MINERALS AND ENERGY
IN THE DEVELOPING COUNTRIES

Report on the Proposal for an International Resources Bank

Table of Contents

I. INTRODUCTION 1

II. PRESENT CONDITION AND PROSPECTS OF THE NON-FUEL MINERAL INDUSTRY 4

III. PROSPECTS FOR FUEL MINERALS AND ENERGY SUPPLIES IN DEVELOPING COUNTRIES 19

IV. THE ROLE OF INTERNATIONAL FINANCIAL INSTITUTIONS IN MINERAL DEVELOPMENT 33

ANNEX A Letter from the United States Governor

ANNEX B Summary and Analysis of the U.S. Proposal for an International Resources Bank

ANNEX C Illustrative Calculations of the IRB Capital Requirements

LIST OF TABLES:

Table 1 Developing Countries' Share of Mineral Output 7
Table 2 Developing Countries' Share of Mineral Output and Known Reserves 9
Table 3 Expansion of Mineral Output Required to Meet Estimated Demand 1976-85 11
Table 4 Estimated Gross Investment Required in the Mineral Sector 12
Table 5 Oil Importing Developing Countries Energy Balance 1960-85 23
Table 6 Projected Capital Requirements of the Oil-Importing Developing Countries (1976-1985) 26
Table 7 Bank Group Operations FY74-76 and Planned for FY77-81 in Non-Fuel Minerals and Energy Development 34
Table 8 Lending in the Last Five Years for Non-Fuel Minerals and Energy Development by the World Bank, the Inter-American Development Bank and the Asian Development Bank 37

This document has a restricted distribution and may be used by recipients only in the performance of their official duties. Its contents may not otherwise be disclosed without World Bank authorization.
MINERALS AND ENERGY IN THE
DEVELOPING COUNTRIES

Report on the Proposal for an International
Resources Bank

I. INTRODUCTION

1.1 This report has been prepared in response to a request by the United States to study the problem of investment in mineral resource development and its proposal to establish an International Resources Bank (IRB) as one approach to improving the climate for investment in this sector of developing countries. The Bank Group was also asked to consider how the functions (of the IRB) could best be performed within its structure. The Bank subsequently received various papers on the IRB proposal prepared by the United States for submission to the Conference on International Economic Cooperation (CIEC) and to the OECD.

1.2 The field of activities for the IRB was seen to be the extraction and refining of minerals in the less developed countries, with an emphasis on non-fuel minerals. The proposal is based on the premise that the flow of private foreign investment into the mining sector of the developing countries is less than would occur in response to physical or commercial considerations, and that the reason is the greater non-commercial or "political" risk attendant on investment in these countries. Reserves of non-fuel minerals located in the industrial countries tend to be exploited instead of lower-cost resources in the developing countries, resulting in a misallocation of investment and an economic loss for industrial and developing countries alike. An underlying concern is that the future supply of essential minerals may fall short of the growing needs of the world economy.

1.3 The role of the IRB would be to reduce the non-commercial risk associated with private participation in mining ventures in the developing countries. This role could be accomplished by the participation of the IRB in a trilateral agreement with the foreign investor and the host country setting out the rights and obligations of the parties and aiming to ensure performance by the foreign investor and the host country of their respective undertakings. The IRB would guarantee investments in mining projects against political risks, and would be provided by member governments with sufficient financial resources to meet its potential liabilities. The IRB could extend its political risk guarantee to "commodity bonds" issued by the project agency as a means of encouraging foreign investment in mining ventures in the developing countries.

1.4 A description and analysis of the IRB scheme will be found at Annex B. In essence it is a multilateral insurance scheme to compensate foreign investors in mining ventures in the event of losses sustained as the result
of non-commercial causes (that is, failure of the host government to fulfil or abide by its undertakings in the trilateral agreement between itself, the foreign partner and the IRB). The scheme does not envisage compensation being paid to the host country in the event that the foreign partner failed to carry out his part of the agreement, e.g. walked away from the project before completion, but simply that insurance cover would be withdrawn from the foreign partner. In principle this lack of symmetry could be remedied. More serious difficulties would be encountered of the kind that caused the World Bank some years ago to abandon its study of the International Investment Insurance Agency (IIIA). These included, among others, the unwillingness of many countries to accept international arbitration of disputes, and the inability to reach agreement on whether the developing countries should subscribe to the capital of the Agency and share any losses, and what voting rights they should have.

1.5 The question of capital subscriptions is important in another sense, in that an insurance scheme of this kind, extending as it would to a relatively few large and inherently risky investment projects, would seem to require capital and reserves not less than the sums insured, at least in the first ten or more years of operation. Even if it were considered acceptable to insure only a minor portion—say one third—of each project on average, the capitalization required would be very substantial. (Some illustrative calculations on this point will be found at Annex C.) None of these difficulties in themselves may be insurmountable, but taken together they suggest that the establishment of an IRB would not be feasible or generally acceptable, and that other solutions of the investment problem in mineral resource development should be sought.

1.6 Section II of the report presents a brief overview of the conditions and prospects of the non-fuel mineral industry. This is an extraordinarily complex industry, owing among other things to the haphazard and frequently remote location of minerals, which have to be discovered, extracted and refined before they can be turned into useful products. It is also an inherently risky industry for the investor, since substantial funds have to be expended on exploration without any assurance of a return. Moreover, the prices of the industry's products are subject to severe cyclical fluctuations which make planning difficult and may adversely affect the profitability of investment for long periods of time. These difficulties have been compounded in the last decade or two by a growing divergence of interest between the governments of mineral-rich developing countries and the large, trans-national mining companies that dominate the industry. Given the increasing dependence of industrial countries on supplies of non-fuel minerals from the developing countries, and the importance of mineral exports to a number of these countries, this is a matter of general concern. The objective of the U.S. proposal, which is to mount a common international effort to bridge or minimize these differences, is therefore both apt and timely.

1.7 The extraction and refining of energy minerals share many of the characteristics of non-fuel minerals. However, the problem and its setting are quite different. Many developing countries face the hard choice of expanding as rapidly as possible their indigenous production of energy or of
accepting a reduced rate of economic growth. There is no serious difference of opinion as to what the choice should be. Neither the industrial countries nor the oil exporters would wish the oil-importing developing countries to reduce their dependence on oil by slowing down their rate of development. The question is rather how to help them become more self-sufficient in energy. Section III takes up this question and suggests the nature and scale of the assistance they require.

1.8 Section IV considers the role of international financial institutions in bringing about a greater flow of investment for mining ventures in developing countries and as an international "presence" in investment agreements between host countries and foreign mining concerns. These institutions, including the World Bank Group and the Regional Banks, can and do fulfil both roles in the course of their normal lending operations. They can also offer the kind of advice and assistance that most developing countries require in drawing up sectoral development plans, identifying investment needs and responding to particular investment proposals. So far their activities in the non-fuel mineral sector have been sporadic, although not unimportant, and in petroleum they have only recently begun to consider projects. A substantial expansion of their financing and related activities in both sectors is called for, and would go a long way to meeting the objectives of the U.S. proposal.

1.9 A possible program is suggested for the World Bank Group in both non-fuel and energy minerals. Taking FY80 as a reference point, to allow time to mount an expanded effort in this sector, an increase in the Bank/IDA lending program is proposed from the presently planned level of about $200 million to $750-850 million. The program would include 10-14 projects in non-fuel minerals, oil, natural gas and coal. A correspondingly increased program of work would be called for, including project-identification, preparation and sector work, and assistance to developing countries in planning and implementing plans for the mineral sector. IFC might provide $50-75 million annually for mineral development after the Corporation's capital increase has been approved. If the Regional Banks decided to join the World Bank Group in a common effort to assist the expansion of mineral output in developing countries, the IFIs between them would be capable by 1980 of financing projects with a total cost approximating one third of the total investment requirements of the mineral sector in those countries.
II. PRESENT CONDITION AND PROSPECTS OF THE NON-FUEL MINERAL INDUSTRY 1/

2.1 Mining involves the extraction and refining of non-renewable resources which are distributed widely and unevenly among economic regions and countries. Although finite, the limits of exploitable resources are far from fixed, depending as they do on the extent of past exploration, technological advances, and the relationship between the prices of minerals and their costs of production. Despite the concern that has been voiced for the adequacy of non-fuel mineral resources given the massive and accelerating consumption of them, in a number of cases known reserves have increased several times over since World War II. At least in the medium term, shortages of non-fuel minerals, if they occur, are more likely to be caused by inadequate investment resulting from commercial or political factors than by an insufficiency of reserves in any absolute sense.

2.2 In the past, investment in the mineral sector of developing countries has been financed by foreign mining companies in response to the demand for low-cost sources of minerals by the industrialized countries. Foreign mining companies were motivated by the prospect of high profits, and the economic advancement of the host country as such was not their concern. In most cases, the mineral sector became an essentially foreign enclave, from which the local economy derived little benefit. In the typical case, the industry was virtually self-financed, generally less than 12% of capital requirements coming from external sources. Existing technology meant that mines could be established on a modest scale and expanded progressively out of cash flow. Taxes and royalties were usually light; so that the division of returns from mining ventures favored the mining company. Ownership and control was normally concentrated in the hands of the foreign investors who made all of the important decisions regarding marketing strategy, pricing policies, the rate of extraction of the product, the rate of expansion of capacity, and the rate at which earnings were to be repatriated. Even those countries that were independent typically lacked the skills necessary to manage mining ventures, and were therefore not in a strong bargaining position.

2.3 Although the mining industry still is dominated by giant, transnational firms with a high degree of technical and financial sophistication, the circumstances under which they can invest in developing countries are greatly changed. Developing countries are demanding a major role in the exploitation of their own resources. In their own interests they are demanding a share in all the major decisions made by the foreign firms. In addition,

the scale of the typical modern mining project places a strain on the financial resources of the largest mining company; and the increased availability of technical consultants has encouraged many developing countries to endeavour to develop their resources without assistance from direct foreign investment. These changes imply an increasing demand for loan funds to finance mineral development; but risk capital is still vitally important, particularly for exploration.

2.4 Both producing and consuming nations suffer from the pronounced cyclical fluctuations in the prices of key minerals. But while all can agree that more stable prices would benefit producing and consuming countries alike, it is difficult to reach agreement over the levels or trends around which prices should be stabilized. The discussion in this report stands aside from the controversy over prices, but it may be said that the climate for foreign investment in non-fuel minerals would be much improved if an accommodation could be reached between the industrial and developing countries on the matter of commodity prices.

The Relationship Between Producers and Consumers of Non-Fuel Minerals

2.5 The consumption of non-fuel minerals is concentrated heavily in the industrialized nations of Western Europe, North America and Japan. The aggregate demand for minerals in these nations has far outstripped their own resources (minable at existing mineral prices), and the resulting excess demand has been met primarily by imports from Canada, Australia, and South Africa and the countries of the developing world. In addition, there is a small, but growing trade in minerals between the centrally planned economies and the Western industrial nations.

2.6 Reliance on imports of non-fuel minerals differs in degree among industrial nations, with Japan the most heavily dependent, the U.S. least dependent and the European nations in an intermediate position. However, the degree of dependence is markedly different for different minerals. A U.S. study 1/ reveals that, although the U.S. depends on imports for only 15% of its consumption of 19 critical industrial minerals, it depends on imports for all of its consumption of chromium ore and tin, and more than 90% of its manganese and nickel (ore, concentrates and metal). Japan’s import dependence is uniformly higher than 90% for the minerals covered in the study, excepting only lead (75%), zinc (60%) and aluminum (23%). Japan’s domestic production of aluminum is completely dependent on imports of bauxite and alumina. In Western Europe, there is lower overall dependence on imports than in Japan, and substantial variation among minerals. Imports account for 89% or more of the consumption of chromium ore, copper, manganese ore, nickel, phosphate rock, tin and tungsten ore; 75% of lead; 61% of zinc; but only half of Europe’s bauxite and alumina requirements and 37% of its requirements of iron ore.

2.7 The major suppliers of minerals differ among consumers. Japan's sources are concentrated in Australia, Canada and South and Southeast Asia, but there has been a recent move towards diversification into Latin America (especially Brazil) and Africa. Western Europe relies more heavily on African sources than do the United States and Japan. Similarly, the United States is relatively more dependent on Canadian and Latin American sources. These differences reflect historical links and geographical proximity.

2.8 The relative importance of mineral production also differs markedly among mineral-rich developing countries. In Zambia non-fuel minerals account for more than 40% of GDP; in five other countries (Bolivia, Gabon, Liberia, Mauritania and Surinam) they account for 25-30%; and in three countries (Guinea, Guyana and Sierra Leone) for 15-20%. Non-fuel minerals account for a significant proportion of GDP in Chile, Indonesia, Jamaica, Mexico and Zaire, with a share of about 10%, and the potential exists for significant increases in mineral production in as many as 30 other developing countries. 1/ The contribution to GDP would be increased substantially if more of the processing activity were to be shifted to developing countries. Value added per capita in mining and processing is several times higher in industrial than in developing countries.

2.9 For some developing countries, the contribution to foreign-exchange earnings from exports of non-fuel minerals is even more important than the contribution to GDP. In Zambia, Chile, Zaire, Bolivia, Liberia, Sierra Leone and Surinam more than 75% of export earnings are derived from non-fuel minerals. Corresponding figures for other countries include: Guinea, Jamaica and Peru 40-55%; Haiti, Indonesia, Malaysia, Mexico, the Philippines and Tunisia 10 - 25%. For these nations, the strategic role of non-fuel minerals in attaining economic objectives is much greater than indicated by the contribution to GDP.

Patterns of Production and Reserves and Inferences Concerning the Allocation of Investment

2.10 In the near term, the maintenance or expansion of the share in production of non-fuel minerals by developing countries depends largely on investment that has been undertaken already. In the longer term, the production pattern will be determined by the exploration activity that is conducted at present. Direct information on investment expenditures is scarce and unreliable; reporting of investment tends to be fragmentary and understated; some investors make insufficient allowance for the provision of infrastructure and other expenses associated indirectly with the project. Information on exploration expenditures and reserves is closely held by mining companies. However, a rough assessment of the pattern of allocation of

1/ For some of these nations (Brazil, India) mineral expansion is of great economic importance not only as a potential source of expanded foreign exchange earnings but also to provide raw materials for the expected growth of domestic industries.
investment can be made by examining the changes in the developing countries' share of mineral output over time. These data reflect investment decisions only with a time-lag (3-8 years), but they are based on reliable production and export statistics.

2.11 Table 1 illustrates the diversity of experience observed for the four minerals of major importance to the developing economies, namely: iron ore, copper, bauxite and nickel. The four minerals have exhibited distinctly different production and (by inference) investment patterns over the past 25 years. Five-year moving averages have been employed in constructing the table to eliminate as far as possible the effects of the business cycle and year-to-year fluctuations in capacity utilization.

Table 1

<table>
<thead>
<tr>
<th>Period</th>
<th>Iron Ore</th>
<th>Copper</th>
<th>Bauxite</th>
<th>Nickel</th>
</tr>
</thead>
<tbody>
<tr>
<td>1950-54</td>
<td>15</td>
<td>45</td>
<td>63</td>
<td>11</td>
</tr>
<tr>
<td>1953-57</td>
<td>19</td>
<td>46</td>
<td>67</td>
<td>20</td>
</tr>
<tr>
<td>1956-60</td>
<td>24</td>
<td>49</td>
<td>70</td>
<td>21</td>
</tr>
<tr>
<td>1959-63</td>
<td>29</td>
<td>50</td>
<td>73</td>
<td>23</td>
</tr>
<tr>
<td>1962-66</td>
<td>33</td>
<td>48</td>
<td>73</td>
<td>26</td>
</tr>
<tr>
<td>1965-69</td>
<td>35</td>
<td>49</td>
<td>68</td>
<td>34</td>
</tr>
<tr>
<td>1968-72</td>
<td>37</td>
<td>47</td>
<td>62</td>
<td>37</td>
</tr>
<tr>
<td>1970-74</td>
<td>35</td>
<td>47</td>
<td>56</td>
<td>37</td>
</tr>
</tbody>
</table>

/a Based on five-year moving averages and excluding centrally planned economies.


Nickel and iron ore production in the developing countries have enjoyed steadily increasing shares in world production; the share of copper has remained relatively stable; while bauxite, the only one of the four in which the developing countries produce more than half of world output, increased for half the period and then declined from the mid-60's. A brief explanation of these movements follows.

2.12 The developing countries' share of iron ore production grew steadily with increasing investment by international mining companies. The investment pattern for iron ore as between developed and developing countries corresponds approximately to their shares of ore reserves, which are abundant and distributed widely. Iron ore is sold on long-term contracts, with relatively stable prices, to a few customers. Because investment in the developing countries has taken place primarily since World War II, associations dating from the colonial period have not played a major role in the development of iron ore deposits.
2.13 The share of developing countries in bauxite production, after increasing in the mid-1960's to more than 70% of world output, is now below the level in 1950. However, the reversal of the trend is attributable to the discovery and development of substantial reserves in Australia, where profitability of production has been the major factor.

2.14 The developing countries' share of copper production has not changed much. During the late 50's, a technological breakthrough permitted economic exploitation of the large, low-grade, open-pit deposits found in North America. However, although substantial investment was undertaken to introduce the new technique in developed economies, the share of developing economies in total output did not drop. In fact, it continued to increase thanks to the rapid transfer of technology to developing countries. Apparently political risk was not a significant factor affecting investment in copper extraction during this period.

2.15 The subsequent decline in the share of developing countries in copper output may be explained partly by productivity losses by developing country producers. However, the effects of political factors on new investment decisions by foreign and local mining firms cannot be discounted. Seventy-five percent of the developing countries' share of copper-mine output is produced by four countries - Chile, Zambia, Peru and Zaire. During the sixties, all four countries entered into renegotiations of concession terms with the foreign owners of the copper mines, leading ultimately to nationalization. In the early seventies Chile, and to a lesser extent Peru, did not welcome foreign investors. Recent political instability in Southern Africa has certainly not been conducive to new investment in copper deposits in Zaire and Zambia. Therefore it is probable that some relatively low-cost copper deposits in developing countries have not been developed.

2.16 Despite the increasing share of the developing countries in mine output of nickel, political factors have influenced the investment pattern in the nickel industry. There is little doubt that international mining firms would have invested in the large laterite nickel deposits in Cuba, if encouraged by the Cuban Government. However, this would have been at the expense of diverting investment from other developing countries such as Guatemala, Botswana, the Philippines and Indonesia.

2.17 The conclusion is that non-commercial factors have affected investment in some minerals, and these factors have influenced the choice between developed and developing economies and among different developing economies. The effects on the copper industry have been much greater than on nickel but the magnitude of any economic losses that may have resulted is difficult to assess. Moreover, depressed market conditions for the two minerals make it difficult to distinguish between the commercial and non-commercial factors that have affected the levels of investment for these minerals in developing countries.

2.18 Another way of looking at the allocation of investment in minerals as between the industrialized and the developing countries is to examine the relationship between known reserves of minerals and shares in mineral output. These figures are presented in Table 2.
The distribution of mineral output in the future depends on patterns of known reserves and current exploration expenditure. Known, commercially exploitable reserves of non-fuel minerals are distributed fairly evenly among major economic regions. However, because comparatively large areas of the developing countries remain unmapped, there is a higher probability of successful exploration in developing countries and it might be expected that a more than proportionate share of exploration investment would be directed to them.

2.19 This expectation is not supported by the facts. Data suggest that from 1970 to 1973 more than 80% of total expenditures on exploration in market economies was concentrated in four countries: Australia, Canada, South Africa and the United States. This strong bias in favor of developed countries has been confirmed more recently by European and American mining interests and government representatives, who, in discussions with World Bank staff, have insisted that investment in mineral exploration in the developing countries has been and remains depressed. On the other hand, the figures in Table 2 indicate that the proportion of known reserves of copper, bauxite and nickel located in developing countries increased in the years between 1970 and 1976. These figures are not necessarily inconsistent with the current view of investment in exploration as any new discoveries may have been concentrated in the late sixties and early seventies. In addition, reserve

---

**Table 2**

<table>
<thead>
<tr>
<th></th>
<th>Iron Ore</th>
<th>Copper</th>
<th>Bauxite</th>
<th>Nickel</th>
</tr>
</thead>
<tbody>
<tr>
<td>1970 Share in Output</td>
<td>38</td>
<td>45</td>
<td>63</td>
<td>37</td>
</tr>
<tr>
<td>1970-74</td>
<td>35</td>
<td>47</td>
<td>59</td>
<td>37</td>
</tr>
<tr>
<td>1975</td>
<td>41 (^b)</td>
<td>50</td>
<td>58</td>
<td>36</td>
</tr>
<tr>
<td>1970 Share in Reserves</td>
<td>40</td>
<td>60</td>
<td>61</td>
<td>56</td>
</tr>
<tr>
<td>1975-76 (^c)</td>
<td>38</td>
<td>66</td>
<td>76</td>
<td>70</td>
</tr>
</tbody>
</table>

\(^a\) Excluding centrally planned economies.

\(^b\) The share in iron ore production in 1974 was 34%.

\(^c\) Estimates by U.S. Bureau of Mines.

levels depend on prices for minerals so the changes indicated in the table may reflect adjustments for the sharp increases in mineral prices through 1974.

2.20 In conclusion, there is no immediate problem of exploration in the sense that there are many known and undeveloped sites for mineral exploitation in the next decade. The fact that some of these sites are not being developed suggests that there may be problems for some minerals (especially copper) and in some countries (Peru, Chile, Zaire). However, these conclusions are necessarily tentative, owing to the lack of reliable data on exploration expenditures and ore reserves and the unfavorable relationship at present between capital costs and product prices for minerals.

Projected Future Needs for Minerals and Associated Capital Requirements

2.21 Estimates of future mineral requirements and the associated level of investment are difficult to make with any degree of accuracy. Subject to this qualification, the Bank has made projections of the increase in production of the principal non-fuel minerals that would be needed to meet the estimated increase in world demand by 1985 (Table 3) and of the amount of investment required (Table 4) for the expansion of capacity. 1/ These estimates indicate broad orders of magnitude.

1/ These estimates have been published. See Kenji Takeuchi, Gerhard E. Thiebach and Joseph Hileny, "Investment Requirements in the Non-fuel Mineral Sector in the Developing Countries", Natural Resources Forum, Vol. 1, No. 3, April 1977.
## Table 3

Expansion of Mineral Output Required to Meet Estimated Demand 1976-85\(^a\)

<table>
<thead>
<tr>
<th>Mineral</th>
<th>Annual Production ('000 Tons)</th>
<th>Average Annual Increase in Output (%)</th>
<th>Developing Countries' Share in Output (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bauxite</td>
<td>68,973</td>
<td>155,000</td>
<td>8.4</td>
</tr>
<tr>
<td>Copper(^*)</td>
<td>5,674</td>
<td>9,090</td>
<td>4.8</td>
</tr>
<tr>
<td>Iron Ore</td>
<td>593,000</td>
<td>990,000</td>
<td>5.3</td>
</tr>
<tr>
<td>Nickel(^*)</td>
<td>560</td>
<td>1,150</td>
<td>7.5</td>
</tr>
<tr>
<td>Lead</td>
<td>2,491</td>
<td>3,300</td>
<td>2.9</td>
</tr>
<tr>
<td>Manganese Ore(^*)</td>
<td>5,950 /(^e)</td>
<td>10,500</td>
<td>5.8</td>
</tr>
<tr>
<td>Phosphate Rock</td>
<td>79,751</td>
<td>137,214</td>
<td>6.0</td>
</tr>
<tr>
<td>Tin(^*)</td>
<td>167</td>
<td>211</td>
<td>2.4</td>
</tr>
<tr>
<td>Zinc(^*)</td>
<td>4,410</td>
<td>7,400</td>
<td>5.3</td>
</tr>
</tbody>
</table>

\(^a\) Excluding centrally planned economies.
\(^*\) Metal content.
\(^e\) Estimate.

Source: IBRD Commodities and Export Projections Division, Economic Analysis and Projections Department.

2.22 The production figures for 1985 and the rates of increase in the output of individual minerals during the period 1976-85 (Col. (1)) are projections based on an average annual growth rate in OECD nations of 4.9%, a figure which has been used generally in recent Bank work related to economic forecasting. More recent information suggests that this growth rate may be too high. Alternative projections (within a range) for individual minerals obtained from sources close to the industry are shown in the second column (2) for the period. If actual rates of growth fall within these ranges, the related estimates of gross investment requirements for individual minerals in Table 4 (page 12) will be overstated. However, gross investment requirements of the mineral sector as a whole may not be much lower, if at all, than the totals shown in Table 4 since provision has to be made for investment in minor minerals (not listed in either table) which account for 10-20% of total investment in minerals.
Table 4

Estimated Gross Investment Required in the Mineral Sector
(in billions of 1975 dollars)

<table>
<thead>
<tr>
<th></th>
<th>1976-80</th>
<th>of which</th>
<th>1981-85</th>
<th>of which</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>World</td>
<td>Developing Countries</td>
<td>World</td>
<td>Developing Countries</td>
</tr>
<tr>
<td>Bauxite/Alumina/Aluminium</td>
<td>13.40</td>
<td>6.67</td>
<td>25.40</td>
<td>18.00</td>
</tr>
<tr>
<td>Copper</td>
<td>13.00</td>
<td>8.70</td>
<td>17.00</td>
<td>11.50</td>
</tr>
<tr>
<td>Iron Ore</td>
<td>32.60</td>
<td>16.45</td>
<td>47.30</td>
<td>18.50</td>
</tr>
<tr>
<td>Nickel /c</td>
<td>7.40</td>
<td>3.30</td>
<td>9.05</td>
<td>5.35</td>
</tr>
<tr>
<td>Lead</td>
<td>0.87</td>
<td>0.50</td>
<td>0.82</td>
<td>0.52</td>
</tr>
<tr>
<td>Manganese Ore</td>
<td>1.20</td>
<td>0.81</td>
<td>1.40</td>
<td>1.00</td>
</tr>
<tr>
<td>Phosphate Rock</td>
<td>1.55</td>
<td>0.64</td>
<td>1.20</td>
<td>0.87</td>
</tr>
<tr>
<td>Tin</td>
<td>0.45</td>
<td>0.42</td>
<td>0.11</td>
<td>0.11</td>
</tr>
<tr>
<td>Zinc</td>
<td>2.50</td>
<td>1.00</td>
<td>3.75</td>
<td>1.09</td>
</tr>
<tr>
<td>TOTAL</td>
<td>72.97</td>
<td>38.49</td>
<td>106.03</td>
<td>56.94</td>
</tr>
</tbody>
</table>

/a These estimates include investment needed to maintain the existing level of capacity.
/b Excluding centrally planned economies (CPEs).
/c Includes CPEs.

Source: IBRD Commodities and Export Projections Division, Economic Analysis and Projections Department.

2.23 These estimates project a significant rise in the level of production by the mineral-rich developing countries and some increase in their overall share. The investment required in the mineral sectors of these developing countries will be of great importance both to their overall development and to the orderly supply of minerals to the world economy. To achieve this increase, a total capital investment on the order of $38 billion (constant 1975 dollars) would be required for 1976-80 and a potential further $57 billion for 1981-85. Both estimates allow for replacement of the capacity of worked-out mines and other capital costs associated with maintenance of existing capacity. Foreign sources are likely to have to provide up to two thirds of the total requirement of $95 billion for the ten year period.

2.24 The ability of the international financial community to mobilize funds on this scale depends critically on the relationship between the developing countries and foreign sources of capital, including mining companies, multilateral institutions and commercial lenders. Past experience suggests that obtaining such an apparently vast sum should not be an impossible task.
given a favorable environment for foreign participation in mineral development. However, recently there have been major changes affecting this environment and the possible effects on capital flows in the mineral industry are now considered.

Problems for the Provision of Capital for Mining Ventures in Developing Countries

2.25 The projections in Table 4 have indicated that, in order to realize their full potential as producers of minerals, the developing countries must attract large amounts of capital from foreign sources. Among the changes that may effect adversely the prospects of obtaining capital from traditional sources are: (i) changes in ownership and management of mining ventures and the division of returns; (ii) the scale of current mining projects; (iii) the potential division ("depackaging") of exploration activity and exploitation of resources; and (iv) an increased perception of non-commercial risk, in part related to these other factors. The likely effects of these changes on capital movements are discussed below.

(i) Changes in Ownership and Management and the Division of Returns

2.26 The developing countries have sought to increase control over the exploitation of their own resources, and to increase their share of the returns from the sale of these resources. This has brought them into conflict with the international mining companies and often these conflicts have resulted in nationalization and expropriation of the foreign enterprise. The Chilean copper industry provides an example. The government's share of pre-tax profits increased from 16% in 1930 to 28% in 1940, 58% in 1950, and 69% in 1965; eventually it expropriated the foreign-owned mines and associated installations.

2.27 All governments have a strong incentive to press for the maximum returns from mining projects located in their territories, whether in the form of high dividends in the case of jointly owned projects, or increased royalties and taxes. Profits from these ventures may appear to the government as excessive, particularly because the need to cover the cost of unsuccessful ventures elsewhere from the profits of those that are successful is only apparent to the transnational company. A demand develops for control of, or at least participation in, decisions over rates of extraction, marketing, pricing policy and investment, decisions normally regarded as the firm's prerogative. In addition to direct governmental intervention in the project, there is the risk that the country may run into balance of payments difficulties that result in restrictions being placed on the firm's ability to repatriate earnings.

2.28 The mining firms' chief advantages in their dealings with host governments are their expertise in and/or control of the technology, markets and access to finance required to mount a large-scale mining project, but in the last resort control over the mineral reserves rests with the host government. Considerable pragmatism has been shown by foreign firms in adapting to
the new situation. Many companies have been willing to promote joint ventures with the government or its agencies, and even to accept full or substantial control of the venture by the developing country over a period in which the mining company’s interest is bought out. In return, host governments have been willing, in principle, to guarantee the conditions under which the venture will be permitted to operate. It is difficult to assess the extent to which these changing circumstances have inhibited the willingness of foreign firms to invest. The possibility exists that the most uncertain period is over, and that international ground rules for investment in minerals are beginning to be established, but, even if this optimistic assessment is valid, funds still must be found to replace those that would have purchased an expanded equity interest by a foreign mining company. Officials of mining companies contacted by the Bank in the course of this study and economists in the international lending institutions agree that the developing countries face a relative scarcity of risk capital for mineral development.

(ii) The Scale of Current Mining Projects

2.29 The importance of economies of scale has resulted in a trend towards massive mining operations in developed and developing countries alike during recent years. Improved technologies have been introduced in a continuing attempt to reduce costs, and these are extremely capital intensive. The financial needs of a modern mineral project are vast relative to those of the past. A firm now must undertake a very large financial commitment to establish a project on an economic scale. In addition, with the typical project costing over US$200 million, and sometimes three or four times that amount, few firms can expect to finance the project through retained earnings or equity issues, but must seek substantial amounts of loan capital. 1/ The scale and nature of the financial commitments associated with modern mineral projects have greatly enhanced the normal risks of investment in this industry and make mining firms reluctant to move into a country where these risks are compounded by political uncertainties.

(iii) The Potential Division of Exploration Activity and Exploitation of Resources

2.30 Exploration costs have also increased dramatically. Foreign companies are increasingly reluctant to undertake exploration ventures without previous assurance of their right to exploit any commercially viable ore bodies they may discover and the principal terms under which they may do so. Favorable terms for the eventual production stage usually are needed as an inducement to the foreign firm to incur the risk of losing its investment in exploration, but these terms may appear to the host government as overly generous when an ore body has been proved. To avoid this problem, governments

1/ The use of loan funds rather than equity is encouraged by cost-plus provisions in agreements between mining firms and host governments. Service payments on loans are costs to the project entity and are subtracted from earnings before taxes.
would prefer to acquire the necessary geological knowledge and techniques themselves and allow firms to compete for the right to operate the mines. Some independent facilities for geological investigation in developing countries do exist (the U.N. Revolving Fund for Natural Resources Exploration \(^1\), some private geological consulting firms) but the scale of these facilities is still small and cannot substitute to more than a limited degree for exploration activity conducted by large mining companies.

2.31 Mining companies regard knowledge of the location of exploitable reserves as "assets in the ground". The complexity of modern mining dictates that they remain as flexible as possible in exploiting these assets. Depending on the circumstances, a mining company may wish to sell its knowledge of the characteristics of an ore body and the right to exploit it to another company. If the government of a developing country is unwilling to permit such a sale, the company may feel that it would be "locked in" and be reluctant to incur the expenditure in exploration. Alternatively, a mining firm may decide that exploitation of a potential mine site should be delayed, and if this is not in accord with the host government's objectives, the government is likely to look elsewhere for a firm willing to exploit the ore body. Even if the company is prepared to go ahead immediately, the government may feel that it could negotiate a better deal with another firm. Or, it may decide to undertake the production phase itself through a national agency.

(iv) The Importance of Political Risk

2.32 No firm assessment can be made as to the magnitude of the effects on investment flows to the mineral sector of developing nations arising from an increased perception of "political" or "non-commercial" risk. Certainly the three factors discussed above suggest the possibility of an increase in the riskiness of investment from "non-commercial" causes. However, commercial and non-commercial elements are intertwined so inextricably that identification of the relative magnitudes of these elements is impossible.

2.33 However, it is apparent from the information obtained in the preparation of this report that the changed environment has caused many firms to be less concerned about outright expropriation and total loss of their investment than they are with the proliferating demands for renegotiation of contracts after investment funds have been committed. The profitability of modern mining projects is very sensitive to "creeping expropriation", and most national insurance schemes provide rather poor coverage against partial losses of this kind. Mining companies are understandably unwilling to undertake what appear to be attractive investments, if \textit{ex post} changes by host governments are likely to result in substantially lower profits. Prospects for a continuing flow of funds from private sources would be much brighter if contracts were so structured that they could be perceived by all parties as fair, both before and after a project has been initiated. This implies in the case of long-term contracts a recognition of the possible need for renegotiation on mutually acceptable terms.

\(^1\) A brief note on this Fund is included in Section IV below.
The Potential for Mineral Development Independent of Direct Foreign Investment

2.34 At the time of widespread nationalization in the sixties, mining companies had been operating in the developing countries for 10 and sometimes 30 years, broadly familiarizing local manpower and some staff with the operation and management techniques of a mining enterprise. Consequently, nationalized mining companies in countries such as Chile, Peru, Zaire, Cuba, Morocco, Tunisia or Mauritania, after a relatively short transition period, could maintain pre-nationalization output levels and subsequently could undertake large scale expansion without new direct foreign investment. This was possible by "depackaging" the integrated technical/financial/marketing services offered by foreign investors in the mining sector. In particular, government or locally owned mining companies in LDCs could supplement their own capabilities by:

(a) hiring technical assistance from consulting firms, contractors, or through more or less extensive managements contracts;

(b) forming their own marketing organization or establishing affiliations with metal traders (either independent or possibly related to the former foreign investor 1);

(c) financing new ventures from internally generated cash, government funds, suppliers' credits, loans from bilateral and international agencies, issues on the international capital market, and direct credits from raw material users in developed countries (or their governments) secured by long-term sales contracts.

The degree of "depackaging" achieved in developing countries varies widely. For example, whereas the Chilean copper industry has operated successfully for some years without external managerial assistance and with only limited engineering consulting needs for selected new projects, the Zambian copper industry still depends on a full-scale management contract with the former foreign owner who retains a minority interest.

2.35 Based on the empirical evidence to date, development of the mineral sector without direct foreign investment is a viable alternative for some developing countries if:

1/ For example, the Zairian state copper company is marketing through a new Zairian marketing organization, but uses SGM, its pre-nationalization sales agent; whereas the Guyana bauxite company broke entirely with its former owner ALCAN and contracted with a well-known US metal trader to market its output.
(a) some managerial and technical expertise has been
developed within the country and can be tapped to
promote mining ventures;

(b) the country is considered creditworthy by the
international financial community and can attract
loan capital;

(c) the country is prepared to forego foreign direct
investment and devote the necessary domestic
resources to mining rather than other sectors or
purposes.

Developing countries without experience in mining or other large industrial
projects would be ill-advised to undertake large scale mining projects
without foreign interests as co-ordinating sponsors and co-financiers. On
the other hand, as growth continues an increasing number of developing
countries will have the prerequisites to adopt a "depackaging" approach to
mineral development.

Summary

2.36 A continuing supply of non-fuel minerals is critical for the
economic health of the world economy. These minerals are also of particular
importance to those developing countries that produce them; they can be a
major source of foreign exchange earnings and domestic revenues, and serve
to stimulate development in other sectors. Both consuming and producing
countries therefore have a fundamental common interest in the efficient and
 equitable exploitation of the lowest cost mineral reserves.

2.37 However, the interests of developing countries and private foreign
investors have tended to diverge rather than come together. Developing
countries have shown increasing dissatisfaction with the enclave arrangements
that were typical in the past. Their claim for a greater voice in decisions
concerning the exploitation of mineral resources in their territories and a
more balanced sharing of the economic and social benefits is coming to be
generally recognized. But the claim is often pressed to the point where for-
eign mining companies and investors hesitate to incur the risks of committing
large funds to mining ventures located in these countries. Exploration is
inherently the riskiest phase of mining investment and it is here that most
observers have reported a major drop in activity, although the situation is
clouded by the economic recession of recent years. It would be prudent to
assume, however, that unless the differences between host countries and
foreign mining firms can be bridged, there will also be a loss of production
in the developing countries some years from now.

2.38 The major problems that inhibit capital flows for mineral develop-
ment have been identified. These problems stem from changes in the environ-
ment for mineral production that add to the inherent riskiness of investment
in the mining industry. It is not possible to distinguish clearly between the commercial and political aspects of this risk. For some countries domestic development of mineral resources appears to be a viable alternative to direct foreign investment but most countries still require external assistance, both of capital and expertise.

2.39 Methods for overcoming these problems and providing external assistance to developing countries on mutually acceptable terms are discussed in section IV, where consideration is given to the role to be played by the international development institutions, particularly the World Bank Group.
III. PROSPECTS FOR FUEL MINERALS AND ENERGY SUPPLIES IN DEVELOPING COUNTRIES

3.1 There are important differences for most developing countries in the way non-fuel minerals and energy minerals affect them. The major concern in non-fuel minerals is whether and how production in mineral-rich developing countries can keep pace with potential world consumption which is generated primarily by the demands of the industrial nations. At least in the medium term, the majority of the developing countries can benefit only indirectly from an ample supply of hard minerals. The developing countries that are major producers appear to have divergent interests from those of the consuming nations. However, the developing countries consume fuel minerals directly, and most of them share the problems of the energy-importing industrial nations, namely balance-of-payments difficulties and reduced potential for rapid economic growth. In energy and fuel minerals there is a community of interest in that virtually all nations have a strong incentive to develop additional sources of energy as rapidly as possible.

3.2 The problems faced by the oil-importing developing countries (OIDCs) in providing the energy required to sustain acceptable levels of economic growth have been greatly exacerbated by the quantum jump in oil prices since late in 1973. At the same time the relative economics of imported oil and domestically produced energy have drastically changed. Over the period 1955-1970 crude oil prices f.o.b. Persian Gulf decreased in real terms by about 60%. In the early 1970's production costs per barrel of crude oil in non-OPEC countries were between $2.80 and $5.00, while the price of OPEC oil was about $1.80 f.o.b. Persian Gulf, and under $3.00 c.i.f. the refineries of the importing countries. At the same time, investment costs of new production capacity were typically of the order of $3,000 - $4,000 per barrel-day in non-OPEC countries, compared with about $200 in the Persian Gulf and Libya and $800 - $1,000 in other OPEC countries. To be profitable, investment in petroleum development had to be located in OPEC nations, so petroleum reserves in other developing nations were not exploited and exploration to expand these reserves was very limited. An important further consequence of low oil prices was the commitment to petroleum for power-generation. The capital requirements for power based on petroleum are much lower than those associated with the alternative sources (hydro, nuclear, geothermal, solar), and somewhat lower than in the case of coal fired plants.

3.3 Following the quadrupling of oil prices in 1973/74 and the subsequent increases, c.i.f. costs of crude are now about $11 (in 1975 dollars) per barrel. Future price movements are uncertain but, barring some unforeseen technological break-through in the provision of energy, the real

1/ Historical prices are quoted at actual levels. Others are quoted in constant 1975 USA dollars.

2/ The reference crude oil, Arabian Light, is approximately $12.09 per barrel in current prices (January 1977).
price of oil is not likely to decline greatly, at least in the next fifteen years. This assessment is based on the distribution and cost structure within the petroleum industry, the growing demand for energy, and the costs of providing energy from alternative sources in the medium term. As a consequence of the higher price of oil, all consuming nations have an incentive to economize in their use of energy; to develop alternative sources of petroleum; and, where possible, to substitute alternative forms of energy for petroleum.

3.4 For the oil-importing countries in particular there are two principal implications of the new level of petroleum prices.

(i) In the short run, given a very limited ability to conserve oil or substitute other energy sources for petroleum, they must continue to borrow to maintain imports of oil at the required levels and/or reduce their rates of growth.

(ii) In the longer term most have the opportunity to develop alternative energy sources. Because oil prices are higher it is now economic for them:

(a) To develop what were previously high cost domestic sources of petroleum and to endeavour to expand their known reserves;

(b) To expand the provision of energy from alternative sources in order to substitute, where possible, for petroleum based energy supplies.

3.5 Possibilities of substitution for petroleum are greatest in oil-based power production. Due to the increased cost, countries with large oil-based systems will find it relatively attractive to switch to the known alternatives. However, the feasibility and desirability of greater use of these alternatives vary greatly by system size and the domestic availability of the alternative sources of energy, and depend also on the planning horizon. Even where the system size is not a limiting factor, the development of power capacity from scratch using non-oil resources typically involves much longer lead times (extensive feasibility studies for hydro sites, mining development, regulations for nuclear safety, etc.), longer construction periods and greater potential manpower and equipment supply problems. In addition, hydro and nuclear plants require 50% – 100% more capital for development than comparable oil-fired plants; coal-fired plants also require rather more capital. Since imported energy requirements consist almost entirely of oil \(^1\), a reduction in imported oil can be achieved in the short term only at the expense of a

\(^1\) In Table 5 (page 23) OIDCs are shown to have imported 75% of their oil requirements in 1976 compared to an approximate balance in non-oil energy supplies.
reduction in energy supply and, in consequence, lower economic growth, as non-productive uses of oil (private transport and residential and commercial heating) are minimal in developing countries.

3.6 For the longer term, developing countries need to marshal effectively the financial resources and technical expertise necessary to expand their indigenous energy sources. To an unprecedented extent, it is the OIDCs themselves that will have to decide how to plan and implement a strategy for their own energy development. Before 1973 investments in petroleum development in oil-importing nations depended primarily on the decisions of the international oil companies which were mainly based on exploiting the lowest cost world reserves of oil. 1/ In the changed circumstances, the oil companies can function no longer as the effective decision-makers for many of the OIDCs. The new situation demands national energy policies. While it is economic to exploit the domestic energy resources of the OIDCs, to do so efficiently it will be necessary to establish priorities for development within an integrated energy program.

3.7 Without such a program, the OIDCs may be unable to command the necessary resources. In petroleum particularly, there are a relatively large number of consulting firms that can provide solutions for the specific technical problems of oil production in the OIDCs. Similarly, private capital resources are available, particularly for oil production, but without external assistance the prospects of attracting this capital are poor for many of the OIDCs. An immediate requirement of many of these countries is expert help to establish priorities in the context of an overall program, then to identify the specific financial and technical needs of a given project and to obtain the appropriate package of services to implement the project successfully.

3.8 In the remainder of this section attention will be focussed on the petroleum industry 2/ with references to the other energy sources where

1/ Diversification, security of supply to downstream refining and marketing were also important objectives.

2/ Oil and gas are not distinguished here, though currently and in prospect oil is easily the more important. Problems related to other fuel minerals are similar in kind but much less important in terms of energy content and the value of production and investment. During the period 1968-73 investment in coal represented less than 5% of that in oil, and in gas about 9-10%. In the year 1974 coal consumption represented about 18% of oil consumption (mainly due to the high use of coal in India) and gas consumption about 8%. 
appropriate. This reflects both the absolute importance of petroleum and
the dimension of the problems for the provision of energy arising from
oil price increases. Attention is directed first to projections of future
consumption of petroleum by non-OPEC developing nations and their potential
for increasing production and known reserves. Secondly, projections of
capital requirements are provided and the problems that inhibit foreign
capital inflows and expansion of oil production are considered.

Past and Future Patterns of Consumption and Production of
Petroleum and Reserve Levels in Non-OPEC Developing Countries

3.9 Petroleum prospects for non-OPEC developing countries differ
markedly. Four are major oil exporters (Oman, Brunei, Bahrain, and Trinidad
and Tobago) and a further nine are minor oil exporters (Angola, Bolivia,
Congo, Egypt, Malaysia, Mexico, Syria, Tunisia and Zaire). Peru may soon
become a net exporter. For these countries the increase in oil prices
offers significant advantages. Changes in their domestic energy strategies
can be implemented without undue haste and any oil released for export by
developing other domestic energy sources can help their balance-of-payments
positions. In 1975 the nine minor oil exporters had a market share of
only 2% in total oil exports from all developing nations. However, based
on the available information on their oil development plans, this share
could increase to about 7% by 1980 and to about 8% in 1985. For these
countries, attracting resources to develop energy sources, specifically
oil reserves, should not be a problem.

3.10 For the oil-importing developing countries the situation is very
different, although it is important to recognize once more the varied
circumstances of the countries within this group. Primary energy con-
sumption in OIDCs increased by about 6.5% per annum from 1960 to 1975
(oil consumption increased at 7.2% p.a.) and to maintain a medium growth
rate (approximately 4.5%) through the decade to 1985 it is projected that
energy consumption will have to grow at about 6% to 1980 and at about 5%
thereafter, allowing for the implementation of programs to economize energy
use. If oil imports are not to rise as consumption of energy increases,
a growth rate of this order implies a heroic effort to develop domestic
resources. The abilities of individual countries among the OIDCs to make
this effort are not distributed evenly. Prospects for some countries
are good; others will require considerable amounts of external assistance
even to approach what are modest goals in terms of their economic needs.
A summary of the projections of energy balance for OIDCs is provided
in Table 5.

1/ An integrated discussion of the problems of energy provision may be
found in "Energy and Petroleum in non-OPEC Developing Countries 1974–
financial dimensions of energy problems are described in Efraín
Friedman "Financing Energy in Developing Countries," Energy Policy
March 1976 (World Bank reprint series No. 27).
Table 5

Oil Importing Developing Countries' Energy Balance 1960-85

Assuming Medium Projection of GNP Growth and $11.50 price (in 1975 $)

(million b/d of oil equivalent)

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Inland Consumption</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Oil</td>
<td>2.8</td>
<td>5.5</td>
<td>6.8</td>
<td>7.0</td>
<td>7.2</td>
<td>7.8</td>
<td>8.4</td>
<td>9.8</td>
<td>12.5</td>
</tr>
<tr>
<td>Non Oil</td>
<td>(1.5)</td>
<td>(3.3)</td>
<td>(4.2)</td>
<td>(4.3)</td>
<td>(4.3)</td>
<td>(4.4)</td>
<td>(4.5)</td>
<td>(4.8)</td>
<td>(5.4)</td>
</tr>
<tr>
<td></td>
<td>(1.3)</td>
<td>(2.2)</td>
<td>(2.6)</td>
<td>(2.7)</td>
<td>(2.9)</td>
<td>(3.4)</td>
<td>(3.9)</td>
<td>(5.0)</td>
<td>(7.1)</td>
</tr>
<tr>
<td><strong>Production</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Oil</td>
<td>1.8</td>
<td>3.3</td>
<td>3.6</td>
<td>3.8</td>
<td>4.0</td>
<td>4.6</td>
<td>5.2</td>
<td>6.7</td>
<td>9.5</td>
</tr>
<tr>
<td>Non Oil</td>
<td>(0.5)</td>
<td>(1.1)</td>
<td>(1.1)</td>
<td>(1.1)</td>
<td>(1.1)</td>
<td>(1.3)</td>
<td>(1.5)</td>
<td>(2.3)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(1.3)</td>
<td>(2.2)</td>
<td>(2.5)</td>
<td>(2.7)</td>
<td>(2.9)</td>
<td>(3.5)</td>
<td>(3.9)</td>
<td>(5.2)</td>
<td>(7.2)</td>
</tr>
<tr>
<td><strong>Bunkers</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(all oil)</td>
<td>0.2</td>
<td>0.3</td>
<td>0.3</td>
<td>0.3</td>
<td>0.3</td>
<td>0.3</td>
<td>0.4</td>
<td>0.5</td>
<td></td>
</tr>
<tr>
<td><strong>Net Imports</strong></td>
<td>1.2</td>
<td>2.6</td>
<td>3.5</td>
<td>3.5</td>
<td>3.5</td>
<td>3.5</td>
<td>3.5</td>
<td>3.5</td>
<td>3.5</td>
</tr>
</tbody>
</table>

Source: 1960-74 World Energy Supplies, 1950-74
UN Series J.19, United Nations
1975-85, World Bank Estimates (Economic Analysis and Projections Department)

Petroleum Potential of Oil-Importing Developing Nations

3.11 An assessment of the petroleum potential of the OIDCs (some 70 nations) is provided in a report prepared for the Bank in 1975 by BEICIP, an affiliate of the French Petroleum Institute. Emphasis was given to the potential for expanding both the production capacity and the known reserves of the OIDCs and for reducing import dependence, thus saving foreign exchange.

3.12 The study estimated the "ultimately recoverable oil resources" (URR) 1/ of this group of countries at about 60 billion barrels (bb), or six times their current proven reserves. 2/ This is a small volume of oil

1/ "Ultimately recoverable resources" denotes proven reserves (i.e., measured quantities recoverable from known fields at current prices and costs assuming presently available technology), plus undiscovered resources (i.e., resources that are inferred to exist in both explored and unexplored areas and could be exploited under both current and future economic and technological conditions.)

2/ The consultants have emphasized the conservative nature of this estimate. The figures provided for the petroleum potential of the OIDCs should be regarded as "lower bound" projections.
compared with the URR of the world as a whole (about 4%) but it means that the OIDCs' petroleum potential is significant in relation to their oil consumption needs during the next 15 years or so. However, the prospective oil-bearing areas of the OIDCs are substantially underexplored. The ratio of their proven to ultimate resources (17%) is much lower than that of the rest of the world (40%). If present investment trends continue, by 1985 they will have discovered about 30% of their URR, while the rest of the world will have discovered about 70%. The study found that petroleum potential is distributed widely. Ten of the seventy OIDCs currently produce oil and in most of these countries the potential for expansion is considerable. By 1985 as many as forty could be producing oil, including many low-income countries of Africa, Asia and Central America.

3.13 In view of the urgency of reducing energy costs and oil import bills if growth rates of the OIDCs are to be maintained at acceptable levels, an attempt was made in the study to estimate the benefits and costs of a program designed:

(a) to raise the ratio of proven to ultimate resources to 50% by 1985 instead of the 30% level that is indicated by existing investment trends; and

(b) to reach by that date an annual production of 256 million metric tons (approximately 5.1 million b/d) compared with 52 million metric tons in 1975. This target is deemed by BEICIP the maximum that reasonably could be attempted. It implies a doubling of the rate of discovery and development and also a far greater geographical diversification of investments in OIDCs; however, it would still leave them considerably behind the rest of the world (70% URR by 1985) in terms of knowledge of reserves.

3.14 If these objectives could be realized, the effect would be to reduce substantially the OIDCs' energy costs and oil import bills, and, for some, to increase export earnings. Allowing for a 5% growth rate in oil consumption, a successful development effort of this magnitude could reduce the oil deficit from 70% of consumption to 6% in ten years. As a result the OIDCs as a group would become almost self-sufficient and their annual oil import bill would be reduced by about $8.6 billion; that

---

1/ Argentina, Brazil, Burma, Chile, Colombia, India, Pakistan, Turkey, Tunisia and Zaire. Recently Zaire has joined the ranks of the minor oil exporters.

2/ Following a commercial discovery, production facilities may be built within 2-5 years and production may last from 10 to 20 years.
is a reduction of 87% in real terms. 1/ Eighty percent of their oil production in 1985 would substitute for imports, particularly in large countries such as Bangladesh, Brazil, India and Thailand. In some half dozen low-income countries with small domestic markets and relatively good oil prospects (e.g., Chad, Niger, Guatemala), new production could be exported as indicated before. These exports might reach about 50-60 million metric tons per year by 1985 (equivalent to about 4% of current OPEC exports), and contribute decisively to the economic development of these nations. However, to increase petroleum production rapidly in the OIDCs already producing oil and to develop the potential of some 30 to 40 more countries would require very substantial, and for some of these countries totally unprecedented, inputs of capital and skills, most of them from outside sources.

Requirements of Capital and Technical Assistance by OIDCs

3.15 The OIDCs main requirements for petroleum development are:

(i) "High risk" capital, mainly for exploration;

(ii) "Development" capital for constructing production, treatment and delivery facilities following a "commercial" discovery; and

(iii) The managerial and technical skills needed to explore and produce oil under increasingly complex and difficult conditions (e.g., deeper wells, high-viscosity oils, off-shore operations).

The majority of the OIDCs can expect severe problems in meeting these requirements, the most pressing of which is the difficulty in mobilizing enough risk capital.

3.16 OIDCs wishing to begin petroleum development generally will need to attract foreign finance for the exploration phase. 2/ In most developing countries exploration has been financed by international oil companies,

1/ It is important to acknowledge that this improvement in the balance of trade does not necessarily mean an equivalent improvement in the balance on current account. Depending on the method used to finance oil development, service payments on foreign funds could be as burdensome as payments for oil imports. International assistance on appropriate terms is essential if this outcome is to be avoided.

2/ Before detailed and costly seismic and drilling exploration takes place in a perimeter, preliminary geological and geophysical surveys are carried out. These surveys cost only a fraction of what the subsequent exploration would involve. In some developing countries, UN agencies and the governmental agencies of developed countries have provided grants for preliminary exploration intended to promote the interest of future investors in areas as yet little explored.
because of their greater ability to provide risk capital. For an operating oil company, outlays of production development capital (excluding downstream investments) are typically five times those of high-risk capital for exploration. Since the risks in production development are normal business ones, financing for this purpose may be obtained from alternative sources such as private banks.

An Estimate of Overall Capital Requirements

3.17 As there is no reason to expect that oil exporting developing countries (both major and minor) will have difficulty in attracting sufficient internal and external financial flows, attention can be directed to the needs of the oil importers. The capital requirements of the OIDCs are estimated on the basis of two alternative sets of assumptions. The first projects a continuation of recent trends, including a slow increase in ODA, in the petroleum sector. These assumptions are broadly consistent with the projections in Table 5 where growth rates in energy consumption and production were assumed to be compatible with a barely acceptable 4.5% growth rate in GDP. The second alternative assumes a concerted effort by the OIDCs to fulfill the maximum production targets proposed and recommended as desirable by the BEICIP study (see 3.13). The results of these alternatives are summarized in Table 6.

### Table 6

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Production *</td>
<td></td>
<td>1.1</td>
<td>2.3</td>
<td>5.1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>12</td>
<td>30</td>
</tr>
<tr>
<td>Consumption *</td>
<td></td>
<td>4.3</td>
<td>5.4</td>
<td>5.4</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* Million barrels per day.

3.18 The figures refer only to expenditure for exploration and for production facilities. In addition, investment will be required for transportation, refining and marketing and, generally speaking, these downstream investments are of the same order as those for exploration and development. Total investment requirements under the second alternative, which allows for almost completely eliminating dependence on imported oil, are of the order of $60 billion (1975 dollars).

1/ In 1975 dollars. Average investment per barrel per day of additional production (including replacement of exhausted fields) is estimated at $6,000 in alternative 1 and $6,200 in alternative 2.
3.19 Two main types of country situation are worthy of examination. The first type describes the situation of some ten countries where technically competent national oil companies already exist and can act as the main agents of an expanded development program. It includes Argentina, Brazil, Chile and India, where national oil companies have had almost exclusive rights, and others, such as Burma, Colombia and Pakistan where national oil companies by themselves, or more usually in co-operation with foreign oil companies, have carried out petroleum operations. The second type, including the bulk of the developing countries, corresponds to the situation of some 40 countries which lack sufficient domestic petroleum expertise to develop their resources independently and where, for the next ten years, development efforts will have to rely largely on capital and expertise provided by foreign companies. This second group includes about thirty countries which are relatively better endowed geologically and therefore of potential interest to foreign companies, provided that they can offer adequate financial incentives and reasonable stability. Among these are Bangladesh, Guatemala, Nicaragua, the Philippines, Thailand, Vietnam and most countries on the West Coast of Africa.

3.20 For countries with competent national oil companies possessing exclusive rights, petroleum development generally has been financed in the past through government contributions, internal cash generation and domestic and foreign borrowings. In the last few years these policies have changed. The urgent need to find new sources of domestic oil has called for much larger amounts of risk-capital for exploration. In addition, much of this exploration has involved work in more difficult areas (e.g., off-shore and jungle) where national expertise was in shorter supply. Consequently, India, Brazil, Chile and now Argentina have invited foreign companies to participate in their exploration and development efforts through service contracts and/or production sharing agreements. The major contribution of these foreign companies is risk-capital and the advanced technology required for exploration. Should discoveries be made, most of the finance for development would have to come from the national oil companies and the traditional domestic and foreign suppliers. As projects of this type are likely to have a very high financial and economic return, there should be little problem in borrowing for a specific project. However, problems are more likely to occur at a country level as the total amounts involved will be unprecedented. This first group of countries is expected to require about $9 billion of the $30 billion estimated in Table 6 for all OIDCs assuming Alternative 2.

3.21 In the much larger number of countries with insufficient domestic expertise, finance for a petroleum development program will have to be provided by foreign investment. This is particularly true because of the need for substantial risk-capital during the exploration phase. Although a foreign investor is not necessarily essential for a country with access to the financial resources required to employ the appropriate consultants, direct involvement by a foreign interest may be very desirable. Any OIDC should obtain the best possible technical advice before making decisions but it would be unwise to let technical advisers who are not taking substantial financial risks assume responsibility for making investment decisions.
3.22 In practice few, if any, of the OIDCs of this group are likely to have available the risk-capital needed for this or other purposes. The question therefore becomes, how can they attract risk capital if it is available elsewhere? Indications are that with the appropriate financial terms, geological prospects, confidence in a country's social and political stability and its treatment of foreign investors, then risk capital for exploration may become available.

3.23 In terms of amounts the financial requirements for exploration investment are relatively minor. The main requirements—about four to five times higher—are for the construction of production facilities. In most cases these funds are likely to be provided on a quite different basis. The trend is for foreign investors and a "de jure" national oil company jointly to take responsibility for this financing. Equity contributions may be made by the country and the foreign investors and both may endeavour separately or together to tap a variety of external sources of finance: suppliers credits, private banks, development institutions. This was not the pattern in the past, when foreign investment in oil was done almost entirely under concession-type agreements. However, this pattern is now effectively obsolete as developing countries and foreign investors have found it unworkable and it has been replaced by joint ventures of various forms.

3.24 In summary, approximately $60 billion will be needed by 1985 if the OIDCs are to expand known reserves and production of oil to the levels recommended in the BEICIP study. If this expansion could be achieved, the OIDCs as a group would become virtually independent of imported oil. Of the estimated $60 billion, about half will be required for downstream investment, and, of the remainder, $5 billion will need to be risk capital for exploration, with the balance of $25 billion for production facilities. While there are many potential sources of funds for investment in production facilities, risk capital can be provided only by investors willing to accept the consequences of (and to participate fully in the returns from) the investment decision. In total, some 40 OIDCs should benefit from an accelerated program of petroleum development, and in about ten of these national oil companies are expected to play the leading role.

**Technical Assistance Requirements**

3.25 As a result of the new energy situation and the suddenness with which it came about, most countries—not only the developing countries—were unprepared in terms of institutional organization and domestic skills for tackling their energy development problems, particularly those connected with:

(i) Total energy sector planning; and

(ii) Fuel exploration and development.

To deal with these matters developing countries will need greatly increased technical assistance, including special intensive training programs.
The formulation of National Energy Policies is a complex endeavor requiring the professional capability to evaluate intelligently alternative strategies in terms of costs and benefits; security of supply; impacts on growth, employment, inflation, environmental quality, balance of payments, and other critical parameters; and to recommend the institutional mechanisms and policies required for successful implementation. Ultimate responsibility for carrying out energy studies and formulating energy policies can rest only on national authorities. In some cases, data may have a strategic or commercial value which prohibits disclosure to foreign experts; in all cases, policy decisions involve value judgements that are not quantifiable or amenable to objective evaluation by foreigners. For these reasons, the most appropriate role for technical assistance is advising national policy makers on how to carry out the studies of primary importance to them in structuring energy policies. To fulfill this role high quality, specialized analysts - both foreign and local - familiar with the best techniques and policies available for planning energy development are required. At this time, very few countries have the database, the methodology, the skilled manpower and the institutions to handle these tasks; and, even when they do, their experience in using these resources for policy formulation is recent and limited.

More specifically in the field of petroleum, except for some ten OPECs with operating national oil companies, all others lack the professional managerial and technical expertise to formulate and control petroleum development policies or to implement them, even with help from foreign consultants. The intricacies of designing petroleum exploration, production and marketing agreements appropriate to the peculiar and changing characteristics of each prospective area and discovered field (costs of production, transportation, world market prices and other conditions) call for able and flexible negotiating teams. Ignorance on the part of developing countries may lead to their blindly copying agreements, such as those current in OPEC countries, which would be totally inappropriate in less well-endowed countries; or at the other extreme, to contracts that benefit foreign oil companies so disproportionately that they are not likely to endure after the country realizes this is so. Technical assistance in this field should include advice on petroleum legislation, negotiation and supervision of agreements with foreign oil companies, assessment of data on resources and reserves, planning and supervision of surveys and exploration, organization of training programs, particularly for national "negotiating teams".

The above forms of technical assistance are of the type normally provided by international development banks in the course of their economic, sector and project work. However, it is important to understand that the banks do not provide this assistance directly. They employ their staff in identifying requirements for technical assistance and in helping the country to obtain it from the best available sources, defining clearly the nature of the work to be performed and supervising the quality of the advice and services provided. The increased need for technical assistance has been pointed out in many international forums. In the UN 7th special session of September 1975, the U.S. Government proposed and the General Assembly agreed that a study be prepared by the Secretary General regarding the establishment
of an International Energy Institute to assist all developing countries in energy resources research and development. Little progress has taken place so far. The types of assistance envisaged include those mentioned above but in addition cover other areas such as:

(i) Encouragement of research, development and demonstration of new technologies particularly appropriate for use in the developing countries (e.g., biogas, solar cookers).

(ii) Establishment of an information/documentation center on energy economics, technology consulting services, demand/supply/trade/prices, etc.

(iii) Organizing training programs in energy planning, production and utilization techniques, including fellowships, establishment of ad-hoc educational and other programs.

This latter form of technical assistance would be a useful complement to that which the international development banks provide in the course of their operations.

Problems for the Provision of Capital and Technical Expertise

3.29 Even though the situation in the oil industry is not directly parallel to that in non-fuel minerals, many of the problems to be confronted in raising finance for oil development are similar. They arise from: (i) the absolute volume of capital to be committed; (ii) the changes that have occurred in patterns of ownership, management and sources of finance; (iii) the importance of political risk (especially as regards renegotiation of contracts ex post, as this is likewise of great concern to the oil companies); and (iv) the separation of exploration activity from production and downstream processing. Such differences as exist in these respects between non-fuel and energy minerals were discussed above in connection with the capital requirements of the oil-importing developing countries.

3.30 The technical problems to be solved to ensure successful exploration and production of petroleum in OIDCs should not be underestimated. However, the prospects for obtaining external technical assistance with these problems are good. There are many competent and experienced consulting firms specializing in all aspects of petroleum development that provide services to the major oil-companies and to existing national oil companies and governments. The services of these companies can be commanded for solving the problems of the OIDCs, if the finance can be made available. The main difficulty for many, if not all, of the OIDCs lies in designing a package of financial and technical services appropriate to their needs and in successfully implementing the design.

3.31 Mention has already been made of the importance of developing petroleum resources as part of an integrated program for energy expansion. Without such a program there is a serious risk of a costly misallocation of resources.
The ability of a developing country to attract financial resources and skills on a sustained basis is likely to be enhanced if foreign firms are confident that appropriate priorities in the energy sector have been established, suggesting competent management of a co-ordinated program.

3.32 Unfortunately, managerial and policy assistance for establishing priorities in a whole sector are much less readily available than more specific technical advice. A major source of such assistance is provided by the international development institutions but, in the past, their participation in oil and other mineral development (as compared with power generation) has been minimal. In order to help provide the overall guidance in energy matters required by the majority of OIDCs, it would be desirable for the development institutions to expand their role in the energy sector, in particular their role in the development of fuel minerals.

Summary

3.33 By contrast with non-fuel minerals, the new price structure in oil (and the overall energy sector) has rendered profitable the exploitation of many fuel mineral reserves and alternative energy sources in developing countries that previously were uneconomic. The rapidity with which the energy situation has changed has left many countries (not only developing countries) unprepared to implement new programs to lower the cost of energy and to reduce the need for imported petroleum. Failure by oil-importing developing countries to respond quickly and effectively to the new circumstances will be detrimental to their prospects for growth. Unfortunately, many of them have neither the institutional organization nor the domestic skills to tackle their energy development problems expeditiously.

3.34 The main prerequisites for a rapid response to meeting petroleum requirements are risk capital for exploration; development capital for provision of production, treatment and delivery facilities; and managerial and technical skills. Although development capital may be obtained from a variety of commercial sources and multilateral lenders, there is a greater need for development capital from these sources as the transnational oil companies are no longer in a position to satisfy the same proportion of these requirements from internal funds. In addition these companies are no longer willing to commit themselves to investment for exploration without firm assurances of the terms under which a commercial discovery may be exploited. Mechanisms for dealing with this problem are needed, and the possible role of international development banks in this respect is discussed in Section IV. In some cases national companies can undertake development of national oil resources. There is a relative wealth of technical consultant firms in the oil industry that could help national companies, provided the companies can obtain finance. They may need external help in securing the volume of capital required.

3.35 In the longer term, national companies can train experts for employment in the oil industry and until then foreign consultants may prove adequate for their needs. A more important deficiency in the short term is the lack of the technical and policy skills required for overall planning of the
energy sector. Emphasis on oil problems should not obscure the fact that oil comprises only one dimension of the energy requirements of the developing countries. New initiatives and expenditures in petroleum development must not be undertaken to the detriment of coal or nuclear development where feasible; nor must investment in power-generation be neglected in a rush to implement new oil projects.

3.36 Managerial (policy) assistance of this kind cannot be expected from the oil companies or other private companies or consultants but without it the likelihood for a misallocation of critically scarce capital resources is great. The main potential sources of expert advice to establish priorities in the overall energy sector are the international development institutions.
IV. THE ROLE OF INTERNATIONAL FINANCIAL INSTITUTIONS IN MINERAL DEVELOPMENT

4.1 The preceding sections of this report have given an account of the present condition of the mineral industry as it affects the developing countries, and of the problems that must be resolved if they are to exploit their resources in an efficient and orderly fashion. Based on the analysis presented in Annex B, it is clear that an international investment insurance scheme would be fraught with many difficulties and that the creation of a new agency with insurance as its main function would be neither feasible nor generally acceptable. However, there are several steps that can be taken which would contribute to expansion of mineral production. These steps relate to the role of an "international presence" in helping to bridge the differences between host governments and foreign mining concerns, thus leading to fairer and more lasting agreements for the exploitation of mineral reserves in the developing countries; to the ability to attract foreign investment for mineral exploration and production in these countries, particularly risk capital; and providing developing countries with the advice and assistance they need to draw up and implement comprehensive plans for the development of their mineral sector. As noted in the earlier sections, the existing development institutions are capable of carrying out all three of these functions, and indeed regularly do so in the sectors in which they operate. They now need to make a greater input of staff and financial resources into the mineral sector than they have made in the past. The present section is concerned with what the World Bank Group has done and could do in this field. But its recommendations apply mutatis mutandis to other international financial institutions, notably the Regional Banks.

4.2 Lending for mineral development has played a small part in Bank Group operations. Except for a few large mineral projects financed by the Bank, it has contributed relatively little to the development of the mineral sector in developing countries. IFC's investments in non-fuel minerals have constituted a significant part of its total portfolio, and its contribution to some individual projects has been critical. However, in financial terms its investments have been small. The Bank has of course been concerned with the energy sector for a long time, and an important, although diminishing, share of its financing has been for power generation, transmission and distribution facilities; it has also financed a number of natural gas projects. For the reasons explained earlier, the Bank has only recently begun to consider petroleum projects; they were either uneconomic at prevailing prices for oil, or if profitable could attract funds without the assistance of the Bank.

4.3 The following table gives a summary of total Bank Group commitments for non-fuel minerals and energy development up to the end of the last fiscal year, and plans for the current five year period (FY 77-81). Commitments for energy development up to FY76 totalled $8443 million, representing 19% of total commitments; almost all of it was for power projects. For the FY77-81 period, Group commitments for energy development are forecast at $6 billion. A small but significant increase is envisaged for oil, gas and coal projects. Group commitments for non-fuel mineral projects totalled
about $600 million in the period through FY76, or about 1-1/2% of total commitments. An increase in the financing of such projects to about one billion dollars had been envisaged for the current 5 year program on present plans. The amounts involved for the Bank/IDA would be about $150 million a year on average, which implies participation in 2-3 projects a year.

Table 7

Bank Group Operations, FY74-76 and Planned for FY77-81 in Non-Fuel Minerals and Energy Development

<table>
<thead>
<tr>
<th></th>
<th>Through FY76 ($ million)</th>
<th>% of Total Commitments</th>
<th>FY77-81 ($ million)</th>
</tr>
</thead>
<tbody>
<tr>
<td>I. Non-Fuel Minerals</td>
<td>611 /1</td>
<td>1.4</td>
<td>1000</td>
</tr>
<tr>
<td>II. Energy Development, Total</td>
<td>8443 /2</td>
<td>19</td>
<td>6000</td>
</tr>
<tr>
<td>Oil, Gas &amp; Coal</td>
<td>76</td>
<td>0.2</td>
<td>300</td>
</tr>
<tr>
<td>Power</td>
<td>8367</td>
<td>18.8</td>
<td>5700</td>
</tr>
<tr>
<td>Total I and II</td>
<td>9054</td>
<td>21.4</td>
<td>7000</td>
</tr>
<tr>
<td>Total Bank Group Commitments</td>
<td>44447</td>
<td>100</td>
<td></td>
</tr>
</tbody>
</table>

/1 Bank lending represented a little over 80%, IDA lending less than 1%, and IFC commitments 19%.
/2 Bank lending represented more than 90% and IDA lending most of the remainder.

4.4 It is recommended that the Bank/IDA decide in principle to double the number of non-fuel mineral projects it is prepared to finance, that is, to 4-6 projects a year. Given the time required to identify and appraise projects, and for the necessary staffing up, this level could probably not be reached before FY80. In 1980 prices this would suggest a lending program for non-fuel minerals of $350-400 million. However, projects of this kind are very "lumpy" and it is hard to predict how much financing they would call for in a particular year. But assuming that loans for non-fuel mineral projects in FY80 would be in the range $350-400 million, and that the Bank's average share of total project costs would be 15 to 20%, the World Bank would be participating in projects with a total cost of $2-2.5 billion in 1980 dollars. It was estimated in Section II (para 2.23) that gross investment requirements in the non-fuel mineral sector of developing countries during the period
1976-80 would be about $38 billion (in 1975 dollars) of which up to two-thirds might be required from foreign sources or about $5 billion a year. In current prices this indicates a gross investment in 1980 of about $10.5 billion and a requirement for financing by foreign investors and lenders of about $7 billion. The suggested program of Bank/IDA lending in that year would therefore help to finance projects representing one fifth to one quarter of the total investment requirement for non-fuel minerals in developing countries.

4.5 Total financial requirements for petroleum development \(^1\) in the oil importing developing countries were roughly estimated by Bank consultants at $6 billion a year (in 1975 dollars) over the next decade (Section III Table 6 and para 3.18). Of this, about 10% would correspond to exploration, 40-50% to production, and the rest to transportation, refining and other down-stream investments. Most of these expenditures would be in foreign exchange. As in the case of non-fuel minerals, the international financial institutions would need to contribute only so much as would permit them to assume the responsibility for appraising and supervising projects and helping the host country to marshal the total funds required, including co-financing with other external agencies. A contribution of about 20% of total costs on average might be required, but there could be considerable variation depending on the country situation and project characteristics. In potentially profitable projects that would be of interest to foreign investors, a token loan would be sufficient to ensure an adequate international "presence". In other cases, where the possibilities of profit were less good or for other reasons the project might not attract investors, a substantially larger contribution would be required by the international financial institution.

4.6 Since neither the World Bank nor the Regional Banks have any experience in lending for petroleum projects, the appropriate scale of lending in this sector cannot be predicted with confidence. The group of developing countries concerned excludes both the major and the minor exporters of oil, and there could be a need for participation by the IFIs in many petroleum and related projects for these countries. The maximum annual lending program in the petroleum sector would then exceed $1 billion in 1975 prices (that is, up to 20% of $6 billion). However, a program of this magnitude, even if it were required, could not be reached until well into the 1980s.

4.7 By FY80, the reference year selected for discussion of the World Bank's program for mineral development, it should be possible to carry out a substantially increased program over what is now planned, given an early decision to do so. Present plans are to bring two oil and gas projects to the Board in the course of FY78 in an amount of about $150 million, and perhaps three in FY79 for an amount between $200 - $250 million. It should

---

\(^1\) The projects included in this paragraph cover both energy production and down-stream facilities. However, they refer to petroleum development including natural gas and do not include coal, which could add 10 to 15% to the total.
be feasible to prepare and complete six to eight fuel mineral projects in the course of FY80, provided a start is made on a program of this scale within the next few months. These would include one or more coal/lignite projects, as well as oil and natural gas projects, including pipelines and refineries. Subject to the same reservation about the difficulty of estimating lending requirements for non-fuel mineral projects in any one year, owing to their "lumpiness" (para 4.4), loans and credits for fuel mineral projects in FY80 might total $400-450 million.

4.8 The present Bank Group program for non-fuel mineral projects during the five year period FY77-81 is about one billion dollars, and for oil, gas and coal projects about $300 million, for a total of $1.3 billion in the sector as a whole (see Table 7). The expanded program now suggested for the Bank/IDA, taking FY80 as the year of reference, would be in the range $750-850 million for the mineral sector as a whole, which would exceed the program now planned for that year by some $600 million. Taking a figure of $10 billion as an approximate measure of total Bank/IDA lending in 1980, additional lending for mineral projects would represent 6%, which it should be possible to accommodate without any substantial re-arrangement of priorities in other sectors.

Regional Bank Lending for Minerals and Energy

4.9 During recent years lending by the two principal Regional Banks, the Inter-American Bank and the Asian Development Bank has been about one third that of the World Bank. However, in non-fuel minerals and energy (principally power) their lending has been nearly 60% of the World Bank's. The details are shown in Table 8. An increase in their lending by FY80 to say $400 to 500 million for the two Banks together should be within their capability if they decided to join the World Bank in making an increased contribution to these important sectors. Since a similar share of total project costs would be appropriate in their case, this means that the two Regional Banks together would be able to participate in fuel and non-fuel mineral development projects with a total cost of $2 to $3 billion.
Table 8

Lending in the Last Five Years for Non-Fuel Minerals and Energy Development by the World Bank, the Inter-American Development Bank and the Asian Development Bank

<table>
<thead>
<tr>
<th></th>
<th>IBRD/IDA July 71-June 76 ($Mil.)</th>
<th>Percent</th>
<th>Inter-Am Dev. Bank Jan. 72-Dec. 76 ($Mil.)</th>
<th>Percent</th>
<th>Asian Dev. Bank Jan. 72-Dec. 76 ($Mil.)</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>I. Non-Fuel Minerals</td>
<td>252</td>
<td>1</td>
<td>39</td>
<td>0.7</td>
<td>5</td>
<td>0.2</td>
</tr>
<tr>
<td>II. Energy Development</td>
<td>3065</td>
<td>13</td>
<td>1349</td>
<td>24</td>
<td>553</td>
<td>24</td>
</tr>
<tr>
<td>Coal and Gas</td>
<td>-</td>
<td>-</td>
<td>10</td>
<td>0.2</td>
<td>99</td>
<td>4</td>
</tr>
<tr>
<td>Power</td>
<td>3065</td>
<td>13</td>
<td>1349</td>
<td>24</td>
<td>454</td>
<td>20</td>
</tr>
<tr>
<td>Total of I and II</td>
<td>3317</td>
<td>14</td>
<td>1398</td>
<td>25</td>
<td>558</td>
<td>24</td>
</tr>
<tr>
<td>Total Loans</td>
<td>23216</td>
<td>100</td>
<td>5671</td>
<td>100</td>
<td>2307</td>
<td>100</td>
</tr>
</tbody>
</table>


IFC Financing in the Mineral Sector

4.10 As mentioned earlier (paragraph 4.2) the International Finance Corporation has been active as an organizer of non-fuel mineral projects and as an investor in them. It has participated in 9 projects, including both large and small projects. IFC has so far participated in only one energy project, a natural gas pipeline in Colombia. A limiting factor in large projects has obviously been the relatively modest resources of IFC. However, with the proposed capital increase, IFC ought to be in a position to play a much more important role in this field, as was emphasized in the paper on the future activities of IFC. 1/ This role will be particularly important in two areas: first, as a supplier of scarce equity or equity-type funds where IFC, following its capital increase, should be in a position to make significant contributions in the capitalization of even large mining projects. Second,

1/ IFC/R76-70, pp. 11-12.
IFC can help to package such projects, particularly in the case of small least-developed countries. IFC has at present under active consideration a number of projects in such countries. As a very approximate measure of IFC's capacity to assist mineral development in the LDCs, the Corporation should have no problem in providing from $50 - $75 million annually over the next five years from its own resources after the capital increase is approved. These funds would, of course, be associated with those of other investors and could help to support total project investment of about $400-500 million annually.

**Assistance for Exploration**

(i) By International Development Banks

4.11 As mentioned elsewhere in this report, one of the main reasons why mining and oil companies do not become more actively involved in exploration in developing countries is the companies' fear—justified or not—that once a discovery is made the host country will unilaterally change the rules of the game. For this reason, oil companies have at times indicated to the Bank that a "Bank presence" in the project during the exploration stage might help to quiet these fears.

4.12 Mineral exploration, being a highly risky activity, is not suitable for development bank lending. Nevertheless, in order to respond to the desire for a "Bank presence" at the exploration stage, two new approaches have been recently discussed within the Bank. It might well be that these approaches could assist the parties in negotiating an agreement that both parties would regard as fair; in so doing they might reduce the investors' concern about unilateral changes being made in the agreement at a later stage. Bank assistance could be particularly helpful to the majority of developing countries that do not have a competent national mining or energy company.

4.13 Under the first approach the Bank could participate in the negotiations between the foreign sponsor and the host country, leading to an agreement setting out their respective rights and obligations regarding exploration and production. At the request of the host country, the Bank would then confirm to both parties that, if a discovery were made, and if the Bank's normal lending criteria were met, the Bank would consider a request by the host country to assist in financing production or related infrastructure facilities.

4.14 The second approach would provide for a token Bank loan to the host country to assist it in financing a small portion of exploration activities jointly with the foreign sponsor, but only on condition that the foreign sponsor would agree to carry the commercial risk on behalf of the host country, i.e. that it would repay the Bank loan in case the exploration activities were unsuccessful. The Bank's Borrower would therefore carry no part of the exploration risk. Precedents for this approach
are preinvestment loans/credits made by the Bank/IDA to member governments or their agencies which were backed by a guarantee of the private companies involved to repay the loans/credits (in one case only a portion thereof) in case the main project were not going to be carried out. One of these precedents concerned the mining sector since it involved infrastructure engineering for the Shashe copper and nickel project in Botswana.

(ii) By the United Nations Revolving Fund for Natural Resources Exploration (the Fund)

4.15 The Fund, established as a trust fund by the UN General Assembly and placed in the charge of the Secretary General, is administered on his behalf by the Administrator of UNDP. The Fund is headed by a Director who is responsible for day-to-day management; it has been operational since the summer of 1975. The Bank has been providing technical assistance to the Fund since its establishment.

4.16 The Fund's purpose is to allow a developing country to determine without risk what, if any, mineral resources are available in its territory. If a discovery is made the government has the option (i) of negotiating with a foreign mining company merely about the production and sale of minerals from a known deposit, and about the split of the benefits accruing therefrom (i.e. without either party having to pay any attention to the exploration risk), or (ii) of entrusting its national mining company with the production of the minerals in question.

4.17 The Fund (at its own cost and without any government counterpart contribution) carries out exploration for solid minerals in any developing country government's territory at the government's request 1/. If the Fund's exploration activities are unsuccessful, the government owes the Fund nothing. If a discovery is made by the Fund, the government will have to pay the Fund a replenishment contribution of 2% of the fair market value of any minerals that are produced during a 15-year period from the time production starts. It is hoped that these replenishment contributions will eventually enable the Fund to become a self-supporting institution, but for decades to come the Fund will continue to depend almost entirely on voluntary contributions. An increase in these contributions from the present rather modest level would allow the Fund to increase substantially its exploration activities as well as to branch out into exploration for hydro-carbons, a field it has had to avoid in view of the very substantial costs involved.

1/ The Fund has at this time 2 exploration projects in operation; 2 more are still under negotiation. As of the end of 1976, the Fund's cash resources available for project financing amounted to about $10.7 million, of which about $7.8 million had been earmarked for the 4 projects in operation or under negotiation. Pledges for 1977 contributions amount to about $6.4 million, none of which has so far been paid in.
Technical Assistance for Mineral Development

4.18 In the course of its normal operational work the World Bank Group provides technical assistance to developing countries in a wide variety of forms in association with its financing, designed to optimize sectoral policies and strategies; project selection and implementation; and training of professional and technical staff. This assistance has been provided for many years in the hard minerals sector and has been expanded more recently in the energy sector and particularly the fuel minerals subsector. Preliminary experience in petroleum project development indicates that such operational work can act as a catalyst in attracting large amounts of private sector assistance of the types described in Section III (paras. 3.25 to 3.32) and to accelerate the decision-making process in the developing countries concerned. A decision to expand the financial operations of the Bank Group and other development banks in the mineral and energy sectors would entail a correspondingly increased effort to provide the associated technical assistance that would be required. In addition to this, developing countries would certainly benefit from technical assistance of the type included in the proposed International Energy Institute: Information/Documentation center; funding of research and development in appropriate technologies; and training programs (see para. 3.28).

Summary

4.19 The report recommends a greater effort by the World Bank Group and the Regional Banks to assist the expansion of mineral production in the developing countries. Their principal role is not so much to provide finance, although that is needed, as to stimulate by their participation an increased flow of foreign investment into mineral exploration and production. There is also a clear need by developing countries, especially those that do not possess competent national mining or energy companies, for help in drawing up strategies for the sector and in determining the technical expertise they should obtain to implement plans. The international banks are well placed to provide help of this kind.

4.20 An indication has been given of the scale of investments that would be required for optimal development of non-fuel and energy minerals in these countries during the period between now and 1985. The amounts are large and the developing countries will have to balance the costs and benefits of expanding exports of hard minerals, or of self-sufficiency in energy, against other claims on scarce domestic and foreign resources.

4.21 Exploration for minerals presents a special problem owing to the high risks that have to be incurred by investors. It is important that developing countries be assisted to improve their knowledge of reserves located in their territories, as this would help to narrow the room for conflict between host countries and foreign mining companies. More use should be made of the UN Fund for Natural Resources Exploration, and the World Bank should participate at an early stage in project formulation, including contract negotiations where appropriate. The Bank might also make small pre-investment loans for
4.22 For the World Bank, a program of lending for FY80 in the range of $750-850 million, covering 4-6 projects in non-fuel minerals, and 6-8 projects in fuel minerals (including coal) and related facilities is considered to be feasible, provided an early decision is made to increase the level of activity and recruit the necessary staff. The two largest Regional Banks together should be capable of lending $400-500 million in the sector as a whole, if they too decided to mount an increased effort to expand mineral production in their respective regions. IFC considers that it could provide $50-75 million annually over the next five years for mineral development after its capital increase is approved. Because of the comparatively small share of project costs that typically needs to be financed by the international banks in this sector, programs on this scale are capable of supporting a substantial proportion of the investment projects likely to come forward by 1980: $4-4.5 billion by IBRD/IDA, $2-3 billion by IADB and ADB together, and $500 million by IFC, for a total of $6.5-8 billion.
The Honorable
Mr. Robert S. McNamara
IBRD
Washington, D.C.

September 30, 1976

Dear Bob:

As you know, we have felt for some time that a major international effort is needed to expand world-wide capacity in minerals if rising world needs are to be met. The sensitivity of developing countries to private investment in their mineral deposits and the possibility of harassment and expropriation of resource investments after such projects have matured are a deterrent to resource development in poor countries. We believe new forms of investment are needed to overcome the mutual reluctance of investors and host governments.

At the seventh special session of the UN General Assembly last September, we proposed that the World Bank Group play a fundamental role in this effort, mobilizing funds from private and public sources, acting as intermediary between private investors and host governments, and linking private and public efforts by providing cross guarantees of performance. More recently, at the UNCTAD meeting in Nairobi, we expanded on this theme and proposed an International Resources Bank to promote more rational, systematic, and equitable development of resources in developing countries. The Resources Bank would encourage joint ventures between private investors and host governments, define the rights and obligations of the participants, and provide guarantees of performance. We have always seen this function as one to be undertaken by the World Bank Group.

Our proposal was illustrative in its broad outlines of the kind of scheme that could meet the basic needs of the developing countries and the international community. It was not a fully elaborated proposal.

Henry Kissinger and I would appreciate it if you would direct your attention to the proposal, elaborating it in the light of the experience of the World Bank Group, and the IFC in particular, making such modification as you might consider desirable, and determining how the function could best be performed within the World Bank Group structure.

We look to the IBRD/IMF Development Committee to produce an intergovernmental consensus on the IRB. We believe that your study will play a central role in the Committee's deliberations and decision.

With best regards.

Sincerely yours,

William E. Simon
Main Functions

1. The U.S. proposal (the Proposal) is not a fully elaborated scheme. It does not completely describe, even in outline form, the nature, organization, functions and financial structure that might be appropriate for a new international institution designed to facilitate foreign investment in the mineral resources of developing countries by reducing non-commercial risk. However, it is possible to distinguish three main functions proposed for the new institution. These are:

   (i) To participate in agreements for the exploitation of mineral resources in developing countries involving foreign investment - what might be termed the role of the IRB as catalyst;

   (ii) to promote or "underwrite" bonds for this purpose - the financial role of the IRB; and

   (iii) to guarantee the performance of the participants in a mining venture - the insurance role of the IRB.

These functions are more fully described and examined in paragraphs 2 through 17 below.

(i) The IRB as catalyst

2. The IRB would take part in trilateral agreements between itself, a foreign investor (e.g. a mining company or an oil company) and the government of a developing country (or its agents). To be eligible for IRB participation the project would have to involve foreign investment, but this would not exclude cases in which equity would be owned and controlled wholly by the host country. The project would include mining and initial stages of processing, such as ore smelting and refining, but not higher stages of processing of minerals. Investment in exploration would be excluded, although no reason for this is given. In view of the potential for disputes between host governments and companies over agreements relating to exploration and subsequent production this would seem to eliminate an important area for the IRB.

3. The role of the IRB as a party to the trilateral agreement would be essentially passive. The IRB would not approach developing countries or mining companies to solicit participation in a mining venture and it would not set up general standards of fairness for agreements. For each project sponsored by the IRB a separate trilateral agreement would be concluded. The terms of the agreement would be the subject of negotiations between the host country and the foreign investor, and the IRB would not insist on any particular conditions except where necessary for legal protection of its own functions under the agreement.
4. Although the IRB might act as an informal mediator between the other two parties to the trilateral agreement, it would not have authority to make binding determinations of disputes by arbitration or otherwise. As a party to the agreement, the IRB might indeed itself be a party to a dispute. The Proposal acknowledges that the trilateral agreement would have to provide for procedures to settle disputes among the parties to the agreement, but makes no specific recommendations in this regard. It avoids the question of whether governments would accept international arbitration, a question which was firmly answered in the negative by the Latin American countries during the discussions on the formation of an International Investment Insurance Agency (IIIA) in the early seventies.* The Proposal is equally silent with respect to the law governing the trilateral agreement.

5. The Proposal lists a number of matters that might be included in the trilateral agreement. In addition to any provisions relating to the IRB's function as financial intermediary and guarantor, the agreement would cover the financial commitments of the host country and the foreign investor, e.g. the financial plan; equity participation; provision of management and technical services; guarantee of loans made by third parties; issuance of import licenses and of permits to transfer earnings; production sharing, training of local staff and conditions for renegotiating the agreement. Thus, the trilateral agreement would be a substitute for the usual main agreement between the contracting parties to international ventures. The Proposal omits some aspects normally covered in the main agreement, such as: the establishment of a project entity; the division of benefits between host country and investor; the transfer prices to be used in case of sales to and from the investor or its affiliates; the extent and nature of any further exploration activities to be undertaken by the investor and/or the project entity; preferences to local suppliers; the construction and use of infrastructure; agreements on health, safety and ecology; and the disposition of assets upon termination of the agreement. There would presumably be no objection to the inclusion of any of these or other appropriate points in the trilateral agreement.

(ii) The financial role of the IRB

6. The main financial role envisaged for the IRB consists of placing and guaranteeing the bonds issued by the project entity to finance the project. The IRB would not underwrite bond issues in the sense of accepting a commitment to buy any unsold bonds. Nor could it make any loans to the project from general funds. However, it might act as a sales agent in placing the bonds and it might receive a fee for these services.

* The five principal issues on which no agreement could be reached in the case of the IIIA proposal were arbitration of disputes; subrogation of claims; financial contribution by developing countries; distribution of voting rights; and link with the World Bank.
7. The chief financial innovation of the Proposal is in the nature of the bonds that could be used to finance projects. Three types of bonds are proposed, namely:

(a) a bond carrying with it the right to "a fixed amount or share of the production that results from the project over a specified time frame";

(b) a bond carrying with it the right to "the revenues from the sales of a fixed amount or share of the production from the project over a specified time frame"; and

(c) a bond carrying with it the right to "a fixed amount of cash at a specified date, or over a specified time frame in which the bond-holder would have a claim on the product or on the proceeds from the sale of a given amount of product as security or collateral for the bond."

8. The third type of bond is similar to the bonds or note sometimes issued in connection with the financing of mining ventures, particularly if commercial institutions such as banks or insurance companies are the lenders. The fact that they would be secured by a claim on production, or on sales proceeds, is not novel, since these kinds of instruments are often secured by a lien on the assets of the issuer. Thus, they are really cash bonds, and need no further discussion.

9. On the other hand, the first two types of bond would be quite a new kind of instrument. There is little difference between them, except that in the first case the holder would be entitled to receive a certain amount of products, while in the second case he would be entitled to receive the proceeds from the sale of those products. In its brief description of the commodity bonds, the Proposal comments that "a private investor would put up loan capital in return for a claim on production which he could pay for or accept as payment on the bond"; that "the idea of the commodity bond is flexible and it would be an entirely optional, not obligatory form of finance"; and that "there would be no requirement to denominate bonds in terms of commodities or make them convertible into commodities".

10. While the detailed features of the novel types of commodity bond are not specified, their major purpose appears to be the introduction of divisibility and negotiability into long-term supply contracts. For investors whose major concern is to secure a supply of minerals these commodity bonds appear to be designed to afford a flexible alternative to a long-term contract which may prove to be inconsistent with the investor's needs. Thus, if the holder of the bond expected to use all of the minerals to which the bond entitled him, he would retain the bond to maturity. If conditions were such that the investor did not wish to take up his entitlement, then some or all of his bond might be sold to another user of the minerals. This would avoid conflicts between investor and host country when, because
of an economic recession or for other reasons, the investor did not wish to purchase all of the mineral for which he had contracted. However, the unusual features of the proposed bonds might limit their usefulness. Questions might arise as to the bond's negotiability under various national laws and even as to their compliance with legal requirements for investment by certain types of investors. If those doubts proved substantial, the commodity bond concept would add nothing to what could be accomplished by a contract provision authorizing the investor to assign future production or revenues.

11. Alternatively, the proposal may have been intended to introduce a "bond with a risk element". The holder (whether an investor actively involved in carrying out the project, a third party lender, or a subsequent purchaser of the bond) would not be able to claim the repayment of a fixed amount of cash but rather a "fixed amount or share of the production ... over a specified time frame" or the revenues from the sale of this production. The amount of production the holder would be able to receive would seem to be expressed either as a fixed amount or as a fixed share of the production over a specified period of time. Depending on the movement of prices for the minerals, these commodity bonds would thus seem to involve considerable risks, which would make them look much more like non-voting equity shares than like conventional bonds.

12. Whether it employed commodity bonds or not, the success of the IRB in its financial role would depend on its ability to convince investors that the financial instruments of the project entity were attractive. Except for direct participants holding equity in the mining venture the two groups of investors most likely to take up the bond issues of the project entity would be those actively engaged in the minerals industry, and speculators. It is not clear that those with an interest in minerals would be willing to accept bonds if equity were not available. They might prefer to go to the minerals markets directly. Speculators could be expected to add commodity bonds to their portfolios only if there were an active market for these instruments and, to say the least, there are doubts about this, quite apart from the legal questions mentioned above. In practice, the "negotiable instrument" feature of commodity bonds, even if legally recognized, is not likely to be of much value unless the IRB stood behind them by exercise of its power to guarantee as discussed in (iii) below.

(iii) The IRB as Guarantor or Insurer

13. There is an ambiguity in the proposal as to the nature of the guarantees to be provided by the IRB. On the one hand, the proposal implies that the IRB would "guarantee" performance by the parties of their undertakings in the trilateral agreement. This cannot mean "ensure performance": no institution can ensure performance of an action by another body unless it controls that body — in the sense, for example, that a government controls the actions of one of its departments or agencies, or that a private company controls a subsidiary. Thus, the IRB would be unable to ensure performance
since it would have no means of enforcing the provisions of the trilateral agreement. However, by endorsing a contract negotiated between the host country and a group of investors (that is, by signing the trilateral agreement, as proposed) the IRB, representing the international community (and also in its role as an insurer - see below), could undertake to use its good offices to prevent default by either of the other parties on its undertakings and thus make default less likely. Although falling far short of a performance guarantee, this aspect of the IRB's role could be of significance in helping to bring about a better climate for foreign investment in mining.

14. On the other hand, the Proposal indicates that IRB would guarantee foreign investors (lenders, bondholders and, for a limited period, equity investors) that they would be reimbursed in the case of losses occasioned by non-commercial causes. This is in fact an insurance function and will hereafter be so designated. Commercial risks would not be covered by the IRB. Indeed, the IRB would insure investments only if cover against commercial risks were secured by the participants. The portion of the financing for a particular project that would be covered by IRB insurance would depend on the request of the participants and IRB's assessment of the extent of its involvement that would be needed to attract the necessary capital. The Proposal does not define "non-commercial" (or "political") risks, except to say that the determination of these risks would require careful study and that they would be specified in each individual trilateral agreement based on guidelines laid down after the establishment of the IRB. With respect to undertakings under the trilateral agreement, it is stated that "non-commercial risks for selected aspects" of these undertakings might be insured; they might include "actions by the host country that interfere with, prevent or prohibit private investors from benefitting from specified commitments under the contract, including such matters as import licensing and earnings repatriation". If the host country were to default on its undertakings, the investors would be compensated for any insured loss they might suffer as a consequence of such default. The IRB appears intended to offer political risk insurance similar to that offered by national investment protection or insurance schemes of the industrialized countries (for a discussion of these schemes see below paragraphs 24-26).

15. An IRB program to insure investors against loss from non-commercial risks would present several difficulties which are not discussed in the Proposal. These include the following:

(a) The criticism most frequently voiced by the mining industry against national investment insurance schemes is that they do not clearly define non-commercial risks and thus do not cover "creeping expropriation" (sometimes called "spoliation") and partial loss, which in the industry's view today are more immediate risks than outright expropriation. However, it is difficult to understand how this problem of definition could be dealt with by the IRB more satisfactorily than by national plans. On the contrary, the need for internationally-agreed guidelines would seem to suggest that more limited rather than broader coverage might well result.
(b) A further problem would be presented if the IRB made payment under its insurance policy. It appears to be intended that the IRB should seek to recover from the party who has violated its obligations under the trilateral agreement. Although the Proposal speaks of "the project entity or the project participants" as potential defendants in recovery actions, where an IRB payment is made to an investor, the defendant would probably be the host government. Apart from the issue of the specific method of settlement of disputes (such as international arbitration) referred to above in paragraph 4 as a disputed IIIA point, the very notion of recognizing a right of recovery to the IRB is likely to run into firm opposition at least on the part of Latin American countries, who raised objections to it already during the IIIA discussions.

(c) Perhaps most important of all is the question whether investment insurance issued by an international body would be more effective than national investment insurance in warding off expropriatory action without due compensation. The IRB proposal appears to assume that to be the case, perhaps because the action would have financial impact on the international community rather than on only one state, and the host country might be reluctant to act. But if the action did not cause a call for payment by IRB members, the felt impact might be minor and the host country might well feel less apprehensive about the general reaction than about reaction of the state from which the investment came. Moreover, a conclusion that an IRB insurance would be more effective than national insurance in preventing expropriation would rest on several extremely doubtful assumptions, for example: that developing countries would be members of IRB and would contribute to its capital; that the IRB would be associated with the World bank Group in a way that would carry the threat of withholding World Bank Group financing in case of a default under the trilateral agreement; and that the scheme would be such that the state from which the investment came would agree to stand aside and not to interfere nor compete with IRB dealings with the host country. These three assumptions are discussed below.

16. The IRB Proposal contemplates extending insurance also to host countries but the protection that would be afforded host countries is less substantial. As regards the investors' undertakings to the host country, the Proposal suggests that the latter would be guaranteed against "failure to perform on contract provisions that require training of host country nationals, transfer of technology, or management participation". Undertakings that would seem to be of even greater concern to the host country, such as a commitment to complete the project according to an agreed time schedule or to operate the facilities at specified rates of capacity, are not mentioned, perhaps because to cover such matters would involve problems of definition and determination at least as difficult as those mentioned above. Nor does the Proposal suggest that compensation be paid to the host country in the event that investors defaulted on any of their undertakings. All that would happen is that such a default, if acknowledged by the IRB, would lead to the cancellation of the investment insurance, which means nothing else than that the IRB, like any other insurer, would cancel the insurance policy in case of
a default by the insured party. As noted above (see paragraph 13), the IRB would not be in a position to guarantee performance by any of the parties to a trilateral agreement, and its principal function as "guarantor" would be to provide compensation to the injured party in the event of default. To be symmetrical, therefore, the IRB should be in a position to offer compensation for loss sustained by either party as the result of an action, or lack of action, by the other. If this is thought too difficult, the alternative would be to confine the guarantee function explicitly to the foreign investor. But it would then be unlikely that the developing countries would agree to meet any part of the losses incurred by the IRB by subscription to its capital or guarantee fund, or otherwise (the question of financial contributions by developing countries was indeed another of the difficulties encountered in trying to reach agreement on the IIIA).

17. One comment applies to both types of insurance guarantees, those to investors and those to host countries. They are quite likely to involve large amounts of money and to generate intense political emotions in the countries involved. In many cases, the state from which the investment comes will have other investments or interests that are affected by host country or investor actions. In those circumstances, the first state can be expected to carry on negotiations itself, and even impose sanctions, rather than leaving the field entirely to the IRB, unless, of course, the IRB were given effective rights of subrogation and access to arbitration, which as noted above it is unlikely to obtain. Obviously, the risk of this kind of interference would tend to further weaken the IRB's position under the trilateral agreement.

Association with the World Bank

18. The Proposal is flexible as to the institutional arrangements to be made for the IRB. The possibilities mentioned include the establishment of a completely new institution, some kind of association with the World Bank, IFC, or regional development banks, and even "complete integration into the World Bank Group". In the case of the IIIA, the proposed link with the World Bank Group was another issue on which no agreement was reached. The stronger the implication that such a link would mean resorting to cutting off financing as a sanction in case of default, the greater would be the difficulty of obtaining agreement on the link.

Financing an IRB

19. The Proposal suggests that the capital of IRB be related to the specific insurance activities ultimately envisaged for it, and indicates a figure of $3 billion, of which $300 million would be paid in and the rest would remain on call to meet obligations of the IRB*. The adequacy of a

* Elsewhere in the documents an alternative figure of $1 billion for paid-in capital is mentioned, but it is not thought that the U.S. had in mind a total capital as large as $10 billion.
capital sum on this order depends on the probability of loss on any given insured investment (it being understood that the basis for normal actuarial calculations would not be available for the kind of insurance envisaged for the IRB); the number and scale of investment projects proposed and accepted for insurance coverage; the average proportion of total investment to be insured; and the degree of financial backing believed to be necessary in order to ensure that the IRB would be able to meet any claims upon it. As to the last, it would seem prudent, at least for a considerable period, to provide financial resources (capital and reserves) not less than the full amount of insurance issued. Mining projects are often very large and the number covered by IRB's insurance guarantees would be small in comparison with the "population" covered under other forms of insurance. Losses, if they occurred, could therefore be substantial.

20. The suggestion that most of the capital might be subject to call also raises questions. Although this is feasible in national schemes, its application to an international insurance organization is doubtful. For one thing, members would have to accept an obligation to pay their share (up to the total of their uncalled subscriptions) of any shortfall resulting from the failure of another member or members to pay. The possibility that a few countries might have to meet the entire call might well dissuade some countries from participating. Moreover, the difficulties of carrying out a series of calls on the members in order to make good any such shortfall would be formidable and might discourage prospective investors if the paid-in capital were only a small proportion of the amounts insured. On the other hand, to insist on a high proportion of paid-in capital would increase the burden on the budgets of members, and so tend to restrict the institution's capital endowment.

21. As to the degree of coverage to be provided in each case, the test would be the minimum proportion of total investment that would need to be covered by an IRB insurance in order to attract the desired participation of foreign capital. The answer would clearly be affected by the circumstances of each project and the country in which it was situated. Some illustrative calculations of the amount of capital that would be required by IRB are set out in Annex C, on the assumption that about one third of the investment in a mining project, on average, would be insured. They indicate that, if mining projects with a total investment cost of $1 billion were accepted by the IRB each year, its maximum exposure — and therefore the required level of capital and reserves — would be about $2.4 billion (corresponding to 32% coverage of $7.6 billion project expenditures). Capital requirements could range between $2 billion and $2.5 billion, depending on the rate at which reserves accumulated. That in turn would depend on the level of premium income* (net of administrative costs), earnings on investments and the extent of compensation payments if any. Assuming no depreciation of the

* It should be noted that the Proposal does not envisage that a premium would be charged for IRB insurance coverage.
project facilities, the total productive capacity mobilized by the IRB in its role as a catalyst would increase to $9.6 billion by the 14th year of operation and would thereafter increase by $1 billion each year.

22. Given the same assumptions, capital subscriptions to the IRB on the order of $3 billion, as suggested in the Proposal, would permit up to $1.5 billion of new mineral projects to be accepted for insurance each year. This would only be sufficient to enable the IRB to extend its insurance guarantee to a small minority of the mineral projects in developing countries likely to require foreign financing in the next ten to fifteen years, particularly if fuel minerals were to be included. It should also be noted that the same volume of capital subscriptions, if used as backing for IBRD loans, could be associated with a substantially larger volume of investment. This is because a Bank contribution of at most 15-20% of total estimated cost is usually sufficient to secure an adequate Bank "presence" in projects of this kind, as compared to the one third assumed to be the minimum coverage required under an investment insurance scheme. Bank lending therefore represents a more efficient use of capital subscription by member countries than investment insurance guarantees. Similar considerations apply to the use of IFC capital or that of the regional banks.

23. The principal objective of the IRB would be to encourage foreign investment in the mineral sector by assuring the investor and the host countries that agreements arrived at under IRB auspices will be lived up to. It may therefore be useful, before concluding the comments on the Proposal, to give a brief survey of existing international agreements and national and international institutions which have similar objectives. A short reference is also made to two proposed international institutions of a regional character which are presently being discussed and which would seem to address themselves to the same question as the IRB.

Bilateral Investment Protection Agreements

24. A number of European countries have concluded agreements with developing countries regarding the treatment of foreign investment. These agreements cover such matters as transfer of profits, repatriation of the investment proceeds, rules regarding nationalization and the compensation to be paid as well as provisions for the subrogation of the investor's home country into the investor's claims against the host country in case the home country has compensated one of its nationals under an investment insurance scheme. All of these agreements provide for the settlement of disputes between the two countries by international arbitration. Some of them provide in addition for ICSID arbitration (see below) between an injured investor and the host country. The pioneer in this field has been Germany, followed in approximate order of number of agreements by Switzerland, The Netherlands, France, Belgium, United Kingdom and Italy. The aggregate number of this type of agreements exceeds 100 and is growing. Some of the agreements cover both existing and new investments. Others are limited to new investments.
25. The United States has not concluded any such agreements. Nor have the European countries been able to conclude such agreements with Latin American countries (a German-Ecuador agreement is the sole exception that has come to the Bank's knowledge).

National Investment Insurance Schemes

26. The United States has been the leader in the field of investment insurance against political risks. By now almost all industrialized countries have national insurance schemes, although many of them are quite small. Also, the extent of the coverage, particularly the definition of "political risks", varies among the different schemes. The United States (OPIC) only writes investment insurance if it has a bilateral agreement with the host country and the latter agrees to recognize the United States as subrogee of a compensated investor and accepts international arbitration. The latter requirement has caused trouble with some Latin American countries. Most other countries require bilateral agreements as a rule, but make exceptions. In a number of agreements France has conditioned the issuance of political risk insurance on the existence of an ICSID arbitration clause in the agreement between the investor and the host country concerning the investment which is to be insured.

ICSID Arbitration

27. The World Bank-sponsored Convention on the Settlement of Investment Disputes between States and Nationals of Other States has been signed by 72 States. No Latin American country has signed the Convention. Arbitration agreements made within the scope of the Convention are irrevocable and arbitration awards rendered are final and binding. While an arbitration agreement between an investor and a host country is in effect, the investor's home state may not intervene in the dispute. However, should the host country fail to abide by an award (which would constitute the violation of treaty obligation) the right of diplomatic protection revives. A large number of agreements for natural resources projects, particularly in Africa, are providing for ICSID arbitration in case of disputes between the investor and the host country.

Proposed Regional Institutions

28. Following upon a submission made to the Commission of the European Communities by the European mining industry, the Commission, the industry and the member Governments are presently studying ways and means of associating the Communities more closely with overseas mining projects. The industry submission suggested essentially the following 3 types of solutions (adding that a combination of the 3 types might well be most effective): a treaty framework (which would presumably follow the pattern of the bilateral investment protection agreements referred to in paragraphs 24 above); financial participation by the Communities in mining projects; and an investment insurance scheme against political risks not unlike the IRB Proposal.
29. In reply to a resolution of the General Assembly of the Organization of American States (OAS), the OAS and the Inter-American Development Bank (IDB) are about to prepare a report concerning the problems relating to investments in the raw materials industries in Latin American countries, which report is expected to deal inter alia with the possibility of establishing a special international institution called the Inter-American Resources Financial Mechanism (IARFM). Among the functions that have been proposed for the IARFM is the issuance of investment insurance against non-commercial risks to cover both equity and debt financing of mining ventures. It is presently being envisaged that this report will be among the items on the agenda of a Special General Assembly of the OAS to be called late this year or early next year.

Summary

30. Insofar as the IRB Proposal is an investment insurance scheme by an international agency, and this appears to be its main feature, it is vulnerable as lacking in symmetry since no compensation for losses is provided for host countries as it is for foreign partners and investors. Moreover, the investment insurance aspect of the Proposal also presents other questions. There would be severe difficulty in defining the risks (intended to be non-commercial in character); regional investment insurance schemes for the mining sector are presently being studied both by the Commission of the European Communities and the Organization of American States and it seems unlikely that financing would be available both for these regional schemes and the IRB; and most of the issues which could not be resolved several years ago in the consideration of the proposed International Investment Insurance Agency would probably also face the IRB. While no one of these obstacles may be insurmountable, taken together and considered in the light of the substantial financing required, they suggest that other means of stimulating foreign investment in the mining sector of developing countries should first be tried.
ILLUSTRATIVE CALCULATIONS OF IRB CAPITAL REQUIREMENTS

1. The attached Table 1 illustrates the potential coverage, exposure and earnings of the IRB under the following assumptions:

(i) The IRB is empowered to extend partial coverage to projects with an estimated cost of one billion dollars in each year of operation. 1/

(ii) Capital subscriptions and reserves are always at least equal to the maximum exposure of the IRB; 10% of subscribed capital is paid in during the year in which the IRB begins operation.

(iii) The average investment takes eight years to be disbursed fully. The pattern of disbursement is assumed to be:

<table>
<thead>
<tr>
<th>Year</th>
<th>% of Investment Disbursed</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td>2</td>
<td>5</td>
</tr>
<tr>
<td>3</td>
<td>10</td>
</tr>
<tr>
<td>4</td>
<td>10</td>
</tr>
<tr>
<td>5</td>
<td>15</td>
</tr>
<tr>
<td>6</td>
<td>15</td>
</tr>
<tr>
<td>7</td>
<td>20</td>
</tr>
<tr>
<td>8</td>
<td>20</td>
</tr>
</tbody>
</table>

(iv) Coverage is extended to 80% of the equity held by foreign interests, assumed to be 40% of the total value of the investment.

(v) Coverage thus builds up to the maximum in year 8, is assumed to be sustained at this level in years 9 and 10 and then reduced to zero in the seventh year of operations (i.e. coverage would be extended for a total of 14 years).

(vi) Premium income is based on a charge of 3/4 of 1% of the sum insured. However, it is assumed that in the first seven years the project entity pays 5/8 of 1% of the sum for which coverage is provided plus 1/8 of 1% on the total commitment. The commitment charge is to cover the IRB in the event that a project is discontinued. For years 8 through 14 the fee charged is 0.75% of the amount covered. 2/

(vii) The paid-in capital and premium income can be invested for a return of 5% per year net of administrative costs (beginning in the second year of operation).

1/. In practice the scale of operations would have to increase in step with the annual rate of price inflation if it were desired to assist the same real volume of investment.

2/. Equivalently, the premium is 3/4 of 1% of the insured amount plus 1/8 of 1% of the committed but undisbursed expenditure.
2. With all figures expressed in millions of dollars, it is observed that by year 14 the maximum exposure of the IRB is attained at 2440. This exposure corresponds to a total disbursed expenditure, on which partial coverage is provided, of 7625, and total new capacity with an incurred cost of 9625. The yearly earnings from premiums have risen to 20 per year 14 and is sustained at this level thereafter.

3. The accumulated earnings from premiums and interest (at 5%) on past premiums and paid-in capital is shown at the base of the table. The figures assume that no claims are paid out during the fifteen years covered. Under the admittedly optimistic assumptions of a 5% return net of administrative costs, the reserves of the IRB can grow rapidly.

4. The ratio of paid-in capital plus reserves to total exposure of the IRB is given in the last line of the table. As exposure increases this ratio falls quickly, so that by year five exposure exceeds paid-in capital plus reserves. The low value for this ratio is reached in year 12 when just under 24% of total exposure is held in the form of cash and investments. After year 12, IRB's holdings increase as a proportion of exposure to 27% by year 15 and 30% in year 16. Given firm commitments by subscribers regarding the availability of callable capital and assuming minimal payments against claims, it then would be possible for IRB to expand its scale of operations without an increase in capital (i.e. reduce the ratio of subscribed capital and reserves to insurance written below 1:1).

5. By contrast, Table 2 presents equivalent figures for World Bank lending to support mineral projects to the value of $1 billion per year, assuming bank participation is 15% ($150 million). Based on the Bank's standard disbursement profile, and the assumed loan terms, the maximum level of net disbursements is $1.05 billion. If Bank participation were 20% ($200m. a year) the corresponding figure would be $1.4 billion.

6. To support this volume of lending for mineral development, the Bank would require capital and reserves of $1.05 billion for 15% participation, and $1.4 billion for 20% participation in the average mineral project. This is about half the capital base required for a similar volume of investment insurance under the IRB proposal.
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>16</td>
<td>32</td>
<td>64</td>
<td>96</td>
<td>148</td>
<td>192</td>
<td>256</td>
<td>320</td>
<td>320</td>
<td>320</td>
<td>320</td>
<td>320</td>
<td>16 48 112 208</td>
</tr>
<tr>
<td>2</td>
<td>0.5</td>
<td>0.6</td>
<td>0.8</td>
<td>1.0</td>
<td>1.2</td>
<td>1.6</td>
<td>2.0</td>
<td>2.4</td>
<td>2.4</td>
<td>2.4</td>
<td>2.4</td>
<td>2.4</td>
<td>0.5 0.6 0.8</td>
</tr>
<tr>
<td>3</td>
<td>16</td>
<td>32</td>
<td>64</td>
<td>96</td>
<td>148</td>
<td>192</td>
<td>256</td>
<td>320</td>
<td>320</td>
<td>320</td>
<td>320</td>
<td>320</td>
<td>16 32 64 96</td>
</tr>
<tr>
<td>4</td>
<td>0.5</td>
<td>0.6</td>
<td>0.8</td>
<td>1.0</td>
<td>1.2</td>
<td>1.6</td>
<td>2.0</td>
<td>2.4</td>
<td>2.4</td>
<td>2.4</td>
<td>2.4</td>
<td>2.4</td>
<td>0.5 0.6 0.8</td>
</tr>
<tr>
<td>5</td>
<td>16</td>
<td>32</td>
<td>64</td>
<td>96</td>
<td>148</td>
<td>192</td>
<td>256</td>
<td>320</td>
<td>320</td>
<td>320</td>
<td>320</td>
<td>320</td>
<td>16 32 64 96</td>
</tr>
<tr>
<td>6</td>
<td>0.5</td>
<td>0.6</td>
<td>0.8</td>
<td>1.0</td>
<td>1.2</td>
<td>1.6</td>
<td>2.0</td>
<td>2.4</td>
<td>2.4</td>
<td>2.4</td>
<td>2.4</td>
<td>2.4</td>
<td>0.5 0.6 0.8</td>
</tr>
<tr>
<td>7</td>
<td>16</td>
<td>32</td>
<td>64</td>
<td>96</td>
<td>148</td>
<td>192</td>
<td>256</td>
<td>320</td>
<td>320</td>
<td>320</td>
<td>320</td>
<td>320</td>
<td>16 32 64 96</td>
</tr>
<tr>
<td>8</td>
<td>0.5</td>
<td>0.6</td>
<td>0.8</td>
<td>1.0</td>
<td>1.2</td>
<td>1.6</td>
<td>2.0</td>
<td>2.4</td>
<td>2.4</td>
<td>2.4</td>
<td>2.4</td>
<td>2.4</td>
<td>0.5 0.6 0.8</td>
</tr>
<tr>
<td>9</td>
<td>16</td>
<td>32</td>
<td>64</td>
<td>96</td>
<td>148</td>
<td>192</td>
<td>256</td>
<td>320</td>
<td>320</td>
<td>320</td>
<td>320</td>
<td>320</td>
<td>16 32 64 96</td>
</tr>
<tr>
<td>10</td>
<td>0.5</td>
<td>0.6</td>
<td>0.8</td>
<td>1.0</td>
<td>1.2</td>
<td>1.6</td>
<td>2.0</td>
<td>2.4</td>
<td>2.4</td>
<td>2.4</td>
<td>2.4</td>
<td>2.4</td>
<td>0.5 0.6 0.8</td>
</tr>
<tr>
<td>11</td>
<td>16</td>
<td>32</td>
<td>64</td>
<td>96</td>
<td>148</td>
<td>192</td>
<td>256</td>
<td>320</td>
<td>320</td>
<td>320</td>
<td>320</td>
<td>320</td>
<td>16 32 64 96</td>
</tr>
<tr>
<td>12</td>
<td>0.5</td>
<td>0.6</td>
<td>0.8</td>
<td>1.0</td>
<td>1.2</td>
<td>1.6</td>
<td>2.0</td>
<td>2.4</td>
<td>2.4</td>
<td>2.4</td>
<td>2.4</td>
<td>2.4</td>
<td>0.5 0.6 0.8</td>
</tr>
<tr>
<td>13</td>
<td>16</td>
<td>32</td>
<td>64</td>
<td>96</td>
<td>148</td>
<td>192</td>
<td>256</td>
<td>320</td>
<td>320</td>
<td>320</td>
<td>320</td>
<td>320</td>
<td>16 32 64 96</td>
</tr>
<tr>
<td>14</td>
<td>0.5</td>
<td>0.6</td>
<td>0.8</td>
<td>1.0</td>
<td>1.2</td>
<td>1.6</td>
<td>2.0</td>
<td>2.4</td>
<td>2.4</td>
<td>2.4</td>
<td>2.4</td>
<td>2.4</td>
<td>0.5 0.6 0.8</td>
</tr>
<tr>
<td>15</td>
<td>16</td>
<td>32</td>
<td>64</td>
<td>96</td>
<td>148</td>
<td>192</td>
<td>256</td>
<td>320</td>
<td>320</td>
<td>320</td>
<td>320</td>
<td>320</td>
<td>16 32 64 96</td>
</tr>
<tr>
<td>16</td>
<td>0.5</td>
<td>0.6</td>
<td>0.8</td>
<td>1.0</td>
<td>1.2</td>
<td>1.6</td>
<td>2.0</td>
<td>2.4</td>
<td>2.4</td>
<td>2.4</td>
<td>2.4</td>
<td>2.4</td>
<td>0.5 0.6 0.8</td>
</tr>
</tbody>
</table>

Total Investment for which partial coverage is provided. 50 150 350 650 1100 1700 2500 3500 4500 5500 6313 6538 7375 7625 7625

Cumulative addition to mining capacity from additional projects involving 1971-72:

- 120 150 350 650 1100 1700 2500 3500 4500 5500 6313 6538 7375 7625 7625

Annual Premiums:

- 0.5 1.1 1.9 2.9 4.1 5.7 7.7 10.1 12.5 14.9 16.85 18.35 19.4 20.0 20.0

Accumulated Earnings on pari-in capital (5/24% net) + Premium Income, at 9% (reserves)

- 0.5 13.8 28.6 45.2 63.7 84.8 104.8 134.8 165.2 197.7 230.9 285.6 331.5 370.3 431.5

Ratio of pari-in capital + reserves to total exposure

- 15.3 5.4 2.4 1.4 0.87 0.60 0.44 0.24 0.25 0.24 0.24 0.24 0.26 0.27

1/ Assumptions: no significant depreciation of production capacity over the period covered by the table.
### Table 2
(Figures in $m.)

Assumptions: IBRD Consists $150 million per year; four-year grace period and 17 years to final maturity; amortization is by level annuity; interest payments are neglected. The disbursement profile is:

<table>
<thead>
<tr>
<th>Disbursement (%)</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
<th>11</th>
<th>12</th>
<th>13</th>
<th>14</th>
<th>15</th>
<th>16</th>
<th>17</th>
</tr>
</thead>
<tbody>
<tr>
<td>Disbursements by Year ($)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Year of Commitment</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
<th>11</th>
<th>12</th>
<th>13</th>
<th>14</th>
<th>15</th>
<th>16</th>
<th>17</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Disbursed per period</td>
<td>3.0</td>
<td>7.5</td>
<td>16.5</td>
<td>46.5</td>
<td>90.0</td>
<td>124.5</td>
<td>147.0</td>
<td>150.0</td>
<td>150.0</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Year of Disbursement/Repayment</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
<th>11</th>
<th>12</th>
<th>13</th>
<th>14</th>
<th>15</th>
<th>16</th>
<th>17</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Repaid per year</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>6.9</td>
<td>14.4</td>
<td>22.5</td>
<td>31.2</td>
<td>40.6</td>
<td>50.8</td>
<td>61.8</td>
<td>73.8</td>
<td>86.7</td>
<td>100.7</td>
<td>115.9</td>
<td>132.3</td>
</tr>
<tr>
<td>Net new lending per year</td>
<td>3.0</td>
<td>7.5</td>
<td>16.5</td>
<td>46.5</td>
<td>90.1</td>
<td>110.1</td>
<td>124.5</td>
<td>118.8</td>
<td>109.4</td>
<td>99.2</td>
<td>88.2</td>
<td>76.2</td>
<td>63.3</td>
<td>49.3</td>
<td>34.1</td>
<td>17.7</td>
<td>0</td>
</tr>
<tr>
<td>Net Disbursements</td>
<td>3.0</td>
<td>10.5</td>
<td>27.0</td>
<td>73.5</td>
<td>156.6</td>
<td>266.7</td>
<td>391.2</td>
<td>510.0</td>
<td>619.4</td>
<td>718.6</td>
<td>806.8</td>
<td>883.0</td>
<td>946.3</td>
<td>995.6</td>
<td>1029.7</td>
<td>1047.4</td>
<td>1047.4</td>
</tr>
</tbody>
</table>