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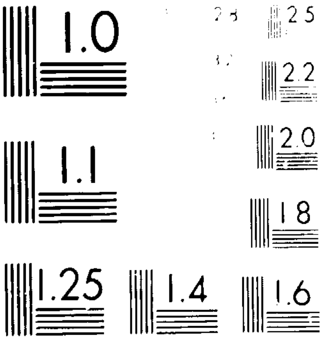
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The Availability of Natural Gas in Developing Countries for Petrochemical Industries

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Explanatory Notes

- The opinions and estimations of any figure presented in this paper do not by any means reflect the official opinion or figure of any OPEC Member Country, especially concerning reserves and petrochemical potentiality. This paper is an overview of the prospects of the Third World[1] for the production of basic petrochemical products from natural gas[2]. For this purpose, mainly secondary sources have been consulted. For the calculations concerned, we have used average or conservative factors, particularly for the estimation of associated gas reserves. Great difficulty was found in calculating the basic data, especially domestic requirements of natural gas for energy purposes in developing countries individually. Therefore, the single country's actual availability of natural gas for petrochemical purposes, as well as its potentiality for the production of basic petrochemicals, will surely defer from the figures estimated in this report. This is due to the fact that, in such a case, specific country's technical and economic factors would have to be used, i.e. gas analysis for each gas reservoir; specific yields of ethane/ethylene, methane/ammonia-methanol; specific levels of potential gas exports in accordance with the country's plans; specific future policy regarding associated gas which is currently flared; etc. Consequently, all calculations presented within this paper are to be taken only as approximate figures.

- Our analysis of raw material/feedstock availability for the production of major petrochemicals (methanol, ethylene and ammonia) in developing countries concentrates on natural gas, not only because it is the most efficient petrochemical raw material, but also because it, fortunately, is the most available one in the Third World area. We do not expect that, before the year 2000, significant quantities of hydrocarbons, at present utilized for energy purposes, could be shifted for petrochemical production due to the utilization of alternative sources of energy. Contrary to this, we think that natural gas could sufficiently cover the new energy needs as well as the petrochemical development in the Third World for a number of years.

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[1] Third World includes those countries grouped by FAO-UNIDO-World Bank as "developing market economies".

[2] Natural gas: naturally occurring mixtures of hydrocarbon gases and vapours remaining in the earth's crust in association with crude oil deposits or in separate reservoirs.

INTRODUCTION

This paper intends to be an assessment of the availability of natural gas as a petrochemical raw material in developing countries (DCs) and, consequently, of the sustained production of basic petrochemicals based on this raw material.

A survey and a computer run have been carried out to estimate the availability of natural gas for the production of basic petrochemicals (ethylene, ammonia and methanol) in 114 DCs. Since natural gas is the most efficient and abundant petrochemical raw material available in DCs, our research and estimations concentrate on its potentiality to produce basic products. Still, other reasons for choosing this resource as a basis of our analysis instead of other petrochemical raw materials are: (a) its lower market price; (b) its lower processing costs; and (c) its lower yield of petrochemical by-products which are not heavily required by the DCs' market structure. We believe that the majority of petrochemical raw materials, such as naphtha, LPG and gas oil, will eventually shift completely to meet the energy requirements of DCs.

In order to estimate the sustained production of basic petrochemical products in the Third World, based on natural gas, a survey was also carried out with regard to the demand, production of and plants' capacity for basic products on a global and regional basis, as well as for a selected group of DCs.

Parts I and II constitute the above-mentioned assessment. The analysis relies on the comparison of the petrochemical raw material availability (natural gas) vis-a-vis the DCs' future demand for basic petrochemical products. Since, at present, the industry is plagued by a high level of plants' capacity under-utilization, one cannot ignore its negative effects on the petrochemical developments in the DCs. For this reason, in the second part of our analysis, we also tackle this phenomenon, although only briefly, but in inter-relation with the first part of the analysis.

Part III presents the conclusion of the analysis and also serves as the basis for identifying the role of some DCs' co-operation in the development of the petrochemical industry in the Third World.

Finally, the results of the entire survey and calculations have been arranged in 35 tables which appear in the Annex.

FOREWORD

Beginning in the early 1920s, the world petrochemical industry experienced an impressive and rapid growth which did not decrease until five decades later. We may recall that the petrochemical industry was born during the 1920s when ethylene was produced on an experimental basis; then followed the production of ammonia from natural gas in the 1930s. During the decade thereafter synthetic rubber was produced, and later on the production of synthetic fibres, detergents and other aromatic products brought the industry to its current stage of development.

Gigantic annual increments of petrochemical output characterized this industry until the early 1970s, when about 70 million tons of basic petrochemicals were produced throughout the world. However, the world annual demand growth of 16%, as recorded during the period 1940 - 1960, decreased between 1970 and 1980 to 9% and for the present decade, the estimated average world growth of demand for petrochemicals will not exceed 4% per year. The traditional proportional relationship of the petrochemical industry's growth to the world GNP growth might in the future decrease from 2.5 to 1.4 times.

The great expansion of the petrochemical industry took place only in the economically developed areas as a result of two main factors prevailing in the past: unsaturated markets and artificially low feedstock prices, especially for natural gas, the most efficient raw material. Therefore, when the market in the aforementioned areas reached maturity, and when the prices of hydrocarbons were adjusted to their real levels, the growth of the petrochemical industry began to slow down. To illustrate this statement, until the early 1970s, the United States' petrochemical industry, thanks to its low-priced indigenous natural gas supply and large unsaturated domestic market, has had a competitive advantage in terms of production cost while its competitors from Western Europe and Japan, with their naphtha-based industry relying principally upon imported hydrocarbons and smaller markets, always faced market disadvantage. However, the United States' industry's advantage already mentioned will, most probably, cease as of 1985. In that year, the U.S. policy of gas price deregulation will be fully applied, aggravating the negative effects of market saturation.

Since the price and availability of natural gas, as well as the size and condition of the petrochemical markets, have been shown to be some of the chief factors for healthy petrochemical development, the growing economies of the Third World, with their enormous gas reserves, appeared to have the best market opportunity for developing this industry.

There is no doubt that the establishment of the petrochemical industry is one of the most important factors for every developing country's economic growth and development, for this industry provides the materials for the production of thousands of final products, from food and medicines to all types of textiles, plastics and rubbers.

The set-up of this industry demands the satisfaction of some requirements: an acceptably large market, large investments of capital, adequate economic infrastructure, and the utilization of sophisticated equipment and technological processes. Consequently, not every DC can satisfy all the requirements, as many papers have already demonstrated.

This brings us to the thesis of our paper. In the case of most of the developing countries (DCs), the development of the petrochemical industry is hindered, not only by some or all of the above-mentioned requirements, but also by two additional factors: by the non-availability of natural gas as the most efficient petrochemical raw material, and recently by the negative impact of the world's large petrochemical idle capacity. Therefore, co-operation among DCs is highly recommended, especially when we consider that a few DCs have plenty of natural gas available for the production of basic and intermediate products, while the majority of DCs could solve their market and financial constraint by integrating the industry with the production of end petrochemical products.

PART I

The Availability of Natural Gas for the Production of Basic Petrochemicals in Developing Countries

The natural gas reserves in DCs for petrochemical purposes are enormous despite the impact of exports and energy domestic requirements. However, this enormous potential exists in only a few DCs.

As of 1st January, 1982[1], the estimated proven reserves of non-associated gas in the DCs were 1,260 TCF[2]. After deducting the current level of gas allocated for exports and domestic energy requirements, that volume is reduced to 1,250 TCF. As for associated gas, the estimated proven reserves were 262 TCF on the same date. If we assume for the moment that the current average proportion of gas utilization (50%) in the total associated gas produced in DCs remains constant in the future, 131 TCF would be left from the estimated level of reserves. This volume, which eventually would be flared, plus the net quantity already estimated from non-associated gas, would constitute the 1982 total potential gas-based petrochemical raw material in the DCs, i.e. 1,381 TCF. From this total, 1,008 TCF of methane and 152 TCF of ethane could be utilized. Therefore, assuming 40,000 CF of gas for the production of one ton of ammonia or methanol, and 65,000 CF of gas for the production of one ton of ethylene, the DCs' petrochemical potential was enormous; ammonia (or methanol) and ethylene could be produced as quantities of up to 25 and 2.3 billion tons, respectively. It is important to know, however, that this great potential belongs to a few DCs only. Out of 114

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1 See sources and references at the bottom of the corresponding tables in the Annex. For individual developing countries' data on natural gas reserves and potential production of methane, ammonia, methanol and ethane/ethylene, see Tables Nos. 10 to 18 and 22 to 30.

2 Trillion Cubic Feet.

DCs surveyed, only 34 countries have natural gas reserves with the corresponding potentiality to produce each basic petrochemical product (see Annex, Tables Nos. 11 - 31).

It is possible to estimate the number of years of sustained production in DCs for various petrochemical products by taking the following two factors into account: the production potential of basic petrochemicals as described above; and the present and expected levels of demand and its growth (or the production capacity of plants in DCs). Due to the world economic recession, the DCs' demand for basic petrochemicals in general, at the end of 1982, is believed to be around the same level as it was in 1979, i.e. 12 million tons for ammonia, 0.9 million tons for methanol, and 2.7 million tons for ethylene. The corresponding plant capacities[1] for the same year were about 10.5[2] million tons, 2.0 million tons and 3.4 million tons, respectively. Therefore, the number of years of sustained production in DCs, based on demand and plants' capacity, and applying the growth compounded formula[3], would be at least 119 - 122 years for ammonia, or 84 - 88 years for methanol and 44 - 52 years for ethylene. If, however, we consider the impact of the expected annual growth of exports in the DCs (10%) and the domestic consumption of gas (11%)

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1 The bases for considering capacity levels are explained in page 16. See also footnotes in Tables Nos. 1 - 6.

2 Refers to capability rather than capacity, following the FAO/World Bank methodology.

3

$$\text{Number of years} = \frac{\ln\left(\frac{TP}{PD}\right)}{\ln\,(1+i)}$$

where: TP = total potential production
PD = present/expected demand
i = annual rate of growth of the demand/plant capacity, for each product.

on those countries' capability to produce petrochemicals[1], the number of years of sustained production decreases (see Annex, Tables Nos. 9, 21 and 23).

Another factor to be taking into account is the geographical distribution of both supply of and demand for petrochemicals up to the end of the century in DCs as a group and individually. On a regional basis, the Middle East area presents the highest potential for production of the three basic products. With respect to demand, Latin America will exhibit the greatest future requirement for ethylene and methanol, while the Far East will demonstrate the greatest demand for ammonia. In any case, each regional potential supply of petrochemicals would cover the expected demand for the corresponding three basic products, at least through the first quarter of the next century. On a country basis, however, the situation is different. With the exception of a few countries, the present and expected demand for petrochemicals in individual countries without natural gas endowment is not significant, although their total future consumption, especially of plastics and fertilizers, will be appreciable and fundamental for their economic growth.

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[1] As a matter of consistency, all countries' calculations are based on UN statistics which, in some cases, differ from other sources, especially with regard to some OPEC Member Countries' domestic consumption of natural gas. Table 35 shows our cross-checking and data analysis for OPEC local consumption of natural gas based on two sources.

In analysing in more detail the DCs' natural gas availability as petrochemical raw material vis-a-vis their demand for basic products, on a regional basis, we have divided the 114 developing countries into five regions[1]. For the analysis of potential production/consumption of ethylene and methanol, the grouping of DCs was made according to the UNIDO's countries distribution while, for the case of ammonia, the grouping follows the World Bank/UNIDO/FAO countries' arrangement.

The analysis on a regional basis indicates two facts: (a) the plentiful availability of natural gas for petrochemical purposes in all regions, and (b) the great concentration of natural gas reserves in only a few countries within each region.

<u>MIDDLE EAST/NORTH AFRICA</u>

a) No. of developing countries: 5

b) total natural gas reserves: 183 TCF
non-associated gas reserves: 165 TCF
associated gas reserves: 18.4 TCF

c) ratio total regional reserves/total DCs' reserves: 12.9%

d) regional potential production of ethylene: 290×10^5 tons

e) regional potential production of ammonia or methanol: $3,253 \times 10^6$ tons.

Although this region comprises only five countries, its total natural gas reserves approximate those of the 28 countries of the Latin American region. Yet the highest concentration of gas reserves belongs to a single country, and therefore its petrochemical potential is considerable, not only within the region but also among all the developing countries of our analysis.

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[1] For the countries forming each region, see grouping as of Table No. 11 in the Annex.

To illustrate the above, we can say that the natural gas reserves of this region constitute about 13% of the Third World's gas reserves, i.e. 183.4 TCF, of which 74% belongs to Algeria, followed by S.P.L.A.J. which holds 19%. Thus, the petrochemical prospect for these countries is substantial, especially for Algeria which ranks among the five developing countries with the greatest petrochemical potential based on natural gas. Considering the impact of the compounded growth of demand for gas for purposes other than petrochemicals, this region could produce up to 290 million tons of ethylene and 3,250 million tons of ammonia or methanol, respectively.

So, based on the annual rates of the demand growth of 20% and 6% for ethylene and ammonia, respectively, this region can satisfy the demand for ethylene for at least 40 years, and can sustain production of ammonia or methanol for one hundred years.

MIDDLE EAST/WEST ASIA

a) No. of developing countries: 12

b) total natural gas reserves: 393 TCF
non-associated gas reserves: 245 TCF
associated gas reserves: 148 TCF

c) ratio total regional reserves/total DCs reserves: 28%

d) regional potential production of ethylene: 576×10^6 tons

e) regional potential production of ammonia or methanol: $5,906 \times 10^6$ tons.

Although only three countries possess no natural gas reserves in this area, which holds one of the world's largest hydrocarbon deposits, the concentration of gas reserves in a few countries is very high. The natural gas reserves of this area, which represent 28% of the total DCs' reserves, can more than satisfy the regional demand for petrochemical products for a number of years.

Specifically, out of 12 countries only Yemen, Jordan and Lebanon have no gas reserves, and from the remaining nine countries, two share a large proportion of the regional gas deposits of 393 TCF. Saudi Arabia holds the most plentiful regional reserves, for both non-associated gas (40%) and associated gas (55%), followed by Qatar with 16% of the total remaining reserves. Based on the total magnitude of natural gas reserves of this area, and considering the expected growth of demand for natural gas for domestic energy purposes until the end of this decade, this area could produce up to 576 million tons of ethylene and 5,906 million tons of ammonia or methanol.

Consequently, we can also say that the Middle East/West Asia region follows the Third World characteristic of high concentration of gas reserves in only a few countries. Moreover, in this case, only one country (Saudi Arabia) holds the largest deposits of associated gas among all developing countries. Thus, the region's potential, either as a supplier of gas as a petrochemical raw material or as a petrochemical producer, is enormous. Ethylene regional demand can be satisfied for at least 40 years and, in the case of ammonia or methanol, for at least 100 years.

ASIA

a) No. of developing countries: 26

b) total natural gas reserves: 609 TCF
non-associated gas reserves: 572 TCF
associated gas reserves: 37 TCF

c) ratio total regional reserves/total DCs' reserves: 43%

d) regional potential production of ethylene: $1,007 \times 10^6$ tons

e) regional potential production of ammonia or methanol: $11,039 \times 10^6$ tons.

The largest concentration of natural gas reserves among the five regions of DCs belongs to this area. Asia, therefore, represents the greatest regional petrochemical potential on the basis of this endowment as a raw material covering regional demand for basic petrochemical products for a number of years. It is, however, important to note that such potential is distributed only within nine countries, of which the Islamic Republic of Iran holds a very significant proportion.

In other words this region, where 572 TCF of the natural gas reserves is of the non-associated type, contains 42% of the total DCs' gas reserves, i.e. 609 TCF. Of the 26 member countries of this region, 17 countries have no natural gas reserves at all; among them are Israel, Korea and Singapore, which are some of the largest consumers of petrochemicals in the Third World. On the other hand, out of nine countries with gas deposits, the I.R. of Iran alone holds 85% of the total regional reserves, followed by Indonesia with only 4.7%. This clearly shows not only the tremendous potential of the I.R. of Iran for all purposes based on natural gas, but also the greatest single-country concentration of gas reserves within the entire Third World. Based on the magnitude of the total reserves of this area, we estimate that 45% and 46% of the total DCs' potential production of ethylene and ammonia (or methanol), respectively, can be supplied by this region.

Consequently, we can conclude that Asia, with a large concentration of natural gas reserves within a single country, could satisfy its regional demand for ethylene for at least 50 years and for methanol for at least 80 years (on the basis of 13% and 13.4% as the annual regional growth demand up to 1990 for each product, respectively).

LATIN AMERICA

a) No. of developing countries: 28

b) total natural gas reserves: 173 TCF

non-associated gas reserves: 144 TCF

associated gas reserves: 29 TCF

c) ratio total reserves/total reserves DCs: 12%

d) total ethylene potential production: 271×10^6 tons

e) total ammonia (or methanol) production: $2,908 \times 10^6$ tons.

Although only few Latin American countries have natural gas reserves, representing 12% of total DCs' natural gas reserves, the petrochemical potential on the basis of this raw material is substantial; it can cover the petrochemical demand of the whole region for at least the first twenty years of the next century.

In fact, out of 28 DCs, only 11 countries have natural gas reserves amounting to 173 TCF. This volume, where non-associated gas constitutes 83%, represents the third largest level of reserves among the five regions under study. From the above-mentioned total reserves, Mexico and Venezuela together hold 73% of the total regional endowment and, therefore, the greatest regional potential for the production of petrochemicals.

If we consider that in 1979 the regional demand for ethylene was 1.2 million tons, and the demand for ammonia and methanol 2.9 million tons and 0.3 million tons, respectively, and if we deduct from the total reserves the supplies of gas needed to meet domestic requirements for non-petrochemical purposes, Latin America would still have enough natural gas to produce ethylene for at least 40 years and ammonia or methanol for 100 or 60 years, respectively.

AFRICA

a) No. of developing countries: 43

b) total natural gas reserves: 55.2 TCF
non-associated gas reserves: 43.3 TCF
associated gas reserves: 9.9 TCF

c) ratio total regional reserves/total DCs' reserves: 3.9%

d) regional potential production of ethylene: 87×10^6 tons

e) regional potential production of ammonia or methanol: 937×10^6 tons.

This region, although composed of the largest number of developing countries, holds the smallest proportion of the Third World's natural gas reserves. On the basis of the gas available, however, this region's petrochemical potential seems adequate to satisfy the regional demand for a number of years, since a single country's demand will share a substantial proportion of the total African demand for basic petrochemicals.

That is to say, the total gas reserves in this region of 43 countries amount to only 55.2 TCF, i.e. 3.9% of the total DCs' gas deposits. It is important to note that, when comparing the phenomenon of concentration of gas reserves among the five regions, the African case is the most extreme; only seven countries out of 43 contain gas deposits, and Nigeria alone holds 90% of the regional endowment. Coincidentally, the demand for petrochemicals in this area is also highly concentrated in Nigeria. In fact, the largest share for basics by 1990 would apply to Nigeria, with a demand for 280,000 tons of ethylene and 240,000 tons of ammonia, respectively. The remaining countries, taken as a group, on the other hand, do not require more than 60,000 tons of ethylene per year. Based on the annual demand growth rate of 16% for ethylene (Nigeria) and 6% for ammonia (regional), we estimate that the regional demand for basic petrochemicals could be covered for at least 50 and 100 years for each product, respectively.

From the above, we can conclude that the African region, although holding the largest number of DCs and the smallest proportion of gas reserves among all regions under study, would be able to satisfy its demand for basic petrochemicals, at least up to the first two decades of the next century.

The preceding regional analysis demonstrates the phenomenon of high concentration of gas reserves in only a few DCs within each region. This fact shows why co-operation among DCs in the area of petrochemical production is needed. The petrochemical potential of some DCs is especially suited to take the lead in such co-operation. For instance, the present and expected petrochemical plant capacities of OPEC Countries make up a significant proportion of the total capacity within all the DCs[1]. By 1990, in fact, OPEC's tonnage in the total DCs' plant capacity is expected to make up 35% for ethylene, 40% for methanol and 51% for ammonia. Further, OPEC's petrochemical raw material endowment is much greater than that of all the remaining DCs. In terms of natural gas raw material endowment alone, at least 80% of the total resource of the DCs is accounted for by OPEC Member Countries; if we add to OPEC reserves those belonging to Mexico, Argentina, Malaysia and Pakistan, 94% of the Third World natural gas reserves are located in only 17 DCs out of 114 developing countries (see Annex, Tables Nos. 7, 19 and 31)

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[1] See Tables Nos. 2, 4

But the mere availability of plentiful natural gas reserves for petrochemical purposes, as well as a high plant capacity in some DCs, are not the only reasons to co-operate with other DCs without natural gas endowment. Although insufficient finances and limited domestic markets constitute serious enough obstacles in themselves to petrochemical development in DCs, a third factor also constrains the establishment of new plants in some DCs: the high level of the world petrochemical idle capacity.

It therefore becomes important to estimate the level of the current and future petrochemical idle capacity on a worldwide basis, as well as the duration of this phenomenon. For this purpose, the world present and expected levels of demand for the three basic petrochemical products will be analyzed with regard to the corresponding world plant capacity.

PART II

The Impact of the World Petrochemical Idle Capacity on the Petrochemical Development of Developing Countries

We know that, with the present high degree of uncertainty regarding the future growth of the world economy, estimation of the petrochemical demand, and thereby of the level of plant idle capacity, has become riskier than ever.

Many forecasts made before 1979 concerning the petrochemical industry are now regarded as unrealistic. This is especially true for predictions about the ethylene demand level and its annual growth. Four years ago, the majority of experts agreed on the "conservative" figure of 6% as the most likely expected yearly growth rate for the world ethylene demand up to the end of the century.

Now, however, a growth rate of 3%, or half the rate of the earlier estimation, seems optimistic to many. Some exercises, however, must be carried out to get an idea of the possible impact of the world idle capacity on future petrochemical developments, especially in developing countries.

Tables Nos. 1, 3 and 6 show our estimation of the probable levels of idle capacity in the world, based on different ranges of annual growth in demand for each of the three basic products. The results indicated by these tables are also based on the assumption that all of UNIDO's predictions[1] of capacity will, in fact, come true during the present decade. In arriving at the gross level of the world's plant idle capacity, no closures or shut-downs since 1979/1980 are considered.

Historically, some relationships have been observed between the respective growth rates of GNP and the petrochemical industry. For instance, during the period 1970 - 1981, the world annual growth of demand for ammonia (nitrogenous fertilizers) was about 1.3 times the annual world GNP growth during the same period. As for ethylene, the referred relationship (but for the period 1963 - 1978) was 2.4 times. In the future, however, these relationships may cease to continue due to the structural changes in the petrochemical industry, especially with regard to the cost of raw materials. Therefore, for our estimations of world demand, and consequently of world idle capacity, we have chosen world demand growth rates on the basis of the most recent and commonly reported rates and/or on reputable sources, and have applied some logistic to the figures. For ethylene and ammonia, respectively, the commonly reported annual growth rates of world demand of 2.5%, and the 4.3% rate as estimated by the World Bank/UNIDO/FAO

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[1] See sources and references at the bottom of the corresponding tables inserted in the Annex.

group, were chosen. In the case of methanol, an annual growth rate of 9.8% as estimated by Chem Systems Inc. was utilized, since the great promise of this product as a future fuel seems to be a more valid criterion than GNP growth.

According to these calculations, then, the world idle capacity for methanol production could last up to 1990 and, in the case of ethylene production, even longer unless rationalization of this industry occurs during the present decade. The case of ammonia seems to be somehow different since, as of 1987, a deficit of capacity could prevail.

So, let us see more details for each product. With regard to methanol's idle capacity, it is the least predictable. As mentioned before, its level of demand depends even more heavily on methanol uses for energy purposes (gasoline blending) than on the growth of GNP. If we accept Chem Systems' estimation of the rate of annual growth for methanol up to 1990 (9.8%), the level of the world idle capacity in 1984 would be 7.9 million tons, declining almost to balance by 1990 (see Annex Table No. 6).

Ethylene demand would be around 45.6 million tons by 1990 (using 2.5% growth/year), and if no closures or shut-downs occur, the level of idle capacity would be 21.1 million tons[1]. A situation of balance would, therefore, be reached by that year if projects which have now become uneconomical are cancelled and/or obsolete plants are shut down, together equalling a proportion of 30% of that total world capacity (see Annex Table No. 1).

As for ammonia, the World Bank/UNIDO/FAO group a few months ago estimated a 1.8 million tons surplus of

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[1] Considering 100% as capacity utilization.

available supply of fertilizer production by 1987[1]. This estimation is based on a demand growth of 4.3% for the period 1981 - 1987. If this rate remains constant through 1990, ammonia consumption for fertilizer production would be around 90 million tons. On the other hand, if we also take the WFU group estimation of available supply of ammonia for fertilizers in 1987, i.e. 77.8 million tons, the deficit in ammonia production for fertilizers would be 12.2 million tons in 1990. However, plant surplus capacity to produce ammonia for all purposes in 1987, as can be seen in Table 3, would be 33 million tons.

But it is not certain whether this surplus capacity would even partially cover the 1990 deficit. Historically, the rate of operation of ammonia plants has varied among developed countries, developing countries and centrally planned economies due to several factors. Moreover, ammonia consumption for purposes other than fertilizers will also grow. The World Bank/FAO/UNIDO group, when estimating the balance of production, does not consider the plants' capacity level, but rather the level of ammonia production obtainable for production of fertilizers which is called "available supply". Therefore, if we deduct the 1.8 million tons surplus of "available supply" (estimated by the WFU group for 1987) from our estimate of 12.2 million tons deficit for 1990, there would be room for some new ammonia plants as of 1987 with an upper limit of 10 million tons altogether. Table 5 shows that the Developed Market Economies as a whole and the regions of Africa and the Far East would face a deficit of ammonia production for fertilizers as of 1987.

Taking only the Third World, the picture is different. Deficit of plant capacity would appear during

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1 See sources and references at the bottom of Tables Nos. 3 and 5 (Annex).

the second half of the present decade. Tables Nos. 10 and 24 show that by 1990 deficit of capacity for ethylene and ammonia production will be felt. The demand for basic petrochemical products - and therefore for intermediate or end products - is expected to grow faster in developing countries than in developed nations. For instance, by 1990 demand for ethylene in DCs will grow to 14.6 million tons which means 5.6 times the total 1979 demand. On the other hand, the ethylene demand will increase, in developed nations, only 1.3 times on the same basis. Taking another example, demand for ammonia in DCs will grow 2 times, i.e. to 22.4 million tons, between 1979 and 1990, while in developed nations it will increase only 1.6 times.

From the above, we must conclude that at least by the mid-1980s, a situation of world idle capacity for the production of all three basic products will prevail; this situation, therefore, will continue affecting the economics of international petrochemical development. Methanol production will not reach a state of balance before 1990. Ethylene production would achieve balance only if closures and/or shut-downs of plants, especially of obsolete ones, take place during the decade. Contrarily, ammonia would be in deficit of capacity as of 1987 if no new plants are built or if existing ones are not expanded; in some specific cases, small domestic ammonia plants of 1 hundred tons per day could be convenient, but a great part of the solution of the problem belongs to large-sized efficient plants. This situation, created particularly by the economic recession, will put even more pressure on the prices of petrochemical products. This pressure might even ensure that industry rationalization will continue as a natural reaction in developed countries, up to the point where only those plants which are large enough and guaranteed by a secure supply of the efficient raw materials would be able to "survive".

Consequently, from the above argument, in order to neutralise the negative effects of the world idle capacity, two approaches appear. It would be more adequate to expand the capacity for ethylene and ammonia production during the present decade only in developing countries which have plenty of material endowment and/or the potential power to penetrate the international market. For most of the DCs, therefore, it would be more convenient to import basic products and/or intermediate products in order to produce end petrochemical products than to establish new petrochemical plants for the production of basics. This is the base of the whole strategy recommended in this paper after analysing the availability of the most efficient petrochemical raw material in DCs, natural gas, and looking at the world petrochemical situation.

PART III

Conclusion

The thesis of this paper has been demonstrated when we remember that, in its first part, we found that, in the case of most of the developing countries, the development of the petrochemical industry is hindered, not only by limited finances, inadequate economic infrastructure and small markets, but also by the non-availability of natural gas as the most efficient petrochemical raw material. This situation is aggravated when, from the regional analysis, we demonstrated the high concentration of natural gas within each region in a few DCs. Moreover, it has also been proved, in the second part, that the world petrochemical idle capacity affects the establishment of new ethylene and methanol plants in most DCs. Although room for new ammonia plants in DCs would exist as of 1987, some negative factors, however, would constitute obstacles to building large ammonia plants in most cases.

Therefore, those developing countries who are possessors of sufficient natural gas reserves, on the basis of their great petrochemical potential, could co-operate with other DCs in various ways in order to assist them in coping with their petrochemical needs. Of course, each sovereign country would determine this co-operation through its individual petrochemical policy; but the starting point could be the supply of basic and/or intermediate petrochemical products for the production of intermediate/end petrochemical products in other developing countries.

Finally, since adequate co-operation in the petrochemical area is an important factor for our nations' economic growth and development, communication among developing countries is needed. Exchange of technical and marketing experience is more than important in the DCs' case. We can understand each other better by expressing, for our mutual benefit, the needs, advantages and limitations of our petrochemical industry development.

A N N E X

Table Nos.	(Ethylene)	:	8, 9 and 10
	(Ammonia)	:	20, 21 and 22
	(Methanol)	:	32, 33 and 34

These tables provide data taken mainly from UNIDO studies (see specific source details in each table).

<u>Note</u>: Estimations on world idle capacity in Table Nos. 8 - 10, 20 - 22 and 32 - 34 do not match with the corresponding figures in Table Nos. 1, 3 and 6. This is due to the utilization of UNIDO's demand annual growth rates for the former group of tables, while for the latter ones more recent (1982) rates of growth were utilized. OPEC capacity for the production of major petrochemicals were updated according to the official replies to our petrochemical questionnaire of November 1982; Table Nos. 2, 4 and 7.

Table 1

ESTIMATION OF THE WORLD ETHYLENE SURPLUS OR DEFICIT OF CAPACITY PRODUCTION*

Million tons

	1979	1981	1984				1990				1990[5]			
			Demand Growth Rates/Year as of 1981								Obsolete Capacity Reduction			
											20%		30%	
			2%	2.5%	3%	4%	2%	2.5%	3%	4%	2.5%	3%	2.5%	3%
Ethylene														
Demand[1]	37.4[2]	36.5[3]	38.7	39.3	39.9	41.1	43.6	45.6	47.6	61.9	45.6	47.6	45.6	47.6
Capacity[4]	46.6		61.2	61.2	61.2	61.2	66.7	66.7	66.7	66.7	53.4	53.4	46.6	46.6
Surplus/(Deficit)	9.2		22.5	21.9	21.3	20.1	23.0	21.1	19.1	14.7	7.8	5.8	1.0	(0.9)***
Reduction as Obsolete Capacity											13.3	13.3	30.0	20.0

Elaboration: OPEC Downstream Operations Unit, 1982.

* The figures corresponding to "surplus/deficit" are simple exercises after comparing supposed levels of demand vis-a-vis those capacity levels recorded by UNIDO**, without considering any temporary plant closures or permanent shutdowns as of 1979.

** When referring to UNIDO as a source, the reference used is the "Second Worldwide Study on the Petrochemical Industry", July 1981 and annexes.

*** Deficit.

1 The levels of demand for 1984 and 1990 have been estimated using rates of annual growth ranging from 2% to 4%. The base year is 1981 level which is actually lower than that of 1979 as reflection of the severe world economic recession.

2 UNIDO.

3 UNIDO - Mr. U. Muukka's estimation as a result of recent investigations on secondary sources, see "The Petrochemical Industry", July 1982 (not yet published).

4 UNIDO - The records on capacity consider existing capacity in 1979 plus additions published and firmly committed up to 1984 and 1987.

5 With the purpose of approaching a balance situation, the estimated levels of demand for 1990 (based on 2.5% and 3% as annual growth) are compared to those levels of capacity for the same year but reduced by 20% and 30% as supposed obsolete capacity.

6 Oil and Gas Journal - "Ethylene Report", 6th September, 1982, reports 4%/year as the upper limit for the future world ethylene demand growth. It also quotes from a Probe Economics' study, 2.6%/year for US demand growth for ethylene. As for W. European ethylene demand increase, Petroleum Times, November 1982, page 21, quotes from J. H. Choufoer's (Royal Dutch Company) Study, 1.7%/year. The same source, estimates W. European capacity at over 32% by 1990.

Table 2

OPEC Estimated Capacity

Ethylene

(1,000 tons)

Country	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	Later
Algeria[+1) *]	120	120	120	120	120	120	120	120	120	120	
Ecuador[2)]	-	-	-	-	-	-	-	-	-	-	140
Gabon[3)]	-	-	-	-	-	-	-	-	-	-	
Indonesia[4) *]	-	-	-	-	-	-	-	-	-	-	340
Iran[5) *]	-	-	-	26	26	26	26	26	26	326	500
Iraq[+6)]	-	-	-	-	-	-	-	-	-	135	
Kuwait[+7) *]	-	-	-	-	-	-	-	-	-	-	350
S.P.L.A.J.[+8)]	-	-	-	-	-	-	-	-	-	330	
Nigeria[9) *]	-	-	-	-	-	-	-	-	-	-	300
Qatar[+10)]	-	-	-	-	-	280	280	280	280	280	
Saudi Arabia[+11)]	-	-	-	-	-	-	-	-	-	1,736	
U.A.E.[+12)]	-	-	-	-	-	-	-	-	-	-	
Venezuela[13) *]	150	150	150	150	150	150	150	150	150	150	430[14)]
Total OPEC	270	270	270	296	296	576	576	576	576	3,077	
Total World[15)]				46,560					61,200		
OPEC % World				0.6					1		

Elaboration: OPEC Downstream Operations Unit
OPEC Statistics Unit

* Information checked with UNIDO's records.

Sources:

\+ OPEC petrochemical questionnaire of November 1982.

1) Algerian ethylene capacity initiated in 1972 with 120,000 t/y.

2) Ecuadorian plans for ethylene production have been delayed, most probably engineering studies will start as of 1985.

3) No projects or plans exist at present according to secondary sources.

4) International Hydrocarbon Processing (IHP) Boxscore, October 1982, reports completion date in 1984.

5) UNIDO's survey, August 1982.

6) OAPEC Petrochemical Seminar, November 1981.

7) This capacity was planned to be onstream in 1985 but the project is still under revision according to secondary sources.

8) At present this plant is under construction expected to be onstream in 1985, IHP Boxscore, October 1982.

9) Official information provided in the Seminar "Petrochemicals and the Nigerian Economy", 22nd September, 1982, in Lagos. This plant will be onstream by 1987.

10) OPEC annual questionnaire, 1979; Petrochemical Conference, Greece, 1980; OPEC 5th Working Party on Petrochemicals, July 1981.

11) Official reply from Saudi Arabia to UNIDO's survey in December 1982.

12) No plans have been reported to the OPEC Secretariat.

13) Venezuelan ethylene capacity initiated in 1975 with 150,000 t/y.

14) Information provided by the Venezuelan National Representative to OPEC Statistics Unit in February 1982.

15) UNIDO's study "Second Worldwide Study on the Petrochemical Industry, Process of Restructuring", June 1981, Annexes, page 6.

Table 3

ESTIMATION OF THE WORLD NITROGEN (AMMONIA) SURPLUS OR DEFICIT OF CAPACITY PRODUCTION*

Million Metric Tons Nutrient

(1)	(2)	(3)			(4)	(5)	(6)			
	1981-82	1984-85			1984-85	1986-87	1990			
		Consumption Growth Rates/Year**								
		As of 1981-82			As of 1981-82		As of 1986-87			
Ammonia (Nitrogen)		3%	4%	5%	4.6%	4.3%	3%	4%	4.3%	5%
Consumption	61.5	67.2	69.2	71.2	70.4	75.9	85.4	88.8	89.8	92.3
Capacity	101.2	117.5	117.5	117.5	117.5	122.9	122.9	122.9	122.9	122.9
Surplus/(deficit)	39.7	50.3	48.3	46.3	47.1	47.0	37.5	34.1	33.1	30.6
Supply Capability	79.4	92.3	92.3	92.3	92.3	97.6	97.6	97.6	97.6	97.6
Surplus/(deficit)	17.9	25.1	23.1	21.1	21.9	21.7	12.2	8.8	7.8	5.3
Available supply	62.6	73.4	73.4	73.4	73.4	77.8	77.8	77.8	77.8	77.8
Surplus/(deficit)	1.1	6.2	4.2	2.2	3.0	1.8	(7.6)	(11.0)	(12.0)	(14.5)

Elaboration: OPEC Downstream Operations Unit, 1982.

Source: The UNIDO/FAO/World Bank Fertilizer Working Group, 13th August, 1982 (where reference is made to this group as source, it is called "group").

Source for columns (1); (2); (4) and (5): Group.

Source for columns (3) and (6): OPEC assumptions, i.e. rates of growth and levels of surplus/(deficit).

* Important note: See Group's notes, table 5.

** Since it is difficult to assume one specific rate of demand growth, a range of rates which tends to include all different forecasts has been used.

Table 4

OPEC Estimated Capacity

Ammonia

(1,000 tons)

Country	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	Later
Algeria +1) *	330	330	330	330	330	660	660	660	990	990	
Ecuador 2)	-	-	-	-	-	-	-	-	-	-	300
Gabon 3)	-	-	-	-	-	-	-	-	-	-	
Indonesia 4) *	-	-	-	1,610	1,610	1,610	2,180	2,180	2,180	2,180	
Iran 5) *	370	370	370	370	370	370	700	700	1,096	1,096	
Iraq 6) +	66	66	300	300	990 7)	990	990	990	990	990	
Kuwait +8) *	660	660	660	660	660	660	660	660	660	990	
S.P.L.A.J. +9)	-	-	330	330	330	330	660	660	660	660	
Nigeria 10) *	-	-	-	-	-	-	-	-	-	-	300
Qatar +11)	-	297	297	297	594	594	594	594	594	594	
Saudi Arabia +12)	-	-	200	200	200	200	530	530	530	530	
U.A.E. 13)	-	-	-	-	-	-	-	330	330	330	
Venezuela 14) *	792	792	792	792	792	792	792	792	792	792	
Total OPEC	2,218	2,515	3,279	4,889	5,876	6,206	7,766	8,096	8,822	9,152	
Total World 15)				65,540	73,900	76,960	81,010	84,670	88,179	91,650	
OPEC % World				7.4	7.9	8.0	9.6	9.6	10.0	9.9	

Elaboration: OPEC Downstream Operations Unit
OPEC Statistics Unit

+ Information checked with UNIDO's records.

Sources:

* OPEC petrochemical questionnaire of November 1982.

1) Ammonia capacity started at Arzew with 330,000 t/y in 1970. OAPEC Seminar, November 1981. The official reply to OPEC questionnaire of November 1982 reports ammonia present capacity of 450,000 t/y.
2) Engineering studies for the construction of ammonia plant of 330,000 t/y have been delayed according to secondary sources.
3) No information is reported in official or secondary sources.
4) Telex sent by the Indonesian Ministry of Mines and Energy to the Secretariat on 21st May, 1980. Project of 570,000 t/y to be completed by 1982 was reported by International Hydrocarbon Processing (IHP) Boxscore, June 1979. IHP, October 1982, reports completion of two more projects totalling 3,000 t/d by the mid-1980s.
5) Iranian ammonia production started in 1963 with Shiraz plant with a capacity of 40,000 t/y. In 1970, Bandar Khomeni plant of 330,000 t/y was inaugurated. By 1982, Bandar Khomeni plant's capacity was expected to be expanded to 660,000 t/y. As of 1984, Shiraz plant capacity will be extended to 396,000 t/y.
6) Basrah plant started with a capacity of 66,000 t/y in 1971. OAPEC Seminar, November 1981.
7) According to the information provided in OAPEC Seminar 1981, capacity was increased to 990,000 t/y as of 1980. OAPEC paper "Oil Downstream" by A. Al-Wattari, 1980, reports Iraq's capacity by 1979 of 600,000 t/y having plans of additional capacity after 1985 of 990,000 t/y.
8) Shuaiba plant was put onstream in 1966 with a capacity of 132,000 t/y. In 1972 this plant was expanded to 660,000 t/y. As for the future, by 1985, Shuaiba plant will have a capacity of 990,000 t/y.
9) According to the OPEC annual questionnaire, 1979, S.P.L.A.J. ammonia production capacity started in 1978 with Brega plant with 330,000 t/y; by 1982 a second plant of 660,000 t/y was completed. Plans for an additional capacity of 330,000 t/y are reported by IHP Boxscore, October 1982.
10) No ammonia production exists at present according to the official information sent by telex by the National Representative to OPEC in July 1982. IHP Boxscore, October 1982, reports plans for a 1,000 t/d capacity at present in the engineering stage.
11) Oil and Gas Journal Worldwide Petrochemical Directory, 1980, reports 900 t/d onstream in 1977. OAPEC publication "Oil Downstream" by A. Al-Wattari, 1980, reports Qatar's capacity in 1979 at 594,000 t/y with no plans for the near future.
12) Saudi Arabian paper "The Status and Future Impact of Petrochemical Projects in Saudi Arabia" by S. Al-Mady, Platt's Petrochemical Conference, 1980. The Oil and Gas Journal Worldwide Petrochemical Directory 1979/80 reports 600 t/d as existing capacity by 1978. IHP Boxscore, October 1982, reports completion of Jubail ammonia plant of 330,000 t/y by 1982. This fact was also previously reported by "OPEC Oil Report" published by the Petroleum Economist, 1979.
13) Provisional information taken from secondary sources. IHP Boxscore, October 1982, reports an estimated completion of a plant of 1,000 t/d by 1983. This figure matches with the one presented at the OAPEC Seminar, November 1981, as well as with UNIDO's records.
14) Venezuelan ammonia production capacity started at El Tablazo with 1,800 t/d in 1974. By 1976, a new capacity of 600 t/d at Moron was completed. No plans for expansion of capacity have been announced according to secondary sources.
15) Current World Fertilizer Situation and Outlook, 1977-78/1980-85, FAO, Rome, 1980-81.

Table 5

WORLD NITROGEN SUPPLY DEMAND BALANCES

(Million Metric Tons Nutrient)

	1981/82	1982/83	1983/84	1984/85	1985/86	1986/87
DEVELOPING M.E.						
Africa						
Capacity	0.41	0.76	1.03	1.03	1.21	1.37
Supply Capability	0.12	0.16	0.61	0.68	0.72	0.82
Available Supply	0.06	0.11	0.50	0.57	0.61	0.69
Consumption	0.69	0.75	0.81	0.89	0.96	1.01
Surplus (-Deficit)	-0.63	-0.64	-0.31	-0.32	-0.35	-0.32
Latin America						
Capacity	4.79	5.22	5.59	6.57	6.89	6.89
Supply Capability	3.28	3.61	3.96	4.58	4.93	5.13
Available Supply	2.74	3.04	3.33	3.87	4.18	4.35
Consumption	2.85	3.07	3.21	3.35	3.50	3.64
Surplus (-Deficit)	-0.11	-0.03	0.12	0.52	0.68	0.71
Near East						
Capacity	3.11	3.61	3.99	4.26	4.93	5.05
Supply Capability	2.21	2.56	2.65	3.11	3.64	3.74
Available Supply	1.93	2.25	2.33	2.74	3.22	3.30
Consumption	1.81	1.96	2.14	2.32	2.47	2.60
Surplus (-Deficit)	0.12	0.29	0.19	0.42	0.75	0.70
Far East						
Capacity	8.70	9.82	10.18	11.21	12.99	13.95
Supply Capability	6.14	6.93	7.35	8.15	9.29	10.37
Available Supply	5.30	5.99	6.38	7.06	8.06	9.01
Consumption	7.25	7.84	8.32	8.85	9.44	10.10
Surplus (-Deficit)	-1.95	-1.85	-1.94	-1.79	-1.38	-1.09
Other Developing M.E.						
Capacity	0.00	0.00	0.00	0.00	0.00	0.00
Supply Capability	0.00	0.00	0.00	0.00	0.00	0.00
Available Supply	0.00	0.00	0.00	0.00	0.00	0.00
Consumption	0.01	0.02	0.02	0.02	0.02	0.02
Surplus (-Deficit)	-0.01	-0.02	-0.02	-0.02	-0.02	-0.02
TOTAL DEVELOPING M.E.						
Capacity	17.00	19.40	20.79	23.07	26.02	27.25
Supply Capability	11.75	13.26	14.57	16.52	18.58	20.06
Available Supply	10.03	11.39	12.54	14.24	16.07	17.35
Consumption	12.61	13.64	14.50	15.43	16.39	17.37
Surplus (Deficit)	-2.58	-2.25	-1.96	-1.19	-0.32	-0.02

(Cont. Table 5)

WORLD NITROGEN SUPPLY DEMAND BALANCES
(Million Metric Tons Nutrient)

	1981/82	1982/83	1983/84	1984/85	1985/86	1986/87
TOTAL DEVELOPED M.E.						
Capacity	37.37	37.96	38.91	40.34	40.72	40.88
Supply Capability	32.45	32.82	33.61	34.67	35.15	35.47
Available Supply	24.43	24.69	25.16	25.90	26.23	26.33
Consumption	23.08	24.24	25.38	26.12	26.76	27.49
Surplus (-Deficit)	1.35	0.45	-0.22	-0.22	-0.53	-1.16
WORLD TOTAL						
Capacity	101.37	107.18	111.62	117.53	121.19	122.92
Supply Capability	79.41	83.28	87.44	92.25	95.34	97.58
Available Supply	62.81	66.01	69.50	73.41	76.11	77.76
Consumption	61.50	64.67	67.69	70.41	73.11	75.95
Surplus (-Deficit)	1.11	1.34	1.81	3.00	3.00	1.81

Source: The UNIDO/FAO/World Bank Fertilizer Working Group, August 13, 1982

NOTES

Nitrogen

"Capacity": refers to nominal or nameplate ammonia capacity.

"Supply Capability": refers to production capability of ammonia. It is estimated by applying country-specific operating rates, based on past performance and other factors, to existing capacity and phased-in new capacity. New capacities are phased-in as 80/90/100% for developed market economies and centrally planned Europe, and as 65/85/100% for developing market economies and Socialist Asia for the first three full years of operations. Phasing-ins, closures, expansions and other charges in capacity are prorated according to the number of months in a year.

"Available Supply": refers to supply potential of nitrogenous fertilizers. It is derived from ammonia "supply capability" and non-ammonia sources of nitrogen. Industrial uses, and processing and distribution losses are subtracted from ammonia "supply capability" to derive 'ammonia available for fertilizers'. Production of nitrogen from non-ammonia sources is added to 'ammonia available for fertilizers' to estimate "available supply". The assumed processing and distribution losses are:

Region	Processing and Distribution Loss
Developed Market Economies	7%
Developing Market Economies	10%
Centrally Planned Economies:	
USSR	17%
Eastern Europe excluding USSR	7%
Socialist Asia	15%

"Consumption": refers to estimated use for 1981-82, and to forecast demand thereafter.

"Surplus (Deficit)": refers to difference between "available supply" and "consumption".

Table 6

ESTIMATION OF THE WORLD METHANOL SURPLUS OR DEFICIT OF CAPACITY PRODUCTION

Million tons

Methanol	1979	1981	1984				1990					1984
			Demand Growth Rates/Year* as of 1981									Obsolete Capacity Reduction
												30%
			6%	7%	8%	9%	6%	7%	8%	9%	9.8%[3]	9.8%[3]
Demand[1]	11.7	12.0[2]	14.3	14.7	15.1	15.5	20.3	22.1	23.9	26.1	28.0[3]	15.9
Capacity[1-7]	13.8[4]		23.8	23.8	23.8	23.8	29.6	29.6	29.6	29.6	29.6	16.7[6]
Surplus/(deficit)	2.1		9.5	9.1	8.7	8.3	9.3	7.5	5.7	3.1	1.6	0.8
Reduction as[5] Obsolete Capacity												7.1

Elaboration: OPEC Downstream Operations Unit, 1982.

Sources: When referring to UNIDO as a source, the reference is the "Second Worldwide Study on the Petrochemical Industry", July 1981 and annexes; and GOIC, the reference is "Industrial Uses of Associated Gas", 1981.

1 UNIDO, Page 11 Annexes.

2 ECN, Market Report, 5th October, 1981, Page 14. Quoted from Chem Systems' Study "New and evolving uses for methanol".

3 Source: See note 2. Chem Systems estimates methanol demand in 1981 at 12 million tons and 28 million tons by 1990 and by the end of the century at 52 million tons. Therefore the estimated annual growth is 9.8%.

4 GOIC estimates world capacity in 1979 at 13.47 million tons and demand at 10.16 million tons, and demand in 1990 at 23.35 million tons. See also notes in Table

5 This would be the 30% of the total plant capacity expected by 1984 if no closures or shutdowns take place as of 1979.

6 Corresponds to the total capacity expected by 1984 reduced by 30% as supposed obsolete capacity proportion or simple excess of capacity.

7 Capacity for 1984 and 1990 corresponds to UNIDO's records. The figure of 1990 represents total capacity of 1979 plus additions published of projects firmly committed up to 1987.

* Since it is difficult to assume one specific rate of demand growth, a range of rates which tends to include all different forecasts has been used.

Table 7

OPEC Estimated Capacity

Methanol

(1,000 tons)

Country	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	Later
Algeria[1]	100	100	100	100	100	100	100	100	100	100	-
Ecuador[2]	-	-	-	-	-	-	-	-	-	-	-
Gabon[3]	-	-	-	-	-	-	-	-	-	-	-
Indonesia*	-	-	-	-	-	-	-	-	-	330[4]	-
Iran[5*]	-	-	-	-	-	-	-	-	-	-	-
Iraq[6]	-	-	-	-	-	-	-	-	-	-	-
Kuwait[7*]	-	-	-	-	-	-	-	-	-	-	-
S.P.L.A.J.[8]	-	-	330	330	330	330	330	660	660	660	-
Nigeria[9*]	-	-	-	-	-	-	-	-	-	-	-
Qatar[10]	-	-	-	-	-	-	-	-	-	-	-
Saudi Arabia[11]	-	-	-	-	-	-	-	600	1,200	1,200	-
U.A.E.[12]	-	-	-	-	-	-	-	-	-	-	-
Venezuela*	-	-	-	-	-	-	-	-	-	-	-
Total OPEC	100	100	430	430	430	430	430	1,360	1,960	2,290	
Total World[13]				13,476	n.i.	n.i.	n.i.	14,957[14]	n.i.	n.i.	
OPEC % World				3.2				9.0			

Elaboration: OPEC Downstream Operations Unit
OPEC Statistics Unit

Sources:

* OPEC petrochemical questionnaire of November 1982.

1 Official information sent to the OPEC Secretariat in July 1982.

2 According to secondary sources (CEPE officials), there are no plans for methanol production in Ecuador.

3 No plans for the construction of methanol plant in Gabon have been reported in official or secondary sources.

4 Date of completion. This plant will be located at Banyu Island.

5 Plans for a methanol plant of 165,000 t/y will be onstream some time during the next five years according to official information sent to the Secretariat in August 1982.

6 No plans for the construction of methanol plant from official or secondary sources.

7 No plans have been reported for the construction of a methanol plant.

8 Provisional information taken from secondary sources: IHP Boxscore, October 1981. Start-up estimated. AP Dow Jones, 9th November, 1981. OPEC annual questionnaire 1979 reported the first methanol plant started in 1978.

9 No plans have been officially reported for the construction of a methanol plant in Nigeria.

10 No plans have been officially reported for the construction of a methanol plant in Qatar.

11 Information provided by the Saudi Arabian delegation to the 5th Working Party on Petrochemicals, July 1981. Middle East Economic Survey, August 1982, page 6.

12 No plans have been officially reported for the construction of a methanol plant in the U.A.E.

13 "The Industrial Uses of Associated Gas", GOIC - UNIDO Study, April 1981.

14 Corresponds to effective production rather than capacity.

Table 8

SUPPLY-DEMAND

ESTIMATED RAW MATERIAL AND ETHYLENE PRODUCTION FROM NATURAL GAS

IN DEVELOPING COUNTRIES

1979

	(1)	(2)	(3)	(4)	(5)	(6)
REGION Country	Demand for Ethylene Tons 10^3	Production Ethylene Tons 10^3	Existing Capacity Tons 10^3	Capacity Excess/ (Deficit) Tons 10^3	Sustained Production Based on (years) Demand - Plants Capacity	Ethylene Potential Production Tons 10^6
AFRICA, of which	-	-	-	-		87
Nigeria						79
Gabon						1
N. AFRICA, of which	100	100	120	20	42-70	299
Algeria			120			228
Egypt						7
Libya						53
Morocco						-
Tunisia						11
W. ASIA, of which	50	50	100	50	36-38	576
Bahrain						15
Iraq			30			63
Kuwait						86
Qatar						103
Saudi Arabia						207
Turkey			60			1
U. Arab Emirates						51
Other			10			
ASIA, of which	900	900	1,000	100	54-71	1,007
India			240			17
Indonesia						45
Iran			30			860
Malaysia						30
Pakistan						27
Philippines						-
Rep. of Korea			150			0
Singapore						0
Thailand						14
Other Asia			580			14
CHINA	430	430	540	110	n.a.	n.a.
LATIN AMERICA, of which	1,200	1,200	1,600	400	39-52	271
Argentina			170			27
Bolivia						9
Brazil			740			3
Chile			60			4
Columbia			20			9
Ecuador						7
Mexico			440			115
Peru						2
Venezuela			150			80
*Andean Countries						
Trinidad-Tobago						14
Other			20			0
TOTAL LDC's	2,680	2,680	3,360	680	44-52	2,254
OPEC	n.a.	n.a.	330	n.a.		1,907
WORLD	37,380	37,630	46,560	9,180		

Elaboration: OPEC Downstream Operations Unit, March 1982

Source: Columns (1) (2) (3): UNIDO "Second World Wide Study on the Petrochemical Industry, Annexes; June 1981." Column (3) is developed based especially on UNIDO's last study as well as on SRI country by country estimations.
Columns (4) (5) and (6) are our estimations.
Note: Some totals could not correspond due to rounding.

*Andean Countries: Ecuador, Columbia, Peru, Bolivia and Venezuela.

Table 9

S U P P L Y - D E M A N D

ESTIMATED RAW MATERIAL AND ETHYLENE PRODUCTION FROM NATURAL GAS

IN DEVELOPING COUNTRIES

1 9 8 4

	(1)	(2)	(3)	(4)	(5)	(6)
REGION Country	Demand for Ethylene Tons 10^3	Production Ethylene Tons 10^3	Existing Capacity Tons 10^3	Capacity Excess/ (De[illegible]t) T[illegible] 10^3	Sustained Production Based on (years) Demand - Plants Capacity	Ethylene Potential Production Tons 10^3
AFRICA, of which	-	-	-	-		87
Nigeria						79
Gabon						1
N. AFRICA, of which	400	400	450	50	37-63	299
Algeria			120			227
Egypt			-			7
Libya			330			5[illegible]
Morocco						-
Tunisia						11
W. ASIA, of which	650	650	800	150	31-33	576
Bahrain			-			15
Iraq			150			63
Kuwait			-			88
Qatar			280			103
Saudi Arabia			-**			247
Turkey			360			1
U. Arab Emirates			-			51
Other						0
ASIA, of which	1,900	1,900	2,300	400	49-66	1,006
India	312	240	240	(72)		17
Indonesia			250			45
Iran			326			860
Malaysia			-			30
Pakistan			-			25
Phillipines			-			-
Rep. of Korea			850			0
Singapore			300			0
Thailand			-			14
Other Asia			920			14
CHINA	700	700	950	250	n.a.	n.a.
LATIN AMERICA, of which	2,821	2,667	3,360	539	34-47	268
Argentina	166	166	250	84		27
Bolivia	*	*	-	-		9
Brazil	1,274	1,220	1,220	(54)		3
Chile	58	58	180	122		4
Columbia	*	*	120*	*		8
Ecuador	*	*	*	*		7
Mexico	953	953	1,440	487		114
Peru	*	*	*	*		2
Venezuela	*	*	150*	*		73
*Andean Countries	370	270	270*	(100)		
Trinidad-Tobago						
Other						
TOTAL LDC's	6,471	6,317	7,860	1,389[1]	38-47	2,249
OPEC	n.a.	n.a.	1,606***	-		1,304
WORLD	50,021	49,767	61,160	11,139		

Elaboration: OPEC Downstream Operations Unit.

Source: Columns (1) (2) (3): UNIDO "Second World Wide Study on the Petrochemical Industry, Annexes; June 1981.
Columns (1) (2) (4): Latin America is our estimation based on 17.6% yearly growth from SRI figures for 1983.
Columns (5) and (6) are our estimations
Column (3) shows UNIDO's figures but adjusted for OPEC Countries according to our more recent information.

1 Total Excess/Deficit capacity of 1,317,000 Tons does not match with the difference of total demand vis-a-vis total capacity 1,389,000 Tons due to the difference of 72,000 Tons found separately for India. Some other differences could exist because of rounding.

*Andean Countries: Ecuador, Columbia, Peru, Bolivia and Venezuela.

** By 1985, Saudi Arabian capacity will be 1.6 million ton/year.

*** By 1985 OPEC capacity will be 4.1 million ton/year.

Table 10

SUPPLY - DEMAND

ESTIMATED RAW MATERIAL AND ETHYLENE PRODUCTION FROM NATURAL GAS

IN DEVELOPING COUNTRIES

1990

	(1)	(2)	(3)	(4)	(5)	(6)
REGION Country	Demand for Ethylene Tons 10^3	Production Ethylene Tons 10^3	Existing Capacity** Tons 10^3	Capacity Excess/ (Deficit) Tons 10^3	Sustained Production Based on (years): Demand - Plants Capacity	Ethylene Potential Production Tons 10^6
AFRICA, of which	300	300	300	-		8*
Nigeria		300	300[2]			79
Gabon			0			1
N. AFRICA, of which	800	590	590	(210)	31-59	297
Algeria			120[2]			227
Egypt			140			7
Libya			330[2]			53
Morocco			0			-
Tunisia						11
W. ASIA, of which	2,650	2,650	3,076	426	26-27	574
Bahrain			330[1]			15
Iraq			130[2]			63
Kuwait			350[2]			87
Qatar			280[2]			103
Saudi Arabia			1,606[2]			247
Turkey			360			1
U. Arab Emirates			-			31
Other						7
ASIA, of which	3,800	2,920	2,920	(880)	43-60	1,004
India			920[2]			17
Indonesia			330[2]			45
Iran			326			859
Malaysia			-			30
Pakistan			100			26
Phillipines			250			0
Rep. of Korea			1,200			0
Singapore			300			0
Thailand			150			14
Other Asia			920			13
CHINA	1,400	1,400	1,810	410	n.a.	n.a.
LATIN AMERICA, of which	5,642	4,314	4,710	(932)	29-41	261
Argentina	332	332	550	218		27
Bolivia	*	*	160	*		9
Brazil	2,548	1,220	1,220	(1,328)		3
Chile	116	116	180	64		4
Columbia	*	*	120	*		6
Ecuador	*	*	140[2]	*		7
Mexico	1,906	1,906	1,940	34		111
Peru	*	*	250	*		2
Venezuela	*	*	150[2]	*		76
*Andean Countries	740	740*	820	80		
Trinidad-Tobago						13
Other						
TOTAL LDC's	14,592	12,174	13,406	(1,186)	33-41	2,238
OPEC	n.a.	n.a.	4,082	-		1,858
WORLD	71,092	n.a.	66,706[3]	(4,386)		

Elaboration: OPEC Downstream Operations Unit.

Sources: "Second Worldwide Study on the Petrochemical Industry" - June 1981 (called UNIDO).

[1] OAPEC, "Oil Downstream" 1980.

[2] Are OPEC Secretariat's records.

** Estimated capacity up to 1987 based on firm plans recorded by UNIDO. Some figures have been corrected according to our records especially for OPEC.

[3] World capacity is estimated on LDC's capacities registered up to 1987, and rest of the world capacities registered up to 1984.

Note: Column (1) UNIDO's projections.

Column (1) for Latin America is projected from 1984 table figures utilizing UNIDO demand/growth rate for Latin America 1984-90, 12.2% per year.

Column (2) Based on columns (1) or (3).

* Andean Countries: Ecuador, Columbia, Peru, Bolivia and Venezuela.

Table 11

DATE: OCTOBER 14,1982

ESTIMATED RAW MATERIAL FOR THE PETROCHEMICAL
INDUSTRY IN LESS DEVELOPED COUNTRIES
SOURCE: NATURAL GAS/UN WORLD ENERGY SUPPLIES
CRUDE OIL/OIL AND GAS JOURNAL
1979

	PROVED RESERVES NAT.GAS	DOMESTIC DEMAND	POTENTIAL ETHYLENE PRODUCTION	PROVED RESERVES CRUDE OIL	ESTIMATED ASSOCIATED GAS	POTENTIAL ETHYLENE PRODUCTION	TOTAL POTENTIAL ETHYLENE PRODUCTION
	BCF	BCF	MILL.TONS	MILL.BBL	MILL.CF	MILL.TONS	MILL.TONS
ANGOLA	1175	3	2	1200	600000	1	3
BENIN	.	.	.	.	.	.	.
BOTSWANA	.	.	.	.	.	.	.
BURUNDI	.	.	.	.	.	.	.
CAPE VERDE	.	.	.	.	.	.	.
CENTRAL AFRICA	.	.	.	.	.	.	.
CHAD	.	.	.	.	.	.	.
COMORIS	.	.	.	.	.	.	.
CONGO	2200	.	4	400	200000	.	4
DJIBOUTI	.	.	.	.	.	.	.
EQU. GUINEA	.	.	.	.	.	.	.
ETHIOPIA	.	.	.	.	.	.	.
GABON	500	9	1	500	250000	.	1
GAMBIA	.	.	.	.	.	.	.
GHANA	.	.	.	7	3500	.	.
GUINEA	.	.	.	.	.	.	.
GUINEA-BISSAU	.	.	.	.	.	.	.
IVORY COAST	.	.	.	.	.	.	.
KENYA	.	.	.	.	.	.	.
LESOTHO	.	.	.	.	.	.	.
LIBERIA	.	.	.	.	.	.	.
MADAGASCAR	.	.	.	.	.	.	.
MALAWI	.	.	.	.	.	.	.
MAURITANIA	.	.	.	.	.	.	.
MAURITIUS	.	.	.	.	.	.	.
MOZAMBIQUE	.	.	.	.	.	.	.
NIGER	.	.	.	.	.	.	.
NIGERIA	61400	23	70	17400	8700000	9	79
RWANDA	.	.	.	.	.	.	.
SAO TOME	.	.	.	.	.	.	.
SENEGAL	.	.	.	.	.	.	.
SEYCHELLES	.	.	.	.	.	.	.
SIERRA LEONE	.	.	.	.	.	.	.
SOMALIA	.	.	.	.	.	.	.
SUDAN	.	.	.	.	.	.	.
SWAZILAND	.	.	.	.	.	.	.
TOGO	.	.	.	.	.	.	.
UGANDA	.	.	.	.	.	.	.
CAMEROON	.	.	.	140	70000	.	.
TANZANIA	.	.	.	.	.	.	.
UPPER VOLTA	.	.	.	.	.	.	.
ZAIRE	50	.	.	135	67500	.	.
ZAMBIA	.	.	.	.	.	.	.
A F R I C A	65325	35	77	19782	9891000	11	87
ALGERIA	132000	231	223	8440	4220000	5	228
EGYPT	3000	47	5	3100	1550000	2	7
LIBYA	24000	47	40	23500	11750000	13	53
MOROCCO	25	3	.	.	.	.	.
TUNISIA	6000	11	10	2250	1125000	1	11
M. E A S T/ N. A F R I C A	165025	340	279	37290	18645000	20	299

Table 12

DATE: OCTOBER 14,1982

ESTIMATED RAW MATERIAL FOR THE PETROCHEMICAL
INDUSTRY IN LESS DEVELOPED COUNTRIES
SOURCE: NATURAL GAS/UN WORLD ENERGY SUPPLIES
CRUDE OIL/OIL AND GAS JOURNAL
1979

	PROVED RESERVES NAT.GAS BCF	DOMESTIC DEMAND BCF	POTENTIAL ETHYLENE PRODUCTION MILL.TONS	PROVED RESERVES CRUDE OIL MILL.BBL	ESTIMATED ASSOCIATED GAS MILL.CF	POTENTIAL ETHYLENE PRODUCTION MILL.TONS	TOTAL POTENTIAL ETHYLENE PRODUCTION MILL.TONS
BAHRAIN	9000	125	15	240	120000	.	15
YEMEN	.	.	.	.	.	.	.
IRAQ	27500	75	46	31000	15500000	17	63
JORDAN	.	.	.	.	.	.	.
KUWAIT	31000	182	52	65400	32700000	36	88
LEBANON	.	.	.	.	.	.	.
OMAN	2000	.	3	2400	1200000	1	5
QATAR	60000	71	101	3760	1800000	2	103
SAUDI ARABIA	93230	20	158	163350	81675000	89	247
SYRIAN ARAB REPUBLIC	1500	24	2	2000	1000000	1	4
TURKEY	500	.	1	125	62500	.	1
UNITED ARAB EMIRATES	20500	17	35	29411	14705500	16	51
M. E A S T/ W. A S I A	245230	522	414	297686	148843000	162	576
AFGHANISTAN	.	12	.	.	.	.	.
BANGLADESH	8000	9	14	.	.	.	14
BHUTAN	.	.	.	.	.	.	.
BURMA	135	13	.	25	12500	.	.
CYPRUS	.	.	.	.	.	.	.
KAMPUCHEA	.	.	.	.	.	.	.
FIJI	.	.	.	.	.	.	.
HONG KONG	.	.	.	.	.	.	.
INDIA	9300	60	16	2600	1300000	1	17
INDONESIA	24000	214	40	9600	4800000	5	45
IRAN	490000	249	829	38000	29000000	32	860
ISRAEL	.	.	.	.	.	.	.
LAO	.	.	.	.	.	.	.
MALAYSIA	17000	27	29	2800	1400000	2	30
MALDIVES	.	.	.	.	.	.	.
MONGOLIA	.	.	.	.	.	.	.
NEPAL	.	.	.	.	.	.	.
PAKISTAN	15800	192	26	200	100000	.	27
PAPUA	.	.	.	.	.	.	.
PHILIPPINES	.	.	.	25	12500	.	.
KOREA	.	.	.	.	.	.	.
SINGAPORE	.	.	.	.	.	.	.
SOLOMON	.	.	.	.	.	.	.
SRI LANKA	.	.	.	.	.	.	.
THAILAND	8000	.	14	.	.	.	14
VIETNAM	.	.	.	.	.	.	.
A S I A	572235	775	967	73250	36625000	40	1007

Table 13

DATE: OCTOBER 14,1982

ESTIMATED RAW MATERIAL FOR THE PETROCHEMICAL
INDUSTRY IN LESS DEVELOPED COUNTRIES
SOURCE: NATURAL GAS/UN WORLD ENERGY SUPPLIES
CRUDE OIL/OIL AND GAS JOURNAL
1979

	PROVED RESERVES NAT.GAS BCF	DOMESTIC DEMAND BCF	POTENTIAL ETHYLENE PRODUCTION MILL.TONS	PROVED RESERVES CRUDE OIL MILL.BBL	ESTIMATED ASSOCIATED GAS MILL.CF	POTENTIAL ETHYLENE PRODUCTION MILL.TONS	TOTAL POTENTIAL ETHYLENE PRODUCTION MILL.TONS
ANTILLES	.	.	.	.	.	.	.
ARGENTINA	15200	94	26	2400	1200000	1	27
BAHAMAS	.	.	.	.	.	.	.
BARBADOS	.	.	.	2	1000	.	.
BOLIVIA	5400	.	9	150	75000	.	9
BRAZIL	1500	43	2	1220	610000	1	3
CHILE	2500	28	4	400	200000	.	4
COLOMBIA	5000	161	8	710	355000	.	9
COSTA RICA	.	.	.	.	.	.	.
CUBA	.	1	.	.	.	.	.
DOMINICAN REP.	.	.	.	.	.	.	.
ECUADOR	4000	3	7	1100	550000	1	7
EL SALVADOR	.	.	.	.	.	.	.
GRENADA	.	.	.	.	.	.	.
GUATEMALA	.	.	.	16	8000	.	.
GUYANA	.	.	.	.	.	.	.
HAITI	.	.	.	.	.	.	.
HONDURAS	.	.	.	.	.	.	.
JAMAICA	.	.	.	.	.	.	.
MEXICO	59000	1072	98	31250	15625000	17	1[illegible]5
NICARAGUA	.	.	.	.	.	.	.
PANAMA	.	.	.	.	.	.	.
PARAGUAY	.	.	.	.	.	.	.
PERU	1100	23	2	655	327500	.	2
SURINAME	.	.	.	.	.	.	.
TRINIDAD/TOBAGO	8000	88	13	700	350000	.	14
URUGUAY	.	.	.	.	.	.	.
VENEZUELA	42800	1215	70	17870	8935000	12	88
L A T I N A M E R I C A	144500	2728	240	56473	28236500	31	271
T O T A L DEVELOPING C O U N T R I E S	1180665	4403	1991	484481	242240500	264	2254
SAUDI ARABIA	93230	28	158	163350	81675000	89	247
VENEZUELA	42800	1215	70	17870	8935000	10	80
IRAN	490000	249	829	58000	29000000	32	860
ALGERIA	132000	231	223	8440	4220000	5	228
UNITED ARAB EMIRATES	20500	17	35	29411	14705500	16	51
INDONESIA	24600	216	40	9600	4800000	5	45
NIGERIA	41400	23	70	17400	8700000	9	75
IRAQ	27500	75	46	31000	15500000	17	63
KUWAIT	31000	182	52	65400	32700000	36	88
LIBYA	24000	47	41	23500	11750000	13	53
QATAR	60600	71	101	3760	1880000	2	103
GABON	500	9	1	500	250000	.	1
ECUADOR	4000	3	7	1100	550000	1	7
O P E C	990930	2344	1673	429131	214665500	234	1907

Table 14

DATE: OCTOBER 14,1982

ESTIMATED RAW MATERIAL FOR THE PETROCHEMICAL
INDUSTRY IN LESS DEVELOPED COUNTRIES
SOURCE: NATURAL GAS/UN WORLD ENERGY SUPPLIES
CRUDE OIL/OIL AND GAS JOURNAL
1984

	PROVED RESERVES NAT.GAS BCF	DOMESTIC DEMAND BCF	POTENTIAL ETHYLENE PRODUCTION MILL.TONS	PROVED RESERVES CRUDE OIL MILL.BBL	ESTIMATED ASSOCIATED GAS MILL.CF	POTENTIAL ETHYLENE PRODUCTION MILL.TONS	TOTAL POTENTIAL ETHYLENE PRODUCTION MILL.TONS
ANGOLA	1175	5	2	1200	600000	1	3
BENIN	.	.	.	.	.	.	.
BOTSWANA	.	.	.	.	.	.	.
BURUNDI	.	.	.	.	.	.	.
CAPE VERDE	.	.	.	.	.	.	.
CENTRAL AFRICA	.	.	.	.	.	.	.
CHAD	.	.	.	.	.	.	.
COMOROS	.	.	.	.	.	.	.
CONGO	2200	.	4	400	200000	.	4
DJIBOUTI	.	.	.	.	.	.	.
EQU. GUINEA	.	.	.	.	.	.	.
ETHIOPIA	.	.	.	.	.	.	.
GABON	500	15	1	500	250000	.	1
GAMBIA	.	.	.	.	.	.	.
GHANA	.	.	.	7	3500	.	.
GUINEA	.	.	.	.	.	.	.
GUINEA-BISSAU	.	.	.	.	.	.	.
IVORY COAST	.	.	.	.	.	.	.
KENYA	.	.	.	.	.	.	.
LESOTHO	.	.	.	.	.	.	.
LIBERIA	.	.	.	.	.	.	.
MADAGASCAR	.	.	.	.	.	.	.
MALAWI	.	.	.	.	.	.	.
MAURITANIA	.	.	.	.	.	.	.
MAURITIUS	.	.	.	.	.	.	.
MOZAMBIQUE	.	.	.	.	.	.	.
NIGER	.	.	.	.	.	.	.
NIGERIA	41400	39	70	17400	8700000	9	79
RWANDA	.	.	.	.	.	.	.
SAO TOME	.	.	.	.	.	.	.
SENEGAL	.	.	.	.	.	.	.
SEYCHELLES	.	.	.	.	.	.	.
SIERRA LEONE	.	.	.	.	.	.	.
SOMALIA	.	.	.	.	.	.	.
SUDAN	.	.	.	.	.	.	.
SWAZILAND	.	.	.	.	.	.	.
TOGO	.	.	.	.	.	.	.
UGANDA	.	.	.	.	.	.	.
CAMEROON	.	.	.	140	70000	.	.
TANZANIA	.	.	.	.	.	.	.
UPPER VOLTA	.	.	.	.	.	.	.
ZAIRE	50	.	.	135	67500	.	.
ZAMBIA	.	.	.	.	.	.	.
A F R I C A	45325	59	77	19782	9891000	11	87
ALGERIA	132000	419	223	8440	4220000	9	227
EGYPT	3000	79	5	3100	1550000	2	7
LIBYA	24000	92	40	23500	11750000	13	53
MOROCCO	25	5	.	.	.	.	.
TUNISIA	6000	19	10	2250	1125000	1	11
M. E A S T/ M. A F R I C A	165025	616	278	37290	18645000	20	299

Table 15

DATE: OCTOBER 14,1982

ESTIMATED RAW MATERIAL FOR THE PETROCHEMICAL
INDUSTRY IN LESS DEVELOPED COUNTRIES
SOURCE: NATURAL GAS/UN WORLD ENERGY SUPPLIES
CRUDE OIL/OIL AND GAS JOURNAL
1984

	PROVED RESERVES NAT.GAS BCF	DOMESTIC DEMAND BCF	POTENTIAL ETHYLENE PRODUCTION MILL.TONS	PROVED RESERVES CRUDE OIL MILL.BBL	ESTIMATED ASSOCIATED GAS MILL.CF	POTENTIAL ETHYLENE PRODUCTION MILL.TONS	TOTAL POTENTIAL ETHYLENE PRODUCTION MILL.TONS
BAHRAIN	9000	211	[illegible]	240	120000	.	15
YEMEN	.	.	.	.	.	.	.
IRAQ	27500	126	46	31000	15500000	17	63
JORDAN	.	.	.	.	.	.	.
KUWAIT	31000	307	52	65400	32700000	36	88
LEBANON	.	.	.	.	.	.	.
OMAN	2000	.	3	2400	1200000	1	5
QATAR	60000	120	101	3760	1880000	2	103
SAUDI ARABIA	93230	47	158	163350	81675000	89	247
SYRIAN ARAB REPUBLIC	1500	40	2	2000	1000000	1	4
TURKEY	500	.	1	125	62500	.	1
UNITED ARAB EMIRATES	20500	34	35	29411	14705500	16	51
M. E A S T/ W. A S I A	245230	885	414	297686	148843000	162	576
AFGHANISTAN	.	27	.	.	.	.	.
BANGLADESH	8000	15	14	.	.	.	14
BHUTAN	.	.	.	.	.	.	.
BURMA	135	22	.	25	12500	.	.
CYPRUS	.	.	.	.	.	.	.
KAMPUCHEA	.	.	.	.	.	.	.
FIJI	.	.	.	.	.	.	.
HONG KONG	.	.	.	.	.	.	.
INDIA	9300	101	16	2600	1300000	1	17
INDONESIA	24000	[illegible]	40	9600	4800000	5	45
IRAN	490000	436	828	58000	29000000	32	860
ISRAEL	.	.	.	.	.	.	.
LAO	.	.	.	.	.	.	.
MALAYSIA	17000	45	29	2800	1400000	2	30
MALDIVES	.	.	.	.	.	.	.
MONGOLIA	.	.	.	.	.	.	.
NEPAL	.	.	.	.	.	.	.
PAKISTAN	15800	324	26	200	100000	.	26
PAPUA	.	.	.	.	.	.	.
PHILIPPINES	.	.	.	25	12500	.	.
KOREA	.	.	.	.	.	.	.
SINGAPORE	.	.	.	.	.	.	.
SOLOMON	.	.	.	.	.	.	.
SRI LANKA	.	.	.	.	.	.	.
THAILAND	8000	.	14	.	.	.	14
VIETNAM	.	.	.	.	.	.	.
A S I A	572235	1349	966	73250	36625000	40	1006

Table 16

DATE: OCTOBER 14,1982

ESTIMATED RAW MATERIAL FOR THE PETROCHEMICAL
INDUSTRY IN LESS DEVELOPED COUNTRIES
SOURCE: NATURAL GAS/UN WORLD ENERGY SUPPLIES
CRUDE OIL/OIL AND GAS JOURNAL
1984

	PROVED RESERVES NAT.GAS BCF	DOMESTIC DEMAND BCF	POTENTIAL ETHYLENE PRODUCTION MILL.TONS	PROVED RESERVES CRUDE OIL MILL.BBL	ESTIMATED ASSOCIATED GAS MILL.CF	POTENTIAL ETHYLENE PRODUCTION MILL.TONS	TOTAL POTENTIAL ETHYLENE PRODUCTION MILL.TONS
ANTILLES	.	.	.	.	.	.	.
ARGENTINA	15200	158	25	2400	1200000	1	27
BAHAMAS	.	.	.	.	.	.	.
BARBADOS	.	.	.	2	1000	.	.
BOLIVIA	5400	.	9	150	75000	.	9
BRAZIL	1500	72	2	1220	610000	1	3
CHILE	2500	49	4	400	200000	.	4
COLOMBIA	5000	271	8	710	355000	.	8
COSTA RICA	.	.	.	.	.	.	.
CUBA	.	2	.	.	.	.	.
DOMINICAN REP.	.	.	.	.	.	.	.
ECUADOR	4000	5	7	1100	550000	1	7
EL SALVADOR	.	.	.	.	.	.	.
GRENADA	.	.	.	.	.	.	.
GUATEMALA	.	.	.	16	8000	.	.
GUYANA	.	.	.	.	.	.	.
HAITI	.	.	.	.	.	.	.
HONDURAS	.	.	.	.	.	.	.
JAMAICA	.	.	.	.	.	.	.
MEXICO	59000	1806	97	31250	15625000	17	114
NICARAGUA	.	.	.	.	.	.	.
PANAMA	.	.	.	.	.	.	.
PARAGUAY	.	.	.	.	.	.	.
PERU	1100	39	2	655	327500	.	2
SURINAME	.	.	.	.	.	.	.
TRINIDAD/TOBAGO	8000	148	13	700	350000	.	14
URUGUAY	.	.	.	.	.	.	.
VENEZUELA	42800	2047	69	17870	8935000	10	79
LATIN AMERICA	144500	4598	237	56473	28236500	31	268
TOTAL DEVELOPING COUNTRIES	1180665	7508	1985	484481	242240500	264	2249
SAUDI ARABIA	93230	47	158	163350	81675000	89	247
VENEZUELA	42800	2047	69	17870	8935000	10	79
[illegible]	490000	436	828	58000	29000000	32	840
ALGERIA	132000	419	223	8440	4220000	5	227
UNITED ARAB EMIRATES	20500	34	35	29411	14705500	16	51
INDONESIA	24000	381	40	9600	4800000	5	45
NIGERIA	41400	39	70	17400	8700000	9	79
IRAQ	27500	126	46	31000	15500000	17	63
KUWAIT	31000	307	52	65400	32700000	36	88
LIBYA	24000	92	40	23500	11750000	13	53
QATAR	60000	120	101	3760	1880000	2	103
GABON	500	15	1	500	250000	.	1
ECUADOR	4000	5	7	1100	550000	1	7
OPEC	995530	4069	1670	429331	214665500	234	1904

Table 17

DATE: OCTOBER 14,1982

ESTIMATED RAW MATERIAL FOR THE PETROCHEMICAL
INDUSTRY IN LESS DEVELOPED COUNTRIES
SOURCE: NATURAL GAS/UN WORLD ENERGY SUPPLIES
CRUDE OIL/OIL AND GAS JOURNAL
1990

	PROVED RESERVES NAT.GAS BCF	DOMESTIC DEMAND BCF	POTENTIAL ETHYLENE PRODUCTION MILL.TONS	PROVED RESERVES CRUDE OIL MILL.BBL	ESTIMATED ASSOCIATED GAS MILL.CF	POTENTIAL ETHYLENE PRODUCTION MILL.TONS	TOTAL POTENTIAL ETHYLENE PRODUCTION MILL.TONS
ANGOLA	1175	9	2	1200	600000	1	3
BENIN	.	.	.	.	.	.	.
BOTSWANA	.	.	.	.	.	.	.
BURUNDI	.	.	.	.	.	.	.
CAPE VERDE	.	.	.	.	.	.	.
CENTRAL AFRICA	.	.	.	.	.	.	.
CHAD	.	.	.	.	.	.	.
COMOROS	.	.	.	.	.	.	.
CONGO	2200	.	4	400	200000	.	4
DJIBOUTI	.	.	.	.	.	.	.
EQU. GUINEA	.	.	.	.	.	.	.
ETHIOPIA	.	.	.	.	.	.	.
GABON	500	20	1	500	250000	.	1
GAMBIA	.	.	.	.	.	.	.
GHANA	.	.	.	7	3500	.	.
GUINEA	.	.	.	.	.	.	.
GUINEA-BISSAU	.	.	.	.	.	.	.
IVORY COAST	.	.	.	.	.	.	.
KENYA	.	.	.	.	.	.	.
LESOTHO	.	.	.	.	.	.	.
LIBERIA	.	.	.	.	.	.	.
MADAGASCAR	.	.	.	.	.	.	.
MALAWI	.	.	.	.	.	.	.
MAURITANIA	.	.	.	.	.	.	.
MAURITIUS	.	.	.	.	.	.	.
MOZAMBIQUE	.	.	.	.	.	.	.
NIGER	.	.	.	.	.	.	.
NIGERIA	41400	72	70	17400	8700000	9	79
RWANDA	.	.	.	.	.	.	.
SAO TOME	.	.	.	.	.	.	.
SENEGAL	.	.	.	.	.	.	.
SEYCHELLES	.	.	.	.	.	.	.
SIERRA LEONE	.	.	.	.	.	.	.
SOMALIA	.	.	.	.	.	.	.
SUDAN	.	.	.	.	.	.	.
SWAZILAND	.	.	.	.	.	.	.
TOGO	.	.	.	.	.	.	.
UGANDA	.	.	.	.	.	.	.
CAMEROON	.	.	.	140	70000	.	.
TANZANIA	.	.	.	.	.	.	.
UPPER VOLTA	.	.	.	.	.	.	.
ZAIRE	50	.	.	135	67500	.	.
ZAMBIA	.	.	.	.	.	.	.
A F R I C A	45325	110	77	19782	9891000	11	87
ALGERIA	132000	848	222	8440	4220000	5	227
EGYPT	3000	148	5	3100	1550000	2	7
LIBYA	24000	200	40	23500	11750000	13	53
MOROCCO	25	9	.	.	.	.	.
TUNISIA	6000	35	10	2250	1125000	1	11
M. E A S T / N. A F R I C A	165025	1243	277	37290	18645000	20	257

Table 10

DATE: OCTOBER 14,1982

ESTIMATED RAW MATERIAL FOR THE PETROCHEMICAL
INDUSTRY IN LESS DEVELOPED COUNTRIES
SOURCE: NATURAL GAS/UN WORLD ENERGY SUPPLIES
CRUDE OIL/OIL AND GAS JOURNAL
1990

	PROVED RESERVES NAT.GAS BCF	DOMESTIC DEMAND BCF	POTENTIAL ETHYLENE PRODUCTION MILL.TONS	PROVED RESERVES CRUDE OIL MILL.BBL	ESTIMATED ASSOCIATED GAS MILL.CF	POTENTIAL ETHYLENE PRODUCTION MILL.TONS	TOTAL POTENTIAL ETHYLENE PRODUCTION MILL.TONS
BAHRAIN	9000	394	15	240	120000	.	15
YEMEN	.	.	.	.	.	.	.
IRAQ	27500	236	46	31000	15500000	17	63
JORDAN	.	.	.	.	.	.	.
KUWAIT	31000	574	51	65400	32700000	36	87
LEBANON	.	.	.	.	.	.	.
OMAN	2000	.	3	2400	1200000	1	5
QATAR	60000	224	101	3760	1880000	2	103
SAUDI ARABIA	93230	88	158	163350	81675000	89	247
SYRIAN ARAB REPUBLIC	1500	76	2	2000	1000000	1	3
TURKEY	500	.	1	125	62500	.	1
UNITED ARAB EMIRATES	29500	77	35	29411	14705500	16	51
M. E A S T/ W. A S I A	245230	1669	412	297686	140843000	162	574
AFGHANISTAN	.	84	.	.	.	.	.
BANGLADESH	8000	28	13	.	.	.	13
BHUTAN	.	.	.	.	.	.	.
BURMA	135	41	.	25	12500	.	.
CYPRUS	.	.	.	.	.	.	.
KAMPUCHEA	.	.	.	.	.	.	.
FIJI	.	.	.	.	.	.	.
HONG KONG	.	.	.	.	.	.	.
INDIA	9300	189	15	2600	1300000	1	17
INDONESIA	24000	755	39	9600	4800000	5	45
IRAN	490000	850	828	58000	29000000	32	859
ISRAEL	.	.	.	.	.	.	.
LAO	.	.	.	.	.	.	.
MALAYSIA	17000	85	29	2800	1400000	2	30
MALDIVES	.	.	.	.	.	.	.
MONGOLIA	.	.	.	.	.	.	.
NEPAL	.	.	.	.	.	.	.
PAKISTAN	15800	605	26	200	100000	.	26
PAPUA	.	.	.	.	.	.	.
PHILIPPINES	.	.	.	25	12500	.	.
KOREA	.	.	.	.	.	.	.
SINGAPORE	.	.	.	.	.	.	.
SOLOMON	.	.	.	.	.	.	.
SRI LANKA	.	.	.	.	.	.	.
THAILAND	8000	.	14	.	.	.	14
VIETNAM	.	.	.	.	.	.	.
A S I A	572235	2615	964	73250	36625000	40	1004

Table 19

DATE: OCTOBER 14,1982

ESTIMATED RAW MATERIAL FOR THE PETROCHEMICAL
INDUSTRY IN LESS DEVELOPED COUNTRIES
SOURCE: NATURAL GAS/UN WORLD ENERGY SUPPLIES
CRUDE OIL/OIL AND GAS JOURNAL
1990

	PROVED RESERVES NAT.GAS BCF	DOMESTIC DEMAND BCF	POTENTIAL ETHYLENE PRODUCTION MILL.TONS	PROVED RESERVES CRUDE OIL MILL.BBL	ESTIMATED ASSOCIATED GAS MILL.CF	POTENTIAL ETHYLENE PRODUCTION MILL.TONS	TOTAL POTENTIAL ETHYLENE PRODUCTION MILL.TONS
ANTILLES	.	.	.	.	.	.	.
ARGENTINA	15200	296	25	2400	1200000	1	27
BAHAMAS	.	.	.	.	.	.	.
BARBADOS	.	.	.	2	1000	.	.
BOLIVIA	5400	.	9	150	75000	.	9
BRAZIL	1500	136	2	1220	610000	1	3
CHILE	2500	95	4	400	200000	.	4
COLOMBIA	5800	507	8	710	355000	.	8
COSTA RICA	.	.	.	.	.	.	.
CUBA	.	3	.	.	.	.	.
DOMINICAN REP.	.	.	.	.	.	.	.
ECUADOR	4000	9	7	1100	550000	1	7
EL SALVADOR	.	.	.	.	.	.	.
GRENADA	.	.	.	.	.	.	.
GUATEMALA	.	.	.	.	.	.	.
GUYANA	.	.	.	16	8000	.	.
HAITI	.	.	.	.	.	.	.
HONDURAS	.	.	.	.	.	.	.
JAMAICA	.	.	.	.	.	.	.
MEXICO	59000	3379	94	31250	15625000	17	111
NICARAGUA	.	.	.	.	.	.	.
PANAMA	.	.	.	.	.	.	.
PARAGUAY	.	.	.	.	.	.	.
PERU	1100	72	2	655	327500	.	2
SURINAME	.	.	.	.	.	.	.
TRINIDAD/TOBAGO	8000	277	13	700	350000	.	13
URUGUAY	.	.	.	.	.	.	.
VENEZUELA	42600	3829	66	17870	8935000	10	76
LATIN AMERICA	144500	8605	230	56473	28236500	31	261
TOTAL DEVELOPING COUNTRIES	1180665	16241	1974	484481	242240500	264	2238
SAUDI ARABIA	93230	88	158	163350	81675000	89	247
VENEZUELA	42800	3829	66	17870	8935000	10	76
IRAN	490000	850	828	58000	29000000	32	859
ALGERIA	132000	848	222	8440	4220000	5	227
UNITED ARAB EMIRATES	20500	77	35	29411	14705500	16	51
INDONESIA	24000	755	39	9600	4800000	5	45
NIGERIA	41400	72	70	17400	8700000	4	75
IRAQ	27500	236	46	31000	15500000	17	63
KUWAIT	31000	576	51	65400	32700000	36	87
LIBYA	24000	203	40	23500	11750000	13	53
QATAR	60000	224	101	3760	1880000	2	103
GABON	500	28	1	500	250000	.	1
ECUADOR	4000	9	7	1100	550000	1	7
OPEC	990930	7792	1664	429331	214665500	234	1898

Table 20

SUPPLY - DEMAND

ESTIMATED RAW MATERIAL AND AMMONIA PRODUCTION FROM NATURAL GAS

IN DEVELOPING COUNTRIES

1980

Column	(1)	(2)	(3)	(4)	(5)	(6)
REGION	Demand (a) Tons 10^6	Ammonia Production (b) for Fertilizers	Capability (c) Tons 10^6	Capability Excess/ (Deficit) Tons 10^6	Sustained Production Based on (Years) Demand - Plants Capacity	Potential Ammonia Production * Tons 10^6
AFRICA	0.60	0.02	0.08	(0.58)	127-	3,445
L. AMERICA	2.96	2.47	2.78	(0.49)	112-112	2,900
NEAR EAST	1.83	1.78	1.97	(0.05)	151-167	15,965
FAR EAST	6.55	5.03	5.66	(1.52)	85-130	1,600
TOTAL LDC's	11.94	9.30	10.49	(2.64)	119-122	23,910
OPEC	-	-	6.31	-	-	20,403
WORLD	60.63	60.73	76.96	0.10	-	-

Elaboration: OPEC Downstream Operations Unit, April 1982.

Sources: Columns (3), (4), (5) and (6): OPEC Secretariat's estimations* taken from tables 23, 24 and 25.
Columns (1) and (2): FAO "Current World Fertilizer Situation and Outlook 1980-86. Table 12, page 31, Rome 1981

(a) Demand for fertilizers
(b) Ammonia available for fertilizer
(c) Ammonia supply capability

Column (4) = (2) - (1) that is: Ammonia available for fertilizers (-) Fertilizers Demand. This is the methodology applied by FAO to estimate the balance. However if we consider demand via a vis plant's capacity as we applied in the case of ethylene and methanol the LDCs deficit of capacity for 1980 is only 1.45 Mill. Tons; while the world's capacity under utilisation was much higher, 16.3 Mill.tons.

* These figures differ with those from tables 23, 24 and 25 due to rounding and countries grouping under the above regional groups.

Table 21

S U P P L Y - D E M A N D

ESTIMATED RAW MATERIAL AND AMMONIA PRODUCTION FROM NATURAL GAS

IN DEVELOPING COUNTRIES

1984/85

Column	(1)	(2)	(3)	(4)	(5)	(6)
REGION	Demand (a) Tons 10^6	Ammonia Production (b) for Fertilizers	Capability (c) Tons 10^6	Capability Excess/ (Deficit) Tons 10^6	Sustained Production Based on (Years) Demand - Plants Capacity	Potential Ammonia Production * Tons 10^6
AFRICA	0.79	0.44	0.54	(0.35)	123-	3,441
L. AMERICA	3.81	4.19	4.67	0.38	108-108	2,873
NEAR EAST	2.35	2.74	3.02	0.39	147-163	15,955
FAR EAST	8.56	7.21	8.00	(1.35)	81-125	1,592
TOTAL LDC's	15.51	14.58	16.23	(0.93)	115-118	23,861
OPEC	-	-	8.80	-		20,403
WORLD	71.43	71.13	91.65	(0.30)	-	-

Elaboration: OPEC Downstream Operations Unit, April 1982.

Sources: Columns (3), (4), (5) and (6): OPEC Secretariat's estimations* taken from tables 26, 27 and 28.
Columns (1) and (2): FAO "Current World Fertilizer Situation and Outlook 1980-86. Table 12, page 31, Rome 1981.

(a) Demand for fertilizers
(b) Ammonia available for fertilizer
(c) Ammonia supply capability

Column (4) = (2) - (1) that is: Ammonia available for fertilizers (-) Fertilizer Demand.

* Those figures differ slightly with those from table 15 due to rounding and countries grouping under the above regional groups.

Table 22

SUPPLY - DEMAND

ESTIMATED RAW MATERIAL AND AMMONIA PRODUCTION FROM NATURAL GAS

IN DEVELOPING COUNTRIES

1 9 9 0

Column	(1)	(2)	(3)	(4)	(5)	(6)
REGION	Demand (a) Tons 10^6	Ammonia Production (b) for Fertilizers	Capability 1985/86 (c) Tons 10^6	Capability Excess/(Deficit) Tons 10^6	Sustained Production Based on (Years) Demand - Plants Capacity	Potential Ammonia Production Tons 10^6
AFRICA	1.18	0.48	0.54	(0.70)	117-	3,432
L. AMERICA	5.40	4.58	5.15	(0.90)	102-102	2,798
NEAR EAST	3.34	3.00	3.38	(0.34)	141-157	15,929
FAR EAST	12.50	7.76	8.72	(4.74)	75-119	1,429
TOTAL LDC's	22.50	15.83	17.79	(6.68)	109-112	23,588
OPEC			9.1[1]			20,334
WORLD	90.83	89.05	94.69	(1.78)		

Elaboration: OPEC Downstreams Operations Unit, April 1982

Sources: Columns (3), (4), (5) and (6): OPEC Secretariat's estimations* taken from tables 29, 30 and 31.
Column (1): Is our estimation based on FAO's demand figures from 1980 up to 1985. The annual growth varies according to the regions, but for LDCs is 6.5%.
Column (2): FAO "Current World Fertilizer Situation and Outlook 1980-85. Table 12, Page 31, Rome 1981. This column is estimated considering the percentage average of capacity utilization during 1980-85, that is 89%. (Only in LDCs).

(a) Demand for fertilizers
(b) Ammonia available for fertilizer
(c) Ammonia supply capability
Column (4) = (2) - (1)
1 OPEC capacity in 1985: 9.1 million tons; see table 39.

Note: In the case of the year 1990, Column (3) refers to the capacity estimated up to 1985/86, therefore when this capacity is compared with our estimations of 1990 demand, we figure out what capacity still is needed for that year column (4). This procedure is adopted since at present there is no figures on future projects published beyond 1985-86. This is an exercise to get an idea on probable balances.

* These figures differ slightly with those from tables 29 - 31 due to rounding and countries grouping under the above regional groups.

Table 23

DATE: OCTOBER 14,1982

ESTIMATED RAW MATERIAL FOR THE PETROCHEMICAL
INDUSTRY IN LESS DEVELOPED COUNTRIES
SOURCE: NATURAL GAS/UN WORLD ENERGY SUPPLIES
CRUDE OIL/OIL AND GAS JOURNAL
1979

	PROVED RESERVES NAT.GAS BCF	DOMESTIC DEMAND BCF	POTENTIAL AMM./METH. PRODUCTION MILL.TONS	PROVED RESERVES CRUDE OIL MILL.BBL	ESTIMATED ASSOCIATED GAS MILL.CF	POTENTIAL AMM./METH. PRODUCTION MILL.TONS	TOTAL POTENTIAL AMM./METH. PRODUCTION MILL.TONS
ANGOLA	1175	3	22	1200	600000	5	27
BENIN	.	.	.	.	.	.	.
BOTSWANA	.	.	.	.	.	.	.
BURUNDI	.	.	.	.	.	.	.
CAPE VERDE	.	.	.	.	.	.	.
CENTRAL AFRICA	.	.	.	.	.	.	.
CHAD	.	.	.	.	.	.	.
COMOROS	.	.	.	.	.	.	.
CONGO	2200	.	41	400	200000	2	43
DJIBOUTI	.	.	.	.	.	.	.
EQU. GUINEA	.	.	.	.	.	.	.
ETHIOPIA	.	.	.	.	.	.	.
GABON	500	9	9	500	250000	2	11
GAMBIA	.	.	.	.	.	.	.
GHANA	.	.	.	7	3500	.	.
GUINEA	.	.	.	.	.	.	.
GUINEA-BISSAU	.	.	.	.	.	.	.
IVORY COAST	.	.	.	.	.	.	.
KENYA	.	.	.	.	.	.	.
LESOTHO	.	.	.	.	.	.	.
LIBERIA	.	.	.	.	.	.	.
MADAGASCAR	.	.	.	.	.	.	.
MALAWI	.	.	.	.	.	.	.
MAURITANIA	.	.	.	.	.	.	.
MAURITIUS	.	.	.	.	.	.	.
MOZAMBIQUE	.	.	.	.	.	.	.
NIGER	.	.	.	.	.	.	.
NIGERIA	41400	23	776	17400	8700000	77	853
RWANDA	.	.	.	.	.	.	.
SAO TOME	.	.	.	.	.	.	.
SENEGAL	.	.	.	.	.	.	.
SEYCHELLES	.	.	.	.	.	.	.
SIERRA LEONE	.	.	.	.	.	.	.
SOMALIA	.	.	.	.	.	.	.
SUDAN	.	.	.	.	.	.	.
SWAZILAND	.	.	.	.	.	.	.
TOGO	.	.	.	.	.	.	.
UGANDA	.	.	.	.	.	.	.
CAMEROON	.	.	.	140	70000	1	1
TANZANIA	.	.	.	.	.	.	.
UPPER VOLTA	.	.	.	.	.	.	.
ZAIRE	50	.	1	135	67500	1	2
ZAMBIA	.	.	.	.	.	.	.
A F R I C A	45325	35	849	19782	9891000	88	937
ALGERIA	132600	231	2471	8440	4220000	37	2508
EGYPT	3000	47	55	3100	1550000	14	69
LIBYA	24000	47	449	23500	11750000	104	553
MOROCCO	25	3	.	.	.	.	.
TUNISIA	6000	11	112	2250	1125000	10	122
M. E A S T/ N. A F R I C A	165[illegible]25	340	3088	37290	18645000	165	3253

Table 24

DATE: OCTOBER 14,1982

ESTIMATED RAW MATERIAL FOR THE PETROCHEMICAL
INDUSTRY IN LESS DEVELOPED COUNTRIES
SOURCE: NATURAL GAS/UN WORLD ENERGY SUPPLIES
CRUDE OIL/OIL AND GAS JOURNAL
1979

	PROVED RESERVES NAT.GAS BCF	DOMESTIC DEMAND BCF	POTENTIAL AMM./METH. PRODUCTION MILL.TONS	PROVED RESERVES CRUDE OIL MILL.BBL	ESTIMATED ASSOCIATED GAS MILL.CF	POTENTIAL AMM./METH. PRODUCTION MILL.TONS	TOTAL POTENTIAL AMM./METH. PRODUCTION MILL.TONS
BAHRAIN	9000	125	166	240	120000	1	167
YEMEN	.	.	.	.	.	.	.
IRAQ	27500	75	514	31000	15500000	137	651
JORDAN	.	.	.	.	.	.	.
KUWAIT	31006	182	578	65400	32700000	289	867
LEBANON	.	.	.	.	.	.	.
OMAN	2000	.	38	2400	1200000	11	48
QATAR	60000	71	1124	3760	1880000	17	1140
SAUDI ARABIA	93230	28	1748	163350	81675000	723	2470
SYRIAN ARAB REPUBLIC	1500	24	28	2000	1000000	9	37
TURKEY	500	.	9	125	62500	1	10
UNITED ARAB EMIRATES	20500	17	384	29411	14705500	130	514
M. E A S T/ W. A S I A	245230	522	4588	297686	148843000	1317	5906
AFGHANISTAN	.	12	.	.	.	.	.
BANGLADESH	8000	9	150	.	.	.	150
BHUTAN	.	.	.	.	.	.	.
BURMA	135	13	2	25	12500	.	2
CYPRUS	.	.	.	.	.	.	.
KAMPUCHEA	.	.	.	.	.	.	.
FIJI	.	.		.	.	.	.
HONG KONG	.	.		.	.	.	.
INDIA	9300	60	1.	2600	1300000	12	185
INDONESIA	24000	214	446	9600	4800000	42	486
IRAN	490000	249	9183	58000	29000000	257	9439
ISRAEL	.	.	.	.	.	.	.
LAO	.	.	.	.	.	.	.
MALAYSIA	17000	27	319	2800	1400000	12	331
MALDIVES	.	.	.	.	.	.	.
MONGOLIA	.	.	.	.	.	.	.
NEPAL	.	.	.	.	.	.	.
PAKISTAN	15800	192	293	200	100000	1	294
PAPUA	.	.	.	.	.	.	.
PHILIPPINES	.	.	.	25	12500	.	.
KOREA	.	.	.	.	.	.	.
SINGAPORE	.	.	.	.	.	.	.
SOLOMON	.	.	.	.	.	.	.
SRI LANKA	.	.	.	.	.	.	.
THAILAND	8000	.	150	.	.	.	150
VIETNAM	.	.	.	.	.	.	.
A S I A	572235	775	10715	73250	36625000	324	11039

Table 25

DATE: OCTOBER 14,1982

ESTIMATED RAW MATERIAL FOR THE PETROCHEMICAL
INDUSTRY IN LESS DEVELOPED COUNTRIES
SOURCE: NATURAL GAS/UN WORLD ENERGY SUPPLIES
CRUDE OIL/OIL AND GAS JOURNAL
1979

	PROVED RESERVES NAT.GAS BCF	DOMESTIC DEMAND BCF	POTENTIAL ANN./METH. PRODUCTION MILL.TONS	PROVED RESERVES CRUDE OIL MILL.BBL	ESTIMATED ASSOCIATED GAS MILL.CF	POTENTIAL ANN./METH. PRODUCTION MILL.TONS	TOTAL POTENTIAL ANN./METH. PRODUCTION MILL.TONS
ANTILLES	.	.	.	.	.	.	.
ARGENTINA	15200	94	283	2400	1200000	11	294
BAHAMAS	.	.	.	.	.	.	.
BARBADOS	.	.	.	2	1000	.	.
BOLIVIA	5400	.	101	150	75000	1	102
BRAZIL	1500	43	27	1220	610000	5	33
CHILE	2500	20	46	400	200000	2	48
COLOMBIA	5000	161	91	710	355000	3	94
COSTA RICA	.	.	.	.	.	.	.
CUBA	.	1	.	.	.	.	.
DOMINICAN REP.	.	.	.	.	.	.	.
ECUADOR	4000	3	75	1100	550000	5	80
EL SALVADOR	.	.	.	.	.	.	.
GRENADA	.	.	.	.	.	.	.
GUATEMALA	.	.	.	16	8000	.	.
GUYANA	.	.	.	.	.	.	.
HAITI	.	.	.	.	.	.	.
HONDURAS	.	.	.	.	.	.	.
JAMAICA	.	.	.	.	.	.	.
MEXICO	59000	1072	1086	31250	15625000	138	1224
NICARAGUA	.	.	.	.	.	.	.
PANAMA	.	.	.	.	.	.	.
PARAGUAY	.	.	.	.	.	.	.
PERU	1100	23	20	655	327500	3	23
SURINAME	.	.	.	.	.	.	.
TRINIDAD/TOBAGO	8000	88	148	700	350000	3	151
URUGUAY	.	.	.	.	.	.	.
VENEZUELA	42800	1215	780	17870	8935000	79	859
LATIN AMERICA	144500	2728	2658	56673	28236500	250	2908
TOTAL DEVELOPING COUNTRIES	1180665	4400	22055	484481	242240500	2144	24199
SAUDI ARABIA	93230	28	1758	163350	81675000	723	2470
VENEZUELA	42800	1215	780	17870	8935000	79	859
IRAN	490000	249	9183	58000	29000000	257	9439
ALGERIA	132000	231	2471	8440	4220000	37	2508
UNITED ARAB EMIRATES	20500	17	384	29411	14705500	130	514
INDONESIA	24000	214	446	9600	4800000	42	488
NIGERIA	41400	23	776	17400	8700000	77	853
IRAQ	27500	75	514	31000	15500000	137	651
KUWAIT	31000	182	578	65400	32700000	289	867
LIBYA	24000	47	449	23500	11750000	104	553
QATAR	60000	71	1124	3760	1880000	17	1140
GABON	500	9	9	500	250000	2	11
ECUADOR	4000	3	75	1100	550000	5	80
OPEC	590535	2364	18536	429331	214665500	1900	20435

Table 26

DATE: OCTOBER 14,1982

ESTIMATED RAW MATERIAL FOR THE PETROCHEMICAL
INDUSTRY IN LESS DEVELOPED COUNTRIES
SOURCE: NATURAL GAS/UN WORLD ENERGY SUPPLIES
CRUDE OIL/OIL AND GAS JOURNAL
1984

	PROVED RESERVES NAT.GAS BCF	DOMESTIC DEMAND BCF	POTENTIAL AMM./METH. PRODUCTION MILL.TONS	PROVED RESERVES CRUDE OIL MILL.BBL	ESTIMATED ASSOCIATED GAS MILL.CF	POTENTIAL AMM./METH. PRODUCTION MILL.TONS	TOTAL POTENTIAL AMM./METH. PRODUCTION MILL.TONS
ANGOLA	1175	5	22	1200	600000	5	27
BENIN	.	.	.	.	.	.	.
BOTSWANA	.	.	.	.	.	.	.
BURUNDI	.	.	.	.	.	.	.
CAPE VERDE	.	.	.	.	.	.	.
CENTRAL AFRICA	.	.	.	.	.	.	.
CHAD	.	.	.	.	.	.	.
COMOROS	.	.	.	.	.	.	.
CONGO	2200	.	41	400	200000	2	43
DJIBOUTI	.	.	.	.	.	.	.
EQU. GUINEA	.	.	.	.	.	.	.
ETHIOPIA	.	.	.	.	.	.	.
GABON	500	15	9	500	250000	2	11
GAMBIA	.	.	.	.	.	.	.
GHANA	.	.	.	7	3500	.	.
GUINEA	.	.	.	.	.	.	.
GUINEA-BISSAU	.	.	.	.	.	.	.
IVORY COAST	.	.	.	.	.	.	.
KENYA	.	.	.	.	.	.	.
LESOTHO	.	.	.	.	.	.	.
LIBERIA	.	.	.	.	.	.	.
MADAGASCAR	.	.	.	.	.	.	.
MALAWI	.	.	.	.	.	.	.
MAURITANIA	.	.	.	.	.	.	.
MAURITIUS	.	.	.	.	.	.	.
MOZAMBIQUE	.	.	.	.	.	.	.
NIGER	.	.	.	.	.	.	.
NIGERIA	41400	39	776	17400	8700000	77	853
RWANDA	.	.	.	.	.	.	.
SAO TOME	.	.	.	.	.	.	.
SENEGAL	.	.	.	.	.	.	.
SEYCHELLES	.	.	.	.	.	.	.
SIERRA LEONE	.	.	.	.	.	.	.
SOMALIA	.	.	.	.	.	.	.
SUDAN	.	.	.	.	.	.	.
SWAZILAND	.	.	.	.	.	.	.
TOGO	.	.	.	.	.	.	.
UGANDA	.	.	.	.	.	.	.
CAMEROON	.	.	.	140	70000	1	1
TANZANIA	.	.	.	.	.	.	.
UPPER VOLTA	.	.	.	.	.	.	.
ZAIRE	50	.	1	135	67500	1	2
ZAMBIA	.	.	.	.	.	.	.
A F R I C A	45325	59	849	19782	9891000	88	936
ALGERIA	132000	419	2467	8440	4220000	37	2504
EGYPT	3000	79	55	3100	1550000	14	68
LIBYA	24000	92	448	23500	11750000	104	552
MOROCCO	25	5	.	.	.	.	.
TUNISIA	6000	19	112	2250	1125000	10	122
M. E A S T/ N. A F R I C A	165025	616	3083	37290	18645000	165	3248

Table 27

DATE: OCTOBER 14,1982

ESTIMATED RAW MATERIAL FOR THE PETROCHEMICAL
INDUSTRY IN LESS DEVELOPED COUNTRIES
SOURCE: NATURAL GAS/UN WORLD ENERGY SUPPLIES
CRUDE OIL/OIL AND GAS JOURNAL
1984

	PROVED RESERVES NAT.GAS	DOMESTIC DEMAND	POTENTIAL AMM./METH. PRODUCTION	PROVED RESERVES CRUDE OIL	ESTIMATED ASSOCIATED GAS	POTENTIAL AMM./METH. PRODUCTION	TOTAL POTENTIAL AMM./METH. PRODUCTION
	BCF	BCF	MILL.TONS	MILL.BBL	MILL.CF	MILL.TONS	MILL.TONS
BAHRAIN	9000	211	165	240	120000	1	166
YEMEN	.	.	.	.	.	.	.
IRAQ	27500	126	513	31000	15500000	137	650
JORDAN	.	.	.	.	.	.	.
KUWAIT	31000	307	575	65400	32700000	289	865
LEBANON	.	.	.	.	.	.	.
OMAN	2000	.	38	2400	1200000	11	48
QATAR	60000	120	1123	3760	1880000	17	1139
SAUDI ARABIA	93230	47	1747	163350	81675000	723	2470
SYRIAN ARAB REPUBLIC	1500	40	27	2000	1000000	9	36
TURKEY	500	.	9	125	62500	1	10
UNITED ARAB EMIRATES	20500	34	384	29511	14765500	130	514
M. E A S T/ W. A S I A	245230	885	4581	297686	148843000	1317	5899
AFGHANISTAN	.	27	1	.	.	.	1
BANGLADESH	8000	15	150	.	.	.	150
BHUTAN	.	.	.	.	.	.	.
BURMA	135	22	2	25	12500	.	2
CYPRUS	.	.	.	.	.	.	.
KAMPUCHEA	.	.	.	.	.	.	.
FIJI	.	.	.	.	.	.	.
HONG KONG	.	.	.	.	.	.	.
INDIA	9300	101	172	2600	1300000	12	184
INDONESIA	24000	381	443	9600	4800000	42	485
IRAN	490600	436	9179	58000	29000000	257	9436
ISRAEL	.	.	.	.	.	.	.
LAO	.	.	.	.	.	.	.
MALAYSIA	17000	45	318	2800	1400000	12	330
MALDIVES	.	.	.	.	.	.	.
MONGOLIA	.	.	.	.	.	.	.
NEPAL	.	.	.	.	.	.	.
PAKISTAN	15800	324	290	200	100000	1	291
PAPUA	.	.	.	.	.	.	.
PHILIPPINES	.	.	.	25	12500	.	.
KOREA	.	.	.	.	.	.	.
SINGAPORE	.	.	.	.	.	.	.
SOLOMON	.	.	.	.	.	.	.
SRI LANKA	.	.	.	.	.	.	.
THAILAND	8000	.	150	.	.	.	150
VIETNAM	.	.	.	.	.	.	.
A S I A	572235	1349	10704	73250	36625000	324	11028

Table 28

DATE: OCTOBER 14,1982

ESTIMATED RAW MATERIAL FOR THE PETROCHEMICAL
INDUSTRY IN LESS DEVELOPED COUNTRIES
SOURCE: NATURAL GAS/UN WORLD ENERGY SUPPLIES
CRUDE OIL/OIL AND GAS JOURNAL
1984

	PROVED RESERVES NAT.GAS BCF	DOMESTIC DEMAND BCF	POTENTIAL ANN./METH. PRODUCTION MILL.TONS	PROVED RESERVES CRUDE OIL MILL.BBL	ESTIMATED ASSOCIATED GAS MILL.CF	POTENTIAL ANN./METH. PRODUCTION MILL.TONS	TOTAL POTENTIAL ANN./METH. PRODUCTION MILL.TONS
ANTILLES	.	.	.	.	.	.	.
ARGENTINA	15200	158	282	2400	1200000	11	293
BAHAMAS	.	.	.	.	.	.	.
BARBADOS	.	.	.	2	1000	.	.
BOLIVIA	5400	.	101	150	75000	1	102
BRAZIL	1500	72	27	1220	610000	5	32
CHILE	2500	49	46	400	200000	2	48
COLUMBIA	5000	271	89	710	355000	3	92
COSTA RICA	.	.	.	.	.	.	.
CUBA	.	2	.	.	.	.	.
DOMINICAN REP.	.	.	.	.	.	.	.
ECUADOR	4000	5	75	1100	550000	5	80
EL SALVADOR	.	.	.	.	.	.	.
GRENADA	.	.	.	.	.	.	.
GUATEMALA	.	.	.	16	8000	.	.
GUYANA	.	.	.	.	.	.	.
HAITI	.	.	.	.	.	.	.
HONDURAS	.	.	.	.	.	.	.
JAMAICA	.	.	.	.	.	.	.
MEXICO	59000	1806	1072	31250	15625000	138	1211
NICARAGUA	.	.	.	.	.	.	.
PANAMA	.	.	.	.	.	.	.
PARAGUAY	.	.	.	.	.	.	.
PERU	1100	39	20	655	327500	3	23
SURINAME	.	.	.	.	.	.	.
TRINIDAD/TOBAGO	8000	148	147	700	350000	3	150
URUGUAY	.	.	.	.	.	.	.
VENEZUELA	42800	2047	764	17870	8935000	79	843
L A T I N A M E R I C A	144500	4598	2623	56473	28236500	250	2873
T O T A L DEVELOPING C O U N T R I E S	1180665	7508	21997	404481	242240500	2144	24141
SAUDI ARABIA	93230	47	1747	163350	81675000	723	2470
VENEZUELA	42800	2047	764	17870	8935000	79	843
IRAN	490000	436	9179	58000	29000000	257	9436
ALGERIA	132000	419	2467	8440	4220000	37	2504
UNITED ARAB EMIRATES	20500	36	384	29411	14705500	130	514
INDONESIA	24000	381	443	9600	4800000	42	485
NIGERIA	41400	39	776	17400	8700000	77	853
IRAQ	27500	126	513	31000	15500000	137	650
KUWAIT	31000	307	575	65400	32700000	289	865
LIBYA	24000	92	448	23500	11750000	104	552
QATAR	60000	120	1123	3760	1880000	17	1139
GABON	500	15	9	500	250000	2	11
ECUADOR	4000	5	75	1100	550000	5	80
O P E C	990930	4069	18506	429331	214665500	1900	20403

Table 29

DATE: OCTOBER 14,1982

ESTIMATED RAW MATERIAL FOR THE PETROCHEMICAL
INDUSTRY IN LESS DEVELOPED COUNTRIES
SOURCE: NATURAL GAS/UN WORLD ENERGY SUPPLIES
CRUDE OIL/OIL AND GAS JOURNAL
1990

	PROVED RESERVES NAT.GAS BCF	DOMESTIC DEMAND BCF	POTENTIAL AMM./METH. PRODUCTION MILL.TONS	PROVED RESERVES CRUDE OIL MILL.BBL	ESTIMATED ASSOCIATED GAS MILL.CF	POTENTIAL AMM./METH. PRODUCTION MILL.TONS	TOTAL POTENTIAL AMM./METH. PRODUCTION MILL.TONS
ANGOLA	1175	9	22	1200	600000	5	27
BENIN	.	.	.	.	.	.	.
BOTSWANA	.	.	.	.	.	.	.
BURUNDI	.	.	.	.	.	.	.
CAPE VERDE	.	.	.	.	.	.	.
CENTRAL AFRICA	.	.	.	.	.	.	.
CHAD	.	.	.	.	.	.	.
COMOROS	.	.	.	.	.	.	.
CONGO	2200	.	41	400	200000	2	43
DJIBOUTI	.	.	.	.	.	.	.
EQU. GUINEA	.	.	.	.	.	.	.
ETHIOPIA	.	.	.	.	.	.	.
GABON	500	28	9	500	250000	2	11
GAMBIA	.	.	.	.	.	.	.
GHANA	.	.	.	7	3500	.	.
GUINEA	.	.	.	.	.	.	.
GUINEA-BISSAU	.	.	.	.	.	.	.
IVORY COAST	.	.	.	.	.	.	.
KENYA	.	.	.	.	.	.	.
LESOTHO	.	.	.	.	.	.	.
LIBERIA	.	.	.	.	.	.	.
MADAGASCAR	.	.	.	.	.	.	.
MALAWI	.	.	.	.	.	.	.
MAURITANIA	.	.	.	.	.	.	.
MAURITIUS	.	.	.	.	.	.	.
MOZAMBIQUE	.	.	.	.	.	.	.
NIGER	.	.	.	.	.	.	.
NIGERIA	41400	72	775	17400	8700000	77	852
RWANDA	.	.	.	.	.	.	.
SAO TOME	.	.	.	.	.	.	.
SENEGAL	.	.	.	.	.	.	.
SEYCHELLES	.	.	.	.	.	.	.
SIERRA LEONE	.	.	.	.	.	.	.
SOMALIA	.	.	.	.	.	.	.
SUDAN	.	.	.	.	.	.	.
SWAZILAND	.	.	.	.	.	.	.
TOGO	.	.	.	.	.	.	.
UGANDA	.	.	.	.	.	.	.
CAMEROON	.	.	.	140	70000	1	1
TANZANIA	.	.	.	.	.	.	.
UPPER VOLTA	.	.	.	.	.	.	.
ZAIRE	50	.	1	135	67500	1	2
ZAMBIA	.	.	.	.	.	.	.
A F R I C A	45325	110	848	19782	9891000	88	935
ALGERIA	132000	848	2459	8440	4220000	37	2496
EGYPT	3600	348	53	3100	1550000	14	67
LIBYA	24000	200	446	23500	11750000	104	550
MOROCCO	25	9	.	.	.	.	.
TUNISIA	6000	35	112	2250	1125000	10	122
M. E A S T/ N. A F R I C A	165625	1243	3071	37290	18645000	165	3236

Table 30

DATE: OCTOBER 14,1982

ESTIMATED RAW MATERIAL FOR THE PETROCHEMICAL
INDUSTRY IN LESS DEVELOPED COUNTRIES
SOURCE: NATURAL GAS/UN WORLD ENERGY SUPPLIES
CRUDE OIL/OIL AND GAS JOURNAL
1990

	PROVED RESERVES NAT.GAS BCF	DOMESTIC DEMAND BCF	POTENTIAL AMM./METH. PRODUCTION MILL.TONS	PROVED RESERVES CRUDE OIL MILL.BBL	ESTIMATED ASSOCIATED GAS MILL.CF	POTENTIAL AMM./METH. PRODUCTION MILL.TONS	TOTAL POTENTIAL AMM./METH. PRODUCTION MILL.TONS
BAHRAIN	9000	394	161	240	120000	1	162
YEMEN	.	.	.	.	.	.	.
IRAQ	27500	236	911	31000	15500000	137	648
JORDAN	.	.	.	.	.	.	.
KUWAIT	31000	574	570	65400	32700000	289	860
LEBANON	.	.	.	.	.	.	.
OMAN	2000	.	38	2400	1200000	11	48
QATAR	60000	224	1121	3760	1880000	17	1137
SAUDI ARABIA	93230	88	1746	163350	81675000	723	2469
SYRIAN ARAB REPUBLIC	1500	76	27	2000	1000000	9	36
TURKEY	500	.	9	125	62500	1	10
UNITED ARAB EMIRATES	20500	77	383	29411	14705500	130	513
M. E A S T/ N. A S I A	245230	1669	4567	297686	148843000	1317	5884
AFGHANISTAN	.	64	1	.	.	.	1
BANGLADESH	8000	28	149	.	.	.	149
BHUTAN	.	.	.	.	.	.	.
BURMA	135	41	2	25	12500	.	2
CYPRUS	.	.	.	.	.	.	.
KAMPUCHEA	.	.	.	.	.	.	.
FIJI	.	.	.	.	.	.	.
HONG KONG	.	.	.	.	.	.	.
INDIA	9300	189	171	2600	1300000	12	182
INDONESIA	24000	755	436	9600	4800000	42	478
IRAN	490000	890	9172	58000	29000000	257	9428
ISRAEL	.	.	.	.	.	.	.
LAO	.	.	.	.	.	.	.
MALAYSIA	17000	85	317	2800	1400000	12	330
MALDIVES	.	.	.	.	.	.	.
MONGOLIA	.	.	.	.	.	.	.
NEPAL	.	.	.	.	.	.	.
PAKISTAN	15800	605	285	200	100000	1	286
PAPUA	.	.	.	.	.	.	.
PHILIPPINES	.	.	.	25	12500	.	.
KOREA	.	.	.	.	.	.	.
SINGAPORE	.	.	.	.	.	.	.
SOLOMON	.	.	.	.	.	.	.
SRI LANKA	.	.	.	.	.	.	.
THAILAND	8000	.	150	.	.	.	150
VIETNAM	.	.	.	.	.	.	.
A S I A	572235	2615	10680	73250	36625000	324	11005

Table 31

DATE: OCTOBER 14,1982

ESTIMATED RAW MATERIAL FOR THE PETROCHEMICAL
INDUSTRY IN LESS DEVELOPED COUNTRIES
SOURCE: NATURAL GAS/UN WORLD ENERGY SUPPLIES
CRUDE OIL/OIL AND GAS JOURNAL
1990

	PROVED RESERVES NAT.GAS	DOMESTIC DEMAND	POTENTIAL ANN./METH. PRODUCTION	PROVED RESERVES CRUDE OIL	ESTIMATED ASSOCIATED GAS	POTENTIAL ANN./METH. PRODUCTION	TOTAL POTENTIAL ANN./METH. PRODUCTION
	BCF	BCF	MILL.TONS	MILL.BBL	MILL.CF	MILL.TONS	MILL.TONS
ANTILLES	.	.	.	.	.	.	.
ARGENTINA	15200	296	279	2400	1200000	11	290
BAHAMAS	.	.	.	.	.	.	.
BARBADOS	.	.	.	2	1000	.	.
BOLIVIA	5400	.	101	150	75000	1	102
BRAZIL	1500	134	26	1220	610000	5	31
CHILE	2500	95	45	400	200000	2	47
COLOMBIA	5000	507	84	710	355000	3	87
COSTA RICA	.	.	.	.	.	.	.
CUBA	.	3	.	.	.	.	.
DOMINICAN REP.	.	.	.	.	.	.	.
ECUADOR	4000	9	75	1100	550000	5	80
EL SALVADOR	.	.	.	(	.	.	.
GRENADA	.	.	.	.	.	.	.
GUATEMALA	.	.	.	16	8000	.	.
GUYANA	.	.	.	.	.	.	.
HAITI	.	.	.	.	.	.	.
HONDURAS	.	.	.	.	.	.	.
JAMAICA	.	.	.	.	.	.	.
MEXICO	59000	3379	1063	31250	15625000	118	1181
NICARAGUA	.	.	.	.	.	.	.
PANAMA	.	.	.	.	.	.	.
PARAGUAY	.	.	.	.	.	.	.
PERU	1100	72	19	655	327500	3	22
SURINAME	.	.	.	.	.	.	.
TRINIDAD/TOBAGO	8000	277	145	700	350000	3	148
URUGUAY	.	.	.	.	.	.	.
VENEZUELA	42800	3829	731	17870	8935000	79	810
L A T I N A M E R I C A	144500	8605	2548	56473	28236500	250	2798
T O T A L DEVELOPING C O U N T R I E S	1180665	14241	21870	484481	242240500	2144	24014
SAUDI ARABIA	93230	88	1744	163350	81675000	716	2460
VENEZUELA	42800	3829	731	17870	8935000	79	810
IRAN	490000	850	9172	58000	29000000	257	9428
ALGERIA	132000	848	2459	8440	4220000	37	2496
UNITED ARAB EMIRATES	20500	77	383	29411	14705500	130	513
INDONESIA	24000	755	436	9600	4800000	42	478
NIGERIA	41400	72	775	17400	8700000	77	852
IRAQ	27500	236	511	31000	15500000	137	648
KUWAIT	31000	574	570	65400	32700000	289	860
LIBYA	24000	200	446	23500	11750000	104	550
QATAR	60000	224	1121	3760	1880000	17	1137
GABON	500	20	9	500	250000	2	11
ECUADOR	4000	9	75	1100	550000	5	80
O P E C	990930	7792	18434	429331	214665500	1900	20334

Table 32

S U P P L Y - D E M A N D

ESTIMATED RAW MATERIAL AND METHANOL PRODUCTION FROM NATURAL GAS

IN DEVELOPING COUNTRIES

1 9 7 9

Column	(1)	(2)	(3)	(4)	(5)	(6)
REGION	Demand for Methanol Tons 10^3	Production Methanol Tons 10^3	Existing Capacity Tons 10^3	Capacity Excess/ (Deficit) Tons 10^3	Sustained Production Based on (Years) Demand - Plants Capacity	Methanol Potential Production Tons 10^6
AFRICA	-	-	-	-		937
N. AFRICA	50	400	450	400	62-186	3,253
W. ASIA /MIDDLE EAST	50	-	430[5]	380	185-78	5,906
ASIA /MIDDLE EAST	300	400	500	200	83-115	11,039
CHINA	240	210	260	20	-	n.a.
LATIN AMERICA	300	310	350	50	66-57	2,908
TOTAL LDC's	940	1,320	1,990	1,050	84-88	24,199
OPEC	-	-	430[4]	-	-	20,435
WORLD [1]	11,740	11,720[2]	13,835[3]	2,095[6]	-	-

Elaboration: OPEC Downstream Operations Unit, April 1982.

Source: Columns (4), (5) and (6) are OPEC Secretariat's estimations. Column (4) = (3) - (1).
Columns (1), (2) and (3) are UNIDO estimations, "Second Worldwide Study on the Petrochemical Industry", Annexe page 11, July 1981.

1- Includes CPE's.
2- UNIDO-GOIC joint study in April 1981 (The Industrial Uses of Associated Gas), estimates 13,466 mill.tons.
3- UNIDO-GOIC joint study in April 1981 (The Industrial Uses of Associated Gas), estimates 10,994 mill.tons.
4- See table 7, OPEC Secretariat's records: some differences could exist due to latest updating.
5- Added to UNIDO estimations. Sources: OPEC Secretariat and GOIC (Industrial Uses of Associated Gas April 1981, page 69).
6- According to the above referred Goic study, the world demanded for methanol in 1978/79 10.2 million tons therefore, the excess world capacity is even greater i.e. 3.3 million tons.

Table 33

SUPPLY - DEMAND

ESTIMATED RAW MATERIAL AND METHANOL PRODUCTION FROM NATURAL GAS

IN DEVELOPING COUNTRIES

1984

Column	(1)	(2)	(3)	(4)	(5)	(6)
REGION	Demand for Methanol Tons 10^3	Production Methanol Tons 10^3	Existing Capacity Tons 10^3	Capacity Excess/ (Deficit) Tons 10^3	Sustained Production Based on (Years) Demand - Plants Capacity	Methanol Potential Production Tons 10^6
AFRICA	-	-	-			936
N. AFRICA	75	400	450	375	57-181	3,248
W. ASIA/MIDDLE EAST	75	600	660	585	180-73	5,899
ASIA/MIDDLE EAST	600	550	600	0	78-110	11,028
CHINA	350	350	400	50	-	n.a.
LATIN AMERICA	700	1,000	1,200	500	61-52	2,873
TOTAL LDC's	1,800	2,900	3,310	1,510	79-83	24,141
OPEC	-	-	2,620	-		20,403
WORLD[1]	18,400[2]	18,900	23,810	5,410	-	-

Elaboration: OPEC Downstream Operations Unit
Source: Columns (4), (5) and (6) are OPEC Secretariat's estimations
Columns (1), (2) and (3) are UNIDO estimations, "Second Worldwide Study on the Petrochemical Industry", July 1981.

1- Includes CPE's

2- GOIC, estimates for 1983: World demand for Methanol, 14.1 million tons, and as the World Production of Mehanol, 14.9 million tons. "The Industrial Uses of Associated Gas", April 1981.

Table 34

S U P P L Y - D E M A N D

ESTIMATED RAW MATERIAL AND METHANOL PRODUCTION FROM NATURAL GAS

IN DEVELOPING COUNTRIES

1 9 9 0

Column	(1)	(2)	(3)	(4)	(5)	(6)
REGION	Demand for Methanol Tons 10^3	Production Methanol Tons 10^3	Existing Capacity 1987 Tons 10^3	Capacity Excess/ (Deficit) Tons 10^3	Sustained Production Based on (Years) Demand - Plants Capacity	Methanol Potential Production Tons 10^6
AFRICA	50		-	(50)		935
N. AFRICA	100	n.a.	760	660	51-175	3,236
W. ASIA /MIDDLE EAST	100	n.a.	1,630	1,530	175-68	5,804
ASIA /MIDDLE EAST	1,200	n.a.	1,300	100	72-104	11,005
CHINA	700	n.a.	800	100	-	n.a.
LATIN AMERICA	1,400	1,641	2,000	600	55-46	2,798
TOTAL LDC's	3,550	3,600	6,490[3]	2,940	73-77	24,014
OPEC			2,620		-	20,334
WORLD [1]	27,550[4]	n.a.	29,690[3]	2,140	-	-

Elaboration: OPEC Downstream Operations Unit

Source: Columns (4), (5) and (6) are OPEC Secretariat's estimations

Columns (1) and (3) are UNIDO estimations, "Second Worldwide Study on the Petroleum Industry Process of Restructing". July 1981. Some UNIDO's figures for OPEC Countries were corrected according to our records.

2,3- OPEC figures corrected based on our more recent records appears in Table 7. The LDCs figure includes what has been published until now, i.e. capacity expansions up to 1987.

1- Includes CPE's - Source: GOIC

4- GOIC, estimates for 1990: World demand for Methanol, 23.4 million tons.
World production for Methanol, 23.1 million tons.
Africa Middle East Methanol Production, 2.6 million tons.
"The Industrial Uses of Associated Gas - April 1981, page 74".

Table 35

OPEC DOMESTIC CONSUMPTION OF NATURAL GAS

(According to Different Sources)

Country	OPEC Statistical Bulletin 1981 10^9CF (1)	UN Tape 1979 10^9CF (2)	UN Publication 1979 10^9CF (3)	OPEC Statistical Bulletin 1979 10^9CF (4)
Algeria	239	231	105	503
Ecuador	2	3	1.8	1.3
Gabon	5	9	7.2	5.3
Indonesia	196	214	141.5	252
Iran	254	249	388.0	515
Iraq	23	75	78.7	78.7
Kuwait	188	182	165.7	124
Libya	115	47	27.1	124
Nigeria	76	23	18.1	49
Qatar	156	71	154.1	154
Saudi Arabia	896	28	22.6	412
UAE	194	17	16.3	127
Venezuela	588	1215	477.5	575

Elaboration: OPEC Downstream Operations Unit
OPEC Statistics Unit

Sources: Columns 1 & 4: a) OPEC Statistical Bulletins, 1979;1981.
Column 3: b) Yearbook of the World Energy Statistics, UN 1980.
Column 2: c) United Nations' Tape: Natural Gas/World Energy Supplies, 1979.

Note:
After cross-checking and investigating the differences among columns (2), (3) and (4) for some countries we came to the following conclusions:

a) Different reporting and computing systems on domestic consumption of natural gas probably exist. OPEC and UN questionnaires are not necessarily the same.

b) It seems that stocks, in some cases, are included in domestic consumption.

c) The gross production of natural gas, as the starting point to calculate domestic consumption, in some cases, changes drastically from one year to another, while exports remain about the same, therefore determining the level of domestic consumption.

d) In some cases, discrepancies might be due to the errors in computer entries.

e) The treatment of gas exports in the whole calculation of domestic consumption may differ.