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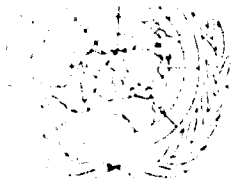
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Regional Developmental Composition of the
Production of the Petrochemical Industries in
Developing Countries

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DEVELOPMENT OF THE PETROCHEMICAL INDUSTRY

IN LEBANON

by

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We regret that some of the pages in the microfiche copy of this report may not be up to the proper legibility standards, even though the best possible copy was used for preparing the master fiche.

The petrochemical industry is practically non-existent in Lebanon. As far as I know there are no firm prospects for the immediate future. There are, thus, two questions: are there any chances that such an industry can be established in Lebanon in the fairly near future? What part can Lebanon play in the development of Arab chemical industry? I shall try to give a brief answer to the questions in reply to these two questions.

Feedstocks

The exploration so far carried out has not resulted in the discovery of any oil or natural gas in Lebanon. But petroleum flows through in transit; two pipelines are available for Iraq and ending at Tripoli and the other coming from Saudi Arabia and ending at Sidon, near Beirut, carrying about 40 million tons annually.

Two small private refineries take about 5% of this crude annually. The IFI refinery at Tripoli started in 1940 and that of Sédrege at Zahrani, belonging to Libilcoil and Galten, started in 1955. The products obtained are: LPG, gasoline, kerosene, gas oil, fuel oil, bitumen and asphalt (Table 1 annexed).

These two refineries have no catalytic cracking units; having only catalytic reformers, they cannot produce high yields. In fact the yield of fuel oil is about 50% of the crude treated and presents serious disposal problems. IFI plan the installation of a catalytic cracker at the end of 1970; this operation, however, depends on the previous authorization of the Lebanese Government.

Further, these two refineries do not satisfy the needs of the country for paraffin motor fuels and cannot improve the yield with their existing plants. Lebanon at present imports 96% of its requirements for gas and about 40% of its requirements of aviation kerosene.

A project for a third refinery is now being studied by the Lebanese authorities. The company preparing this project is a Franco-Lebanese association and Lebanese sources of capital propose to install a catalytic cracking refinery which would treat 800,000 metric tons in 1975 and 1,200,000 metric tons in 1980 with a fuel oil yield of 45%. This project has been under way since 1964 and it is difficult to predict when realization will be given.

However, that may be, it appears, the chief aim of the existing and

projected refineries is to cover the Lebanese requirements for gas and motor fuels. They cannot, given their size and structure, feed a petrochemical industry. For this it will be necessary either to import the feedstock or to install a production unit for it in one of the refineries.

It must be admitted that the absence of natural gas and the insufficiency of refinery gases are serious handicaps.

It is unfortunate that the absence of chemical plants has led to this state of affairs, characterized by a dispersion of capital and of means of production and a high cost of refinery. There are many reasons for this high cost and there is no point in discussing them in this report. The increase in cost has been estimated at 20%. Finally the price of a barrel of crude to the refineries is 217 cents for H&M and 227 cents for IFC.

The chemical industry situation

Basic chemical industry is limited to the products necessary for manufacture of phosphatic and nitrogenous fertilizers. It is a new industry and comprises:

- A factory for production of sulphuric acid, phosphoric acid and superphosphates. Situated at Sala'itah, it started up in 1959 and has developed during the last few years. It belongs to the Lebanese Chemical Company, a company with Lebanese capital. No data have been published on its capacity and actual production but the production of nitrogenous fertilizers in 1967 has been estimated at 34,000 metric tons.

- A factory for nitric acid and nitrogenous fertilizers situated near the previous one. It started up in 1966 and belongs to the ESO Fertilizer Company, formed by ESOC with participation by Lebanese capital. Ammonia is imported from Greece or Italy. The capacity is 23,000 metric tons per annum of HNO_3 , 30,000 metric tons per annum of ammonium sulphate at 21% N and for 23,000 metric tons per annum of ammonium nitrate at 28% N. In the absence of published information, our production estimates for 1967 are 17,000 metric tons of sulphate and 17,000 metric tons of nitrate.

- Project for production of chlorine and its derivatives as well as for caustic soda are currently envisaged by private companies.

But a chlorine plant can only be profitable if the chlorine and its deriva-

atives are necessary for other important local industries. Thus Lebanon imported 333 metric tons of Pbl and 62.6 metric tons of halogens in 1967.

Any development of the petrochemical industry must be accompanied by development of a complementary chemical industry.

Local market for plastics

The market in Lebanon, with 2,500,000 inhabitants, is limited and would support a small petrochemical industry. Table 2 (annexed) lists the traditional products and their significant tonnage. The absence of separate figures for plastic materials is unfortunate.

A study of the export and import of international - is fundamental to any industrial program. The Lebanese market, at best, is a stimulant for production. The extent of foreign goods to be consumed in this market and the possibility of it to help produce local goods, in the light of recent developments in the world economy, which industry or industries could be stimulated by it.

Although Lebanon's production of plastic materials increased from 3,500 metric tons in 1962 to 12,000 metric tons in 1967, this could not be a stimulant for development. First, the Lebanese market is not a wide variety of products. Second, the demand for a particular product seems to be not constant, but to vary with the nature of the Lebanese market, such as that for the plastic materials, even to the extent of dumping, to such an extent that it could not only be profitable with excessive customs protection.

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It is also conceivable that a Lebanese petrochemical industry could develop, but it would have to be supported by the State. The Lebanese market is not a wide variety of products. Second, the demand for a particular product seems to be not constant, but to vary with the nature of the Lebanese market, such as that for the plastic materials, even to the extent of dumping, to such an extent that it could not only be profitable with excessive customs protection.

This regional planning, is on the agenda for the next meeting of Arab experts. After this, meeting it will be possible to define the Lebanese role more clearly.

Instead of money, Lebanon, can offer its government, institutions and several trump cards that will be determined. They must be made more better placed than other Arab parties. The emergence of a new industrial sector will probably be the future hope and source of development of the Lebanese economy.

However, while the Arab countries are installing petroleum producing countries to install factories in Lebanon, it is not to be expected that they will tie up their capital in this way. The installation of the factories in their own territories will bring dispersed advantages to their viable economy which they could not afford to forego.

The free economy has been established. International companies are would participate in Arab projects on a joint venture basis. The State is ready to give them every assistance on the basis of a feasibility report giving the required details and the necessary justifications.

Industrial services and scientific and technical potential

It will be useful to refer to the following paragraphs on industrial services: the situation regarding qualified workers and the scientific and technical potential and make up what we can regard as the main cards which Lebanon can offer.

Electric power

Although most industrial companies provide for their own electricity requirements since the market is well supplied with fuel, a figure can be given to indicate the average price which the Lebanese Electricity Company offers to industry. It is 1.5 cents per kWh, but can be lowered in certain cases.

Water

Supplying industrial water does not present special problems in Lebanon as in some other Arab countries. In general, facilities are being in relation to the possibility of finding water on site. When a simple bore is sufficient. In the most unfavourable case water can be obtained for a price not exceeding 3 cents ^{4.3}/₁₀₀.

Qualified Workmen

Lebanon has a reputation for its qualified workmen. Even for new industries it is possible to assemble the required labour force quickly. The difficulties are diverse industries in Lebanon employ a local labour force which is already under-strength and, as a result, is still lower than usual elsewhere.

Technical and Scientific Education

The development of higher and technical education is being actively fostered to supply the needs not only of Lebanon, but also of the other Arab countries. Furthermore, numerous Lebanese students pursue their scientific and technical studies abroad. Some hundreds of Lebanese engineers have thus acquired their professional training in schools in Europe and America. The effective employment of engineers and technicians does not present any problems, especially in a post-war recovery period abroad as envisaged.

Availability of Professional Qualifications

Lebanon has a long and varied tradition in the development of higher and technical education, especially in petroleum-producing countries: Iraq, Saudi Arabia, Kuwait, etc.

Most of the construction of new dams, municipal installations, roads, telephone networks, etc. Lebanon is recruiting and constructing engineers and numerous individual installations in the industrial, chemical, petrochemical and other sectors. These engineers are engaged in planning, constructing and supervising installations, dams, etc. Many of them, however, are foreign technical qualifications, and a few have a lower rank than those of any foreign group.

It must be pointed out that the manufacture of small equipment in a factory, steel, electrical, oil, copper, aluminium, etc. can be carried out in Lebanon at a cost which is lower than in most other countries, at very advantageous prices.

Scientific Research

The role of scientific research in the social and economic development of a country is becoming more and more important. In our view, the development of scientific research in Lebanon and in Arab countries is indispensable for the achievement of a more rapid industrial development which will be viable in the long run.

Lebanon has, from this point of view, a privileged position. With its

four universities, which are continuing to develop, it continues to be the center of higher education for young people from the countries of the Middle East. During the past 20 years some hundreds of Lebanese have turned to scientific research and have taken their doctorate in the most famous universities and in the most important research centres in Europe and America. They constitute a reservoir potential unfortunately still unexploited by Lebanon and by the Arab countries. A great number of these researchers now work in countries where they are welcome, but they are ready to return and work in their own country if opportunities for research were offered to them.

An effort is being made in this direction. The American University of Beyrouth has, for some years, actively undertaken the development of its research laboratories, procuring the necessary finance from the U.S.A. The French University at Beyrouth is spreading its net. The Lebanese University has just been given a new Faculty of Science destined to be an important centre of scientific training and a centre for multidisciplinary research.

Further, the Lebanese State in 1963 created a National Council for Scientific Research to which it has committed 1% of its budget for research. This Council intends shortly to create a modern documentation centre. In this connexion, the library of the American University is the best equipped and the richest in the region.

In conclusion, it appears to us that the Lebanon cannot expect an early development of petrochemical industry in its own territory. On the other hand, it has a part to play in the development of Arab petrochemical industry. This part, to which the other Arab countries will probably not object, lies in scientific research.

Indeed, it is an ideal place for the establishment of an "Arab Centre for Petrochemical Research" in which all the researchers of the Arab countries would work. The operating expenses would be charged as a very small percentage on the petroleum revenues of each country. This centre would not be devoted solely to applied research according to the requirements of the member countries, but would equally undertake fundamental research. The idea of an Arab Research Centre has been suggested by the Directorate of Petroleum Affairs at the Arab League and appears on the agenda for the next meeting of Arab petrochemical

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experts.

Everything leads to the belief that the Arab countries are aware of the importance of scientific research as well as of the urgent necessity for a regional plan for the petrochemical industry. It is to be hoped that the meetings which are to take place may lead to some definite and rapid decisions.

TABLE I

PRODUCTION OF LEBA, FUEL PRODUCTS, 1962 - 1968
(in '000 metric tons)

	1962	1963	1964	1965	1966	1967	1968
Crude refined	640	1018	1306	1442	1652		1803
Gasolines	123	162	224	281	310	303	347
Kerosine	102	124	127	129	153	180	190
Gas oil	164	176	219	230	232	269	281
Fuel oil	415	527	673	767	853	891	
Butane produced	9	3	11	20	21	21	24
Butane imported	8	16	21		17	24	24

TABLE II

FERTILIZERS AND PETROLEUM PRODUCTS IMPORTED 1962 - 1967
(in metric tons)

	1962	1963	1964	1965	1966	1967
Liquid ammonia	-	-	17	41	1,949	1,972
Nitrogenous fertilizers	31,000	53,900	53,000	50,800	60,300	24,700
Phosphatic fertilizers	-	-	588	265	1,525	239
Superphosphates	1,100	2,015	1,100	750	450	65
Natural phosphates	10,900	17,100	20,400	43,600	33,400	4,012
Lubricating oil and greases	6,540	9,460	8,520	10,750	12,720	13,750
Synthetic textiles	3,200	3,430	3,880	4,470	5,690	5,530
Plastics materials and products	3,470	5,830	7,780	9,300	11,960	12,580
- condensation, polycondensation and polyaddition products (1) in the crude state or partially worked			1,750	2,634	3,233	2,761
- polymers and co-polymers acrylate and polyacrylate polymers and derivatives			127	128	181	81
Others (2) PE, PVC ...			3,059	3,166	4,322	6,370

(1) Phenoplasts, amideoplasts, alkyds, alanyl polyesters, silicones

(2) Polyethylene, polystyrene, PVC, polyvinyl derivatives . . . in the crude form or partially worked.

Source: External trade statistics (last edition)





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