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### FINANCING OF NUCLEAR PROJECTS

#### Report by the Board of Governors

1. In Resolution GC(XIII)/RES/256 the General Conference requested:
  - (a) The Director General to make a comprehensive study of the likely capital and foreign exchange requirements for nuclear projects in developing countries during the next decade, and of ways and means to secure financing for such projects from international and other sources on favourable terms, particularly in the form of grants or long-term loans at low interest, and to make suggestions concerning a constructive role which the Agency could play in this regard; and
  - (b) The Board of Governors to review the progress of this study and to report thereon to the General Conference.
  
2. Last June the Director General presented the Board with a report on the progress that had been made with the study in question up to the end of April. The first part of the study, to which that report related, is reproduced in Annex I hereto; it is concerned with estimates of nuclear power demand in developing countries and related foreign capital requirements. From it a broad picture emerges of the needs of those countries during the decade which is just beginning for foreign capital to finance the installation of nuclear power plants, even if the tentative character of the estimates on which it is based does not yet allow all the detail in the picture to be seen with complete clarity.
  
3. In December 1969 the Director General sent out two inquiries for the information needed to make the second and third parts of the study, which are to deal respectively with the sources from which the required foreign capital might come and the possible role of the Agency in facilitating its provision. One inquiry took the form of four questions which were addressed to the Governments of 13 Member States that could be considered potential suppliers of investment capital for nuclear projects in developing countries, whereby information was requested on the present activities and future plans of their institutions actively engaged in electric power financing, with special reference to the role they might be prepared to assume in developing countries; to this inquiry only six replies had been received by the end of April last, and four more by 31 July when the present report was prepared for press. The second inquiry was sent to the International Bank for Reconstruction and Development (IBRD) and elicited information on the role it has played in the past in financing electric power together with some indication as to its policy with regard to the installation of nuclear power in the future.

4. The information thus obtained from nine Governments[ 1 ] and IBRD is assembled in Annex II for the information of the Conference. In relation to it, the Board concurs with the view put forward in the Director General's progress report that if the study is to deal comprehensively with the whole subject of financing nuclear projects in developing countries, as the Conference has asked, substantially more data will need to be made available to the Secretariat than Governments have as yet seen fit to communicate. This applies especially to information as to sources and availability of foreign capital to finance the nuclear power plants which developing countries wish to install, and still more to the terms and conditions under which such capital could be made available.

5. At the end of its review of the progress thus made with the study, the Board requested the Director General to urge the Governments of those Member States that were likely to be able to furnish the additional information needed for the completion of the study to make it available to him, to proceed with the study as expeditiously as possible and to keep the Board informed of progress. For its part the Board intends to keep the Conference similarly informed.

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[ 1 ] From Austria, Canada, Belgium, the Federal Republic of Germany, Italy, the Netherlands, Sweden, Switzerland, the United Kingdom of Great Britain and Northern Ireland and the United States of America. The communication from Sweden indicated that no answer could be given to the questions at that stage.

## ANNEX I

## FINANCING OF NUCLEAR PROJECTS IN DEVELOPING COUNTRIES

The first part of a study by the Director General

## INTRODUCTION

1. In September 1969 the General Conference requested the Director General  
"to make a comprehensive study of the likely capital and foreign exchange requirements for nuclear projects in developing countries during the next decade, and of ways and means to secure financing for such projects from international and other sources on favourable terms, particularly in the form of grants or long-term loans at low interest, and to make suggestions concerning a constructive role which the Agency could play in this regard". [ 1 ]
2. The requested study called for the assembly of three different classes of material:
  - (a) Estimates of nuclear power demand [ 2 ] in developing countries [ 3 ] and related foreign capital requirements;
  - (b) Information as to sources from which capital could be obtained to meet these requirements; and
  - (c) Suggestions on the possible role of the Agency in helping developing countries to obtain the capital required.

The present paper consists of an initial analysis of the material in the first class which the Secretariat had succeeded in assembling by the end of April 1970.

## ASSEMBLY OF THE MATERIAL

3. Five to six years usually elapse between a decision to install a nuclear power plant and its commissioning. Since finance must be secured before the decision is taken, it was therefore necessary to obtain estimates of nuclear power demand extending well into the eighties of the present century, in order that the total requirements of foreign capital during the decade which is just starting could be estimated. The expected power demand over the 15-year period 1970-85 has accordingly been taken as the basis for the study.

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[ 1 ] By Resolution GC(XIII)/RES/256, para. 1.

[ 2 ] Although the request for the study refers to "nuclear projects", the present paper is limited to an analysis of nuclear power demand, because other nuclear projects usually only involve capital requirements that are smaller by several orders of magnitude.

[ 3 ] For the purpose of the study, developing countries are defined as those countries for which a programme under the technical assistance component of the United Nations Development Programme had been approved by its Governing Council for 1969. There were 73 Members of the Agency in that category last year.

4. It was clear from the outset that this demand and the attendant foreign capital requirements could be estimated by two different methods:

- (a) On the basis of a country-by-country analysis of general data already available to the Secretariat. This would have involved forecasts not only of the costs of nuclear and conventional plants and of their fuel in various regions of the world, but also forecasts of the reactor types likely to be selected by each country, of the terms under which financing would be obtainable in each case and of the extent to which domestic industries would participate in the construction of the nuclear plants chosen; and
- (b) On the basis of specific data to be supplied for the purpose by the developing countries themselves.

Although the second method would not overcome all the difficulties inherent in any long-term forecasting of nuclear power development, its adoption would have the advantage that the data assembled would be the result of analyses made by each country in full knowledge of the latest technical, economic and commercial developments.

5. This part of the study is, therefore, mainly based on the data obtained up to the end of April this year from the Governments of developing countries, in reply to a circular letter addressed to them by the Director General in November 1969; [ 4 ] 32 replies were received, of which 12 came from Members that expect to require finance for nuclear power plants in the next decade [ 5 ]. The first method of estimation has, however, been used in cases where replies have not been forthcoming, and the national programme has also been subjected to critical analysis whenever the time element made the achievement of certain targets appear doubtful. Ranges rather than single figures are presented for the 1980-1985 period.

#### ESTIMATED DEMAND FOR NUCLEAR POWER IN DEVELOPING COUNTRIES

6. Table 1 below provides estimates of the total electricity generating capacity expected to be installed in the developing countries in various areas of the world by the end of 1970, 1975, 1980 and 1985 respectively. Similar data in respect of the nuclear component of that capacity are presented in Tables 2 and 3.

Table 1

Estimate of total electrical capacity in developing countries  
(thousands of megawatts)

Area	Year			
	1970	1975	1980	1985
Africa	13	19	27	45
Asia	34	60	100	162
Europe <sup>a/</sup>	37	52	75	120
Latin America	39	57	84	134
Middle East	4	6	9	14-15
Total	127	194	295	475

a/ Bulgaria, Cyprus, Greece, Hungary, Poland, Romania, Turkey and Yugoslavia.

[ 4 ] The situation had not substantially changed by 31 July.

[ 5 ] Brazil, China, Greece, Israel, the Republic of Korea, Mexico, Pakistan, Peru, the Philippines, Romania, Thailand and Turkey.

Table 2

Estimate of nuclear electrical capacity in developing countries  
(thousands of megawatts)

Area	Year			
	1970	1975	1980	1985
Africa	0	0	< 0.5	1
Asia	0.5	2.5-3	10-12	20-26
Europe <sup>a/</sup>	0	0.5	5- 6	10-12
Latin America	0	1 -1.5	5- 7	13-20
Middle East	0	0	0	1
Total	0.5	4-5	20-25	45-60

a/ Bulgaria, Cyprus, Greece, Hungary, Poland, Romania, Turkey and Yugoslavia.

Table 3

Estimated increase in nuclear electrical capacity in developing countries  
(thousands of megawatts)

Area	Period		
	1970-75	1975-80	1980-85
Africa	0	0	1
Asia	2.0-2.5	7.5-9	10-14
Europe <sup>a/</sup>	0.5	4.5-5.5	5- 6
Latin America	1.0-1.5	4.0-5.5	8-13
Middle East	0	0	1
Total	3.5-4.5	16-20	25-35

a/ Bulgaria, Cyprus, Greece, Hungary, Poland, Romania, Turkey and Yugoslavia.

7. Estimates of the total electrical capacity and of its nuclear component expected to be installed over the next 15 years in industrialized countries are compared below with corresponding data for developing countries.

Table 4

Estimate of total and nuclear electrical capacity in industrialized  
and developing countries  
(thousands of megawatts)

Category of countries	Year and capacity							
	1970		1975		1980		1985	
	Total	Nuclear	Total	Nuclear	Total	Nuclear	Total	Nuclear
Industrialized	1000	23 (2.3%)	1400	120 (9%)	1950	300-330 (15-17%)	2800	600-750 (21-27%)
Developing	127	0.5 (0.3%)	194	5 (2.5%)	295	20-25 (7-8%)	475	45-60 (9-13%)

It will be seen that the relative size of the nuclear component will grow in both cases, but that by 1985 it will still remain much smaller in developing countries than in industrialized countries.

#### FOREIGN CAPITAL REQUIREMENTS FOR NUCLEAR POWER PLANTS IN DEVELOPING COUNTRIES

8. The task of translating forecasts of future nuclear capacity in developing countries into estimates of the related foreign capital requirements introduces further elements of complexity and uncertainty. Predictions about costs must reflect the contribution that domestic industry can be expected to make towards the construction of the nuclear power plant, and this will necessarily vary not only with the country and the reactor type but also from the first plant to successive units. Some broad simplifying assumptions are therefore unavoidable, and their impact on the accuracy of the resulting estimates should be constantly borne in mind. The most important of these assumptions are the following:

- (a) The great majority of nuclear power plants expected to be commissioned between 1975 and 1980 fall within the 400-600 MW(e) range. The average capital cost of these plants (including the first fuel loadings) is estimated at about \$250/kW(e) for light-water and advanced gas-cooled systems and at about \$300/kW(e) for heavy-water systems; [6] and
- (b) Most of the plants considered for initial operation in the 1980-85 period are expected to fall within the 800-1000 MW(e) range. The economies resulting from the use of such larger units should approximately offset the effects of inflation at a rate of between 3% and 4% a year, so that the cost figures of \$250 and \$300 may be considered to retain their validity as a first approximation.

9. The approximate proportions of domestic and foreign capital required for nuclear power plant construction in developing countries is shown in Table 5, which reflects special adjustments for the cases of India (with an ultimate target of 80% of plants to be provided by domestic industry) and of some Eastern European countries (with 60% as a possible goal).

[6] With an accuracy of plus or minus 10%.

Table 5

Period	Capital required for			
	Light-water and advanced gas-cooled systems		Heavy-water systems	
	Domestic (%)	Foreign (%)	Domestic (%)	Foreign (%)
1975-80	20	80	33.3	66.6
1980-85	40	60	50	50

10. When this distribution is applied to the capital cost assumptions made in paragraph 8(a) above, it appears that the foreign capital component is practically independent of reactor type and can be expected to average approximately \$200/kW(e) and \$150/kW(e) respectively in the two periods. Table 6 provides an estimate of the total foreign capital requirements based on this assumption.

Table 6

Period	Total foreign capital requirements (millions of dollars)
1975-80	3200-4000
1980-85	3750-5250

11. Although it must be emphasized that the foregoing estimates are very rough, they nonetheless provide an indication of the order of magnitude of the foreign capital that developing countries will need to obtain over the next 15 years in order to achieve their goals for the installation of nuclear power plants. It is to be noted too that the cumulative amount of roughly \$7000-9000 million that is required exceeds the total of all credits so far granted to developing countries for this purpose by a factor of more than 10. It is equally clear that the acute difficulties experienced by most of these countries in achieving equilibrium in their balance of payments make even partial achievement of their goals contingent upon their being able to obtain foreign capital financing on unusually favourable terms.

A N N E X II

FINANCING OF NUCLEAR PROJECTS IN DEVELOPING COUNTRIES

Information on sources of foreign capital

A. REPLIES RECEIVED BY 31 JULY 1970 TO FOUR QUESTIONS PUT TO GOVERNMENTS BY THE DIRECTOR GENERAL

Question 1. Which of your national financial organizations, whether governmental or private, are active in the field of financing of power projects in developing countries?

Austria

"As part of their endeavours to promote exports to developing countries private and nationalized Austrian banks offer jointly with the ERP [1] Fund, funds for financing exports of investment goods to developing countries. Responsible authority is the Österreichische Kontrollbank AG."

Belgium

"Such projects are financed by the private banks through CREDITEXPORT, an organization established by them."

Canada

"The Canadian International Development Agency (CIDA) and the Export Development Corporation (EDC) have both separately and jointly financed power projects in developing countries. Both are Crown agencies. The former administers Canada's official programmes of development assistance. The latter administers export credits and insurance schemes."

Germany, Federal Republic of

"In the Federal Republic of Germany, there are several ways of financing projects for developing countries. First of all, loans are made from funds earmarked for financing exports; under this system, private exporters as a rule avail themselves of the support of their own bankers. In addition, the Federal Government subsidizes such private financing by providing deficit guarantees; these guarantees are handled by the Hermes-Kreditversicherungs-AG, Hamburg (Hermes Insurance Company Ltd., Hamburg). In the case of projects financed out of public funds, a method used for development aid projects carried out by the Federal Government itself, similar loans are granted by the Kreditanstalt für Wiederaufbau (Reconstruction Loan Corporation), Frankfurt/Main."

Italy

"In Italy there are no financial organizations, either public or private, which contribute specifically to the financing of electric power projects in developing countries. Within the framework mentioned above, credit institutions may provide medium- or long-term financing at a favourable rate of interest to promote such projects in developing countries."

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[1] European Recovery Plan.

Netherlands

"Power projects in developing countries are not considered to be a separate item for which development financing might be provided by any specific national financial organization. All financial development assistance is administered within the context of consortia of IBRD [ 2 ] through the intermediary of 'The Netherlands Investment Bank for Developing Countries', acting on behalf of the Government.

"An exception is made for projects financed in the Netherlands Antilles and Surinam, and there are some special cases of contributions on the basis of a grant. "

Switzerland

". . . . financing of power projects abroad, whether hydroelectric, thermal or nuclear, has hitherto been undertaken, so far as Switzerland is concerned, exclusively by banks and private industry. The banks involved in such financing are mainly the large houses which specialize in foreign transactions. The type of credit offered naturally depends on market conditions and is likely to vary from case to case in accordance with the risks. The banking institutions concerned would alone be in a position to furnish detailed information on the terms and conditions available for financing of power stations abroad.

"The Federal Government, for its part, facilitates private financing to the extent that it extends guarantees to cover the export risks involved in construction and development work, technical and economic assistance and the supply of equipment. In practice, the banks generally regard this guarantee as a prerequisite to financing. No such guarantee has so far been given for the supply of nuclear facilities. On the other hand, the equipment of several hydroelectric power stations abroad, or some parts thereof, has been subject to a guarantee against export risks. We might mention for example the guarantee accorded in respect of the entire equipment for a thermal power station in Turkey, representing a sum of S. Fr. 150 million, which extends over a period of 12 years.

"The Federal Law relating to guarantees against investment risks, which is at present being drafted, will undoubtedly help to promote the financing of power projects abroad. Article 1 of this Law stipulates that investments may qualify for a guarantee provided they help to stimulate the economies of developing countries and are closely associated with the Swiss economy. Investments will be particularly favoured by this Law to the extent that it facilitates financing by banks. "

United Kingdom of Great Britain and Northern Ireland

"British firms exporting power plant seek credit, if required, from commercial banks. At government level, the Export Credit Guarantee Department offers a service to insure sales to overseas buyers, and its guarantee enables the banks to charge a favourable rate of interest. The Ministry of Overseas Development has assisted power projects with aid loans, within the limits of available resources, and having regard to the priorities of the receiving government: however, these loans are not on a scale which would match the financial needs of a nuclear power station. "

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[ 2 ] International Bank for Reconstruction and Development.

United States of America

"The twenty nuclear power projects outside the U.S. involving reactors supplied by U.S. manufacturers have, in all cases except two, involved financing by the U.S. Export-Import Bank (EIB). These loans total some \$550 million and involve approximately 1000 megawatts in installed capacity. Of the two exceptions, the Indian Tarapur reactor was financed with the assistance of a loan from the U.S. Agency for International Development (AID), and the Italian Garigliano Nuclear Power Station with a loan from the International Bank for Reconstruction and Development (IBRD). Commercial supplier credits have also been involved, but to a relatively minor degree, in this financing.

"U.S. commercial banking houses have not been involved until quite recently in foreign nuclear power projects. The EIB, however, has recently emphasized a policy that provides for participation by commercial banks in the financing of projects, including those for nuclear power, in which the EIB is participating. In order to reduce the overall financing cost to the borrower, repayment of the commercial bank portion of the financing, which normally carries a higher interest rate than the EIB portion, may be made first. Several loans of this type have been made and more are under consideration.

"Conventional power projects outside the U.S. have also been financed by EIB, which has made loans for conventional power totalling some \$1400 million (roughly 4/5 thermal and 1/5 hydro). In addition, the EIB has authorized a large volume of guarantees of U.S. commercial supplier credits.

"AID, which in the past has made loans for conventional power generation, is now, as a matter of basic policy, stressing the provision of technical assistance rather than capital loans to qualifying countries, including, among other sectors, electric power systems. An additional factor of basic importance is that the AID has adopted a policy of concentration in the fields of agriculture and food production, family planning, health and education. In addition, AID has pre-investment assistance and investment insurance and guarantee programmes for the encouragement of U.S. private investment abroad."

Question 2. What have been the general terms and conditions of recent loans under which credits have been made available for conventional and, if relevant, for nuclear power plants built, under construction or planned in developing countries?

Austria

"Up to September 1969 loans were offered for a period of ten years, beginning with the date of the completion of the project in question, and at a maximum interest rate of 5 1/2%. As of September 1969 the terms were readjusted in accordance with the recommendations of the OECD [3] committee on development aid (DAC) [4], implying longer durations and lower interest rates. Hitherto, loans were only given for the building of conventional power stations."

[3] Organisation for Economic Cooperation and Development.

[4] Development Assistance Committee.

Belgium

"The duration of the loans which have been made for complete power stations varies considerably. It is five years as a rule, but may be as long as ten years in the case of developing countries. In competitive situations it can be longer than ten years.

"The financing terms are those which apply to the export of capital goods in general."

Canada

"No explicit policy has been formulated respecting financial arrangements for nuclear power projects. Two nuclear power plants have been financed under official credit arrangements. In the case of the KANUPP project in Pakistan, the financing was mixed - approximately 50% under EDC terms of 6% and 20 years maturity, and 50% under CIDA development assistance loans of 3/4% and 50 years maturity. However, CIDA loan terms vary as indeed do those of EDC."

Germany, Federal Republic of

"Since the character of the individual projects varies and the economic scene is subject to rapid change, it is difficult to establish general principles. Interest rates and terms of loans vary with every project and offer numerous ways of combining conditions - a state of affairs which, again, makes it difficult to lay down standard conditions. However, the following trends can be observed:

"The conditions for capital aid loans, i. e. loans raised exclusively from public funds, are primarily determined by the profitability of the project; in addition, the financial and economic power (i. e. transfer ability, capital resources) of the recipient country is taken into consideration here. As a rule, capital aid is granted under the conditions recommended by OECD [ 3] ( a thirty years' term, including eight years during which no payments have to be made, and 2. 5% interest). In recent years, power projects have also been financed by means of funds raised from various sources: from low-interest public loans granted on a long-term basis on the one hand, and from capital market funds granted on a shorter-term basis on the other."

Italy

"No such loans have so far been made available for nuclear power plants in developing countries. Loans have been granted, however, for conventional power plants at varying rates of interest (between 4 and 6 1/2%) and for varying periods of repayment (from 12 to 20 years)."

Netherlands

"General terms and conditions of any loans within the context of consortia and consultative groups are currently based on the 'new DAC average terms', laid down by the Development Assistance Committee (30 years' amortization, 8 years of grace, 2. 5% interest). In some cases easier terms have been given. No differences are made between the various categories of goods which the developing country in question wishes to purchase with Netherlands' assistance."

Switzerland

"The opportunities of the Federal Government are at present limited as regards direct financing of the export of Swiss power plants. However, the competent Federal Department is now considering whether the measures adopted so far for the benefit of developing countries could not be supplemented by a special appropriation under which financial assistance would be granted for the specific purpose of enabling the countries in the 'third world' to develop their infrastructure through public funds made available under favourable conditions.

"Bilateral credit agreements have already been concluded or are being concluded with three developing countries. Last autumn the Federal Parliament approved a loan of S. Fr. 45 million for Pakistan at an average rate of interest of 5.12%, which will be made available during 1970 as soon as the necessary agreement has been signed. The possibility of using this money for financing power stations depends first on Pakistan's needs, and also on the allocation of the credit among the different sectors of our export industry, a matter that has yet to be settled.

"A similar loan of S. Fr. 63 million was made available to India in 1966. Of this amount about S. Fr. 9.7 million still remain unutilized, a sum hardly sufficient for the financing of power plants.

"Last year the Parliament also approved a credit of S. Fr. 15 to 20 million for Turkey. The final amount and the terms of the loan - which is likewise linked with Swiss deliveries to Turkey - will be specified by an agreement which is now being negotiated bilaterally.

"Several Swiss companies (engineering firms) which specialize in the design and construction of power plants have had a part in the construction of such installations in various developing countries, particularly by providing engineering consultant services.

"In the matter of financing, one notes a certain amount of reserve which will doubtless give way once the guarantee against investment risks, referred to earlier has been introduced. Nevertheless, various firms are participating in the financing of power plants in countries belonging to the 'third world'."

United Kingdom of Great Britain and Northern Ireland

"For normal commercial sales, it is not UK policy to offer more favourable credit terms to buyers in developing countries than to buyers in other countries. As may be seen from figures quoted in a recent study of the International Monetary Fund on commercial credit, terms of over five years have not been uncommon in the field of conventional power contracts in developing countries. In practice, export credits extended by the UK in such cases have varied widely. UK firms have not built any nuclear power stations in developing countries nor are they at present doing so."

United States of America

"The terms and conditions of the EIB's participation in nuclear power plant financing, whether to a developing or industrialized country, vary somewhat according to market and competitive factors but follow the same general pattern. The financing package is divided into two parts. The part relating to capital equipment carries a repayment term of up to 30 equal semi-annual instalments of principal, the first payment due six months after start-up of the plant. EIB's participation takes the form of a direct loan at the Bank's going interest rate (currently 6%), an EIB financial guarantee of a loan extended by a US or foreign financial institution or a combination of both. In addition, there may be participation in the

financing by US or foreign institutions whose loans are not guaranteed and, as circumstances dictate, by the supplier of the equipment. A cash payment by the borrower of not less than 10% is customarily required.

"The second portion of the loan relates to the initial fuel core and related services. The sources of financing, as in the case of capital equipment, will be a combination of EIB and private funds. Repayments will generally be in ten semi-annual instalments, beginning not later than six months after plant start-up, and a cash payment of not less than 10% will be required. EIB is also prepared to participate in the financing of fuel and related services sold separately from the plant.

"As stated above, AID's present policy emphasizes the provision of technical assistance and the encouragement of private investments. It should be noted that the Tarapur loan was made in 1961 and since that time no loans have been made by AID for nuclear power plants."

Question 3. Have any estimates been made by the organizations mentioned under point 1 of the potential volume of financing of electric power projects in developing countries for the period 1970-80?

Austria

"No. "

Belgium

"Nothing seems to have been done in this field. "

Canada

"Estimates of future power project requirements have been made only for select countries. "

Germany, Federal Republic of

"Unfortunately, there are no estimates of this type especially for electric power projects in developing countries. "

Italy

"No financial organization in Italy seems to have made any estimates of the potential volume of financing of electric power projects in developing countries for the period 1970-80. "

Netherlands

"The answer is in the negative. "

Switzerland

"No. "

United Kingdom of Great Britain and Northern Ireland

"The UK Government has made no estimate of the type described."

United States of America

"During the 1970s the EIB is prepared to increase its loan activities significantly for projects which can utilize nuclear power on a sound basis and involve US exports of nuclear fuel and power plants. According to projections of the USAEC, there will be 10 to 12 such possible projects by 1980 located in countries considered by IBRD to be developing, as opposed to industrialized countries. [5] The EIB expects to participate in the financing of most or all such sound nuclear projects involving US exports as they materialize."

Question 4. What special financing terms might be considered for nuclear power plants (components, fuel and services) which may be supplied by your national manufacturers to developing countries?

Austria

"Producers of components of nuclear power plants have shown a certain interest in such exports, but there are so far no concrete ideas as to the financing involved."

Belgium

"A proposal has been made to supply a nuclear power plant with payment spread over 15 years from the date of commissioning, which would be five years after the order is placed. As regards credit insurance, the Office National du Ducroire (national del credere office) would appear to offer a solution; on the other hand, no solution has yet been found to the question of financing."

Canada

"If development assistance financing would be appropriate, the terms and conditions would be as for other development projects under the Canadian aid programme for a given country."

Germany, Federal Republic of

"Reference is made here to what has been stated under Question 2 above. The conditions for financing nuclear power plants are determined by the circumstances in every individual case; here the range of financing methods is as wide as it is for other development aid projects. However, it is possible that different financing conditions may be fixed for the several components of nuclear projects, such as the power plant part, fuel elements, supplies, etc."

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[5] Source: IBRD lists of developing and industrialized countries reproduced in *Partners in Development*, Report of the Commission on International Development, Praeger Publishers, Inc., New York and London (1969), pages 358 and 359, footnotes 1 and 2.

Italy

"In view of present circumstances, it is thought that the terms for financing of nuclear power plants in developing countries could not be more favourable than 6% interest with repayment over ten years (from the date of completion of the plant)."

Netherlands

"The Netherlands consider it desirable that financing terms should not be in accordance with the project in question, but with the repayment capacity of the receiving country. They are also inclined to think that the setting up of special financing institutions or the laying down of special financing terms for particular groups of capital investment projects would not be appropriate, as this might lead to multiplication of financial institutions and overlapping of their functions and operations."

Switzerland

[ No reply. ]

United Kingdom of Great Britain and Northern Ireland

"The UK Government is anxious to assist the development of nuclear power wherever it is economically justified; but does not find it possible to suggest in general any special financing terms for exports of nuclear equipment to developing countries. The conditions in the country concerned and the future state of the credit market would be bound to affect particular cases and, as noted, terms have varied widely even for conventional plants. The UK Government recalls that the services of reputable consultants are available to advise developing countries both as to whether nuclear power would be economic and technically suitable in particular contexts, and as to the most advantageous ways of financing it."

United States of America

"We are not aware of any special financing terms, in the sense of unique concessionary offerings, that might be considered for nuclear, as opposed to conventional, power plants. In our view, the basic solution to the problem of financing nuclear power rests, in the first instance, on the economic and technological soundness of the particular project, as well as on the priority that has been assigned to the development of a scientific and technological infrastructure. The sum of these factors undoubtedly bears heavily on the attitudes of the various agencies and institutions involved in the financing of nuclear power projects."

**B. REPLY FROM THE INTERNATIONAL BANK FOR RECONSTRUCTION AND DEVELOPMENT**

"... Bank/IDA[6] finance for power has totalled US \$3 billion during the decade 1960-69. This total represents about 28% of all Bank/IDA lending during this period. The average maturities for Bank loans for power have been about 25 years for hydroelectric facilities, 20 years for thermal facilities and 15 years for transmission and distribution projects, including grace periods ranging from three to five years depending on the construction period for the project. Interest rates, which are the same for all Bank projects,

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[6] International Development Association.

have varied over the years as the cost of money to the Bank has changed; the Bank's current lending rate is 7%. Bank loans also carry a commitment charge on the undisbursed loan balance of 3/4 of 1%. IDA terms have thus far been a uniform 50 years maturity, including ten years of grace, with no interest but a service charge of 3/4 of 1%. Because these concessional terms are intended to assist the country and not a particular utility, IDA funds are lent to the Government for relending to the beneficiary utility on terms similar to Bank terms.

"Loan and credit conditions are, of course, specific to particular situations, but they may be described as being generally directed towards helping to strengthen the utility and improve the environment in which it operates. The normal conditions attached to our loans and credits thus relate, on the organization and management side, to the retention of appropriate consultants where necessary to help improve management and operation of the utility, including auditing of accounts and financial reporting, and to help carry out the project. On the financial side, normal conditions relate to regulatory legislation and procedures, rate policy adequate to generate funds needed to support expansion programmes, debt limitation covenants, etc.

"Regarding flows of foreign assistance to the developing countries for power development, the OECD has recently published the following:

	<u>International Assistance for Electric Power</u> (US \$ million equivalent)		
	<u>Bilateral</u>	<u>Multilateral</u>	<u>Total</u>
1967	502.9	176.2	679.1
1968	221.9	585.5	807.4

Source: OECD: DAC Chairman's Report for 1969, page 16

The bulk of the multilateral aid shown in this table was provided by the Bank and IDA: 1967 - US \$111.8 million; 1968 - US \$469.5 million. OECD may have comparable information for earlier years.

"For the future, our current estimate is that installed generating capacity in the developing countries will rise from 120 million kW in 1970 to 190 million kW in 1975, and that the Bank/IDA may help finance some 15-20% of this addition to capacity.

". . . . With present costs, several [ developing countries ] have interconnected power systems large enough to consider nuclear facilities for their system expansion plans; whether or not nuclear facilities will prove to be economic will, of course, depend upon the alternatives available in each case. As you know the Bank has been following closely the rapid evolution of both the technology and costs of nuclear facilities and we routinely examine the economics of nuclear versus other generating plant wherever such comparisons are called for.

". . . . ."