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*Closing Report on Actions Relating to Recommendations  
of the Electric Power Eval. Report of March 1972*

*Apr. 1975*



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# OFFICE MEMORANDUM

*file  
Power Closing  
Report*

TO: Mr. C. R. Willoughby

DATE: April 16, 1975

FROM: Christopher G. Melmoth *CGM*

SUBJECT: Closing Report to Electric Power Evaluation

The report attached to your memo dated March 5 was, on the instructions of Mr. Weiner, brought to the attention of the Division Chiefs in the South Asia Department. Only the India Division has any comments, mainly very minor ones. To save time, and in the hope that they will be helpful, I am sending you these comments as noted in the margin on the India Division's copy.

CGM/nk  
Att.

*185*  
APR 17 1975

DOCUMENT OF  
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SecM75-247

April 11, 1975

FROM: The Secretary

CLOSING REPORT ON ACTIONS RELATING TO RECOMMENDATIONS OF THE  
ELECTRIC POWER EVALUATION REPORT OF MARCH 1972

Attached is a copy of a memorandum from Mr. Shoaib with its accompanying report entitled "Closing Report on Actions Relating to Recommendations of the Electric Power Evaluation Report of March 1972", dated April 11, 1975 (report No. 690) prepared in the Operations Evaluation Department.

Distribution:

Executive Directors and Alternates  
President  
Senior Vice President, Operations  
Executive Vice President and Vice President, IFC  
President's Council  
Directors and Department Heads, Bank



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April 11, 1975

MEMORANDUM TO THE EXECUTIVE DIRECTORS

SUBJECT: Closing Report on Actions Relating to Recommendations of the  
Electric Power Evaluation Report of March 1972

Attached, for information, is a copy of a confidential report entitled "Closing Report on Actions Relating to Recommendations of the Electric Power Evaluation Report of March 1972", prepared by the Operations Evaluation Department. This report, which is the first of its kind, takes up again each of the recommendations originally contained in the first evaluation report issued, "Operations Evaluation Report: Electric Power", dated March 10, 1972 and distributed to the Executive Directors under cover of Secretary's memorandum R72-55; it reviews and assesses Bank action related to each point and overall since the evaluation report was completed.

*W. Shorab*

Attachment

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**APR 26 2023**

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Report No. 690

CONFIDENTIAL

INTERNATIONAL BANK FOR RECONSTRUCTION AND DEVELOPMENT

INTERNATIONAL DEVELOPMENT ASSOCIATION

CLOSING REPORT ON ACTIONS RELATING  
TO RECOMMENDATIONS OF THE  
ELECTRIC POWER EVALUATION REPORT of March 1972

April 11, 1975

Operations Evaluation Department

## PREFACE

This Closing Report is an outcome of the follow-up procedures applied by the Operations Evaluation Department to its first report, containing quite complex recommendations to the Bank Group: "Operations Evaluation Report - Electric Power" dated March 1972. Under these follow-up procedures, responses to the recommendations were first solicited from the concerned operating departments and discussed with them before they were put into final form; a little over one year later a review was carried out of the related work throughout the Bank Group in the interim; that review led to the preparation of the first draft of this report, whose wide distribution and discussion within the Bank Group over the last nine months has helped draw attention again to the issues that emerged from the original studies and to the work done on them by various parts of the Bank Group over the last few years.

The excellent cooperation of the Bank Group Staff, and especially of the Public Utilities Department, most heavily concerned, in the follow-up and review process is most gratefully acknowledged.

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IBRD/IDA Lending for Electric Power FY 1970-74

3



CLOSING REPORT ON ACTIONS RELATING TO  
RECOMMENDATIONS OF THE  
ELECTRIC POWER EVALUATION REPORT of March 1972

In 1971 the Operations Evaluation unit carried out, as one of its first efforts, a review of Bank operations in the electric power field, mainly on the basis of ex-post assessments, against original objectives, of a large and diversified sample of projects for which the Bank had lent a cumulative total of about \$1 billion to ten different power companies -- three in Colombia and one each in Argentina, Brazil, Ethiopia, Ghana, Malaysia, Mexico and Singapore. The results of this study were presented in "Operations Evaluation Report: Electric Power" (IBRD Report No. Z-17) dated March 1972. Bank assistance to the Colombian power sector was also treated somewhat more comprehensively in one chapter of the report "Bank Operations in Colombia: An Evaluation" (IBRD Report No. Z-18) which was issued shortly thereafter. Both studies included certain suggestions regarding future Bank activity in the field of electric power which were discussed with the relevant operating departments both before and after presentation of these reports to the Executive Directors and were in the main agreed to be worthy of pursuit.

The purpose of the present document is to report briefly on actions since taken by the Bank that relate to the suggestions made. It is based on a review of relevant research papers and operational guidelines issued by the Bank in 1972-74 and of appraisal reports for power loans approved in FY 1974; on a series of discussions in July 1974 with all operating units principally responsible for electric power work; on comments received in October and November on the first draft of this report; on a meeting with relevant Bank managers early in December 1974; and on comments provided early in 1975 on a revised draft of the present report. After recalling the main conclusions of the evaluation studies and indicating the main lines of recent Bank activity in the field of electric power, this report systematically summarizes each of the original suggestions, the response that the Bank operating departments gave at the time and relevant actions since taken. An overall assessment is given in the concluding paragraphs.

The evaluation studies found that the rapid pace of power system expansion achieved in the developing countries between 1950 and 1970 had depended crucially on Bank financing and concluded that the wider pattern of Bank action had been notably effective in achieving the main preoccupation that the Bank had developed in its work in this field: minimizing long-run (financial) costs of power system expansion by such measures as improvements in sector organization, careful advance investigation and planning to enable selection of the most economic path of system expansion, use of international competitive bidding and assuring adequate cash-flow to the utility to prevent construction interruptions. The Bank had in particular in several instances made significant contributions to institutional rationalization by urging amalgamation of regional power companies, or cooperative arrangements, to permit achievement of scale economies, and its financial covenants, which had become steadily better in form, showed evidence of having been causative factors in the continuous improvement of financial performance demonstrated by most of the companies. Notable internal organizational improvements had also been stimulated by the Bank in several companies, and the two cases among all ten that still showed considerable institutional weakness were ones where, in complex political circumstances, responsibility for power supply

within relatively small areas remained divided. Major cost overruns had occurred on some projects, but generally for reasons that would have been hard to foresee, and in the case of very few plants were they large enough to raise doubts in retrospect as to the economic validity of projects selected. Only in few cases had there been temporary unproductive building ahead of demand, due to faulty planning.

The main theme of the report's suggestions for the future was that the Bank could make an important contribution to further improving its own selection of power projects and the role of its power customers in development by helping them to cope with fundamental questions, essentially related to the links between power supply and development, which it had largely bypassed in the past and on which they not infrequently themselves wanted advice. How quickly should power demand be allowed or encouraged to grow? How much can electricity supply induce development or improvements in efficiency in other sectors (e.g. small industry and agriculture)? How much expenditure should be allocated to electrification of villages or small towns presently unserved, and how should they be selected? How much effort should be devoted to expanding the coverage of the power system as opposed to improving reliability standards on the existing system? What are appropriate risks of load shedding to run under different economic conditions? Under what circumstances is it worthwhile from the socio-economic viewpoint to provide power at less than cost to serve? The report asked the Bank to develop appropriate methods of analysis and project appraisal to help bring answers to these basic dilemmas.

Bank and IDA lending for electric power, after falling sharply in FY 1973, reached a new peak in FY 1974, in excess of \$750 million, in real terms 20% above the average annual amount of power lending committed in 1969-73 and envisaged for 1974-78. 1/ The number of projects, at 14, was about the same as the average number approved in each of the previous five years; but three of the loans were in excess of \$100 million, including one of \$148 million, the largest single project loan ever made by the Bank, for the Elbistan lignite-fired thermal plant in Turkey. A somewhat surprising trend, in light of earlier expectations, is a sharp drop over the last year in the share of power distribution in the Bank Group's lending and in the projects supported, as shown by the following table: 2/

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1/ Revised IBRD/IDA Program 1974-78 of June 1974.

2/ The table refers only to lending directly for power utilities. In most years there are a few loans/credits for other principal purposes which also include a small power component, generally mainly distribution. But the total amounts involved are not usually very significant compared with the magnitudes given above. For instance, two of the larger provisions of this sort in FY 1974 were US\$ 2.4 million (out of a total US\$ 25.0 million loan) for a US\$ 3.7 million power distribution component of the Korea Kyongju Tourism Project (Ln. 953-KO) and US\$ 1.0 million (out of a total US\$ 30.0 million loan) for a US\$ 2.2 million distribution component of the Greece Nestos and Yannitsa Irrigation Scheme (Ln. 991-GR).

IBRD/IDA Lending for Electric Power FY 1970-74  
(current US\$ millions)

	<u>1970</u>	<u>1971</u>	<u>1972</u>	<u>1973</u>	<u>1974</u> <u>a/</u>
Loan/Credit Amounts Approved	556.0	500.9	520.6	321.5	754.8
% for Distribution	20	19	20	14	1
Total Project Costs <u>b/</u>	1512.1	816.1	2425.5	883.1	2958.0
% for Distribution	25	18	19	30	0.5

a/ excluding three small supplementary loans committed under amendments to earlier loan agreements to help cover cost overruns.

b/ excluding interest during construction.

In each of the years 1970-73 two of the loans/credits approved were predominantly or very largely for distribution expansion -- in such countries as Argentina, Brazil, Ghana, Iran, Nigeria and Turkey -- and another four projects included some distribution component. FY 1974 power lending included two projects with a distribution component and in both it was quite small. The first integrated rural development project to have an electric power component 1/ was the Mexico Papaloapan Basin Rural Development Project for which a loan was approved in October 1974; further rural development projects in Mexico are expected to follow suit in this respect.

An important innovation in the Bank's power work, sponsored by the new Public Utilities Department that emerged from the Bank's reorganization in October 1972, is the establishment of regular series of publications of research papers and operational guidelines. In 1973 and 1974 numerous papers prepared by Bank staff and consultants have been published in this form, ranging from guidelines on technical cooperation with other international agencies to a major review of the changing relevance of nuclear power for developing countries. Some of the research done on electricity pricing and rural electrification has culminated in an important policy statement on the economic analysis of public utility projects, 2/ carrying the Bank's approach much beyond cost minimization and demonstrating how the incremental return concept that has come into use in the Bank in the last few

1/ The Bank's loan of US\$ 50.0 million included a US\$ 5.0 million contribution for a US\$ 10.0 million rural power distribution component of the project designed to bring grid electricity to 106 villages with nearly 140,000 inhabitants, raising the percent of people in the Papaloapan Basin with electricity connections from about 41% now to 48% on project completion.

2/ Economic Evaluation of Public Utilities Projects (September 30, 1974).

years can become a meaningful tool of economic analysis once the relationship between prices charged for utility services and their marginal costs is established.

#### 1. System Extensions

Original Recommendation: The Bank should expedite work to develop techniques for analyzing the economic validity of extending public power supply to new areas, such as marginal zones of the cities, surrounding villages or small towns or larger regions presently unserved.

Bank Response: The Bank agreed with the need to study this matter on a priority basis and to identify economic and social effects of system extensions to smaller and less dense markets, with a view to finding practical ways to improve cost/benefit techniques and also provide a sounder basis for justifying departures from strict economic/financial pricing policies in order to meet social objectives.

Review of Action: The Bank has carried out, on schedule, a major research study of rural electrification experience in El Salvador and produced a number of internal instructions and papers relating to the economic justification of such schemes.<sup>1/</sup> Further field study is underway in connection with a small rural electrification component to a power loan made to Ecuador in February 1972. The major conclusions derived from these studies can be summarized:

a) Rural electrification is best undertaken within the framework of an integrated regional development program, and even in the (usual) absence of such a program it is desirable to move as far as possible to examining the potential in this broad context.

b) Successful village electrification normally requires that the village average per capita income be above a particular "threshold" level (for example, \$50-60 in El Salvador in 1972) at which demand begins to develop, but growth in demand can be very rapid and it is essential to focus on the prospects for this.

c) Economic benefits in excess of prices charged for power (mainly increases in production made possible by power supply and savings on alternative fuels) can and should be routinely assessed for productive uses of electricity (such as irrigation, agro/village industries, water supply works).

d) For household consumers, comparable benefits in excess of prices charged (from savings on alternative fuels and greater value of higher-quality energy) are so difficult to estimate soundly at

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<sup>1/</sup> Public Utility Note 6, "The Appraisal of Village Electrification Projects" (August 1, 1973), and IBRD Report No. 517, "Issues in Rural Electrification" (July 24, 1974), distributed under Secretary's Memorandum SecM74-636 of September 12, 1974.

reasonable cost and may well normally be sufficiently small that revenue projections may generally be taken as a reasonable indicator of gross benefits of such consumption, implying that electrification for households alone in rural areas is generally unlikely to be economic.

e) It is essential to take a long-run (20-year) rather than a medium-run (5-year) term of analysis due to the importance in the economic analysis of both the prospective growth of demand and of possible scale economies from increasing network utilization.

f) Tariffs may be set below long-run marginal costs during the early years because of the generally high initial investment costs, the need particularly at first to promote the use of the service, or social reasons (to help small business and low-income families), but subsidies (or taxes) should be made explicit and tariffs should within five-ten years aim at reflecting the level and structure of long-run marginal costs of supply in order to secure efficient allocation of resources and to avoid inequities with the much larger number of rural families in most developing countries who remain without electricity (probably still about 75% in the early 1980s).

g) Non-quantifiable benefits in excess of revenues (e.g. educational or other effects on households) may sometimes be sufficiently significant to warrant undertaking a project whose incremental return based on financial returns plus an allowance for productive users' benefits (in excess of prices charged) is slightly below the opportunity cost of capital, but this can only be a matter of judgment.

The results of this research were only put into final form towards the end of FY 1974, and none of the appraisals of projects approved by the Bank and IDA in that year reflect any of this work. However, a preliminary appraisal, giving special attention to economic justification and partially drawing on the Bank's research, has been made of a major rural electrification project (involving many tubewells and agro-industry) in India. Direct application of research results is underway for a rural electrification project being prepared in Iran. Further projects are under active early consideration for Northeast Brazil, Malaysia, Thailand and Tunisia. Efforts are also planned in 1975 to examine the situation of rural electrification in poorer countries, especially in Africa, to see whether the approaches so far developed can be applied directly or whether further research is required. Bank/IDA financing for several African rural electrification projects is envisaged for later years.

## 2. New Connection Policies

Original Recommendation: The Bank should try to assess, in the economic evaluation of power projects at both the selection and appraisal stages, whether utility policies regarding the connection of new customers and extension of distribution systems are satisfactory in the sense that they respond to any opportunities that may exist for accomplishing significant

development benefits from spread of electrification -- for example, increasing efficiency of small industry or aiding production and education in rural and marginal urban areas.

Bank Response: The Bank stated that the necessary judgments would be made in the course of appraisal missions and that they would be aided by the results expected from the research discussed under Recommendation 1 which would be disseminated among the staff as and when available.

Review of Action: The Bank's own research and India's experience of rural electrification do indicate that the application of electricity for agricultural and industrial purposes in particular can bring substantial development benefits. However new connection policies do not yet appear to be assessed by appraisal missions for power projects generally, and few appraisal reports have even given a projection of the number of new consumers expected to be connected. This may in part reflect the very low share of distribution in recent power leading and the fact that some loans have been to bulk suppliers, although, from the point of view of project justification and utilization, new connection policies of ultimate retailers would seem to warrant attention, whatever the Bank is directly helping to finance.

Now appraisal reports are beginning to give projections of the number of new consumers expected and appraisal guidelines are being revised to require collection of basic data on new connection policies and charges, at least in cases where this is reasonably easy because the borrower is substantially involved in distribution as well as in generation and transmission; in the case of countries where there are numerous power utilities or where the Bank's main borrower is a bulk generation and transmission company, this work will probably only prove possible in the course of sector studies. Experience in the assessment of these data will have to be developed, but rigorous application of the new approach adopted to economic evaluation of public utility projects, emphasizing the relationship between marginal costs of supply and charges, but also incorporating development benefits, should eventually enable the Bank to advise its borrowers constructively on whether the pace of connection of new consumers should, from the economic point of view, be accelerated or reduced.

Consideration is being given to an effort in FY 1976 to develop Bank familiarity with, and policy on, the special problem of new connection policies in marginal urban areas, where electrification may be very worthwhile economically but unattractive financially due to the difficulty of obtaining adequate customer capital contributions from these typically poor areas and of subsequently charging there tariffs different from those in the rest of the urban area.

### 3. Self-Help for Distribution Expansion

Original Recommendation: The Bank should encourage country authorities and power companies to find appropriate institutional mechanisms for mobilizing self-help efforts in distribution expansion.

Bank Response: The Bank undertook to be on the lookout for successful experience in this field with a view to incorporating it in projects supported or otherwise propagating it, but it did not think that any general guidelines could be prescribed.

Review of Action: The Bank's rural electrification research touched usefully on the role of cooperatives in rural power supply and pointed out that the labor component of a rural electrification project may constitute up to 25% of total investment costs, so that use of self-help arrangements may make the scarce funds available for rural electrification go further. The Bank is aware of some successful applications of self-help in the power field, both in actual construction of distribution systems (mobilization of community financial contribution and manpower) and, perhaps even more important, in operation, administration and billing. Some examples are Andhra Pradesh, Colombia and Turkey. But no effort yet seems to have been made in operational work to propagate experience.

The Bank has now agreed to try to have operating staff prepare, at convenient moments, brief notes on experiences of this sort for dissemination through the regular information channels established over the last years.

#### 4. Generation and Transmission Reliability Standards

Original Recommendation: The Bank should help develop, and require of utilities and consultants, more systematic procedures for rational determination of reliability standards appropriate to different countries and areas, with a view to eventual presentation in appraisal reports of explicit justification of standards selected.

Bank Response: The Bank indicated its agreement with this general proposal but emphasized the difficulties of estimating the economic costs involved by lowering standards of service. Research and guidelines were intended to lead to appraisal reports explicitly stating the standard of risk of failure to supply implied in project proposals, even if they could not yet assess the economic optimality of this standard.

Review of Action: The related research was cut short by staff shortages, but some useful notes were circulated. <sup>1/</sup> A recent system-planning study for the Comision Federal de Electricidad (CFE) of Mexico, presently under study in the Bank, reviewed the various generation and transmission reliability standards to be retained for large interconnected systems as well as some crucial economic indicators to be considered in the selection of a particular reliability standard. The Bank states that many other borrowers have been increasingly adopting computerized system-planning models which deal explicitly with the probability of load shedding and facilitate consideration

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<sup>1/</sup> Public Utilities Note 3, "Generating Plant Reserve Margins" (June 20, 1973). See also Annex 1 to Public Utilities Research Report 3, "Framework for Electricity Tariff Studies" (March 18, 1974).

of alternative standards of bulk supply reliability.<sup>1/</sup> The Bank staff has continued to review these matters in connection with lending operations on the basis of experience and judgment, but it is doubtful whether they are getting more systematic attention than in the past and it cannot be said that appraisal reports yet carry explicit statements of the risk of failure to supply.

Relative neglect of these matters may be justified by the fact that many of the more important Bank borrowers of recent years have been suffering shortages, more or less severe, of generating and bulk transmission capacity and (although this does not generally show in the forecasts beyond a few years out) some may well be expected to continue to do so, with the new prospects, especially in some cases, of more rapid growth of demand for electricity, following the increase of oil prices, and higher costs to meet it. Yet there seems to be general agreement on the importance of this subject and the worth of trying to give it more systematic attention. The Mexican study, referred to above, is being summarized for circulation, and appraisal guidelines are being revised to refer more fully to the problem. The difficulty is always in estimating the costs to the economy of any particular lowering of standards; the corresponding savings in power system costs are not difficult to calculate. Even with this difficulty, the Bank has suggested <sup>2/</sup> that estimates be made, for consideration in connection with tariffs at system peak, the adequacy of load-shedding arrangements and the general circumstances of the country, of

(a) the savings in system costs that would result from adoption of the next lower standard of bulk supply reliability than the one proposed,

and

(b) the corresponding amounts (or additional amounts) of load shedding that might be required if this lower standard were applied.

It would seem, in light of the importance of the subject and its significance in any investment planning, that appraisal reports should indeed give an explicit statement of "the risk of failure to supply implied in project proposals", citing the reserve criterion used in planning, and translating this into a probability distribution for different amounts/durations of load shedding for the particular system in question; with the apparent wide spread of system planning models now, this should not be difficult, it would present information in a form directly comparable among countries and projects,

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<sup>1/</sup> The Bank is considering propagation of one such model itself. See below, Section 11.

<sup>2/</sup> Public Utilities Research Report 3, "Framework for Electricity Tariff Studies" (March 18, 1974).



and its systematic use would soon lead to a better understanding of the matter and, probably, better planning, more adjusted to the economic circumstances of different countries.

#### 5. Distribution Reliability Standards

Original Recommendation: Distribution standards should be subjected to the same treatment as mentioned above for Generation and Transmission, and the Bank should encourage borrowers to carry out systematic studies to optimize distribution standards to local conditions.

Bank Response: The Bank expressed general agreement with these propositions and, emphasizing again some of the technical difficulties involved, referred to planned research to be undertaken.

Review of Action: A useful note has been prepared on the aspects that need to be examined by appraisal and other technical missions,<sup>1/</sup> and most of the planned research (particularly covering European practices) has been carried out. An optimization study, of approximately the nature suggested in the evaluation report, was called for by the Bank in connection with the April 1973 loan for the Istanbul Distribution project.

The work so far done in or for the Bank suggests that there may be significant scope for saving on costs simply to reach presently intended standards in many developing countries, by improvements in system and plant design; further savings should be possible by lowering the planning standard. There is considerable interest in this subject within the Bank. It is envisaged that some specific studies may be undertaken by Bank staff to seek scope for reducing the cost of distribution, particularly an East African review partly stimulated by concern about the possibility of distribution standards presently being excessive in Zaire. A consultant study focussing on this aspect has been underway in Ghana, at the initiative of the Ghanaian authorities, with a view to preparing a project for submission to the Bank. The Bank's Research Committee has authorized an extension of the general research so far done to include two case studies (one now underway in Mexico) and the preparation of guidelines to judge the adequacy of distribution plans and the benefits of alternative standards.

#### 6. Urban Context

Original Recommendation: Appraisal and sector reports could usefully consider power in its urban context and treat explicitly the question of balance between power and other services and facilities in terms of the quantity and quality of their supply.

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<sup>1/</sup> Public Utilities Note 4, "Standards of Urban Electricity Distribution", (June 28, 1973).

Bank Response: The Bank took the view that appraisal teams had neither the opportunity nor the ability to make judgments about the adequacy and quality of other services compared with power and that anyway these were not in practice very serious issues, except possibly in rare instances in which case they would be given special treatment -- as was being done at the time in a particularly intensive effort on Istanbul, involving several loans for different services and numerous studies. Normally, it was felt, these issues would be treated in the Bank's operations at the time of developing the country lending program and in discussions with Governments as to appropriate projects for Bank consideration.

Review of Action: Several cases of imbalance of urban services, with power being consistently more plentiful and better in quality than other services (particularly water), without any clear economic justification, have been encountered by the Operations Evaluation Department in its work on completed Bank-assisted projects. It does seem that a problem has existed, at least in the past, and there is no reason to suppose it does not continue. But there is no easy solution, and the evaluation report recommendation was probably oversimplified. Appraisal is really too late a stage for the subject to be most usefully considered. More fundamentally, while the "consumer's view" is very important, it requires sectoral specialists to develop and cost means of improving the different services to different standards, and no satisfactory way has yet been found of calculating cost-benefit ratios or economic returns fully comparable between sectors. Perhaps the best that can be said is that Bank program officers should be aware that this problem has arisen in the past and they should try to delve into it a little at the earliest stage of project consideration by appropriate enquiries about the relative availability and coverage of different services and plans for their expansion. This should then enable an appropriate statement in President's Reports, presenting project proposals, about the prospects for a reasonable balance in service supply.

## 7. Tariff Structures

Original Recommendation: The Bank should further increase the attention given in recent years to tariff structures, systematically analyzing wherever possible the extent to which tariffs charged to different consumer groups reflect social marginal costs so that deviations may be explicitly justified in terms of (a) effective means of taxation of inelastic consumers, (b) subsidies warranted to induce consumption because of resultant economic benefits or (c) price distortions elsewhere in the economy.

Bank Response: The Bank accepted this recommendation and planned research, case studies and production of appropriate guidelines, but it stressed, as an obstacle to progress, the shortage of qualified people in the Bank and in borrowing institutions to work on these problems.

Review of Action: With the aid of consultants the Bank has produced research papers 1/ of particularly high quality in this area,

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1/ Principally, Public Utilities Research Paper 1, "Economic Analysis of Electricity Pricing Policies: An Introduction" (January 9, 1974) and Research Paper 3, "Framework for Electricity Tariff Studies" (March 18, 1974); also Public Utility Note 14, "Incremental Cost Pricing for Utilities" (January 16, 1975).

undertaken case studies (in Sudan and Tunisia) and prepared the guidelines envisaged.<sup>1/</sup> The specific points raised in the evaluation report recommendation now appear to be very generally accepted. Virtually all appraisals of power projects now include some treatment of the borrower's tariff structure, and the Bank has increasingly raised questions about major deviations between charges to particular consumer groups and the costs to supply them, and itself studied them in detail or called for their review by consultants and borrowers (for instance in Burma, Sudan, Malawi, Syria, Turkey, Algeria, Iceland, in recent years). Actual adjustment of borrower tariffs in light of the Bank's new emphases in this regard appears to be still in the future, but it is, for instance, very much under discussion in the case of Tunisia. The Bank's analysis will be further deepened as the research results are fully applied and as the new approach to economic evaluation of utility projects mentioned earlier comes into general use. The main constraint to more frequent analysis of tariff structures against marginal costs appears to have been the shortage of appropriate Bank and consultant staff.

#### 8. Shadow Prices

Original Recommendation: Shadow prices should be used in the economic analysis of project validity in all appropriate circumstances, and they may be reflected if necessary in utility tariffs.

Bank Response: The Bank agreed that ideally shadow prices should be used in benefit/cost analysis, project selection, design, and construction and in the setting of tariffs, although in practice at the time their use was largely confined to a few cases of project selection and to the calculations of internal economic rates of return (based on adjusted financial data) and their use in design and bidding would be difficult in reality.

Review of Action: Guidelines since prepared on analysis of rural electrification schemes and of tariff structures and on economic evaluation of utility projects do recommend that shadow prices for foreign exchange, labor and capital be used, whenever appropriate, in benefit-cost analysis, project selection, marginal cost pricing and internal economic return calculations. Actually there has been a widespread recognition of their usefulness; shadow prices have been used mainly in the selection of least-cost alternatives (Nigeria, Gabon, Morocco and Iceland), in a few instances in economic return calculations (Turkey, Algeria), but seldom in marginal cost and tariff reviews (Burma only); the two tariff structure case studies (Tunisia and Sudan) did not use shadow prices despite their seeming relevance to these countries -- apparently because of difficulty in obtaining suggested values from the Bank's country specialists. Finally, shadow prices have not been included in the documentation provided to consultants responsible for early selection and design of projects considered for Bank financing.

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<sup>1/</sup> Public Utility Note 5, "Pricing in Power and Water Supply" (July 1973).

Shadow prices may actually be of greatest practical significance in the electric field in tariff studies, where failure to use them whenever appropriate could lead to wrong recommendations in view of the particularly heavy foreign exchange component of electricity costs in many countries. Hence they will become more important as the Bank increases its work on power tariffs. The principal need now seems to be for firmer help from country specialists in the choice of appropriate values. This problem should be eased with the decision recently made by the Bank to undertake a special effort on the generation and application of appropriate shadow prices for selected countries in each region, as a preliminary step to generalized use of these concepts.

#### 9. Fiscal Contribution of Power Companies

Original Recommendation: Examining the power company from the point of view of the contribution it can make to development, it might be useful to include regularly in appraisal reports a paragraph or two about fiscal aspects of the company's operations, in view of their importance in connection with tariffs, procurement, the financing of investment, maintenance of sound balance among utility services and Government revenue needs; borrowers studied show a very wide diversity of performance in this respect.

Bank Response: Stressing that all flows between Government and power company, as well as internal cash generation substituting for Government capital contributions, should and could quite easily be considered in assessment of the fiscal effects of borrowers' operations, the Bank planned to prepare instructions on this subject.

Review of Action: Fiscal aspects were referred to, and proposed for review by operational missions, in the previously mentioned Public Utility Note 5 issued in 1973, but shortage of staff led to postponement of the planned revision of the appraisal checklist in which this matter was to be incorporated, and recent appraisal reports on power projects have not included the proposed special paragraph -- although there appears to be a large amount of agreement that this would be quite feasible and useful, and telecommunication project appraisal reports have begun to include such a discussion. The Bank has continued to intervene on this matter, in some cases suggesting payment of taxes or dividends by the utilities to Government (e.g. Ethiopia and Ghana) and in others recommending or accepting exemption from such payments as a means to improve company profitability (e.g. Philippines and Iceland). More general draft instructions, of more elaborate nature, have recently been prepared for the handling of this aspect in all projects, not only those in power.<sup>1/</sup> It remains true that a good starting point, not difficult, would be a simple presentation in appraisal reports of the various aggregate flows (or substitutes of flows) between Government (or Governments, in the case of countries with federal systems) and power company, perhaps with some comparative figures from other power companies or other sectors in the same country; some consideration might also have to be given to internalized transfers, e.g. out of revenues from existing urban consumers to finance investment in rural connections, a financing form favored in the Bank's report on Rural Electrification.

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<sup>1/</sup> "Pricing and Cost Recovery of Public Sector Projects", July 1974.

The Bank states that short guidelines on analysis of power companies' fiscal contribution are now nearing completion and that the appraisal checklist is being revised to include a reminder on this subject.

#### 10. Utility Performance Indicators

Original Recommendation: The Bank should give more systematic attention to technical and financial indicators of utility performance other than the overall rate of return on assets, and include in appraisal reports simple tables showing the trends of selected indicators over past years; in the case of serious problems, performance targets for the future could be agreed upon during loan negotiations (along with specific steps or studies to attain them) and regularly checked by project supervision missions.

Bank Response: The Bank agreed that there were large potential benefits to be obtained from more systematic use of technical and financial performance indicators although at that time it seemed to think of them more for purposes of broad comparison between countries, to understand better existing situations, rather than as bases for targetting improvements.

Review of Action: Instructions for the systematic use of such indicators in appraisal reports, calling for presentation of target values, were issued in final form in November 1973.<sup>1/</sup> Of the projects for which loans were made in FY 1974, many had been appraised by that time and the appraisal report only for one (in Algeria) seriously followed the instructions, perhaps too comprehensively -- insofar as past values are given for 108 different items, but no targets or projected values are shown. In another, earlier case an elaborate "Plan of Action" was developed for the improvement of a borrowing utility in particular difficulties (PLN in Indonesia: Credit 399-IND of May 1973) and was presented in the appraisal report; in response to the Executive Directors' request during discussion of the proposed credit a progress report after one year was circulated to the Directors in mid-1974. The "Plan of Action" gave time targets with regard to completion of certain steps and studies, but no numerical specifications of the overall improvements in performance (except for the operating ratio) that were expected to result.

There appears to be unanimous agreement in principle that greater use of efficiency indicators and targets would be useful in Bank power operations, and a growing convergence of view that informal agreement with the borrower at the time of loan negotiations on target values for a few (say 10-15) indicators is worthwhile even when there are not serious problems. Future appraisal reports may be expected normally to contain such performance indicators.

#### 11. Power Planning Units

Original Recommendation: The Bank should give more attention in sector and appraisal missions and institution-building efforts to the functional adequacy of utility and national power planning units.

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<sup>1/</sup> Public Utility Guidelines 3, "Guidelines for Project Monitoring System for Public Utilities Projects" (November 8, 1973).

Bank Response: Pointing out that planning units needed to be examined for the adequacy of their staff, their techniques and their influence, the Bank agreed that this was an area requiring consistent priority. Guidelines emphasizing these points were to be prepared.

Review of Action: In the event it was decided not to prepare full guidelines specifically on this subject but to include coverage of it in the Guidelines for Power Sector Studies.<sup>1/</sup> Appraisal and sector missions have normally given attention to the planning units, but their weaknesses are seldom subject to quick solution, although the possibility of major progress is illustrated by the number of companies which have moved over time from heavy reliance on consultants to doing almost all their own planning except of a most specialized type (e.g. in Thailand, Ghana, Tunisia, Algeria and Morocco).

The Bank is constantly on the lookout for opportunities to help strengthen local planning units -- checking consultant terms of reference for feasibility studies to see that they include training wherever suitable counterparts are available, intending to adapt an optimal generation expansion planning program developed for IAEA <sup>2/</sup> to use by borrowers, including funds in loans for development of planning units wherever appropriate and now, for instance, actively considering a project in Liberia largely oriented to this specific purpose.

## 12. Training

Original Recommendation: The Bank should systematically consider the needs for training and opportunities for promoting and assisting it, in project appraisals and reviews of consultant terms of reference.

Bank Response: This point was agreed to by the Bank, and covered by the Bank's general guidelines and memoranda on training in Bank/IDA projects.

Review of Action: Indeed, training has received in recent projects frequent and full attention, and substantial Bank funds in some cases (Indonesia, Papua and New Guinea). Preparation of notes to help missions better assess the adequacy, efficiency and economy of training programs is envisaged.

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<sup>1/</sup> Public Utility Guidelines 5, of November 20, 1973.

<sup>2/</sup> International Atomic Energy Authority: the Wien Automatic System Planning Package (WASP).

### 13. Financial Recording and Planning

Original Recommendation: Despite improvements achieved there remain weaknesses in borrowers' accounting systems and procedures, particularly with regard to cash flow planning, which need additional emphasis.

Bank Response: The Bank stressed the time required to install effectively improvements in accounting systems and financial planning techniques, and it suggested that the problem might be less in diagnosis than in follow-up on improvements proposed or agreed. To facilitate work it envisaged the preparation of standard financial annex formats for appraisal reports and more supervision effort in this field.

Review of Action: The standard financial formats have not yet been agreed, but project supervision in this area has continued to receive emphasis, especially in cases where particular problems are encountered as, for instance, Iran recently. In some cases there may be opportunity for economizing Bank staff resources by greater contact with, and reliance on, borrowers' auditors,<sup>1/</sup> but the scope for this is severely limited by the scarcity of good auditors. As regards cash flow planning, preparation of a periodically revised forecast is generally included in regular borrower reporting requirements under Bank lending, but the assistance of a supervision mission is quite often required to help produce it.

### 14. World Trends in Power Financing

Original Recommendation: In view of the importance of electric power in development investment and in developing countries' foreign debt and of the past predominance of the Bank in this field and its desire to diversify its lending increasingly, the Bank should consider undertaking a systematic review of worldwide trends in capital requirements for power in the developing countries and of prospects for financing from other sources, to provide a perspective which would complement country and sector considerations in planning power lending.

Bank Response: The Bank agreed with this suggestion in principle but pointed out that staff constraints would not permit investing in the subject the fairly significant amount of staff time that would be necessary.

Review of Action: In assessing the impact of the energy crisis on its member countries the Bank has in fact done some work on this subject at the global level <sup>2/</sup> and it has produced a paper adducing some of the general

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<sup>1/</sup> The Bank did recently issue a useful note on financial auditing: Public Utility Guidelines 9, "Illustrative Audit Report for a Power Company" (November 15, 1974).

<sup>2/</sup> IBRD Report No. 477, "Prospects for the Developing Countries" (July 8, 1974).

considerations relevant to estimation of future requirements for investment in electric power.<sup>1/</sup> Insofar as the recent changes in relative fuel prices tend to make electric power a relatively more attractive form of energy, in several important respects, than previously, although generating plants of higher capital cost are likely to have to be built, capital requirements for electric power, which have long accounted for a remarkably large part of loan financing between countries and internationally <sup>2/</sup>, may now become even more important. However, as mentioned, the Bank's own plans foresee lending for power in FY 1974-78 only about the same amount in real terms as in FY 1969-73 (about \$3,100 million in FY 1974 prices); such lending would constitute 12% of all IBRD/IDA lending in the forthcoming period, compared with 18% in FY 1969-73. To deepen understanding of the feasibility and implications of this divergence in trends and to help effective implementation of the Bank's policy and program, renewed thought is being given to a more detailed investigation along the lines suggested in the evaluation report.

#### 15. Sales of Participations in Bank Loans

Original Recommendation: If a situation recurs such as that in 1967-68 when the Bank desired to use Joint Financing to make up for shortages in the funds it could lend, in total or to particular countries, then serious consideration should be given to making arrangements with supplier countries whereby funds available for export financing might be used to buy participations in Bank loans in amounts directly related to contracts won by their nationals.

Bank Response and Action: Although consideration was given to financial arrangements of this sort in connection with one loan, their applicability more generally has not been actively explored with export credit agencies given the context of substantial funds available for purchasing IBRD bonds and the fact that changes in the legal powers of such agencies would, it is understood, probably be necessary. However, official export credit agencies have provided very large amounts of direct financing for Bank-assisted projects - in the neighborhood of \$2 billion for projects (in all sectors) approved over the five years FY 1969-74 - almost entirely on a 'parallel financing' basis. Participation in IBRD loans has the advantage of considerable administrative simplicity compared with most other co-financing arrangements, but its appeal to authorities responsible for promoting exports would be appreciably reduced by the appearance that funds so used do not finance additional exports and by the relative anonymity of the arrangement.

#### 16. Follow-up Evaluation Studies

Original Recommendation: Analysis of the Bank's financing of local procurement of electrical equipment and of the contribution such financing has made to the growth of efficient domestic equipment industry

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<sup>1/</sup> IBRD Report No. 477, Background Paper V, "Sectoral Adjustment to Higher Energy Costs" (July 8, 1974).

<sup>2/</sup> See original evaluation report, IBRD Report No. Z-17, "Operations Evaluation Report: Electric Power".



would be useful for future policy. Second, a more thorough study of the economic validity of the Volta River Project in Ghana might be worthwhile.

Review of Action: The Operations Evaluation Department has not had the time to pursue either of these studies to date. Doubts about the aspects of the Volta River Project questioned in the evaluation have remained and perhaps deepened, but in connection with new projects the Bank is now giving considerable attention to possible resettlement problems, ecological side effects and contractual terms between local authorities and international mineral concerns, so that further study of the Volta project might make only a limited contribution to strengthening Bank policy. The review of actual experience with the financing of local procurement would still seem worthwhile for execution as soon as the resources of the Operations Evaluation Department permit.

#### 17. Central Power Institutions

Original Recommendation: The Bank should, wherever circumstances in a country permit, encourage development of a strong central institution in the power sector through which it might later channel lending in a sector program manner (as in the last few years with CFE in Mexico). Experience suggests that such an institution (not necessarily implying regional interconnections) is essential in order to develop (a) sound and well-coordinated investment planning, (b) balanced plan implementation among regions, and (c) effective and economical use of other sources of foreign financing such as supplier credits.

Bank Response: The Bank was generally in agreement with this recommendation, very much in line with, and indeed drawing on, its own successful experience in earlier years in this field.

Review of Action: The Bank has continued to try to reinforce established institutions of this type (e.g. in Brazil), to assist the development of newly created ones (e.g. in Indonesia, Nigeria, Turkey and Zambia), and to encourage their emergence in other countries (e.g. India, Yugoslavia, Cameroon and Morocco), largely for the improvements in electricity development planning and policy that this should make possible. Relevant studies are being started, wholly or partly at Bank request, in Colombia and Iceland. Probably the suggested sector-lending approach, excluding detailed Bank appraisal of project components and therefore more economical in staff time on these aspects, could be applied more widely in countries where basically satisfactory central institutions of the type described have now been in existence for a number of years; a credit now envisaged for rural electrification in India would necessarily be of this type, although any potential staff time savings have in this case been more than taken up by sectoral issues and the problems of establishing a relationship with a beneficiary agency new to the Bank Group. The practical relevance of a time-saving sector-lending course depends in part on the amount of financial resources the Bank is prepared to put into power lending (see discussion under point 14 above) because the smaller it is the better it may be to ration it around in such a way as to carry a maximum of "technical assistance" from the Bank Group.

18. Unified Jurisdiction of Local Power Companies

Original Recommendation: Experience suggests that the Bank can make a major contribution by insisting on unified control of generation, transmission and particularly distribution in urban regions.

Bank Response: The Bank agreed that this point was relevant in certain circumstances.

Review of Action: While the Bank has made very useful contributions in this direction in earlier years the need for this emphasis is becoming rarer now with the rationalization already accomplished in many cities and regions and with the growth of national bulk supply agencies assuring generation and transmission. One case where the Bank has been trying to help resolve problems of divided jurisdiction in a relatively small area has been Istanbul, in connection with a loan approved in the first half of 1973.

19. Institution-Building Delays

Original Recommendation: Examination of cases where the Bank held up lending pending fulfillment by the prospective borrower of certain institutional conditions shows that the Bank has sometimes made major contributions to institutional strengthening in this way but more instances where it is doubtful whether the delays were really worthwhile, partly because they proved costly and partly because of doubt either as to whether the objective sought was important enough to warrant this cost or as to how effective the Bank action was in causing the change that finally came. The value of withholding loans has to be treated on a pragmatic case-by-case basis, bearing in mind costs and potential benefits of delays as foreseeable at the moment of decision; general rules cannot be established.

Review of Action: Delays in power lending appear to have been fairly limited in the past two years and sound assessment of the delays that have occurred -- principally on the loan for the Elbistan power plant in Turkey and on a planned loan for power development in Sudan -- would require more study than is possible here. There may still be room for more frequent and systematic consideration, when delays are in prospect, of how long a delay (with its consequent costs, for instance of power shortage or higher-cost generation) may be warranted in the interests of any proposed precondition to lending.

20. Construction Cost Estimates

Original Recommendation: The rather frequent recurrence of substantial cost overruns on projects studied, especially in some countries, suggests that somewhat more use may be worthwhile of the

specialized consultant firms that the Bank has sometimes hired in recent years to check project cost estimates, especially for major civil engineering works.

Bank Response: The Bank agreed with this recommendation, for appropriate circumstances, and planned in particular a paper on cost overruns on projects involving substantial tunnelling which would contain specific guidelines in this respect.

Review of Action: The paper was produced <sup>1/</sup> and, more generally, there now appears to be a wide awareness in the Bank of the advantage in some cases of having detailed revisions of cost estimates by specialized consultants. This fairly expensive technique has actually been applied only to one project approved in FY 1974 -- the Kafue project in Zambia -- for which it appears at present that the original estimates and those of the specialist consultant (which were actually lower) were about equally close to the final bids received. An individual specialist was also hired by the Bank to check the cost estimates on the mining part of the Elbistan project. Although cost overruns have been a major problem on some projects currently underway with Bank support, this has been mainly due to general cost-inflation and it does not seem that greater recourse should have been had for projects approved in FY 1974 to specialist consultants of the type described.

### Conclusions

Judged against the conclusions of the evaluation report the Bank, over the last two years, has accomplished a large amount of useful and appropriate work in research and preparation of policy papers and guidelines. Priorities seem generally to have been correct. What now appear to have been the more important suggestions -- for instance with regard to the economics of system extensions, tariff structures and distribution standards -- have, for the most part, received considerable attention, while matters with more limited practical significance and relevance in the recent period -- such as the issue of planning standards for bulk supply reliability and the suggested study of world trends in financing for power -- received much less effort. The Bank is undoubtedly closer now than it was two years ago to being able to assist its borrowers with finding solutions to the major dilemmas mentioned at the outset to this paper. Serious application of the new proposals with regard to methods of economic justification of public utility projects should cause several of these issues eventually to be dealt with on a routine basis.

Despite these good research results, the actual operational effect of the evaluation report's principal suggestions must be considered to have been quite limited to date, whether in respect of application of research

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<sup>1/</sup> Public Utility Guidelines 6, "Guidelines for Estimating Costs of Tunnel Construction," (January 17, 1974).

results (as for system extensions and new connection policies) or in respect of implementation of the few direct improvements proposed (such as wide use of efficiency indicators and targets, and standard discussion of fiscal aspects of power borrowers' operations). Only with regard to the recommendations on tariff structures, distribution standards and use of shadow prices, among the evaluation report's economic suggestions, has any broad pattern of relevant operational activity begun to be visible.

The main reason for this apparent gap between principles and practice seems to be inevitable time lag, especially in view of the rather undeveloped nature of many of the original recommendations themselves, somewhat exacerbated by a shortage of economists in the relevant period to work on operational application of the ideas emerging from research. Most of the projects approved for Bank/IDA support in FY 1974 were appraised 9-18 months after the original Evaluation report was issued in final form, but its appearance had first to be followed by discussion of the validity and significance of its recommendations and then by continuation or commencement of work to produce the needed research or, even in the case of the relatively simple "directly applicable" suggestions, more elaborated instructions. As regards the projects, they may have been appraised well after the report's appearance, but initial work on them by the Bank or consultants, even more by the borrowers, would have started several years before -- and some of the points raised in the evaluation report really need to come into consideration at those earlier stages of project preparation if they are to be very useful. So, in one sense, it is too early to have expected readily visible widespread reflection of the evaluation report's concerns in actual lending operations; changes over the last nine months alone show that the situation is very much evolving.

Other important factors have undoubtedly been the sheer difficulty of recruiting people with the competence and experience to work on electric power economics and the partial diversion of available capacity that became necessary late in 1973 to assess the implications for borrowing countries of the drastic changes in oil prices that then occurred. These did undoubtedly hamper the transposition of research results into practical guidelines, effective review of power appraisal reports from the economic point of view and, most important of all, practical demonstration, in real cases, of the methods and procedures proposed. By the end of 1974 the staffing situation seems to have somewhat improved as a result of both recruitment and reduction of the work pressures brought by the initial impact of the "energy spirit". But even when power economics gets its full planned complement of six or seven man-years under present budgetary ceilings, and taking account also of the quite tight budgetary limits on engineers and financial analysts, resources will not permit to apply across the board all the innovations and new emphases developed. Nor should they. To get a good allocation of the resources that are available the departments responsible are planning to develop a system for early identification of the key qualitative objectives of lending operations in power. For this to work effectively as a means for applying and spreading the knowledge that the Bank has accumulated in areas that were identified in the evaluation report as of special importance for development, it will be essential to identify prospective power lending operations early, rather than, as occasionally happens now, to bring them in to fill a gap in a country lending program.

Qualitative objectives must be determined mainly by the needs of the borrowing utility and, to a small extent, by the Bank's comparative advantages within the field of power. But as the only part of the United Nations significantly involved in electric power, the Bank has also somewhat of a special and broad responsibility. Our impression remains that the greatest general need of the borrowers, additional to those which the Bank has long been trying to meet, is still on the side of distribution economics, so stressed in the principal recommendations of the Evaluation Report, and tariff structures -- which does not necessarily mean to say that the Bank should swing its lending heavily toward distribution, although it certainly seems likely that the share of distribution in Bank lending and Bank-supported projects may rise to higher proportions than attained in the early 1970s, but it does mean that an ability to provide convincing technical advice in these fields will be very important. In the last two years the Bank has made important advances on the economics of rural electrification and it needs to complement these with further exploration of related issues, like self-help organization, capital contributions, and distribution standards, and, particularly, to apply and test in practice the research results already reached. Excellent means, additional to lending operations, and complementary to them, to make the most of the experience gained should be to introduce an EDI course in electric power, as is now firmly planned for FY 1976, and to organize periodic seminars of senior power officials in member countries, as is now intended; these seem particularly appropriate functions for the Bank Group given its unique position in the U.N. system in the power field.

