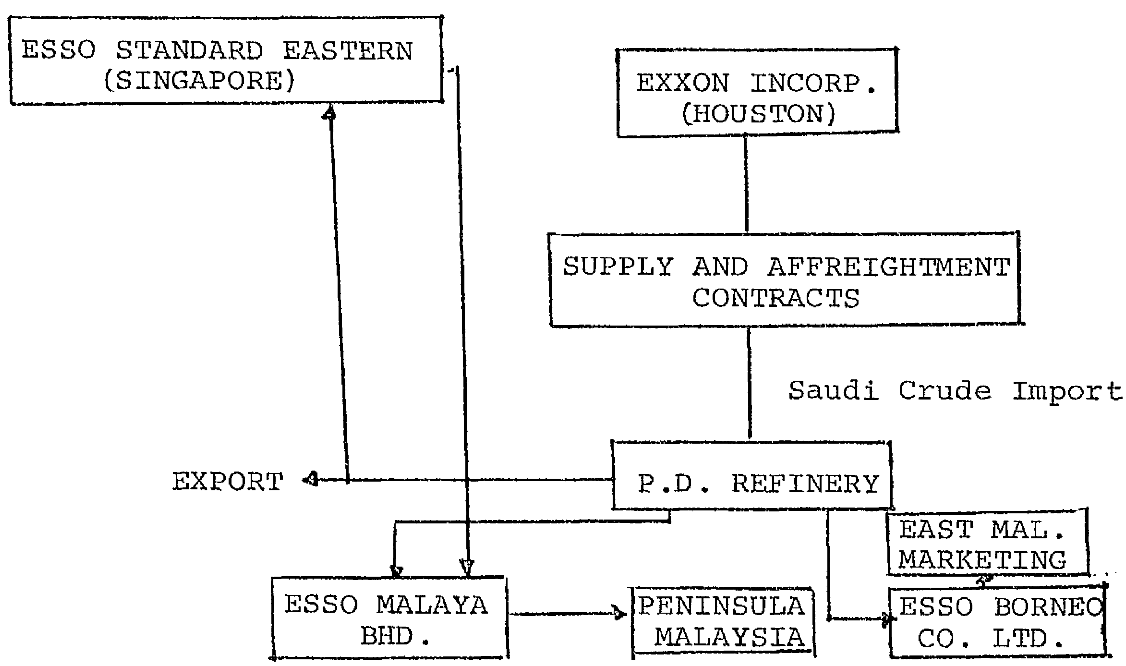
In view of the expansion of the market for the products of the company and the Sherman's Anti Trust Law ruling on the Standard Oil in America, and the fact that the partnership imposed certain expansion limitation on each partner's organizational objectives, ESSO and Mobil decided to end their joint ownership of Standard - Vacum Oil Company. The partnership was formally dissolved in 1962. ESSO's share in Peninsula Malaysia became ESSO Standard Malaya Berhad.

ESSO Standard Malaya Berhad was incorporated in the Federation of Malaya in 1960 with a paid-up share capital of $54 million - 35% of its share or $18.9 million are owned by local investors. This makes it one of the largest Malaysian companies. On September 20, 1960 ESSO Standard Malaya was granted a Pioneer Certificate for the construction and operation of an oil refinery at Port Dickson. In November 1962, the company purchased and took over all the ESSO Standard Eastern Incorporations (ESI) petroleum marketing business and assets in the Federation of Malaya in exchange for 16,099,700 fully paid $2 ordinary shares of ESSO Standard Malaya, the payment of about $394,600 and the assumption of ESI's liabilities. The company thus became member of the world wide

EXXON organization of over 300 companies affiliated to the world's biggest oil company - The Standard Oil Company (N.J.) The company was converted into a public company on March 30, 1963 and on April 9 the same year, 8.75 million of ordinary shares of $2 each were issued to the public at par.

At present, the ESSO Group of Companies comprises of: ESSO Standard Malaya Berhad (Marketing), ESSO Standard Refinery Berhad, ESSO Chemical Malaya Sdn. Bhd., ESSO Exploration Malaya Incorporated now known as EXXON Malaya Incorporated.

The relationship between the various ESSO affiliates is graphed in Figure 8A (iv)



The flow of relationship between ESSO affiliates is less complicated compared to the Shell Group of companies earlier. EXXON Incorp. in USA has a supply affreightment contract with the ESSO PD Refinery. The products for the ESSO Malaya Refinery Bhd. is marketed by ESSO Standard Malaya Bhd. in Peninsula Malaysia and ESSO Borneo Co. Ltd. for Sabah and Sarawak markets. On the other hand the 2 companies also obtain additional supplies for their markets from the ESSO Standard Eastern Refinery in Singapore.

APPENDIX 9A: RECORD OF PETROLEUM PRODUCT PRICE CHANGES IN PENINSULA MALAYSIA FROM 1956 TO 1976 $ per I.G.

(a) PREMIUM PETROL

	30.10.56	7.11.56	1.12.56	5.2.57	1.7.57	15.2.58	8.9.58	3.12.58	8.2.60	5.7.60
Johor Bharu	1.66	1.93	1.93	1.95	1.90	1.91	1.91	2.11	2.09	2.08
Batu Pahat	1.67	1.94	1.95	1.97	1.92	1.93	1.93	2.13	2.11	2.10
Port Dickson	1.69	1.96	1.96	1.97	1.92	1.93	1.93	2.13	2.11	2.10
Port Kelang	1.67	1.94	1.94	1.96	1.91	1.92	1.92	2.12	2.10	2.09
Brickfields (Kuala Lumpur)	1.68	1.95	1.96	1.98	1.93	1.94	1.94	2.14	2.11	2.11
Kuantan	-	-	-	-	-	1.95	1.95	2.15	2.13	2.12
Telok Anson	1.69	1.96	1.96	1.98	1.93	1.94	1.94	2.14	2.12	2.12
Ipoh	1.71	1.98	1.99	2.01	1.96	1.97	1.97	2.17	2.15	2.14
Bagan Luar	1.67	1.94	1.95	1.97	1.92	1.93	1.93	2.13	2.11	2.09
Penang Island	1.68	1.95	1.96	1.98	1.93	1.94	1.94	2.14	2.12	2.10
Kota Bharu	1.69	1.96	1.98	2.00	1.95	2.00	2.00	2.20	2.18	2.18
Kuala Trengganu	-	-	-	-	-	-	1.97	2.17	2.15	2.14
Duty included	0.73	1.00	1.00	1.00	1.00	1.20	1.20	1.20	1.20	1.20
Extent of change and Reason		+0.27 Duty or Tax Increase	+0.01 to 0.02 Freight Increase	+0.01 to 0.02 Freight Increase	-0.05 Freight Decrease	+0.01 to 0.05 Freight Increase		+0.20 Freight Increase	-0.20 Freight Increase	No change -0.02 Revision i posted pri

9A(a)

20.10.60	13.12.61	29.11.62	12.11.63	3.1.66	29.10.66	15.11.69	5.6.71	22.12.73	10.5.74	17.2.76
2.05	2.03	2.13	2.10	2.13	2.16	2.13	2.22	2.56	3.07	3.35
2.07	2.05	2.15	2.13	2.16	2.19	2.16	2.25	2.59	3.10	3.38
2.07	2.05	2.15	2.10	2.13	2.16	2.13	2.22	2.56	3.07	3.35
2.06	2.04	2.14	2.12	2.15	2.18	2.15	2.24	2.58	3.09	3.37
2.08	2.06	2.16	2.13	2.16	2.19	2.16	2.25	2.59	3.10	3.38
2.10	2.08	2.18	2.16	2.19	2.22	2.19	2.28	2.62	3.13	3.41
2.09	2.07	2.17	2.12	2.15	2.18	2.15	2.24	2.58	3.09	3.37
2.11	2.09	2.19	2.16	2.17	2.20	2.17	2.26	2.60	3.11	3.39
2.06	2.04	2.14	2.12	2.15	2.18	2.15	2.24	2.58	3.09	3.37
2.07	2.05	2.15	2.13	2.16	2.19	2.16	2.25	2.59	3.10	3.38
2.17	2.15	2.25	2.23	2.26	2.29	2.26	2.35	2.69	3.20	3.48
2.11	2.09	2.19	2.17	2.20	2.23	2.20	2.29	2.63	3.14	3.42
1.20	1.20	1.30	1.30	1.30	1.30	1.30	1.30	1.30	1.30	1.41
-0.01 to -0.03	-0.02	+0.10 Duty Increase	-0.02 to 0.03	+0.01 to 0.03	+0.03	0 to -0.03	+0.09	+0.34 Crude Cost Increase	+0.51 Crude Cost Increase	+0.18 Crude Cost Increase +0.11 Duty Increase

9A.(b) REGULAR PETROL

	1.1.56	1.2.56	1.9.56	7.11.56	1.12.56	5.2.57	15.2.58	3.12.58	8.2.60	5.7.60
Johor Bharu	1.47	1.49	1.46	1.73	1.73	1.75	1.76	1.96	1.94	1.93
Batu Pahat	1.47	1.47	1.47	1.74	1.75	1.77	1.78	1.98	1.96	1.95
Port Dickson	1.47	1.49	1.49	1.76	1.76	1.77	1.78	1.98	1.96	1.95
Port Kelang	1.47	1.49	1.47	1.74	1.74	1.76	1.77	1.97	1.95	1.94
Brickfields (Kuala Lumpur)	1.47	1.49	1.48	1.75	1.76	1.78	1.79	1.99	1.97	1.96
Kuantan	1.47	1.49	1.49	1.76	1.77	1.79	1.80	2.00	1.98	1.97
Telok Anson	1.47	1.49	1.49	1.76	1.76	1.78	1.79	1.99	1.97	1.97
Ipoh	1.47	1.49	1.51	1.78	1.79	1.81	1.82	2.00	2.00	1.99
Bagan Luar	1.47	1.49	1.47	1.74	1.85	1.77	1.78	1.98	1.96	1.94
Penang Island	1.47	1.49	1.48	1.75	1.76	1.78	1.79	1.99	1.97	1.95
Kota Bharu	1.47	1.49	1.49	1.76	1.78	1.80	1.85	2.05	2.03	2.03
Kuala Trengganu	1.47	1.49	1.49	1.76	1.76	1.80	1.82	2.02	2.00	1.99
Duty Included	0.73	0.73	0.73	1.00	1.00	1.00	1.00	1.20	1.20	1.20
Extent of change and Reason		+0.02	+0. to -0.02	+0.27 Increase in Duty	0 to 0.02	+0.01 to 0.02	+0.01 to +0.05	+0.18 Increase in Duty	0 to -0.02	0 to -0.02

9A (b)

20.10.60	13.12.61	29.11.62	12.11.63	1.1.60	29.10.66	15.11.69	5.6.71	22.12.73	10.5.74	17.2.76
1.90	1.88	1.98	1.95	1.98	2.01	1.98	2.05	2.29	2.72	2.97
1.92	1.90	2.00	1.98	2.01	2.04	2.01	2.08	2.32	2.75	3.00
1.92	1.90	2.00	1.95	1.98	2.01	1.98	2.05	2.29	2.72	2.97
1.91	1.89	1.99	1.97	2.00	2.03	2.00	2.07	2.31	2.74	2.99
1.93	1.91	2.01	1.98	2.01	2.04	2.01	2.08	2.32	2.75	3.00
1.95	1.93	2.03	2.01	2.04	2.07	2.04	2.11	2.31	2.74	2.99
1.94	1.92	2.02	1.97	2.00	2.03	2.00	2.07	2.33	2.76	3.01
1.96	1.94	2.04	2.01	2.02	2.05	2.02	2.09	2.31	2.74	2.99
1.91	1.89	1.99	1.97	2.00	2.03	2.00	2.07	2.32	2.75	3.00
1.92	1.90	2.00	1.98	2.01	2.04	2.01	2.08	2.35	2.78	3.03
2.02	2.00	2.10	2.08	2.11	2.14	2.11	2.18	2.36	2.79	3.04
1.96	1.94	2.04	2.02	2.05	2.08	2.05	2.12	2.42	2.85	3.10
1.20	1.20	1.30	1.30	1.30	1.30	1.30	1.30	1.30	1.30	1.41
-0.01 to -0.03	-0.02	+0.10 Increase in Duty	-0.02 to -0.05	+0.01 to +0.03	-0.03	-0.03	+0.07	+0.18 to +0.30	+0.43	+0.14 inc in crude 0.11 in Duty

(c) AUTOMOTIVE DIESEL OIL

	5.6.71	22.12.73	10.5.74	26.6.74	6.3.75	12.2.76
Johor Bharu	0.75	0.86	0.86	0.94	0.98	1.16
Batu Pahat	0.77	0.88	0.88	0.96	1.00	1.18
Port Dickson	0.74	0.85	0.85	0.93	0.97	1.15
Port Kelang	0.76	0.87	0.87	0.95	-	-
Kuala Lumpur	0.77	0.88	0.88	0.96	1.00	1.18
Telok Anson	0.76	0.87	0.87	0.95	0.99	1.17
Ipoh	0.77	0.88	0.88	0.96	0.96	0.96
Bagan Luar	0.76	0.87	0.87	0.95	0.99	1.17
Penang Island	0.77	0.88	0.88	0.96	1.00	1.18
Kuantan	0.81	0.92	0.92	1.00	1.09	1.22
Kuala Trengganu	0.83	0.94	0.94	1.02	1.06	1.24
Kota Bharu	0.88	0.99	0.99	1.07	1.11	1.29
Duty Inclusive	0.20	0.20	-	-	-	-
Extent of Increase and Reason		+0.11 Increase in Crude Price	Withdrawal of Duty of 0.20	+0.08 Increase in Crude Price	+0.04 Increase in Crude Price	0 to +0.18 Increase in Crude Price

(d) INDUSTRIAL DIESEL OIL

	5.6.71	22.12.73	10.5.74	26.6.74	16.3.75	17.2.76
Johor Bharu	0.70	0.81	0.81	0.89	0.97	1.15
Batu Pahat	0.72	0.83	0.83	0.91	0.99	1.17
Port Dickson	0.69	0.80	0.80	0.88	0.96	1.14
Port Kelang	0.71	0.82	0.82	0.90	0.90	0.90
Kuala Lumpur	0.72	0.83	0.83	0.91	0.99	1.17
Telok Anson	0.71	0.82	0.82	0.90	0.98	1.16
Ipoh	0.72	0.83	0.83	0.91	0.91	0.91
Bagan Luar	0.71	0.82	0.82	0.90	0.98	1.16
Penang Island						
Kuantan	0.76	0.87	0.87	0.95	1.03	1.21
Kuala Trengganu	0.78	0.89	0.89	0.97	1.05	1.23
Kota Bharu	0.83	0.94	0.94	1.02	1.10	1.28
Duty	0.20	0.20	-	-	-	-

(e) KEROSENE

	12.1.69	1.5.74	10.5.74	12.2.76
Johor Bharu	0.69	0.69	0.74	0.82
Batu Pahat	0.71	0.71	0.76	0.82
Port Dickson	0.68	0.68	0.73	0.80
Port Kelang	0.70	0.70	0.75	0.82
Kuala Lumpur	0.71	0.71	0.76	0.82
Telok Anson	–	–	–	–
Ipoh	–	–	–	–
Bagan Luar	0.70	0.70	0.75	0.81
Penang Island	–	–	–	–
Kuantan	0.75	0.75	0.80	0.86
Kuala Trengganu	0.77	0.77	0.82	0.86
Kota Bharu	0.81	0.81	0.86	0.86
Duty	0.05	0.05	–	0.01

(f) FUEL OIL

	5.6.71 (1)	(2)	22.12.73 (1)	(2)	1.5.74 (1)	(2)
Johor Bharu	92.00	95.60	104.00	107.60	317.00	317.00
Batu Pahat						
Port Dickson	92.00	95.60	104.00	107.60	317.00	317.00
Port Kelang						
Kuala Lumpur						
Telok Anson	93.20	96.80	105.20	108.60	317.00	317.00
Ipoh						
Bagan Luar	93.20		105.20	125.00	317.00	317.00
Penang Island						
Kuantan		113.00				
Kuala Trengganu						
Kota Bharu						
Duty Inclusive	17.00	17.00	17.00	17.00	17.00	17.00

(1) Fuel Oil 450"

(2) Fuel Oil 750/1000"

(g) Liquified Petroleum Gas (32 lb. Cylinder)

	25.10.70	28.5.74
Johor Bharu	8.80	12.80
Batu Pahat	8.80	12.80
Port Dickson	8.80	12.30
Port Kelang	8.80	12.50
Kuala Lumpur	8.80	12.50
Telok Anson	8.80	12.80
Ipoh	8.80	12.80
Bagan Luar	8.80	12.80
Penang Island	8.80	12.80
Kuantan	9.30	12.80
Kuala Trengganu	9.30	13.20
Kota Bharu	9.30	13.20

APPENDIX 9B: RECORD OF PETROLEUM PRODUCT PRICE CHANGE IN EAST MALAYSIA FROM 1971 TO 1976 ($ per I.G.)

(a) Premium Petrol

	5.6.71	7.12.72	27.12.72	6.12.73	22.12.73	3.10.74	23.6.76
Sarawak							
Kuching	1.79	1.89	1.89	2.19	2.53	2.98	3.35
Sibu	1.83	1.93	1.93	2.23	2.57	3.02	3.39
Miri	1.84	1.94	1.94	2.24	2.58	3.03	3.40
Duty Inclusive	0.80	0.90	0.90	1.20	1.20	1.15	1.32
		+0.10	-	+0.30	+0.34	+0.45 Duty Decrease -0.05	+0.37 Duty Increase +0.17
Sabah							
Labuan	1.73	1.73	2.28	2.28	2.62	3.02	3.46
Kota Kinabalu	1.69	1.69	2.24	2.24	2.58	2.98	3.42
Sandakan	1.71	1.71	2.26	2.26	2.60	3.00	3.44
Tawau	1.85	1.85	2.40	2.40	2.74	3.14	3.58
Lahat Datu	2.02	2.02	2.57	2.57	2.91	3.31	3.75
Duty Inclusive	0.65	0.65	1.20	1.20	1.20	1.10	1.21
			+0.55		+0.34	+0.40	0.44

RECORD OF PETROLEUM PRODUCT PRICE CHANGES IN EAST MALAYSIA FROM 1971 TO 1976 ($ per l.G.)

(a) Regular Petrol

	7.12.72	27.12.72	21.12.73	22.12.73	11.1.74	18.5.74	17.2.76
Sarawak							
Kuching	1.67	1.67	1.97	2.21	2.21	2.47	2.91
Sibu	1.71	1.71	2.01	2.25	2.25	2.51	2.95
Miri	1.62	1.62	1.62	1.96	2.16	2.42	2.86
Duty Inclusive	0.90	0.90	1.20	1.20	1.20	1.15	1.32
Sabah							
Labuan		2.06	2.06	2.30	2.30	2.51	2.98
Kota Kinabalu		2.02	2.02	2.26	2.26	2.47	2.94
Sandakan		2.04	2.04	2.28	2.28	2.49	2.96
Tawau		2.18	2.18	2.42	2.42	2.63	3.10
Lahat Datu		2.35	2.35	2.59	2.59	2.80	3.27
Duty Inclusive		1.20	1.20	1.20	1.20	1.10	1.21

(c) Automotive Diesel Oil

	5.6.71	22.12.73	1.8.74	30.10.74	26.6.76
<u>Sarawak</u>					
Kuching	0.80	0.91		1.02	1.22
Sibu	0.83	0.94		1.05	1.25
Miri	0.84	0.93		1.04	1.24
Duty Included	0.20	0.20		-	-
<u>Sabah</u>					
Labuan	0.78	0.98	1.00	1.10	1.30
Kota Kinabalu	0.83	0.94	0.96	1.06	1.26
Sandakan	0.80	0.91	0.93	1.03	1.23
Tawau	0.82	0.93	0.95	1.05	1.25
Lahat Datu	0.82	0.95	0.95	1.05	1.25
Duty Included	0.20	0.20	0.20	-	-

(d) Kerosene

	12.11.69	1.5.74	1.9.74	31.10.74	23.6.76
Sarawak					
Kuching	0.71	0.71	0.72	0.77	0.82
Sibu	0.73	0.73	0.74	0.79	0.84
Miri	0.73	0.73	0.74	0.79	0.84
Duty Inclusive	0.05	0.05	0.05	0.05	0.01
Sabah					
Labuan	0.79	0.79	0.80	0.85	0.86
Kota Kinabalu	0.73	0.73	0.74	0.79	0.80
Sandakan	0.76	0.76	0.77	0.82	0.83
Tawau	0.81	0.81	0.82	0.87	0.88
Lahat Datu	0.81	0.81	0.82	0.87	0.97
Duty Inclusive	0.05	0.05	0.05	0.05	0.05

(e) Fuel Oil

	5.6.71	1.9.73	16.12.73	22.12.73	1.5.74
<u>Sarawak</u>					
Kuching	127.00	157.00	197.00	209.00	289.00
Sibu					
Miri					
Duty Inclusive	17.00	17.00	17.00	17.00	17.00
<u>Sabah</u>					
Labuan	110.21				
Kota Kinabalu	134.50	164.50	197.00	209.00	289.00
Sandakan		177.00	207.00	219.00	209.00
Tawau					
Lahat Datu					
Duty Inclusive	17.00	17.00	17.00	17.00	17.00

(f) Liquified Petroleum Gas (32 lb. Cylinder)

	28.5.74	1.11.74
<u>Sarawak</u>		
Kuching	11.50	15.20
Sibu	13.20	17.20
Miri	14.40	18.50
Duty Included	0.64	0.64
<u>Sabah</u>		
Labuan	14.15	18.00
Kota Kinabalu	14.15	18.00
Sandakan	13.40	17.00
Tawau	14.95	19.00
Lahat Datu	14.55	18.20
Duty Included	0.64	1.00

APPENDIX 10A

THE PROFIT SHARING AGREEMENT OR 50:50 CONCEPT

The basic terms of the petroleum agreement of 1966 important in this discussion are duration, areas covered (size), provisions of relinquishment minimum expenditure commitments, rental payments and royalty rates. Comparisons will be made with other producing countries not only regarding the basic agreements but also as to the total effect of all the terms in each country.

(i) Duration of the Agreement

Basing on the recommendation by W.J. Levy, the Malaysian petroleum agreements provided for an 8 year exploration phase on land and a 10 years exploration phase offshore, followed in each case, by a 30 year development phase. In many other oil producing countries the exploration and prospecting phases of current petroleum agreements are often less than 10 years.

(ii) The Size of the Agreement Area

The Commission recommended that an effective exploration programme can be carried out, in Malaysian conditions even offshore, over an initial area of 4,000 square miles and less. The New Petroleum Agreement Sec. 8(2) specified that the initial area covered by the new exclusive agreement should not exceed 4,000 sq. miles.

(iii) Compulsory Relinquished Provisions

Under this, the New Petroleum Agreement stipulated that 50% of the initial agreement area should be relinquished after 5 years, and that a further 25% of the initial agreement area should be relinquished after a further 5 years. This was stipulated under the Surrender Provisions sect. 4(1)(i), (ii) of the Petroleum Agreement.

(iv) Work Obligations and Minimum Expenditure Commitments

The minimum expenditure commitment provided for in the existing Sabah model offshore prospecting licence was adopted in new offshore petroleum agreements in sect. 4(1) (i) and (ii) except the minimum expenditure during any third 5 year term (if the exploration phase is extended) should be 50% higher than the minimum expenditure during the second 5 year term giving the following scale as per stated under sect. 10(4) of Petroleum Agreement:

Period	Rate M$ Mil	Minimum Expenditure on offshore Exploration(M$ Mil)	Maximum Area (sq.miles)
1st 5 yrs	0.2 mil. for 1st 2 years 0.5 mil. for 2nd 2 years 2.0 mil. in the 5th year	3.4	4.000
2nd 5 yrs	2.0 mil. per year	10.0	2.000
3rd 5 yrs (if extended)	0.3 mil. per year	15.0	1.000

(v) Rental Payments

No rental payment was imposed during the exploration phase of a comprehensive agreement, except in respect of land physically occupied by the company. After the first five years of the development phase, rental payments on acreage outside the area of a developed oilfield would be imposed. Sect. 11(1) of the Petroleum Agreement required that the company pay the Government a fixed yearly payment in respect of each sq. mile of land held the following: (a) Exploration Phase: No rental payment was levied in the first 5 years. After that between 6-10 years at $20 per sq. mile per year; if the exploration were extended then it had to pay $40 sq. miles per year and was not to be offset against new exploration expenditure within the agreement area. (b) During the Development Phase: The rental during the 1st 5 years was at $50 per sq. miles per year and from 6th to 20th year at $1,000/sq. mile per year and beyond that at $2,000 sq. miles per year.

(vi) Royalty Rates on Crude Oil

Under Part VI sect. 14(1) and 15(1), 16(1) the Royalty rates under the new agreement was uniform at the generally established level of 12½% on crude oil, natural gas and casinghead petroleum spirit produced in Malaysia, whether on land or of offshore and a lower rate was set for marginally profitable fields.

(vii) The Concept of Posted Price

Under the new agreement, the royalty value of any crude oil product in Malaysia was directly related with an appropriate adjustment for transport cost and quality differential to the royalty value established from time to time in the Middle East. Similarly the tax value of any crude oil produced in Malaysia was directly related with an appropriate adjustment for transport cost and quality differential, to the tax value established, from time to time in the Middle East i.e. to the posted price of comparable Middle East crude less any discounts off these prices and allowance for tax purposes from time to time./Part VI sect. 18(i) (a) and (b)./

(viii) Deduction from the Export Price

Under this any marketing allowance accepted for tax purposes in Malaysia should not exceed one half of one US cent per barrel.

(ix) The Royalty and Tax Value of Natural Gas

Unlike crude oil, the value of natural gas, for royalty and tax purposes should be taken as the actual selling price of the gas.

(x) The Expending of Intangible Development Costs

Under the new arrangement, the Government allowed current intangible development costs to be fully expensed against current income.

(xi) Expensing of Exploration Costs

The new agreement gave the oil companies the option of expensing all of their current exploration costs against current income.

(xii) Accelerated Depreciation

The agreement gave oil companies initial allowances, or accelerated depreciation, on a generous scale.

BONUS PAYMENTS

In many oil producing countries, the granting of concession was based on bidding in the form of cash bonus to be paid by the company to the government. This cash bonus would be made in 2 forms: after a certain number of years, or after a certain level of production had been reached. The first category of bonus was called "initial" or "signature" bonus whereas the second was called "delayed" or "production" bonus.

A signature or initial bonus was a net cash payment to the government and the company bore the risk that no oil may be found. A production bonus was payable only if a commercial oilfield were found. The company paid nothing if it was unsuccessful. Between the two, the former was more costly than the latter to an oil company as it was paid at an earlier date.

In the Petroleum Agreement, under sect. 9 of the Petroleum Mining Act, 1966 in respect of offshore land signed on 16th April, 1968 between the Government of Malaysia and ESSO Exploration Malaysia Berhad and Continental Oil Malaysia, the companies paid the Government M$6,000 on signing the Agreement.

GOVERNMENT PARTICIPATION IN PETROLEUM OPERATIONS

Towards the end of 1950s, in the Middle East producing countries, some governments had insisted on having the option to participate in the petroleum operations. The Government did not participate in the exploration venture initially, but reserved the right to do so after oil has been found. Under this form of joint-venture agreement the Government was normally committed to contribute its proportionate share of the costs of developing the oilfield. However, in the case of Malaysia, there was no provision for government participation as Malaysia was not a substantial oil producer.

EMPLOYMENT IN THE PETROLEUM INDUSTRY IN MALAYSIA

The petroleum legislation of several oil producing countries included the stipulation that the staff of any oil company operating in the country must include a certain proportion of the country's citizens in the higher executive and board of directors. This was included in the Malaysian Petroleum Agreement as well. Sect. 51 of Oil Agreements, under sect. 9 of the Petroleum Mining Act, 1966, stipulated that any oil company must use its best endeavours to employ and train local staff and to promote any suitable employees to high promotions - operations and management.

PRIORITY FOR CONSUMPTION IN MALAYSIA

In the petroleum agreement under sect. 52(1) the government requested the oil companies to give priority to Malaysia's internal requirements. Each oil company was obligated to supply Malaysia's internal requirements in proportion to its total production. In addition Sect. 52(2) of an oil company agreement, crude oil sold for internal consumption would be at part with export price or lower in the case of government purchases.

REFINING OBLIGATIONS

Sect. 35 of the petroleum agreement required the oil companies to "consider with the government the economic feasibility of erecting a refinery or extending any refinery it already owned to a capacity capable of processing shares of predicted local consumption proportionate to its share of local crude production". This was to be carried out when total demand in Malaya appeared to exceed refining capacity for local consumption.

THE DISPOSAL OF PETROLEUM NATURAL GAS AND CASINGHEAD PETROLEUM SPIRIT

This was explicitly defined in sect. 19B (1) of the Petroleum Agreement which gave the companies right to export petroleum and natural gas and casinghead petroleum spirit produced in excess of Malaysia's internal requirements. However, priority was given to the use of petroleum and natural gas for conservation purposes in the oilfields. This also applied to products manufactured for export and consumption outside Malaysia. Moreover, Sect. 19B (2) guaranteed to the oil companies the right to fully export, without duty, all petroleum produced in excess of the country's internal requirements.

II THE PETROLEUM (INCOME TAX) ACT, 1967

The Petroleum (Income Tax) Act of 1967 was passed by the Malaysian Parliament on the 28th September 1967. The objective of the Act was "... to impose income taxes from the winning of petroleum in Malaysia, to provide for the assessment and collection thereof and for purposes connected therewith".

The provisions of calculating the oil companies' annual profit and loss accounts were laid down in Section 6 of the Petroleum (Income Tax) Act, 1967. The items in the Act used in the assessment of the Oil companies' profits can be summarised in the following:

	Proceeds	
1	2 & 6	Gross income from sales of all chargeable petroleum (natural gas or casinghead petroleum spirit, crude oil sold and refined in Malaysia) by the company.
2	2 & 7	Gross proceeds of sales from crude oil sold and exported by the company.
3	2 & 9	Proceeds from crude oil exported otherwise than on sale by the company.
4	2 & 10	Proceeds from crude oil delivered to refinery by or on behalf of the company.
5	2 & 11	Crude oil delivered to government in lieu of royalty by the company.
6	2 & 12	Casinghead petroleum spirit injected into crude oil by the company.
7	2 & 13	All receipts of revenues other than 7, 9, 10, 11 & 12 by the company.
8	2 & 14	Sums recovered on account of debts and debts released.
9		Gross Income of the company in the Accounting period.

Deductions

The adjusted income of a petroleum company for the period was the deduction made from the gross income of the company for that period all outgoings and expenses incurred by the company during that period in the production of the gross income.

10	3 & 15(1)(a)	Any monies payable in interest on capital employed in petroleum operations.
11	3 & 15(1)(b)	Any rents payable for the period by the company in respect of any land or building occupied.
12	3 & 15(1)(c)	Expenses incurred for repairs or alterations

		or renewals of premises, plant, machinery or fixtures employed for carrying out petroleum operations.
13	3 & 15(1)(d)	Assessment rates payable by the company.
14	3 & 15(1)(e)	Other deduction prescribed by the Authority.
15	3 & 16(1)&(2)	Deductions in respect of irrecoverable debt, bad or doubtful.
16	3 & 16(3)	Contributions to approved scheme such as pension, provident fund or any other society schemes or funds.
17	3 & 16(4)	Expenditures for drilling appraisal and development wells.
18	3 & 16(5)	Capital expenditures allowed according to Schedule I
19	3 & 16(6)	Royalties payable by the Company (royalty did not include the value of any crude oil which was delivered to the Government).
20	3 & 17(1)	The differences in the value of stock-in-trade at the beginning and at the end.
21	<u>Adjusted Income</u>	
22		Amount of any loss incurred during any previous accounting period.
23	<u>Assessable Income</u>	
24	22(1)	Gift of money made by the company to the government, a state government or any approval institution or organisation.
25	<u>Chargeable Income</u>	

Basically under the Systems of Profits and Loss Accounts in the Petroleum (Income Tax) Act 1967, there were 3 main categories of items to be considered in arriving at the chargeable profit. They were firstly, the earnings of the oil companies as a basis for Establishing Profits;

secondly, items deductible from Proceeds as provided by the Law; and thirdly items which might be deducted from the Chargeable Tax, and are summarised below as:

PROCEEDS - DEDUCTIONS = ADJUSTED INCOME

ADJUSTED INCOME - LOSS = ASSESSABLE INCOME

ASSESSABLE INCOME - GIFTS = CHARGEABLE INCOME

Under the category of proceeds, the earnings from the oil company operations included the actual income received from the petroleum operation during the accounting period and the miscellaneous receipts accrued to the oil company during the same period. Prior to 1966, the value of crude oil produced from the Miri oilfields in Sarawak was calculated for the Royalty and income tax purposes on two completely different bases in the case of Royalty. The basis of calculation was to relate the value of the two main grades of Miri crude oils - Miri Light and Miri Heavy - to the market values of the products produced from the crude oils. These values were in turn related to the prices of refined products at the US Gulf (without allowing for transport differential).

Two further deductions were made, US 35¢ per barrel for Light crude and US 30¢ a barrel for Heavy crude, to allow for the cost of transport of the crude oils from the field to the refinery and the cost of processing it into products. A further US 15¢ per barrel was deducted from the net value in case of Light crude and US 5¢ per barrel in the case of Heavy crude to compensate for the quality deficiencies of the products deemed to be yielded.

There was no tax value as such attached to both the Miri Light and Heavy crudes as all these crudes were refined in Shell Sarawak Lutong refinery. Profits were calculated, for income tax purposes, on the prices actually received by Lutong Refinery for the refined products exported from Sarawak.

From the above arguments, it appeared that not only from an administrative point of view but also on economic grounds that a simpler and more direct method of valuation was adopted. In general, the Middle Eastern countries with whose oil the crude oil of Malaysia competed at that time was valued for royalty purposes at posted prices and in some other countries, the sales proceed were at the 2 different markets namely the same posted prices from the starting point for the calculation of the tax value of the crude oil. While for the theoretically calculated sales process the crude oil sold was assessed from the internationally fixed posted prices, the actual income of companies were the basis for assessing operational profits from realised proceeds. Due to the surplus of crude in the middle of 1960 in the world market, and since the oil companies were forced to give rebates on the list prices, the realised proceeds were something lower than the sales proceeds calculated from posted prices.

APPENDIX 10B

MANAGEMENT SHARING AND THE PETROLEUM DEVELOPMENT ACT

The Petroleum Development Act had the provision regarding the issue of Management shares to PETRONAS by companies carrying out the business of processing, manufacturing, refining, marketing and distributing of petroleum and petro-chemical products.

The spin-off of the management sharing concept was the realisation of the importance of the petroleum and petrochemicals as a fact and essential items for the proper development of the Malaysian community and therefore it was intended that the country should introduce measures to control and regulate the distribution of essential items. This was summed up by the then PETRONAS Chairman himself, Tengku Razaleigh:

> ".... the corporation's purchasing of management shares in the oil and petrochemical industries was to regulate and control the industries. It is through this device that it would ensure that companies selected would meet the needs and requirements of the country."[1]

From the objectives of the Management share concept enunciated above, there were two main underlying

1 Speech by Tengku Razaleigh Hamzah, Chairman and Chief Executive of PETRONAS as appeared in MALAYSIAN DIGEST in 1975.

reasons for such need. Firstly, although Malaysia is an oil producing country, the petroleum industry did not shelter the economy during the oil crises in 1973 from the vagaries of world market and from the activities of speculators and manipulators. Therefore, something had to be done to ensure that the Malaysian community would at all times obtain sufficient supplies of these essential items at reasonable prices. Secondly, through this device the Government and the people in Malaysia could be assured of some form of participation in the exploitation, distribution of petroleum and its products.

Under the new section 6A of the Petroleum Development Act, any company which carried on business of (a) processing or refining of petroleum or (b) manufacturing of petro-chemical products from petroleum or (c) marketing or distributing of petroleum or petro-chemical products, was required to provide two classes of shares, called the Management shares and the Ordinary shares. The company concerned can only issue Management shares to PETRONAS and the price of such Management shares was equivalent to the market price of the Ordinary shares, as quoted in the Stock Exchange in Malaysia or elsewhere, or if not quoted at all in the Stock Exchange at such fair and reasonable price as might be determined by the Prime Minister.

The Management sharing[2] in the Petroleum Development

2 See the PETRONAS Act in PETRONAS, a booklet published by Petroliam Nasional Berhad, p.18.

Act of 1974 spelt out in Section 6A was originally as follows:

"Section 6A(1) Any company which carries on any business referred to subsection (1) and (3) of Section 6 (hereinafter referred to as 'the relevant company') shall: (a) have two classes of shares, called the Management shares and the Ordinary shares, and (b) issue no Management shares except to the Corporation.

(2) As soon as practicable after the commencement of this section, (a) every relevant company the shares of which are quoted on a Stock Exchange in Malaysia or elsewhere shall issue for cash at a price which is equivalent to the market price of the ordinary shares prevailing at the date of the issue; and (b) every relevant company the shares of which are not quoted on the Stock Exchange in Malaysia or elsewhere shall issue for cash at such fair and reasonable price as may be determined by the Prime Minister, such number of management shares as is equal to the percentum or more of its issued and paid-up capital and whatever subsequent issue of shares is made by the relevant company on percentum of every such issue shall consist of management shares.

(3) A relevant company to which paragraph (b) of Subsection (2) applies shall

issue the management shares required to be issued under sub-sections (2) at the fair and reasonable price determined by the Prime Minister as soon as practicable after the Prime Minister has so determined.

(4) The directors of a relevant company shall, on the requisition of the holders of its issued management shares, forthwith convene an extraordinary general meeting of the company, but in any case, not later than two months after the receipt by the company of the requisition and the provisions of Section 144 of the Company's Act 1965 except Subsection (1) thereof shall have effect in relation to such requisition.

(5) The holders of both the management and ordinary shares of the relevant company shall rank 'parri passu':
(a) in respect of the dividents declared by the company (same for both declared for the financial year of the relevant company which is current at the date of the commencement of this section);
(b) in respect of bonuses and rights of issue made by the company;
(c) in the right to return of capital; and
(d) in the right to participation in all surplus assets of the company in liquidation.

(6) The holder of the management shares of a relevant company shall be

entitled either on a poll or by a show of hands to 500 votes for each management shares held by him upon any resolution relating to the appointment or dismissal of a director or any member of the staff of the relevant company but shall in all other respects have the same voting rights as the holder of its ordinary shares.

(7) Voting on appointment of dismissal of a director of a relevant company shall be by means of a poll only.

(8) The provisions of this section shall have effect notwithstanding the provisions of any other written law or of the Memorandum or Articles of Association of a relevant company.

(9) For the purpose of this section, "Surplus assets" means all the assets of a relevant company remaining after the liabilities of the relevant company have been discharged and after the costs of winding up have been paid or provided for but before any capital has been paid or profits distributed to the holders of its ordinary shares.

(10) The Prime Minister may exempt any relevant company or any class of relevant companies from the provision of this section.

(11) Subject to sub-section (10) any relevant company which contravenes or fails to comply with any of the provisions of this section shall be guilty of an offence and shall, on conviction, be liable to a fine

not exceeding one million
dollars or to imprisonment for
a term not exceeding five years
or to both and in the case of
continuing offence it shall be
liable to a further fine not
exceeding one hundred thousand
dollars for each day or part of
a day during which the offence
continues after the first day
in respect of which the conviction
is recorded."

APPENDIX 11.1

MALAYSIA: PETROLEUM INDUSTRY EXPENDITURE BY CATEGORY

CATEGORY	EXPLORATION $ Mln.	DEVELOPMENT $ Mln.	OPERATING $ Mln.	TOTAL $ Mln.
Drilling Contractors	63.8	163.3	0.0	227.1
Fabrication and Construction	0.0	398.7	6.0	404.7
Transport Services	47.6	149.4	89.2	286.2
Engineering and Surface Production Facilities	10.2	107.5	166.7	274.4
Data Aquisition	11.4	0.0	0.0	11.4
Supply Bases and Shore Support	4.2	19.3	9.6	33.1
Specialised Sub-Surface Activities	37.1	07.0	21.1	145.2
Sub-Sea Engineering	12.8	33.3	12.1	58.2
Catering	10.7	27.9	16.9	55.5
Communications	0.9	2.1	4.8	7.8
Specifications and Inspections	0.5	1.1	4.8	6.4
Workovers	0.0	0.0	48.2	48.2
Company Expense	33.0	84.9	233.3	351.2
Total	232.2	1074.5	602.7	1909.4

Source: Carr W I FAR EAST RESEARCH, W I Carr Sons and Co (Overseas) 1976. According to them the information contained in the table was drawn from sources which they believed to be reliable. However they did not guarantee for its accuracy.

BIBLIOGRAPHY

ADELMAN, M.A THE WORLD PETROLEUM MARKET. John Hopkins Press Baltimore, 1971.

ASIA & AUSTRALASIA: BASIC OIL LAWS AND CONCESSION CONTRACT Petroleum Legislation Co., N.Y. 2 volumes & Supplements.

BARROWS, GORDON H. THE INTERNATIONAL PETROLEUM INDUSTRY, International Petroleum Institute, 1965-67. 2 volumes, (Vol. 2: Central America, South America, Africa, Far East, North America)

BRITISH MALAYA: RETURN OF FOREIGN IMPORTS AND EXPORTS (yearly) Malaya Publishing House Limited, Singapore, 1928.

BRITISH PETROLEUM COMPANY, B.P. STATISTICAL REVIEW OF THE WORLD OIL INDUSTRY, LOndon, 1976.

CARR, W.I. FAR EAST RESEARCH, W.I. Carr Sons & Co (Overseas), London, 1976.

COHEN, J.B. JAPAN'S ECONOMY IN WAR AND RECONSTRUCTION, University of Minnesota Press, Minneapolis, 1949.

DARMSTADTER. J, TEITELBAUM, P.D. & POLACH, J.G. ENERGY IN THE WORLD ECONOMY: A Statistical Review of Trends in Output, Trade and Consumption Since 1925, The John Hopkins Press, Baltimore (Md.), published for Resources for the future, Inc. 1971.

FABRICIUS, J. EAST INDIES EPISODE, The Shell Petroleum Company, London, 1949.

FABRIKANT, R. LEGAL ASPECTS OF PRODUCTION SHARING CONTRACTS IN THE INDONESIAN PETROLEUM INDUSTRY, Institute of Southeast Asian Studies, Singapore., 1972.

FABRIKANT, R. THE INDONESIAN PETROLEUM INDUSTRY: Miscellaneous Source Materials, Institute of Southeast asian Studies, Singapore, 1972.

FRANKEL, P.H. ESSENTIALS OF PETROLEUM. Reprinted by Frank Cass & Co. Ltd., 1969.

HARTSHORN, J.E. OIL COMPANIES AND GOVERNMENTS. Faber and Faber London, 1967.

HENRIGUES, R., MARCUS SAMUEL-FIRST VISCOUNT BEARSTEAD AND FOUNDER OF THE "SHELL" TRANSPORT AND TRADING COMPANY, 1853-1927, Barrie and Rockliff, London. 1960.

HIDY, R.W. and HIDY, M.E. PIONEERING IN BIG BUSINESS 1882-1911 History of Standard Oil Co. (N.J.), Harper and Bros., N.York, 1955-56.

HOSE, C. ROMANCE AND RESEARCH OR A JUNGLE WALLAH AT LARGE, Hutchinson Co., London, 1927.

INTERNATIONAL PETROLEUM ENCYCLOPEDIA 1976, Vol.9. The Petroleum Publishing Company, Oaklahoma.

JACOBY, N.H. MULTINATIONAL OIL - A Study in Industrial Dynamics MacMillan Publishing Co., London 1974.

LIM, P.T. ed: MULTINATIONAL CORPORATIONS AND THEIR IMPLICATIONS FOR SOUTHEAST ASIA, Institute of Southeast Asian Studies.

LOVEJOY, W.F. and HOMAN, P.T. ECONOMIC ASPECTS OF OIL CONSERVATION REGULATION, John Hopkins Press, Baltimore 1967.

MACKAY, D.I. and MACKAY, G.A. THE POLITICAL ECONOMY OF NORTH SEA OIL, Martin Robertson & Co. Ltd., 1975.

MICKSELL, R (ed) FOREIGN INVESTMENT IN PETROLEUM AND MINERAL INDUSTRIES. Baltimore: John Hopkins Press, 1971.

MIKDASHI, Z. THE COMMUNITY OF OIL EXPORTING COUNTRIES, Allen and Unwin, London, 1972.

OEI, H.L. PETROLEUM RESOURCES AND ECONOMIC DEVELOPMENT: A Comparative Study of Mexico and Indonesia, Unpublished Ph.D Thesis, University of Texas, 1964.

PEARSON, S.R. PETROLEUM AND THE NIGERIAN ECONOMY, Stanford University Press, Stanford, California, 1970.

PENROSE, E. THE GROWTH OF FIRMS, MIDDLE EAST OIL AND OTHER ESSAYS, Frank Cass, London, 1971.

PENROSE, E. THE LARGE INTERNATIONAL FIRM IN DEVELOPING COUNTRIES - THE INTERNATIONAL PETROLEUM INDUSTRY, Allen and Unwin, London, 1968.

PORTER, M. PETROLEUM ACCOUNTING PRACTICES, New York 1966.

PRINGLE, R., RAJAH AND REBELS: The Ibans of Sarawak Under Brooke Rule, 1841-1941, McMillan Company, 1970.

QUAH, S.L, comp., OIL DISCOVERY AND TECHNICAL CHANGE IN SOUTHEAST ASIA: A Preliminary Bibliography, Institute of Southeast Asian Studies, Singapore, 1974.

QUARTERLY ECONOMIC REVIEW: OIL IN THE FAR EAST AND AUSTRALASIA. Economist Intelligence Unit, London (1972-)

QUAH, S.L. (Comp.) OIL DISCOVERY AND TECHNICAL CHANGE IN SOUTHEAST ASIA - A Bibliography, Institute of Southeast Asian Studies, Singapore May 1973.

REINHARD, M and WENK, E, GEOLOGY OF THE COLONY OF NORTH BORNEO Bulletin No.1, Geological Department of the British Territories in Borneo, His Majesty's Stationery Office, London, 1951.

REINHARD, M. and WENK, E., GEOLOGY OF THE COLONY OF NORTH BORNEO AND BRITISH TERRITORIES IN BORNEO, Geological Survey Department Bulletin No.1 His Majesty's Stationery Office, London, 1951.

RENWICK, A (ed) FUEL RESOURCES-COAL, LIGNITE AND PETROLEUM - IN MALAYA, Geological Survey Department, Ministry of Lands and Mines, Kuala Lumpur, May 1966.

ROE, F.W. THE NATURAL RESOURCES OF SARAWAK, Government Printer, Kuching.

RIFAI, T. CRUDE OIL PRICING, Praeger Press, New York, 1974.

RUNCIMAN, S. THE WHITE RAJAHS - A History of Sarawak from 1841 to 1946, Cambridge University Press, 1960.

SARAWAK SHELL OILFIELDS LIMITED, OIL IN SARAWAK 1910-1960, Brunei Press Limited, Kuala Belait.

SHELL INTERNATIONAL PETROLEUM COMPANY LIMITED, THE PETROLEUM HANDBOOK, 5th Edition, 1966.

SILCOCK, T.H. THE COMMONWEALTH ECONOMY IN SOUTHEAST ASIA, Duke University Press, 1959.

STIGLER, G.J. THE THEORY OF PRICE, Macmillan, New York, 1966.

TANZER, M. POLITICAL ECONOMY OF INTERNATIONAL OIL AND THE UNDERDEVELOPED COUNTRIES, Beacon Press, Boston, 1969.

TATE, D.J.M. THE MAKING OF MODERN SOUTHEAST ASIA - The European Conquest, Vol.1, Oxford University Press, Kuala Lumpur, 1971.

TER BRAAKE, A.L. "Mining in the East Indies" in Bulletin 4 of THE NETHERLANDS AND NETHERLANDS COUNCIL OF THE INSTITUTE OF PACIFIC RELATIONS, New York, 1944.

THE JAPANESE ADMINISTRATION OF PETROLEUM IN SOUTHEAST ASIA DURING THE WORLD WAR II, Teikoku Sekiyu Co. Ltd., July 1955, (translated into English by Yuji Suzuki of University of Malaya, December 1977).

SHATZL, PETROLEUM IN NIGERIA, Oxford University Press, London 1958.

TREGONNING, K.G., UNDER CHARTERED COMPANY RULE - NORTH BORNEO 1881-1946, University of Malaya Press, 1958.

TURVEY R, PUBLIC ENTERPRISE, Penguin Books, London, 1968.

UNITED NATIONS. ECONOMIC COMMISSION FOR ASIA AND THE FAR EAST. COMMITTEE FOR CO-ORDINATION OF JOINT PROSPECTING FOR MINERAL RESOURCES IN ASIAN OFFSHORE AREAS - Report. Bangkok (annual)

UNITED NATIONS. ECONOMIC COMMISSION FOR ASIA AND THE FAR EAST. MINING DEVELOPMENTS IN ASIA AND THE FAR EAST. New York, 1968.

UNITED NATIONS. ECONOMIC COMMISSION FOR ASIA AND THE FAR EAST. CASE HISTORIES OF OIL AND GAS FIELDS IN ASIA AND THE FAR EAST. New York, 1963.

WALLACE, E.P. and DOROTHY. G. (ed) WORLD GEOGRAPHY OF PETROLEUM, American Geographical Society, New York, 1950.

WIGMORE, L. THE JAPANESE THRUST, Australian War Memorial, Griffin Press, Adelaide, 1957.

JOURNAL ARTICLES

ADNAN, M.A. "Critical Issues in Petroleum Development in Malaysia", a paper presented to the Fourth Malaysian Economic Convention Seminar on AGENDA FOR THE NATION: PUBLIC POLICIES FOR RESTRUCTURING SOCIETY organised by The Malaysian Economic Association from 19-21 May 1977, Kuala Lumpur.

DUBEY, "Oil Boom in Indonesia" in INSIGHT, No. 21, 1971.

GRANT, J. McB., "The Petroleum Industry" in THE ECONOMICS OF AUSTRALIAN INDUSTRY, by Alex Hunter (ed.) 1963.

HADI, R. "The Role of the Petroleum Industry in Socio-Economic Development in Malaysia" (A Slide Presentation) delivered to the Fourth Malaysian Economic Convention Seminar on AGENDA FOR THE NATION: PUBLIC POLICIES FOR RESTRUCTURING SOCIETY organised by The Malaysian Economic Association from 19-21 May 1977, Kuala Lumpur.

HARPER, G. "The Miri Field 1910-1972 in SARAWAK MUSEUM JOURNAL" January/December 1972, Government Printer, Kuching, 1972.

"Japanese seek oil nearer home". PETROLEUM AND PETROCHEMICAL INTERNATIONAL 12 (1): 75. 80, January, 1972.

KEWLEY, J. "The Crude Oils of Borneo", in JOURNAL OF THE INSTITUTION OF PETROLEUM TECHNOLOGISTS, Volume VII, July 1921 London.

NORTH W.J. "British North Borneo - First Half Century of Development" in CROWN COLONIES, Vol.1, No.4, March 1932, pp. 169-172.

NORTH, W.J. "Notes on Mineral Research in North Borneo" in ASIAN REVIEW, Vol. XXXVI, No. 126, April 1940, pp. 359-371. Also in FAR EASTERN ECONOMIC REVIEW Vol.XXXVI, No 9 September 1940, Vol. XXXVI, No. 26, April 1940, pp. 359-371.

NORTH, W.J. "British North Borneo" in JAVA GAZETTE, Vol.VI. No. 1 January, 1937, pp.17-18.

ODELL, P.R. and ROSING, K.E. "The North Sea Oil Province - A Simulation Model of Development" in ENERGY POLICY, December 1974.

"Oil in Brunei" in CORONA, Vol. III, No. 6, June 1951, p. 226.

"Oil in Southeast Asia", Pt.1 ASIA RESEARCH BULLETIN, 1(3) 163-167, August 1971.

"Oil: Changing the face of.Asia" in SINGAPORE TRADE AND INDUSTRY, 37-47, May 1971.

"Oil Production Expanding in British Borneo" in BURMA COMMERCE, Vol. II, No. 22 September 7, 1951, pp. 527,529.

"Offshore Oil perks up Brunei Drilling" in OIL AND GAS JOURNAL Vol. LXII, September 7, 1964, p. 85.

PEARSON, G. E. "Offshore Prospects" in FAR EASTERN ECONOMIC REVIEW, Vol. XLVIII, No. 8, May 20, 1965, p. 371.

"Petroleum Development in the Far East" Foreign Development Papers (annual reviews) 1950-1973, in AMERICAN ASSOCIATION OF PETROLEUM GEOLOGISTS BULLETIN, Vol. 34-43, Part 2 (variously July, August, or September issues).

PFOHL, J.L. "Petroleum Refining in Malaysia", a paper presented at the Seminar on THE OIL INDUSTRY DEVELOPMENT organised by the Technological Association of Malaysia from 13-16 May 1976 in Kuala Lumpur.

REDFIELD, A.H. "Promising Oil Reserves in Sarawak and Brunei" FAR EASTERN SURVEY, Vol. VIII, August 19, 1939, pp. 178-180.

REDFIELD, A.H. "Petroleum in Borneo" ECONOMIC GEOLOGY, Vol. XVII, No. 5 August 1922, pp. 313-347. Also in FAR EASTERN ECONOMIC REVIEW, Vol. XIX, No. 2 February 1923, pp. 136-140 and Vol. XIX, No. 3, March 1923, pp. 205-209.

RESOURCES OF THE COLONIAL EMPIRE VII - "Oilfields in Trinidad and Borneo" in THE TIMES BRITISH COLONIAL REVIEW. Winter 1952 Quarterly No. 8.

ROE, F.W. (Compiler), "Extracts from a report on British Borneo Petroleum Production, Resources and Industry" SARAWAK GAZETTE, Vol. LXXXIV, No. P205 July 31, 1958. pp. 120-124.

ROE, F.W. "Documents Relating to Petroleum Resources Development in Individual Countries of the ECAFE region: British Territories in Borneo," in SYMPOSIUM ON THE DEVELOPMENT OF PETROLEUM RESOURCES OF ASIA AND THE FAR EAST, PROCEEDINGS 1958, held in New Delhi, India, Dec. 3-16, 1958, published by ECAFE, Bangkok, 1959.

SARAWAK SHELL CO., "Shell's Fifty Year Oil Search in the Baram Valley" in SARAWAK GAZETTE, Vol. XL, No. 1277, July 31 1964, pp. 171-172. Also in BARAM REGATTA Booklet, 1964, Shell Sarawak.

SCHAUB, H.P. and JACKSON, A. "The North Western Oil Basin Of Borneo - Habitat of Oil" a Symposium paper edited by Lewis and Week in AMERICAN ASSOCIATION OF PETROLEUM GEOLOGISTS, 1958.

SHELL COMPANY LIMITED, "Shell in Singapore and Borneo" in MALAYA August 1955, pp 29-32.

SHELL MALAYSIA TRADING BERHAD, BERITA SHELL (SHELL NEWS) Vol.2 No. 7 October/November 1974, Kuala Lumpur.

SWEMLE, 1 "Indonesia, British Borneo and Burma" in WORLD GEOGRAPHY OF PETROLEUM, edited by WALLACE, EP. and DOROTHY, G. American Geographical Society, N York, 1950, pp. 273-300.

SYMPOSIUM ON THE DEVELOPMENT OF PETROLEUM RESOURCES OF ASIA AND THE FAR EAST, 4th Canberra, 1969 REPORT. United Nations Economic Commission for Asia and the Far East, Bangkok, 1970.

SYMPOSIUM ON THE DEVELOPMENT OF PETROLEUM RESOURCES OF ASIA AND THE FAR EAST, 3rd, Tokyo, 1965. REPORT, United Nations Economic Commission for Asia and the Far East, N York 1967, 3 volumes.

SYMPOSIUM ON THE DEVELOPMENT OF PETROLEUM RESOURCES OF ASIA AND THE FAR EAST, 2nd Tehran, 1962 PROCEEDINGS. United Nations Economic Commission for Asia and the Far East, N York 1963.

SYMPOSIUM ON THE DEVELOPMENT OF PETROLEUM RESOURCES OF ASIA AND THE FAR EAST, 1st, New Delhi, 1958 PROCEEDINGS, United Nations Economic Commission for Asia and the Far East, N York, 1959.

UNITED NATIONS. CASE HISTORIES OF OIL AND GAS FIELDS IN ASIA AND THE FAR EAST, N Y 1963.

WARD, J and MURPHY, C.L., "Financial Aspects of Malaysian Petroleum Industry", a paper presented at the Seminar on the Oil Industry and its impact on National Development, organised by the Technological Association of Malaysia from 13-16 May 1976 in Kuala Lumpur.

WONG, J. "A Visit to the Seria Oilfields" in THE BORNEAN, 1960, pp. 58-60.

"WORLD WIDE OIL REPORT", OIL AND GAS JOURNAL, Vol. LII, December 21, 1953, pp. 152-153.

GOVERNMENT OF MALAYSIA PUBLICATIONS

GEOLOGICAL DEPARTMENT OF BRITISH BORNEO, THE GEOLOGY OF SARAWAK BRUNEI AND THE WESTERN PART OF NORTH BORNEO, Kuching.

GOVERNMENT OF MALAYSIA, ECONOMIC REPORT 1976/1977, Ministry of Finance, Kuala Lumpur 1976.

THE FIRST MALAYSIA PLAN 1966-1970, Government Printer, Kuala Lumpur 1966.

THE SECOND MALAYSIA PLAN 1971-1975, Government Printer, Kuala Lumpur 1971.

THE THIRD MALAYSIA PLAN 1976-1980, Government Printer, Kuala Lumpur 1976.

PETRONAS Information Booklet, PETRONAS, Kuala Lumpur.

STATISTICS OF SABAH EXTERNAL TRADE, Department of Statistics Kota Kinabalu, Malaysia.

STATISTICS OF SARAWAK EXTERNAL TRADE, Jabatan Perangkaan Sarawak, Malaysia.

OIL JOURNALS

ASIA RESEARCH BULLETIN, Singapore (monthly)

BRITISH PETROLEUM STATISTICAL Review, BP, London (Annual)

FAR EASTERN ECONOMIC REVIEW, Hong Kong (Weekly)

OIL AND GAS JOURNAL, Petroleum Publishing Company, Tulsa, Oklahoma (Weekly)

PETROLEUM NEWS SOUTH-EAST ASIA Hong Kong (Monthly)

PETROLEUM ECONOMIST, London (Monthly)

PETROLEUM INTELLIGENCE WEEKLY (P.I.W.)

PETROLEUM PRESS SERVICE, London (Monthly)

SKINNER'S OIL AND PETROLEUM YEARBOOK (Yearly)

WORLD OIL, Gulf Publishing Co., Houston, Texas

WORLD PETROLEUM, New York

ADDENDUM

Books

BRANNON, G.M. ENERGY TAXES AND SUBSIDIES, Ballinger Publishing Company, Cambridge, Mass., 1974.

YOON, S. PARK. OIL MONEY AND THE WORLD ECONOMY, Wilton House Publications, London, 1976.

Journal Articles

HARTSHORN, J.E. "Energy Expectations and Uncertainties", MIDDLE EAST ECONOMIC SURVEY, Nov. 14, 1977.

MABRO, R. "Energy Crisis in 1985?" MIDDLE EAST ECONOMIC SURVEY April 10,1978.

PARRA, F.R. "Energy Perspectives Worldwide", MIDDLE EAST ECONOMIC SURVEY, Oct. 24, 1977.

PENROSE, E.T. "Choices For The Oil Exporting Countries" MIDDLE EAST ECONOMIC SURVEY, January 16, 1978.

RAHMANI, B. M. "Energy Conservation in Iran and Hedging Against Energy Crunch", MIDDLE EAST ECONOMIC SURVEY, January 23, 1978.

RAMANATH, A. "The Development of Electricity Generation Facilities in Peninsula Malaysia", a paper presented at the Workshop on Energy, Resources and Environment, Penang, Malaysia, February 21-23, 1975.

WAGNER, G.A. "Energy Prospects for the Pacific Region", An address to the Indonesian Petroleum Association Jakarta, June 7, 1976.

WORKSHOP ON ALTERNATIVE ENERGY STRATEGIES, ENERGY: GLOBAL PROSPECTS 1985-2000.

Oil Journal

MIDDLE EAST ECONOMIC SURVEY, Middle East Petroleum and Economic Publications (Cyprus), Nicosia (Weekly).