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Power - Follow Up - 1973

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# OFFICE MEMORANDUM

TO: Mr. Ives Hovani FROM

SUBJÉCT:

DATE: December 10, 1973

Standards of Urban Electricity Distribution

1. Cur Work Program calls for two case studies in standards or urban electricity distribution to be carried out in FY 74; the "pilot" study financed by the Pasearch Committee, the second (the first of a series of operational studies) financed from the Departmental consultants' budget.

2. Recently I requested the finance (US\$16,000) for the pilot case study from the Research Committee. They advised me to forward the formal application when the State of the Art paper has been completed at the end of Decomber 1973. We hold US\$10,000 in the departmental budget for the second case study.

3. Saveral large cities (and it is with large cities with which we are dealing here) have been suggested by the Public Utilities Division Chiefs in the Regiona, e.g., Bogota, Caracas, Sao Paulo, Buenos Aires, Nairobi, Bonbay, Bangkok, and Taipei. It is time that we finalized our choice, at least for the pilot study, in that it takes considerable time to mount a new venture. Also, we wish to involve our regional colleagues and bring in the consultants (who have not even been chosen) right from the start.

4. Although the State of the Art paper has not yet been received in the Eank, the following points are very likely to be made in it and must influence our decision on where to carry out the case studies:

> a. Perhaps the most incortant point to concentrate at the moment is how to design some distribution systems for the same standard but at considerably less cost;

b. For sness of low density loading the chargest possible cost should be aimed at, bearing in aimed, safety considerations;

a good deal more thinking has to be given to metaring. Electricity meters of the simplest kind are chosp, but more complex meters (needed for rationing by price and paying for standards) might well be feasible, as shown in the Boggis-Wegtfield Report. Alternatively, mechanical devices could be used for paying for standards, e.g., cipple control, voltage sensitive relays;

2 80 DEC 1 2 1971 d. Very much more information is needed on what electricity is used for. Until at least a rudimentary knowledge of this available it is difficult to consider an appropriate standard. Load analysis has been carried out for some time by one or two utilities in developed countries, e.g., Electricite de France and the Electricity Council, London. Their methodology developed should be modified to meet the requirements of the developing countries;

- e. What is meant by a socially acceptable standard of supply is an attitude of mind as much as anything.
  A great deal needs to be done into getting behind the opinions held by customers; and,
- f. Several types of case study are desirable :
  - i. To gather data on a particular aspect;
  - ii. To investigate the institutional framework which knits together the whole subject; and,
  - iii. To design for a particular city the cheapest possible system within the limits of safety.

5.. I recommend that we discuss the choice of city for the case studies, first within the department, and then put our recommendations before the Division Chiefs. This should be done within the month of December.

6. With respect to the consultants for carrying out this work, the following have shown interest:

a. France - Solfralec, SEMA;

b. United Kingdom ~ Merz and McLellan Kennedy and Donkin Overseas Consultancy Services (who are writing the State of the Art Paper)

- Preece, Cardew and Rider

c. United States of America - Barber Associates (they are presently writing our paper on First Approaches to Energy Sector Studies)

7. One tactic would be to send the above consultants the State of the Art Paper (due in the Bank end-December) and ask them:

a. What subject(s) they consider should be studied in depth in the light of the paper;

b. How they would set about a case study;

c. When they could carry out a case study;

d. How much it would cost; and,

e. What would be the broad terms of reference

8. It seems to me that a modified version of the State of the Art paper would make a useful Public Utility Note. We might even squeeze a short Guideline out of it, but this remains to be seen.

9. I am working on a program which would combine a debriefing of the authors of the paper in Washington with a number of seminars for public utility and other Bank staff. The sconer in the new year this is held, within reason, the better.

cc: Messrs. Willoughby, Dunkerley, Ray, Rao, Howell, Anderson, Friedmann, Warford, Bateman

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# OFFICE MEMORANDUM

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COTT - Clickel Preductively of a Public Stilley

i. You will read the discussion which we had with Mr. Janin on Mg above subject, originally introduced to me by (I believe) Mr. Buphosene. Since then I have given the arther further consideration because:

a. It finds one of the Willoughby points;

.b. It should fit in with the Department's noniboring function;

c. It should be purt of our sector and project data base; and,

d. It tends to bridge the communic and financial aspecte very nicely and might belp very-much - in soluting terrifle (perhaps in a modified form).

2. It carbainly weams to have set with a fair degree of success with various government agencies in France. My short trip to Paris in September convinced me that it could be used as a significant control methanism in the decentralization of a large-organization which has integrated functions. In the electricity supply industry in Britain I was one of a team looking far some sort of tool during 1966/67, with little success. A similar situation exists in many developing countries, e.g., OFE (Nexion). Taipovory (Taiwan), KECO (Korea), and I would like to discuss further the practicalities of the system with EdF.

3. There is a much greater economic ispect to the system than I originally thought, e.g., it is much merer to average marginal cost pricing than most people realize. Also, it allows economic concepts, a.g., inoremontality, ceparatebility, to spill over into financial matters, which I view as a good thing on communications grounds alone.

4. Its greatest use may well be in system planning (the term used in its widest sense) i.e., in the formulation of a development plan for a public utility sector. The method is probably of little use to the operational manager in the short-term but of much more use to the corporate planning manager for his five year plan, his monitoring of the plan and his modification of the plan. In addition (and this seems important) it should enable the various geographical regions of a national public utility supply authority to become part of the corporate planning process and monitor themselves (or be monitored) by it. The decentralized manager could be given limits of freedom, settled to obtain the optimized manager

DEC 11 1973

5.

between the centralized and decentralize system. This would seem to exclude, at least at first, certain aspects from the scheme, which would be treated exogenous, e.g., some power transfers in an interconnected power system. Despite these limitations, however, there would seem to be considerable advantages in the method.

Difficulties which I suggest we examine further are:

a. Dealing correctly with inflation;

b. Dealing with a rapidly expanding system; and,

c. Clarification of the concepts alternately unclaimed by economists and accountants

6. A plan of action which I recommend is to ask Mr. Jennings to be chairman of an informal working group to carry the work a stage further, the basic objective function being to create a climate (and the means) within a utility for producing a corporate plan with decentralization, and for monitoring the plan performance. I have described to Mr. Jennings my own experience in this matter in 1966/67 but should now commit it to paper.

cc: Messrs. Willoughby, Howell, Shipman, Jennings, Friedmann

TWBerrie:cdd

Form No. 75

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# WORLD BANK GROUP

ROUTING SLIP DATE Nov. 26, 1973				
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APPROPRIATE DISPOSITION	NOTE AND RETURN			
APPROVAL	PREPARE REPLY			
COMMENT	PER OUR CONVERSATION			
FULL REPORT	RECOMMENDATION			
INFORMATION	SIGNATURE			
INITIAL	SEND ON			
REMARKS				
FROM T.C	Howell			

AUSCIATION RECORDENCE RECORDENCE AND REVELOPMENT

NTENDRAL DURAL - TRANCE NORPORATION

# OFFICE MEMORANDUM

TG: Mr. D. C. Rao

JP JECT

DATE: December 7, 1973 fre Power Follow up

FT 74 Allocation for RPO 267

I am pleased to note that the FY 74 allocation for the State of the Art paper has been increased to US\$28,000.

The explanation of your query concerning the make up of the U3\$26,000 (now US\$28,000) is that in FY 74, US\$3,000 has already been dismosred in travel expenses, which would have left US\$23,000 (now US\$25,000) to be disbursed.

I note that you recommend that our proposal for a case study should avait the completion of the State of the Art paper. I agree that this is prudent but, nevertheless, we will need to make preliminary arrangements now if the study is t be organizationally possible in FY 74.

I enclose a copy of the Review Paper which was used as a basis for discussions for agreeing terms of reference of the State of the Art paper. (The State of the Art Paper will be quite considerably different.)

Attachment

cof Mr. Willoughoy (with attachment)

cos Messre. Dunkerley, Rovani, Howell, Friédmann, Anderson, Warford, Batemen

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file Power-

November 30, 1973

Mr. Piero Facconi Via Gransci 28 CO197 Roma Italy

Dear Mr. Facconi:

### Re: Union for the Coordination of the Generation and Transmission of Electricity

Thank you for the pamphlets which you promised and which have recently arrived via New York.

I have no comments at this time, but would appreciate any further papers which you or your colleagues write on these matters, in what I shall be preparing an internal paper for the Bank on transmission and interconnection early in 1970.

Meanchile I enclose for your information an internal Basic document on Generating Plant Margins which you may find to be of interest.

Sincircly yours.

Thomas W. Berrie Power Adviser Public Utilities Department

Attaciment

cc: Messrs. Hoffman, Willoughby, Rovani, Howell, Friedmann

TWBerrie:cdd



# INTERNATIONAL BANK FOR RECONSTRUCTION AND DEVELOPMENT

INTERNATIONAL DEVELOPMENT ASSOCIATION

#### PUBLIC UTILITIES DEPARTMENT

GUIDELINES SERIES

# GUIDELINES FOR SECTOR WORK IN THE POWER SECTOR

November 20, 1973

Central Projects Staff Public Utilities Department

> This paper is one of a series issued by the Public Utilities Department for the information and guidance of Bank staff working in the power, water and wastes, and telecommunications sectors. It may not be published or quoted as representing the views of the Bank Group, and the Bank Group does not accept responsibility for its accuracy or completeness.

### GUIDELINES FOR SECTOR WORK IN THE POWER SECTOR

### ABSTRACT

These guidelines suggest why studies of the power sector in developing countries should be carried out, point out that decisions affecting the sector's evolution reach across the whole economy, and caution that a mere inventory of facilities does little to illuminate the problems and prospects associated with the assurance of a long-term dependable supply of power appropriate to the needs of the country's development. A general approach is outlined, supplemented by reminders of specific information sought. The Annexes are offered as Aides Memoire in this connection.

Prepared by:

Efrain Friedmann, Philip Owusu, and F. H. Howell

# GUIDELINES FOR SECTOR WORK IN THE POWER SECTOR

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### ANNEXES

1.	Checklist	for	Power Sector Information
1 -	Attachment 1 Attachment 2		Production of Electric Power Power: Production and Consumption Table Summary of Electricity Consumption
-	Attachment 3		Access to Electricity Supply
2.	Checklist	for	Power Sector Problems
3.	Outline of	Pow	ver Sector Study Reports

### GUIDELINES FOR SECTOR WORK IN THE POWER SECTOR

#### I. OBJECTIVES

In common with its activities in other sectors, the Bank carries 1. out from time to time reviews  $\frac{1}{of}$  the electric power sectors in developing member nations. $\frac{2}{}$  Availability of energy is an essential component of a modern economy and an important factor in promoting both economic and social development. At the present time average annual electric consumption in developing nations is about 200 kWh per capita compared with 5,000 in the industrial countries: the difference in power use is about two times larger than the gap in GNP per capita (\$250 and \$2,750 respectively). The developing countries are clearly aware of the need to allocate significant resources to this sector. A survey carried out by the Bank in  $1971\frac{3}{}$  indicated that of all public sector investments, as much as one-sixth might be going into development of electric power supply systems. Indeed the stakes for the developing work as a whole have been estimated at over \$75 billion for the next ten years. It is clear that rewards can be large in assuring that electric power development is carried out on a sound foundation of sector knowledge and goals.

2. Thus developing nations -- and therefore the Bank itself as an instrument of their development -- should seek a comprehensive knowledge of the sector in connection with plotting overall development strategy. Because economic sectors in any country are interrelated, it would be desirable to have a working knowledge of all of them -- electricity included -- upon which to plan. The Bank, however, in contemplation of its limited resources of staff, has had to limit its sector review activities and has ordered its priorities for the power sector as set forth immediately below.

- 1/ The terms "review", "survey", "studies" are used indiscriminately and interchangeably here with no attempt to relate them to the definitions in P&B's June 26, 1973 memorandum.
- 2/ Electricity, of course, actually represents only a sub-division of the total energy sector. At the present time the Bank is involved only peripherally in the analysis of energy sectors, and has not yet developed guidelines. Cognizant nevertheless of the direct linkages between overall energy resources, requirements and policies on the one hand and electric power on the other, this paper attempts to highlight at appropriate points the need for taking the broader view.

3/ Electric Power Sector Working Paper.

a. in countries where electric power lending activities by the Bank are planned, or at least contemplated;

- 2 -

- in countries where substantial lending in other sectors is planned;
- c. in countries where a special situation has arisen where power makes a large contribution, e.g. an electrometallurgical enclave project.

In practice, most reviews have fallen into category (a). However, as the Bank broadens its action to cover countries where the main problems are related with extremely low access to service both in the urban fringes and in rural areas, one can foresee that sector reviews appropriate to these new situations will become important as well.

4. There are two dimensions to the sector -- supply and demand -and the review should concern itself with both. On the supply side are encountered the institutions and agencies that design, finance, construct, own, operate and regulate1/the facilities that go to make the power supply; the facilities themselves; and their interrelationships with the primary energy resources they exploit. On the demand side we find the individuals and their homes; the industries and businesses; as well as the public institutions which combined form the market for electricity. In this area, the demands of low and high income, industrial and domestic, urban and rural consumers make competing claims on the limited funds allocated to the sector.

5. In most cases, full satisfaction of all claims is not a realistic short or even medium term goal; therefore development programs are often compromises after consideration of many factors: e.g., levels of funding; degree of emphasis on urban versus rural development; quality of service, including variations according to category of consumers; technical options, etc. These judgments are based on both qualitative and quantitative factors, but they can and should be made explicitly, and on the best available factual basis. In making these decisions, more and more emphasis is being given to "social" factors, by both governments and lending institutions. Social effects have to be considered when determining, for example, the urban versus rural emphasis, pricing policies, alternative tariff structures, the effects of programs on government revenues, the criteria of environmental quality, and so on. These are largely political choices and must therefore be made by government. However, they should be made in the full knowledge of the effects of the trade-offs involved.

<u>1</u>/ Regulation has recently acquired new dimensions such as environmental requirements, safety, energy policies, in addition to the traditional ones involving franchises, tariffs, etc.

3.

6. The broad objective of carrying out sector studies is to provide a foundation for making these decisions by those responsible for sector development and management. In many cases, authorities are so preoccupied with dayto-day problems and emergencies that they have little or no opportunity to view the broad problems and policy issues facing the sector. This not only adversely affects decision-making at the sector level, but also means that the government's economic planners are not presented with information that enables them to make the best decisions in allocating scarce funds among competing projects. Thus a full sector survey, after analysis of the necessary sector information, will (a) identify the principal problems and constraints of the sector; (b) analyze existing goals or propose a ternative goals toward which the national plan for the sector can be directed; (c) recommend the institution, or modification, of policies and practices required to achieve the goals, after consideration of whatever tactical alternatives may be available. It cannot, however, lead to establishment of inter-sector priorities.

7. From the narrower perspective of the Bank, the principal objective should be the development of sufficient knowledge of the sector's organization and legal basis to permit orderly pursuit of specific lending operations. In carrying out the sector review the staff should keep in mind this operationally-oriented objective, but in the context of the country's economic development program so that plans for the electric power sector -- both the supply and demand sides -- are consistent with overall national priorities.

8. In most cases, further studies will be needed before particular investment decisions can be made. These may range from preliminary engineering and feasibility studies to those concerned with the structure and management of project entities, financial policies, legal questions, economic investigations, or training. Such studies are needed both to support sound decisions, and because most agencies financing power projects are interested not only in the works to be financed but also in the ability of the borrower to deal with all of the continuing problems of the sector. The Sector Report should identify and describe the studies needed.

#### II. EXECUTION

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9. Given the wide range of climates, population density, size, indigenous energy resources, economic conditions, etc. of the developins; countries, it is obvious that the scope and depth of a sector study in any given one should be determined <u>ad hoc</u>. While the objectives outlined above can best be achieved with a full survey, a more limited study may best fit a given set of circumstances. In such cases, planning the study becomes even more important. A reconnaissance visit to the country can help in making these decisions.

10. Special emphasis on the demand side may be warranted in those countries where a majority of the population has not been supplied with power. Here the review should examine in the light of costs of supply and appropriate pricing and institutional policies, the economic and social benefits of extending supply to low income groups living in the fringes of urban centers, small towns, villages and in rural areas.1/

11. It is apparent that a sector study can be carried out as an exercise separate from other Bank activities although it may be related to them. This would usually be the approach in large sectors which are complex, as for example, Brazil. Indeed, such a study was carried out under the auspices of the UNDP, required considerable manpower (a consortium of consultants was employed) and extended over several years. On the other hand, the Bank deals with power sectors which are institutionally simple, as for example, Ireland. Here a thorough sector review may be carried out at little additional cost in connection with appraisal of the power supply agency which constitutes the whole sector. It is clearly in the interests of economy of staff to schedule such activities together where the nature of the sector is conducive to doing so.

1/ See, e.g., Public Utility Note No. 6, "The Appraisal of Village Electrification."

#### III, GENERAL APPROACH

12. What follows is meant to be illustrative rather than allencompassing, and by nature "guidelines", as the title suggests, rather than a checklist. No general "guidelines" will be perfectly suited to all circumstances encountered, and they should not either be followed slavishly, or relied upon as a substitute for common sense. Attached to these guidelines are three annexes covering the following items:

Annex 1: Checklist for Power Sector Information
Annex 2: Checklist for Sector Problems
Annex 3: Outline of Power Sector Studies Reports

These annexes are intended to be used as tools in systematically reviewing possible gaps in sector knowledge information, problems and issues which might need investigation and analysis before or during a sector study.

#### Coordination with National Planning

A good starting point would be the country economic development 13. plan if one exists, and any related studies available on the energy economy. Normally, development plans for the whole economy exist, however crude in form, but policies for the energy sector seldom exist. The power sector review will thus usually have to proceed without it. Information on the development plan should in the first instance be sought within the Bank: it would be preferable to require the host government to supply its development plan to headquarters rather than to rely upon reviewing it in the field when time will be scarce. The plan should have been examined by the appropriate country economist as well as whoever is responsible for the survey of the power sector. It should have been found to be reasonable, or anomalies noted and brought to the attention of the host government planning authorities. In any event, the plan -- or a plan with suggested amendments -- should be acceptable to the Bank, and present a balanced, realistic program giving due attention to economic and social objectives, inter-sectoral priorities, and resource availabilities. The plan should have a summary for the power sector. This summary should present the magnitudes and timing of the resources required to carry out the sector program. The power sector review effort should not be mounted unless a reasonable amount of relevant information has been collected by the host government.

#### Demand Aspects

14. A prediction of electricity consumption over a number of years should be available. In countries with complex sectors the national "forecast" requirements may be no more than the summation of forecasts of individual systems, and as such may ignore the real or potential effects of interconnection, integrated operation, and diversity between systems. For the purpose of the sector survey these imperfections may be acceptable. The overall national electric energy requirements should be reviewed against the programmed level of economic activities implied in the strategy of the country economic development program. The forecast and the program should exhibit internal consistency. In a complex sector, the individual system forecasts should be examined vis-a-vis past sales, the nature of the service area and market, tariffs and any other relevant information including planned economic activities. Judgments should be made, not only as to whether the forecast growth consumption is likely to turn out to be accurate, but whether that rate of consumption, broken down as necessary by different consumer groups, is justified. In turn this requires that the role of price as a means of signal-ling investment decisions be seriously examined, subject to income distribution or other social constraints.  $\underline{1}/$ 

#### Access to Supply

In examining demand projections, caution should be exercised to 15. properly take into account "hidden demand" which may exist. The most obvious element may be "suppressed demand" which exists solely due to the supply system's inability to provide all the service customers are seeking. It may be manifest by known restrictions in new connections or limitations on consumption by present customers; or it may be attributed to deliberate covert or overt rationing, as by on-peak voltage reduction. $\frac{2}{}$  The other dimension is less apparent and much more difficult to quantify; the demand which could be attributed to segments of the population who for reasons that need to be explored have no access to service. In many societies the extent to which it is planned to cater to this demand is a question of penetrating social significance. Demographic data should be sought with special reference to availability of service and income level, where the information exists. This will generally require searching several sources: the appropriate government agency with access to census material; and the power supply agencies' customers' records. The performance of any rural or village electrification projects should be reviewed to determine if this type of market has been a responsive one. The purpose is to develop the basis for making evaluations and judgments concerning availability of service to all segments of the population, and plans to increase access to supply. These data may also prove useful in the examination of the potential role of the sector for such national goals as redistribution of income, decentralized regional development, industrialization, urban planning (including improvements in transportation and environmental quality), employment, etc.

- 1/ See Public Utility Note No. 5, "Pricing in Power and Water Supply."
- 2/ Evidently, captive generating capacity installed by industry at large because of inadequate public supply may or may not constitute hidden demand in the event measures are instituted to render the public supply adequate. The comparative costs to industry would have to be examined. See paragraph 25.

Electric power pricing policies in the less developed world have 16. traditionally been related to the financial requirements of the power supply agency with only passing concern for social objectives, and almost none for the allocation of resources on sound economic bases. To best serve all objectives, tariffs should be calculated to achieve optimum resource allocation through the mechanism of providing correct signals about costs to consumers, modified by consideration of equity to all social classes, with due attention to achieving the financial targets of the enterprise. $\frac{1}{2}$  As with all compromises, no one objective will be served perfectly. The sector survey ideally should examine tariff policies and structures, and determine to what extent they fail to contribute to the achievement of these objectives. In practice, this would require the collection and review of (economically stated) enterprise marginal costs and making judgments as to whether tariff structures adequately reflect them; whether the tariff and metering system used provides consumers with the right incentives; and of whether any implicit cross-subsidies are in line with social aims. In practice, it may not be possible to do more than indicate the need for a more thorough review of tariffs, as suggested in paragraph 31.

#### Institutional Aspects

17. The institutional nature of the sector should be reviewed and reported upon. This would include in addition to power supply systems concerned, government agencies at both the national and lower levels. There may be ministries, specialized development instrumentalities, financing bcdies, and regulatory agencies. Underlying their existence may be legislation, executive orders such as decrees, and charters. Sufficient knowledge must be gained of (1) the nature and interrelationship of the legal bases for all key agencies; (2) their powers and obligations; and (3) their access to resources to permit the development of a comprehensive understanding of "how and why" the sector works the way it does. True copies of all important laws, codes, decrees, charters, etc. should be obtained. Some or all will be germane not only to the path of sector development on the macro level, but also to eventual project financing.

18. It is particularly important to investigate the existence and application of legislation/decrees (or whatever) which govern use of water resources. Most societies hold agricultural claims against water in higher priority than those of power. It is most important not only to rational development of the country, but also to the efficacy of the Bank's role in this process, that these issues be sorted out before serious investment planning proceeds. In the event international waterways are involved, or where development of rivers is planned which may affect downstream riparian countries, especial care must be exercised. Any treaties and/or protocols must be reviewed, and copies obtained.<sup>2</sup>/

1/ See Public Utility Note No. 5, "Pricing in Power and Water Supply."

2/ See O.M. 2.22, "Projects on International Waters."

19. It should be realized that there is no single organizational structure best suited to the sector which would be most appropriate in all countries. Public and private utilities may coexist. Generation, transmission and distribution may or may not be managed by single entities and can be of a national, regional, municipal or cooperative nature. The sector organizational structure should be reviewed with an open mind and respect for national idiosyncrasies. In Bank experience organizational effectiveness seems to be more closely related to sound management than to organizational structure, although the most skillful management cannot operate effectively within a badly conceived organization structure. Nevertheless certain general characteristics for an effective organization can be established such as:

- i. A policy making body (national or local) to set objectives and broad policies, and to monitor the performance of operating institutions;
- ii. A reasonable degree of operational autonomy including financial independence, as well as powers to set charges within appropriate guidelines and controls, to collect revenues, to control cash, and to plan the financing of the entity's development through an appropriate combination of internally generated revenue, borrowings, and government contributions;
- iii. Effective minimum information systems which can provide the financial and operating data which are the raw material for day-to-day management and control, and technical and financial planning. The most important single element of such a system is a well designed "commercial" accounting system;
- iv. Authority to set salaries and wages at competitive levels in order to attract and retain competent staff, and the power to hire, dismiss or discipline staff members; and
- v. A continuing program of staff training at all levels within the organization.

Assessment of the capacity and limitations of the institutional arrangements of the sector is an important part of the sector survey. Any programs planned or proposed need to be examined from this point of view, and the mission's judgment about the arrangements should be clearly stated in the report.

#### Use and Development of Human Resources

20. A sector study should give particular attention to management and manpower needs. The importance of power systems as well as the magnitude of present and planned capital investment should command a fair proportion

of available management talent. The waste of resources arising from inefficient management of entities in this capital-intensive sector far outweighs the cost of adequate management, which is very small in relation to the size of the investments. This usually can and should be conclusively demonstrated to decision makers. The lack of well thought out training programs for top management, as well as for all the other levels of operational responsibility, is often one of the major constraints to efficient and rapid development of the sector. A thorough sector survey should include a brief survey of educational institutions with theoretical and practical programs in the various disciplines important to the sector. The need for expansion of these programs and for short and long term training programs operated by sector entities should be specifically considered during the study. Other inhibiting factors include the difficulty of getting highly qualified staff to accept assignment in outlying areas where there is a dearth of educational, health, and other facilities. This problem is particularly difficult in dealing with village and rural electrification.

#### IV. SPECIFIC INFORMATION REQUIRED

21. At the same time as the information discussed in Section III is compiled, the present and projected position of the agencies carrying out the direct power supply function must be reviewed. As suggested, there may be few, or many institutions. The history of their past operation and a description of their present facilities need be of concern only insofar as they offer a guide to the future.<sup>1</sup>/ For example, it would be important to have a concise five-year record of production and sales by principal customer category, but not necessary to have a detailed description of facilities that amounted to an inventory of transmission and distribution plant down to the total length of secondary circuits. Some judgment must obviously be exercised in collecting information, and the objectives of the review kept in mind.

22. Forecasts of demand and energy requirements will have been collected. It is desirable that the energy projections be available for each class of customer. The bases on which the projections were carried out should be known not only because a judgment about their validity is needed, but also because they should be tested against projections of economic activity at the national level, as suggested earlier. Sufficient information should be available in the historic sales data to reveal any seasonal variation which is characteristic of the market. When readily available, load-duration curves should be collected.

1/ Except for the considerations discussed in paragraph 23.

23. In connection with the data described in paragraph 15, a special effort should be made to obtain historic information concerning the consumption of residential or domestic customers. To the extent that power supply agency records permit, these data should be sought on a basis as disaggregated as possible, and preferably so consumption can be correlated with income. Some societies have created special agencies to promote, in cooperation with the principal power supply institutions, programs of village and countryside electrification. Thus it may be necessary to correlate information from several sources. These data are of interest not only in examining sector policies, but are useful in connection with other Bank work where cross-section analysis is of interest.

24. Information on primary power resources and prices of fuels should be assembled and reviewed. Basically, this would include any inventories of potential hydroelectric developments together with any studies of specific proposals. Data should cover approximate energy available, projected capability, reservoir capacity, and an outline of probable operation. Estimated costs should be sought, and their basis determined. Fossil fuel resources should be investigated and present and projected prices obtained. A general appreciation of transportation and handling facilities should be gained, adequate to identify problems and potential bottlenecks. Where imported fuel (probably petroleum) figures importantly, a knowledge of seaport and pipeline capacities is necessary, and the role of domestic refineries should be understood. The prospects for development of indigenous fossil fuel should also be looked into. Finally, in the exceptional instances of those few developing countries with fairly sophisticated domestic manufacturing industries, a broad grasp of its probable role in power system development would be useful.

25. The existing power system(s) should be described. Here again, there is no need for an exhaustive inventory of every nut and bolt. The review should reveal whether or not the various elements of the supply system(s) appear in reasonable balance. Some indication should be obtained of the reliability of supply as available to the principal classes of customers, and if there is evidence that reliability is unsatisfactory, an assessment of the underlying causes should be made. (Thus the problem may be inadequate generating capability; improper maintenance; overloaded distribution plant, etc., or several factors in combination.)<sup>1</sup>/ The existence of captive plant in the hands of industries which generally otherwise would rely on public supply may be taken as prima facie evidence that public

<sup>&</sup>lt;u>1</u>/ See Public Utility Note No. 3, "Generating Plant Reserve Margins" and Public Utility Note No. 4, "Standards of Urban Electricity Distribution" respectively.

supply is inadequate or unreliable.  $\frac{1}{}$  Some information should be obtained on the amount of such captive plant as well as its cost.

26. An appreciation is required of the soundness of planning for the forecast market development. The planning horizon should be reasonable vis-a-vis the probable time to conceive, engineer, and construct new facilities. Due attention should have been paid to alternative sources of generation; to possible bulk power transmission schemes; and to various different patterns of distribution system evolution. Preinvestment and feasibility studies particularly for generation and high voltage facilities should be carried out with significant lead time to allow for a meaningful comparison of development alternatives. In addition, market studies in new areas to be covered by the power system should be scheduled sufficiently in advance. Of particular importance is a national overview to assure that development plans for one system or region do not pre-empt the options available in another: thus for example the selection of the level for a new extra-high-voltage transmission system should be made only after considering the requirements of all geographic regions.

27. Satisfactory evidence should exist that the plan(s) constitute the "least-cost solution(s)" in the economic sense where costs have been measured in correct economic terms. With increasing frequency, the exercises leading to this conclusion are carried out by one or another type of power system model using computer techniques. Key inputs should be checked for "reasonability," and the basis for any constraints or anomalies understood. $\frac{2}{}$ For example, it may be national policy to burn indigenous fuel even though imports may be less costly. In this respect an appropriate long term view of the prices and availability of indigenous and imported fuels should be considered. The range of primary resources has been considerably expanded with the development of nuclear and geothermal technology and the availability of fossil fuels with different characteristics (such as high and low content of sulphur which have important effects on prices). In the same manner new types of medium sized generating plants such as large diesels, dual steam-gas cycles, gas turbines, etc. should be kept in mind. Finally, the "least-cost solution(s)" must be shown to be technically feasible by engineering analysis which has taken account of such considerations as steady-state and transient stability.

<sup>1/</sup> But some industries (such as sugar where bagasse can be burned as a fuel, or chemical processes where steam is required) have economic advantages in producing their own electric power.

<sup>2/</sup> But not necessarily accepted. The tests of "reasonability" may include whether appropriate use has been made of shadow pricing.

28. The plan should be translated into capital requirements, preferably by major category of plant. The incidence of expenditure should be as realistic as possible and correspond to the best estimate of the actual flow of funds needed to finance the construction contracts. A capital budget should be prepared corresponding to the period of the planning studies underlying it. Expenditures should be separated into domestic and foreign components.

29. Once the aggregate sector construction financing requirements are quantified, an outline plan of meeting them should be prepared. In the case of single-agency sectors this can probably most readily be done with the power supply agency itself. Where a number of systems are involved, the national planning office (or other appropriate agency of the national government) should have available projected funds statements for all the agencies constituting the sector. Generally speaking this information may be the most difficult of all to obtain on a reliable basis. Certainly, the government should have been alerted to its need well in advance of the field work in connection with the sector review. It may be more productive to contact the power companies directly. In the end, the Bank mission may have to prepare the largest part itself. This would entail visiting the key companies in the sector, with a view towards obtaining coverage as nearly complete as is consistent with a reasonable expenditure of time and effort. In many societies as few as three or four companies represent 75% or more of the sector, and a very good appreciation of overall sector financial requirements can be obtained by extrapolation. Care must be exercised to assure that where it is intended to aggregate data, they are comparable. The goal should be to identify broadly the extent to which recourse can be had to (i) revenues, (ii) borrowings, and (iii) government contributions in satisfying sector needs.

30. Broad judgments should be drawn about the adequacy of revenues (and hence tariffs) both from the apparent soundness of the overall financial picture, and the extent to which new construction can be financed from internal sources. If indicated, the proposed sources of borrowings should be contacted to determine the degree of realism underlying the projections. Finally, the overall plan should be reviewed in some detail with the planning office. Some feel for the Bank's role should be developed. At this stage any gross structural or institutional flaws should have become apparent, and the opportunity seized to bring them to the government's attention. For example, in the face of rapidly increasing electricity requirements, legislative limitations on earnings may tend to either create power shortages, force systems to borrow under imprudent terms, or result in overwhelming demands on budgetary sources. The principal conclusions from the review should be drawn before the mission departs from the country, and they should be discussed with the appropriate government agencies.

31. Assembling the information discussed in the two preceding paragraphs will allow a judgment to be formed about the adequacy of the general level of tariffs. In addition, however, tariff structures should be examined. For

example, peak and off-peak differentials, the justification of increasing or declining block rates, and the role of demand, energy, and customerrelated charges all warrant critical scrutiny. All this may not be possible where many agencies are involved (except of course in the unusual circumstances where tariff structures and levels are uniform throughout the sector), the major systems and appropriate government bodies should be acquainted with the desirability of investigating the real effect of the structures in force. Inadvertent cross-subsidies of iniquitous nature may prevail, quite contrary to intention. On the other hand, pursuit of a policy of low tariffs believed to benefit lower income classes may introduce distortions in the shape of the daily load curve, which in turn result in unjustified investments in the power supply system. In villages (and in distribution networks in residential areas of towns) low returns on the investment may be a reflection on the tariffs, rather than a measure of the merits of the investment. One of the conclusions to be drawn from the sector review is whether or not a more detailed examination of tariffs appears desirable.

# V. REPORT

32. The sector review should be made available to Bank staff in general by a report. The report should of course reflect the objectives of the review. To this end it should more nearly be a dynamic analysis of an evolving sector than a compendium of bare (and perhaps unstructured) data. Detail is fine in its place (i.e., annexes) but in preparing the report it should be borne constantly in mind that the reader should be given an appreciation of:

- i. How the sector fits into the economy;
- To what extent it is consciously or otherwise used as an instrument of national social policies;
- iii. Whether its development is founded on an adequate basis of market, preinvestment, and engineering feasibility studies; and if not, the shortcomings should be identified;
- iv. How it will be financed and what demands it is likely to make on the national budget; and
- v. The role appropriate to the Bank's participation in its development.

33. If the suggestions above have been followed the salient features of the sector will have been uncovered, and any outstanding anomalies or aberrations brought to the attention of the host government. The report prepared after the field work should of course include a discussion of any such aspects together with the mission's recommendations, and an evaluation of the government's position on them.

#### ANNEX 1 Page 1 of 3 pages

#### CHECKLIST FOR POWER SECTOR INFORMATION

#### 1. Legal and Institutional

- 1.1 Government policy/legislation governing aspects of power development and the power supply industry. Laws, codes, decrees and other legislation affecting the organization of the power sector. Responsible authority at national, regional, and local levels; legal status and composition of planning, regulatory and coordinating agencies; organization of the various utilities owning and operating the power plants and systems.
- 1.2 Means by which decisions pertinent to power sector are implemented, controlled and evaluated, e.g.,
  - tariff policy
  - capital and operating budgets
  - appointments to board memberships
  - operating regulations
  - licenses
  - utility commissions
- 1.3 Details of any pooled operation with neighboring countries/ regions.

#### 2. General Information on Power Sector

- 2.1 Total and per capita electricity consumption; growth trend in electricity consumption;
- 2.2 Access to electricity supply:
  - Population served by categories: large, medium, small cities, rural areas. (For a suggested format for presenting this information, see Attachment 3.)
  - Distribution of electricity consumption by class of consumers: industry, commercial, residential, etc. (For an example of how this may be presented, see Attachment 2.)
- 2.3 Investment program for power sector for period covered by national development plan (if any). Criteria for determining priorities; financing plan for new investments.
- 2.4 Relationship between electricity consumption and economic activity. Electricity consumption and GDP per capita. Electricity consumption (production) and activity in other sectors. Methodology for forecasting electricity demand.

### ANNEX 1 Page 2 of 3 pages

2.5 Design criteria for power systems; formulation and regulation of industry standards; procurement procedures, customs policy, import duties.

#### 3. Production

- 3.1 Types of power plants (hydro, steam, diesel, nuclear, geothermal, etc.), their installed capacities, energy potentials and individual contribution of total production. Trend in installed capacity of various types of power plants. (See Attachment 1 for a suggested format for presenting this information.)
- 3.2 Geographic distribution of power plants. Reasons leading to choice of location and type of power plants in the various regions.
- 3.3 Trends in cost of production (broken down into interest on capital, depreciation, fuel costs, operation and maintenance costs) of electrical energy from different types of power plants in different regions.
- 3.4 Statistical summary of electricity production by type of generating plant and breakdown of consumption by sectors. (Attachment 2, Table 1 shows an outline suggested by the UN for presenting this data.) If electricity is imported, quantity, source, cost of such imports, and problems associated with imports. In the case of exports, details of export trade.
- 3.5 Characteristics of main producing companies. Scope of activity (whether generation, distribution, or transmission). Organizational and legal structure of the entity. Percent and type of customer served. Installed capacity and growth rate. Operating characteristics (load factor, peak demand, efficiency, etc.) Quality of service (reserve capacity, frequency of interruption, etc.)
- 3.6 Installed capacity of self producers and type of power plant. Reasons for self generation - customers and region served. Law affecting development and operation of self generators. Trends in future development of self producers. Provision of stand-by by public supply. Arrangements for sale of surplus by auto-producer to public supply.
- 3.7 Trends in capital investment (and foreign exchange components) involved in construction of different types of power plants.

#### 4. Rural Electrification

- 4.1 Government policy regarding rural electrification. Organization of agency responsible for planning, programming, promotion and control of rural electrification. General technical and economic problems of rural electrification. Means to cope with these problems.
- 4.2 Number and percentage of rural households receiving electricity; aggregate investment. Consumer response to electrification in villages.
- 4.3 Benefits of village electrification (development of agro-industries, irrigation). Effect on urban rural migration patterns. Tariff structures in villages and reasons for these. Sources of finance for village electrification programs.

#### 5. Tariffs and Finances

- 5.1 Historical background on tariffs. Present tariff regulations. Mechanism for determination and application of electricity charges. Policy and criteria for determining tariff structure. Geographic pattern of tariffs. Urban/rural tariff comparisons. Analysis of rate structure by class of consumer. Tariff policy on interconnected systems. Trends in rate structure. Indirect tariffs (taxes, compulsory loans, etc.).
- 5.2 Value of assets and basis of valuation. Depreciation policies.

#### 6. Management and Staff

6.1 Organization chart of the lines of authority in the sector and in the main utilities. Manpower resources. Recruitment problems, if any. Training facilities and policy. Adequacy of managerial and technical staff in the sector. Use of foreign personnel in advisory and operational roles. Use of consultants.

#### 7. Future Development

7.1 Overall national policy on energy sector development in general and power in particular. Proposed legislative actions, pricing policies, taxation measures. Plans to upgrade quality of supply and service. Improvement in efficiency. Power sector expansion program. Sources of finance for expansion program.

ANNEX 1 Attachment 1

### PRODUCTION OF ELECTRIC POWER

# (Power generation capacity as total minimum monthly capability\* and gross annual production)

	Uti	Utilities		Auto Producers		
	Capacity MW	Production GWh	Capacity MW	Production GWh		
Hydro						
Steam						
Diesel						
Gas turbine				,		
Total						
Average Tariff in USc/kWh						

\* Recognizing this will frequently not be readily available, and surrogates accepted such as "nameplate ratings."

### POWER: Production and Consumption Table

Electricity					
Years			<u>.</u>		
RODUCTION					
of which:					
Hydro-power plants					
Steam power plants					
using Coal					
Lignite					
Natural gas					
Coke-oven gas					
Blast furnace gas					
Petroleum products					
Other fuels					
Diesel-electric plants					
Nuclear power plants					
Geothermal power plants					
Gas turbine power plants					
Imports					
Importo					
Exports					
TOTAL INTERNAL FINAL CONSIMPTION:					
Consumption by energy sector					
or which;					
Lignite mines					
Coke ovens					
Gas works					
Patent fuel plants					
Crude petroleum extraction					
Petroleum refineries					
Natural gas extraction					
Electric power plants					
Pumped storage plants					
Distribution losses					
Consumption by transportation sector					
of which:					
Road transport					
Railways					
Internal and coastal navigation					
Consumption by industries sector	지 않는 것 같은 곳				
of which:					
Mining and quarrying					
Textiles Chemicals except fortilizers					
Fertilizers					
Cement					
Non-metallic mineral products					
Iron and steel basic					
Non ferrous basic					
Other industries					
Consumption by agricultural sector:					
Consumption by domestic sector:					
Consumption by commercial sector:					
Consumption by government sector:					
a second s					

# POWER SECTOR: SUMMARY OF ELECTRICITY CONSUMPTION

# ELECTRICITY CONSUMPTION BY CLASS OF CONSUMERS, REGIONWISE OR STATEWISE, 1971 (sample data sheet)

Page

N

VEX 1 tachment

ment 2 of 2 pages

(GWh)

States	Region	Residential	Commercial	Industrial	Rural	Others*	Total
All Northern All Northeastern Sao Paulo Minas Gerais Guanabara Rio de Janeiro Espirito Santo Sub-Total Southeast All West Central All Southern Sub-Total Other Utilities Self Producers GRAND TOTAL	North Northeast Southeast Southeast Southeast Southeast West Central South Main Utilities1/	$     \frac{156.2}{878.8}     3,800.8     738.4     1,413.8     723.7     79.4     6,756.1     250.3     996.1     9,037.5     $	91.9 473.5 2,347.2 326.4 1,277.4 280.5 42.7 4,274.1 157.4 635.3 5,632.3	$     \begin{array}{r}             \underline{69.0} \\             \underline{1,500.2} \\             10,006.2 \\             3,541.8 \\             958.4 \\             1,091.0 \\             241.4 \\             \underline{15,838.9} \\             \underline{75.5} \\             \underline{1,345.9} \\             18,829.5 \\             \end{array} $	$ \begin{array}{r}                                     $	$     \frac{73.4}{553.5}     2,131.7     404.0     640.5     290.9     45.0     3,512.1 228.9 520.5 4,888.2$	390.5 3,435.5 18,498.5 5,050.1 4,290.1 2,389.5 410.6 30,638.8 714.1 3,545.1 38,724.0 580.0 3,624.6 42,928.6

1/ 66 main distributing utilities surveyed by ELETROBRAS. With a few exceptions, these are roughly the same as the 63 OPE utilities and represent a market about 0.3 percent larger.

\* This may be subdivided into agricultural, government and all others.

Source: ELETROBRAS

Reproduced from: The Economic and Social Development of Brazil IBRD Report No. 38-BR, Vol. VIII, March 1973

ANNEX 1 Attachment 3

# ACCESS TO ELECTRICITY SUPPLY

		% Supplied			% Projected Supply for Yr.		
	Population	Cont.1/	Discont.2/	Total	Cont1/	Discont.2/Fotal	
Rural Areas							
Small towns							
Medium sized towns							
Capital city				2			
Other large cities							
					1	1	

1/ Continuously

2/ Discontinuously

#### CHECKLIST FOR POWER SECTOR PROBLEMS

#### 1. Technical

- a. Does the national planning agency know what is required of the energy/power sector to meet development objectives?
- b. Is there knowledge of energy and power resources and their probable roles in the future?
- c. Is the method of investigation of resources effective?
- d. Are design standards satisfactory?
- e. Are the maintenance and operation of existing systems satisfactory?
- f. Are the problems associated with electricity transmission and distribution known to national authorities?
- g. Are there plans to overcome the technical and other problems associated with rural electrification?

# 2. <u>Managerial - Planning</u>

- a. Is investment planning of a high standard?
- b. Are investment alternatives adequately examined?
- c. Are the criteria for the selection and location for power projects adequate?
- d. Do we know what equipment and materials can be supplied locally?
- e. Are procurement, contracting, and bidding procedures satisfactory?
- f. Can local consultants or government engineers be relied upon to carry out preliminary engineering and feasibility studies?
- g. Are local contractors efficient?

#### 3. Financial - Economic

- a. Are accounting systems satisfactory?
- b. Do we know how electricity supply is charged for?
- c. Do charges reflect economic costs of providing the services?

- d. Are utility companies financially viable?
- e. Are metering, billing and collection systems reasonable?
- f. Do we know terms and interest rates of local funds?
- g. Are methods of subsidizing the sector, if any, likely to result in misuse of resources?
- h. Is foreign aid to the sector likely to be maintained?
- i. Are terms of interest rates likely to be changed?
- j. Are there any extreme budgetary constraints?
- k. What is the record of approving and implementing tariff increases needed in the past?

#### 4. Manpower

- a. Are local personnel technically competent and sufficient in number to carry out the development plan?
- b. Are manpower training schemes effective?
- c. Could adequate skilled and semi-skilled manpower be supplied if the development plan were expanded?
- d. Do we know the manpower and training needs? Detail as to
  professional, sub-professional, and skilled labor by area:
  (i) investigation and design, (ii) construction, and
  (iii) operation and maintenance.
- e. Can expatriates be employed if needed?

#### 5. Organizational - Administration - Legal

- a. Are the laws, codes and decrees regulating power systems, and the allocation and consideration of power resources satisfactory?
- b. Is the division of responsibility for policy, construction and operation adequate?
- c. Are the roles of national, regional, and local public authorities clearly defined and satisfactory?

ANNEX 2 Page 3 of 3 pages

- d. Is there need to change the legal status of any of the parts of the system (commercial corporations, utility commissions, administrative bodies, etc.)?
- e. Are organizational structures of individual electric utilities conducive to efficient operation?
- f. Are local officials aware of the requirements of international lending agencies for project preparation?
- g. Are any laws or regulations in conflict with the Bank's procurement guidelines?
- h. Is there sufficient coordination with other agencies with interest in energy development with responsibility for industrial or infrastructural development, urban planning, and so on?
- i. Should there be any new government action to govern the future development of the industry?
#### ANNEX 3

# OUTLINE OF POWER SECTOR STUDY REPORTS

I. SUMMARY AND CONCLUSIONS

#### II. INTRODUCTION

- A. Background and Reasons for the Study
- B. The Role of the Sector in the Economy
- C. Development of the Sector
- D. Bank Involvement

# III. SECTOR DESCRIPTION

- A. Organization
- B. Policies
- C. Present Market Situation (supply, demand, access to supply, etc.)
- D. Tariffs

# IV. SECTOR ANALYSIS

- A. Goals
- B. Organization
- C. Planning and Project Preparation Studies Needed
- D. Staffing
- E. Finances

# V. RECOMMENDATIONS

- A. Recommendations to National Agencies
- B. Recommendations to International Organizations
- C. Recommendations to Bank Group



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INTERNATIONAL BANK FOR RECONSTRUCTION AND DEVELOPMENT

INTERNATIONAL DEVELOPMENT ASSOCIATION

#### FUBLIC UTILITIES DEPARTMENT

#### GUIDELINES SERIES

# GUIDELINES FOR SECTOR WORK IN THE WATER SUPPLY AND WASTE DISPOSAL SECTOR

November 9, 1973

Central Projects Staff Public Utilities Department

> This paper is one of a series issued by the Public Utilities Department for the information and guidance of Bank staff working in the power, water and wastes, and telecommunications sectors. It may not be published or quoted as representing the views of the Bank Group, and the Bank Group does not accept responsibility for its accuracy or completeness.

GUIDELINES FOR SECTOR WORK IN THE WATER SUPPLY AND WASTE DISPOSAL SECTOR

# A B S T R A C T

These guidelines suggest the means for acquiring the information about the water supply and waste disposal sector needed in order to prepare plans for its development. Sector studies are primarily for the benefit of decision makers at the national and local level, but they also benefit outside agencies interested in efficient development of the sector. To be effective, sector work must involve both appropriate officials and the sector specialists in the country in question, and be seen as part of a continuous process for building up knowledge and improving decisions in the sector. Several typical sector issues are discussed, along with a number of practical considerations for organizing sector work. Detailed planning of sector work is emphasized. Annexes provide, among other things, checklists which help to assure that important aspects are not overlooked.

Prepared by:

De as as

James H. Jennings, Harold R. Shipman, Jeremy J. Warford, Paul Bierstein (WHO) et al

November 9, 1973

# GUIDELINES FOR SECTOR WORK IN THE WATER SUPPLY AND WASTE DISPOSAL SECTOR

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Definitions of Sector Work Categories (Used by the IBRD)
 Decade Goals for Water Supply
 Checklist for Sector Information
 Checklist for Identification of Problems
 Preinvestment Program - Study Data Sheet

 Study Data Sheet Supplement

November 9, 1973

# GUIDELINES FOR SECTOR WORK IN THE WATER SUPPLY AND WASTE DISPOSAL SECTOR

#### I. INTRODUCTION

1. Few development projects have greater potential for directly benefiting the living conditions, health and eventually the productivity of large numbers of people than water supply improvement. Few will have a greater impact on environmental improvement than those concerned with the proper collection and disposal of liquid wastes. In most developing countries, more knowledge of the water supply and wastes disposal sector is required for decisions about its development, than is available. These guidelines suggest that means for acquiring this knowledge and beginning the decision making process which will lead to the appropriate actions for the sector's development.

2. A full study of the water supply and sewerage sector in a particular country should represent a comprehensive review of the organization or organizations responsibile, its present state of development, its problems, and major development policy options. The study is primarily for the benefit of:

- a. National, regional and local authorities responsible for planning and allocation of resources among sectors;
- b. Authorities responsible for developing and operating water supply and waste disposal systems; and,
- c. International, regional or bilateral institutions which assist in preparing or financing development projects in the country, and which are concerned with the efficient use of development resources.

3. In its broadest definition, the water supply and wastes disposal sector encompasses all activities related to the provision of water for human consumption and for industrial, commercial and governmental uses, and the collection and disposal of all liquid and solid wastes. These guidelines are oriented to a slightly narrower definition, i.e., to community (piped) water systems, and liquid wastes systems. In any given country, a broader or narrower definition may be adopted as a guide for the scope of planned sector work, but the approach as outlined below will be largely unchanged.

4. Given the wide range of climates, population density, size, geography and economic conditions of the developing countries, it is obvious that the scope and depth of sector work should be decided in each case only after thorough consideration of the objectives of the work, and the resources available for it. The work may range from a complete study of the country-wide water and sewerage situation to a sub-sector study such as rural water supply in a given region or state. Choices also need to be made about the depth to which the major issues (see Section II) are to be investigated. Careful planning can contribute much to the success of the work, help to avoid lost time and collection of irrelevant data, and help to assure that the judgments and conclusions will be well founded.

5. The IBRD has adopted standard terms which denote various kinds of sector work; these are listed in Annex 1. The term "sector study" is used in these Guidelines in a general sense, and is not intended to represent any particular scope or depth of sector work.

Given the "social" nature of water supply and sewerage, the basic 6. objective in their development is usually to provide the maximum number of people with safe water in adequate quantities, and to collect and dispose of wastes in a manner that will avoid public health, environmental and aesthetic problems, at the minimum unit cost. In most cases, full satisfaction of these needs is not a realistic short-term goal; therefore development programs represent a selection among alternatives - i.e., levels of funding, degree of emphasis on urban versus rural development, quality of service, techical options, and the like. These judgments must be based on both qualitative and quantative factors, but more and more emphasis is being given "social" factors, by both governments and lending institutions. Social effects have to be considered when deciding, for example, the urban versus rural emphasis, pricing policies, alternative tariff structures, the effects of programs on government revenues, and the degree of sewage treatment, and so on. These are largely political choices and must therefore be made by government. However, they should be made in the full knowledge of the financial and economic, as well as the social, consequences of the decisions.

7. The objective of sector studies is to provide a foundation for these decisions. In many cases, sector authorities are so preoccupied with day-to-day problems and emergencies that they have little or no opportunity to view the broad problems and policy issues facing the sector. This not only adversely affects decision making at the sector level, but also means that the government's economic planners are not presented with information that enables them to make the best decisions in allocating scarce funds and natural and human resources among competing projects. Thus a full sector study after analysis of the necessary sector information, will (a) identify in physical and financial terms the principal problems and constraints of the sector; (b) analyze existing goals or propose alternative goals toward which a national plan for the sector can be directed; and, (c) recommend the establishment or modification, of organizations, policies, and practices required to achieve the goals, after consideration of whatever tactical alternatives may be available, and after discussion and consideration of the views of the government.

8. In most cases, further studies will be needed before certain sector and project investment decisions can be made. These may range from preliminary engineering and feasibility studies for individual projects, to those concerned with the structure and management of project entities, financial policies, legal questions, economic investigations, or training. Such studies are needed both to support sound decisions, and because most agencies financing water and sewer projects are interested not only in the works to be financed but also in the ability of the borrower to deal with all of the continuing problems of the sector. The Sector Report should identify and describe the specific studies needed.

9. Section II of these guidelines discusses a series of issues that are frequently encountered in sector work. Section III outlines some of the practical considerations of planning and executing studies.

# II. TYPICAL SECTOR ISSUES

10. The experience of the Bank accumulated while working with a wide variety of water supply and sewerage sectors and projects suggests that certain issues are so frequently encountered that they can be termed "typical". The most important of these are discussed below.

## A. Sector Objectives and Goals

11. It is common to find that specific goals or targets for sector development have not been established. The two main reasons for this seem to be the usual fragmentation of the sector, and the piecemeal planning that goes with it; and the fact that decision makers do not have a factual basis (for example, cost information) for setting such goals. An important function of a sector study is to provide a basis for setting sector goals by (a) looking at the sector from the national point of view, taking into account alternatives of making service available to various income groups and localities, quality of service, technical options, etc., as discussed above; and, (b) by providing an assessment of the constraints - human, financial and organizational - which will limit any development program.

12. Such programs (goals) may be described in various specific ways, e.g., percentage of urban or rural population with access to safe water, per capita consumption, connections per 100 population, funding levels, etc. But in all cases the full implications of the goals need to be considered, and the selected goals stated with as much precision as possible so that they provide effective guidance to those who will implement the program. Some countries subscribe, more or less seriously, to global or regional goals established by outside agencies. Among these are the "development decade" targets suggested by WHO, and the goals established initially for Latin America by the Charter of Punta del Este and later updated for the 70's by a regional conference in Chile (See Annex 2). In countries where these, or any other, specific goals have been established, the sector study should examine the feasibility of the goals and recommend modifications if necessary.

13. In most cases it will be desirable to present alternative goals, with the implications of each presented in a manner that will permit selection of the one which best fit the country's resources and development plans. Such decisions are clearly the prerogative of the highest planning level of government, and given the ultimate objective of providing safe water to everyone, tend to be a selection of the optimum "pace" and sequence for development. Whatever "pace" is chosen, the elements essential to success of the program are practically the same.

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# B. Sector Organization

The physical characteristics of the water supply and waste dis-140 posal sector suggest an organizational structure somewhat different from the power and telecommunications sectors, although in many other respects the sectors are similar. Systems can (and usually do) operate effectively without interconnection, and this gives them a strong local flavor. From the national point of view, however, effective coordination of sector development plans is necessary in order to consider the needs of different regions, uses and consumer classes, in light of the total resources available, and to assure consistent standards of technical and financial performance. These needs have to be balanced against the equally valid objective of giving managers of individual systems the authority and responsibility for achieving their goals by using the resources under their control without undue interference for political or other reasons. organizational aspects of rural water supply, however defined, are particularly difficult, and usually need to be considered in conjunction with the administrative arrangements for rural development programs, which involve other sectors, e.g., transportation and agriculture.

15. Thus, there is no single organizational structure best suited to the sector. Experience suggests that a national water supply and sewerage authority organized internally so as to delegate to its regional or local sub-divisions appropriate authority and responsibility for day-today affairs, is an effective approach in countries where management skills are scarce and the country not too large. Other structures may be more practical for a variety of reasons, but the arguments in favor of combined water and sewerage operations are usually very strong. However, effective examples can be found of regional authorities, local organizations in which water and sewerage are combined or separated, private corporations, concessions, etc. In each of these examples, however, it will be noted the basic principles of good management have been observed. Thus organizational effectiveness seems to be more closely related to sound management than to organizational structure. Of course competent and dedicated people are more important than either of these.

16. Whatever structure is selected, good management requires clearly defined objectives, the attendant authority, and adequate human and financial resources. These establish certain necessary characteristics for an effective organization, such as:

i. A policy making body (national or local) to set objectives and broad policies, and to monitor the performance of management;

- ii. A reasonable degree of financial independence, including powers to set charges, within appropriate guidelines and controls, to collect revenues, to control cash and to plan the financing of the entity's development through an appropriate combination of internally generated funds, borrowing and capital appropriations;
- iii. Effective minimum information systems which can provide the financial and operating data which is the raw material for day-to-day management " and control, and technical and financial planning. The most important single element of such a system is well designed public utility accounting system;
- iv. Authority to set salaries and wages at competitive levels in order to attract and retain competent staff, and the power to hire, dismiss or discipline . staff members; and,
- v. A continuing program of staff training at all levels within the organization.

Assessment of the capacity and limitations of the institutional arrangements of the sector, considering the above, is an important part of a sector study. Any programs planned or proposed need to be examined from this point of view, and the mission's judgment about the arrangements should be clearly stated in the report.

17. Where water and sewerage operations are decentralized, there is a need for a unit at the national level which can represent the interests of the sector in national planning and administration; collect, organize and disseminate sector data; promote observance of national standards; and provide a coordination channel for local and regional bodies.

#### C. Use and Development of Human Resources

18. A sector study should give particular attention to management and man-power needs. Water supply and sewerage systems are usually locally managed and financed, and thus require a relatively large management input at the local level. The need for management capability is typically underestimated by both national and local authorities. The importance of these systems for community welfare, and the magnitude of present and planned capital investments, demand a fair proportion of available management talent. Nevertheless, it is common to find large and expensive systems being poorly managed by technicians who have little interest in management in the broad sense, or by civil service short-term appointees who lack technical knowledge and have little interest in the long-term development of the sector. Problems thus created are reinforced by legitimate government concern for cost control, which frequently translates into shortages of staff in both numbers and abilities, and rigid salary schedules. The waste of resources arising from ineffecient management of entities in this capital intensive sector far outweighs the cost of adequate management, which is very small in relation to the size of the investments. This usually can and should be conclusively demonstrated to decision makers.

19. The lack of well thought out training programs for top management, as well as for all the other levels of operational responsibility, is often one of the major constraints to efficient operation of existing facilities, and rapid development of the sector. Sector studies should include a brief survey of educational institutions with theoretical and practical programs in the various disciplines important to the sector. The need for expansion of these programs and for short and long term training programs operated by sector entities should be specifically considered during the study. One factor which inhibits management development is the difficulty of getting highly qualified staff to accept assignment in outlying areas where there is a dearth of educational, health and other facilities. This problem is particularly troublesome in dealing with rural water supplies.

#### D. Sector Finance

20. The important financial questions of the sector are determined by its basic financial characteristics:

- a. The systems require large investments of capital, and in most cases unit capital costs are rising rapidly because of the need to develop more distant sources of water, and because of the large backlog of needed sewerage works, especially sewerage treatment facilities;
- b. Cash expenditures related to operations are relatively fixed, and usually heavily weighted with capital charges. This means that opportunities for cost savings are related as much to efficient system planning as to efficient operations;

- c. Water and sewerage systems tend to be considered "social" services, and tariffs are rarely set to cover full costs; and,
- d. Good quality financial management is extremely rare.

As with institutional arrangments, there is no generally 21 . applicable optimum approach to finance in this sector. Usually there are many financial entities, so that a study of finance from the sector point of view involves more a consideration of policies than of detailed financial statements. The financial position and performance of utilities have to be judged by looking at each one individually; generalizations may be misleading. The nature of the financial part of a sector study will be largely determined by the number and size of the financial entities in the sector, and the quality and amount of financial information available. As far as possible, the scope and depth of the financial work should be planned in advance, with the emphasis on a broad review of the financial facts and policies, with spot checks of details as necessary to acquire a thorough understanding of the situation. However, when the outlines of a proposed investment program begin to emerge, it has to be examined from the financial point of view. This requires at least rough projections of capital requirements and sources, and operating costs and revenues, so that some idea of the financial consequences can be fed back into the planning process. The completeness of this work will vary with the circumstances, but in most cases, time and other constraints will preclude a "detailed" examination of these questions.

While recognizing the need for flexibility in dealing with sector 22. finance, particularly in the cases of sewerage and rural water supply, there are a few principles which have to be observed in any sound financial approach. The most important of these is a sound tariff policy, i.e., one which assures that revenues will be sufficient to meet operating expenses, debt service, and a reasonable portion of capital needs, and at the same time assures that water is not used frivolously. To accomplish the latter, from the economic point of view, tariffs should approximate long-run marginal costs; from the financial point of view, tariffs need to reflect the realistic cost of the capital invested in the system. This is accomplished by setting as the objective an appropriate rate of return on net assets in use. Social objectives frequently dictate concessionary charges for the poor, and these have to be offset in some way to meet the financial objectives. In practice, tariff policies usually reflect a blend of these objectives, and may employ such techniques as rate structures designed to favor the low water-use consumers and higher basic charges for the large users, provision for the municipalities to pay for water supplies for street hydrants, and special flow limiting devices that

allow modest flat-rate charges to be applied. For each situation the most suitable approaches have to be studied, and this is often difficult because of poor data on water consumption, income levels, etc. The sector survey should identify any deficiencies or inequities of the water pricing systems in effect and, where needed, make broad proposals for improving them or suggest the studies necessary to provide a basis for establishing sound policies.

23. Applications of such policies will usually involve tariff increases. Any increase in water charges evokes strong resistance, and with the concept of operating water systems as public utility enterprises not fully accepted, related practices such as metering, elimination of free water, and prompt collection of bills compound the problems. A policy that will reasonably satisfy the various objectives can usually be developed. An important part of sector work is to do this, at least in broad outline, and discuss it with national and local authorities.

24. Regarding sewerage, a surcharge on water bills is an administratively simple and a reasonably equitable means of charging for sewer service. Other means are commonly employed, however, such as property improvement taxes, fixed user charges, general property taxes, and general revenue allocations. All of these, or some appropriate combination, may need to be considered.

25. Excessive reliance on government or municipal budgets for capital as well as, in some instances, operating funds, has often hampered the development of the sector relative to other public utility sectors. The study should review the past, present and future finances of the important sector entities in sufficient depth to be able to outline financing plans which rely appropriately on self-financing from user charges; budget contributions reasonably related to the fiscal position of the government and/or municipal authorities, and the borrowings from local and foreign sources. Pricing policies need to be examined to ensure that they fit with the need to develop both feasible and well balanced financing plans.

26. For the purpose of a sector study, relatively thin examination of the finances of the enterprises representing the bulk of proposed investment programs may be more useful than deep coverage of only one or two of many. Ideally, for those entities examined in detail, the study should cover at least three years of financial history as represented by Income Statements, Balance Sheets and Cash Flows, with emphasis on the level of capital investment, sources and terms of capital, profitability and valuation of assets. Financial forecasts for five to ten years in the same format will allow more meaningful examination of financial trends. These forecasts are likely to be relatively crude, and the underlying assumptions should be recorded in detail somewhere in the report. The extent to which this detailed examination can be done is determined by the objectives of the study, as well as the amount and reliability of data available.

27. A separate forecast of the fiscal impact of the sector development plan, including various alternatives as needed, should be prepared in order to help clarify alternative financial policies such as the appropriateness of proposed claims on official budgets.

28. Within the limits of time available, and the scope of the study, a brief examination of the status (quality and quantity) of the accounting and auditing profession in the country is desirable. This will give useful insights into some of the staffing and training aspects of the development plan, and establish a basis for discussing the audit of accounts required as projects approach the lending stage. It may also be useful as backfound for discussions about management/institutional reform measures associated with the development plan. Interviews with leaders of the profession and one or two of the larger accounting/auditing firms should be sufficient for this purpose. Government policies regarding audit of publicly owned utilities should be examined. If audits of sector enterprises are made by some government audit group, they should be interviewed to obtain some appreciation of their procedures and competence.

# E. Management of National Water Resources

In any thorough review of the water supply and sewerage sector, 29. the methods of managing national water resources should be examined. The policies and procedures by which water resources are controlled may vary, but the end objective should be management of the nation's water resources in a manner which will ensure the most economic and environmentally appropriate use of the resources. This responsibility should not be vested in any agency which is a user, but all major users should be represented. Coordination of activities between water and wastes entities and other water agencies is important. Failure to collaborate will reduce the effectiveness of the water and sewer programs and may lead to serious conflicts as agencies try to protect their own interests. The urgency of the question of management of water resources will vary from country to country, depending primarily on the extent to which water resources exceed present uses. In countries or regions where uses are approaching the total supply, the sector work should be planned to take this into account.

# F. Technical Policies and Practices

30. Many of the comments made in the preceeding paragraphs concerning management, man-power, and institutions have a direct bearing on the technical side as well; without regard to these aspects, the technical rerources available cannot be used to full advantage, no matter how competent the technical personnel may be. Some technical issues are discussed below.

# i. Studies of Alternatives

31. It is not uncommon to find that future water sources have been selected without adequate study of the alternative sources. For example, groundwater, which will usually be the source of choice in countries where the required quality and quantity of water is available, is often overlooked. In other cases, the engineers accept without further question, administrative allocations of water, for irrigation for example, which may not be based on an adequate study of the economic consequences of the allocation. Selection of the source is an important determinant of capital and operating costs; all possible sources should be studied, and the selection based on sound financial and economic, as well as technical, principles. Where political influences seem to run counter to objective selection of the best source, they should be quantified where possible in terms of cost.

There are also alternatives in the amount and type of water 32. treatment, which are determined in part by the source. The objective is to determine the least cost methods of treatment, keeping in mind the quality requirements determined by health factors and acceptability to consumers. In areas where water is hard and such elements as iron, sulphates, chlorides and manganese are present in quantities which, though high, have not proven a serious problem to the people accustomed to drinking such water, additional treatment can usually be postponed until such time as the consumers demand a better quality water. However, treatment processes should take account of those constituents known to have adverse physiological effects, and treatment should be to reasonable safety standards, such as those proposed by WHO. Methods for disinfection, reduction of turbidity, and stabilization should be those most suited to the capacity of local personnel to operate, and should take full account of problems of maintenance, supply of chemicals, and economy of operations. Similar alternatives exist for sewage collection and treatment, including factors like the potential for reuse of effluents.

33. Alternatives in system design should be examined during preparation of master plans. With an occasional exception, these will be prepared well after the sector study. Therefore, the sector work will normally consist of examination of whatever plans are available, and impressing on local authorities the need for a thorough examination of alternatives as future plans are developed. It is important to have a master plan within which the various sources of water to be utilized in future years are identified and water rights acquired, and the basic layout of the distribution system established. However, preliminary designs for each stage should be prepared only as required. Designs for individual components of the system should provide for the most economic staging under the prevailing conditions. This suggests that the design period for most systems will very seldom extend beyond ten years, without precluding design of certain units of the system for longer periods where this can be established as the most economic approach. Discounted cash flow techniques, using reasonable

interest rates, should be used for analyzing these alternatives, as well as others, such as pipe size, which involve trade-offs between capital and operating costs. While one of the major benefits of the water system is its use in times of fire, questions of whether or not the system should be designed for flows higher than those required to meet the normal domestic and industrial demand need to be raised and justified. There is frequent need to consider standpipes versus house connections in low income areas of cities and in rural or village systems.

34. Concerning materials and equipment, maximum use of those locally produced and available should be made. Particular attention needs to be given to quality control and production capacity in the manufacture of pipes, pumps, valves, fittings, meters, and other appurtences to ensure that they will meet acceptable specifications and to identify possible constraints on the program. Materials which are particularly resistant to corrosion and are least susceptible to the effects of aggressive waters and soils should be employed.

35. It must be said that thorough consideration of alternatives, and decisions about them, will rarely, if ever be possible during a sector study. Time consuming (and expensive) studies may be needed to provide the necessary information. An important function of the sector study is to identify the need for such studies, and, if necessary, help design them, so that timely decisions can be made without causing delays in the program and any project which may be under development.

#### ii. Leakage Control and Metering

36. One of the most common problems encountered in many water systems is the large quantities of water lost or wasted after entering into the transmission and distribution systems. Losses result from leakage in poorly constructed systems or when pipes become corroded, from illegal connections, from meters which under register, and from records which have been lost on customers receiving service. Because of the economic consequences of large water losses, including the health hazards of poorly maintained systems, technical sections of every water institution need to give high priority to prevention and correction of water losses. Consideration of metering policy should represent a deliberate choice of the extent to which consumer connections are metered. Some practices which may need attention are administration of the billing and collection system, meter reading, procedures, measures to avoid graft, illegal connections and so on. 37. One hundred percent metering is not necessarily the best solution where there are large numbers of consumers with very low consumption. Alternative degrees of metering should be costed, using assumptions as to the administrative, capital, and maintenance costs of meters, etc., and compared with revenues and savings due to reduced consumption. This will frequently involve a separate study. Where less than 100% metering is indicated, it is very useful to install meters on a representative sample of unmetered connections, which will be read for statistical purposes only. These will provide the basis for calculating consumption and losses which are needed both for operating and planning purposes. Accurate production meters installed at all production points are also important.

# iii. Design Criteria, Construction Standards and Maintenance

38. A sector study should include examination of any nationally applicable design criteria, and local construction and maintenance standards to the extent practicable. The objective is to assure that standards are appropriate to the conditions of the country, and that they are being observed in practice. Where foreign consultants are engaged for planning and design, they may, without due consideration, apply criteria used in other countries that may not be appropriate. In such cases, suitable modifications should be discussed. Although the full effects of overdesign, and poor construction and maintenance standards are not easy to quantify, experienced engineers should be able to reach conclusions valid for sector study purposes during the normal course of their technical work. Pipe sizes and materials, sizing of distribution reservoirs, treatment methods for both water and sewerage, meter types and specifications, minimum service pressure, hours of service, fire flows, and combined or seperate sanitary and storm sewers are examples of the areas in which technical standards may become an issue.

39. The quality of construction work needs attention. This applies to concrete work, pipe laying, service connections, plumbing, mechnical and electrical installations, and structures of all kinds. High cost of maintenance and frequent disruption of service commonly stem from poor construction. Poor construction is the result of poor specifications, poor contractors, poor supervision by engineers, or all three. To the extent possible, the availability and competence of local contractors and technical consultants should be investigated.

# III. PLANNING AND EXECUTION OF SECTOR STUDIES

# A. Planning and Staffing

40. Experience has shown that it is desirable to make a brief reconnaissance before a water supply/sewerage sector study is undertaken. The purpose is to reach an understanding with national authorities about the objectives, scope and working arrangements of the mission. The discussions should cover such topics as the local staff to be assigned to the study, the towns to be visited, the officials to be consulted, the channels of communications to be set up, and the transport and office facilities to be arranged. They should also identify the means of obtaining the various kinds of information needed and assure that its collection has started. An inventory of previous studies of the sector or individual systems by foreign or local bodies should be made. The studies should be selectively reviewed before or during the field work, if relevant to the survey. Draft terms of reference for the full mission should be a part of the reconnaissance mission's report.

41. The time estimated for carrying out a sector study depends on a number of factors: among them are the size of the country; the number of organizations involved in planning, building and operating the water supply, sewerage and sanitation facilities: the number of experienced staff assigned to the study; and, obviously, the kind of study they are expected to make. In a small country with only a few urban water systems or where only one agency is responsible for all sector activities, it is possible to make a fairly thorough study in 4-6 man-weeks. On the other hand, a sector study in a large country with many administrative divisions and high population densities involving many water and sewerage systems might require several months if each of the provinces or regions of the country are to be covered. For medium-sized countries, when it is decided to undertake a comprehensive study covering water supply, waste disposal and rural needs, a period of one to two calendar months in the field, plus additional time for the analysis of data and preparation of the report, may be taken for planning purposes.

42. As was stressed in paragraph 4, careful planning of a study is critical to its success. Ideally, a study should cover the entire range of water, sewer and sanitation operations, from urban to rural. In some instances, however, it may be appropriate to concentrate as a first step, on one sub-sector, for example, on urban water supplies, particularly if the sub-sector is one where important decisions need to be taken. Where a limited study is decided upon, arrangements should be made for a brief survey of the other sub-sectors during the field work, or to make a more thorough study at an early date; otherwise, balance decisions are more difficult to make, and the compatability of goals of the national development plan may be improperly assessed. Sector work should be viewed as an on-going, long-term activity. The ultimate objective is for each country itself to establish and maintain a thorough knowledge of the sector for its own benefit.

43. Sector work should be carried out by the most experienced staff available. By definition, they must cover much ground in a short time, which implies the need for a well developed sense of the relative importance of the facts and circumstances examined; this comes only with experience. Also, since the focus is on broad policy issues rather than technical details, balance and good judgment are as important as technical abilities. Each study team should include at least an engineer, a financial analyst and an economist. Studies which do not adequately reflect these three points of view are very likely to be deficient. Much of the lasting value of sector work is related to the participation of local staff. Ideally, the work should be done primarily by them, supplemented only in special areas by outsiders. In some cases, this may not be a realistic short-term goal, but it should be kept in mind, and in all cases the training effect of local staff participation in studies should be maximized.

44. There are basically four ways studies in this sector can be staffed:

# a. Local Personnel

In countries where engineers, economists, planners and financial analysts are available and have competence in the field of sector analysis and planning, a local team with the appropriate skills can carry out the sector study. Since this is a rather new type of activity it is not common to find personnel at operational levels who have the training and experience to competently undertake such a study by themselves. Hence, if this method is used, it is worthwile to consider soliciting assistance for the national team from staff of the IBRD/WHO Cooperative Program, as noted under (d) below;

#### b. Employment of Consultants

Because study of sectors is a comparatively new field and is somewhat limited in its opportunities for employment, not many consulting firms in the field of water supply and sewerage have personnel who can carry out a sector study of the type required. It should be possible, however, for some of these firms to affiliate with management and economic specialist groups, or with university professors, for example, to form teams with enough competence to undertake such studies. This has not been done on any scale to date.

# c. Teams Obtained from WHO/IBRD Cooperative Program

Under this Cooperative Program, WHO has entered into an agreement with the World Bank to provide staff for carrying out sector studies. Teams from WHO's Pre-Investment Planning Unit (PIP), Geneva, are available for the purpose. Through agreement between WHO, the Bank, and the government of the country in which a sector study is to be undertaken, a team can be made available to help the government carry out the study. IBRD staff frequently participate in such teams where there is prospect for Bank lending in the sector.

# d. <u>Combined Teams</u> - WHO/IBRD Cooperative Program Staff and National Personnel

By far the most advantageous method of carrying out a sector study appears to be the one in which the government provides key personnel from water/ sewerage entities and the national planning body to join with personnel provided through the wHO/ IBRD Cooperative Program to form a combined team. This has the advantage of bringing to the study first-hand knowledge of the policies and resources of the local institutions, while at the same time bringing in specialists who can take a fresh, objective look at the sector problems and who have the experience gained from other sector studies. Arrangements for obtaining the assistance of the Cooperative Program staff can be made by contracting either wHO or the Bank.

45. Whatever staffing method is chosen, substantial and active participation of local staff is essential.

# B. Data Collection

The amount and reliability of data available for studies of the 46. sector vary widely from country to country. The main objective is to reach broad conclusions and judgments on the sector's status and development needs, and the quality of these judgments is strongly influenced by the amount and quality of the information on which they are based. mission should try to collect the data needed, but should not indiscriminately gather all information remotely related to the sector. This may result in masses of material that remain unexamined and unanalyzed and divert attention from the more important work of the mission, which is more analytical than descriptive. Advance planning for collection of only the data really needed can help to avoid such problems. Annexes 3 and 4 may aid this planning, and references to the Checklist for Appraisal Missions, and the Water Supply and Sewerage Questionnaires may also be useful. To facilitate future sector work, authorities should be encouraged to set up a minimum national information system which will provide on a continuing basis carefully selected technical, financial, and socio-economic information, in a timely and well organized form.

#### C. Identification of Projects and Pre-Investment Studies

Water supply and sewerage projects which appear to be of high 47. priority in the national program should be identified in the sector study. The concept of the project and its relationship to the national program, should be sketched out, along with the status of preparation, studies needed, preliminary cost estimates, and so on. The objective is to provide enough information to allow the government and lending agencies to decide on actions needed to move the project(s) toward the execution stage. Where the projects are of obvious urgency and priority they can and should be prepared without waiting for the processing of the sector work and the government decisions which will normally follow. The government should be notified and any long lead time actions (for example, legislation) which could delay financing or execution of the project. Pre-investment or other special studies should be noted where they appear to be needed for urgent projects, for longer range project development or solutions related to the program. A form for describing such studies is attached as Annex 5.

# D. Preparation of Reports

48. Since a sector study report is aimed at several audiences, the report is an unusually important part of an effective study. Skillful presentation of the facts and judgments can both encourage busy officials to read it, and increase the acceptability of its recommendations. It should be incisive, factual, diplomatic, readable (especially to a layman), complete and brief. This means that good reports are difficult to prepare, and experience has confirmed this.

The basic structure of reports should be set up in advance. A 19. suggested outline for a complete sector study is shown in Annex 6. It should allow readers with different degrees of familiarity with the sector and the country, and with differing amounts of time to devote to reading the report, to extract what they need without difficulty. This suggests a brief, but complete, Summary and Conclusions section; the body of the report divided into more or less independent sub-sections dealing with the description of the sector and its problems; a Recommendation section giving the detailed suggestions of the mission and the supporting arguments. Most of the purely descriptive and statistical information should be in annexes. The descriptive sub-sections and annexes should be prepared as much as possible in the field while the information is fresh. The broad recommendations should be discussed in the field with appropriate officials, but they can best be written in the calmer atmosphere of the home office, after discussion of the analysis and policy implications with supervisors as required. Whatever form the report takes, it should highlight the sector's problems and opportunities at this stage of its development, and provide a basis for decisions about its future development.

50. At some appropriate place in the report, there should be a listing of specific actions by the government, by individual enterprises, by consultants, by potential lenders, or others, required to move forward preparation of projects or other steps in getting sector development underway. These should be followed up in order to preserve the momentum that will hopefully have been produced by the study.

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# DEFINITIONS OF SECTOR WORK CATEGORIES (Used by the IBRD)

## Sector Survey

A broad analysis of sector potential and major sector problems, policies and issues cast in the medium of long-term perspective. Lending program development may also be an objective.

#### Comment

For work programming purposes, this category includes missions to select in advance the principal topics to be covered in the sector survey proper and follow-up missions to discuss the draft report and the country concerned. UNDP financed sector surveys by consultants, with the Bank or WHO as executing agency, should continue to be classified as a technical assistance activity.

#### Sub-sector Survey

Same as above, but limited to major sub-sectors (urban water supply, major city wastes disposal, rural water supply, etc.) or geographic regions.

#### Comment

Sub-sector surveys may be useful where general sector survey are not considered feasible or where knowledge in some sub-sectors is already considered adequate on the basis of project work, previous sector work, or other sources.

### Sector/Sub-sector Review

Of similar broad scope as survey but in considerably less depth. May involve an initial review of the sector or an updating of a previous sector survey. May also involve some lending program development.

# Comment

While some sector updating missions have been carried out, most sector reviews are conducted in association with IBRD economic missions and often appear as appendices of economic reports.

# Special Sector Study

Analyses of one or several specific sector problems, policies or issues (sewage treatment and disposal standards, water supply for low income groups, sector training needs, etc.) or of a sub-component of the sector too limited to be considered a major sub-sector. May deal with matters which cut across national boundaries (allocation of water from boundary rivers) or across sector boundaries (urban water versus irrigation water). Lending program development may also be an objective of such studies.

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#### ANNEX 2

#### DECADE GOALS FOR WATER SUPPLY

## United Nations Second Development Decade (1971-1980)

The United Nations Development Decade target figures are summarized as follows:

<u>Urban water supplies</u>: all urban dwellers to receive a safe and abundant water supply, either in their houses or courtyards, or from public standpipes.

Rural water supplies: 20 per cent of rural inhabitants to be supplied with safe water.

# Goals for Latin America (1961-1971) Punta del Este

Urban population 70

70% to be served with piped water supplies.

Rural population 50% to be served with safe water.

# Goals for Latin America (1972-1981) ECLA/Ministers of Health

<u>Urban water supplies</u>: 80% of the population to be served by house connections, or as a minimum, a reduction by 50% of the population without service.

<u>Rural water supplies</u>: the provision of water to 50% of the rural population, or as a minimum, a reduction by 30% of the population without service.

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1.

2.

3.

# CHECKLIST FOR SECTOR INFORMATION

# General Information on the Sector

 Laws, codes and decrees regulating water sources, allocation, pollution and the organization of water supply and sewerage. Responsible authority at national, regional and local levels. Distribution of responsibilities between national and regional authorities, municipalities and management of water supply/sewerage systems. Legal status of the systems (government department, national authority, local authorities, commercial corporations, concessionaires, etc.,).

- 2. Situation in rural areas; the agency or agencies responsible for rural water supplies and sanitation.
- 3. General health conditions in the country. Prevalance of diseases attributable to inadequate and unsafe water supplies and bad sanitation. Data by region and urban centers on waterborne and water-related diseases. Population trends, housing status and programs.
- 4. Priority and magnitude of investment for water supply and sewerage systems within the national plan.

Comparison with total investments in the public sector, past and future.

How are urban water/sewerage capital expenditure financed?

# Basic Information on Water Supply and Sewerage Systems

 Classification of urban centers by size and geographic sub-division. Number of cities and towns having both municipal water supply and sewerage systems. Number of cities having one but not the other. Number of cities and towns without any system. Percentage of urban zones covered by the systems. Number of centers with overall urban plans and status of such plans. Electricity and other types of infrastructure. 2. Broad statistics on water/sewerage operations by size of urban centers and geographic sub-division, giving general information on percentage of private, industrial and commercial customers served from public systems, numbers of public taps, income levels. Water consumption data on private, industrial and

government customers. Broad assessment of the ratio of water consumption to water production, and analysis of difference. Past growth of the urban population and of the number of connections and water consumption by each category of customers. Per capita consumption of water in various areas

and cities.

3. Investments in the past five years for new systems and expansions of existing systems. Number of systems newly constructed or expanded in water supply and sewerage. Their classification by size of the urban centers and geographic sub-division. Status and problems of implementation of .past and on-going projects.

4. Analysis of past investments. Classification of financing sources (foreign loans, national departmental or municipal funds, internally generated resources). Share of each source. Changes in financing sources in the past five years.

5. Mechanism for determination and application of water and sewerage charges, and authority determining tariffs. National or departmental coordination. Tariff schedules for water and sewerage in several urban centers. Policy and criteria for determining the rates (e.g., consumption, category of customers, obligation for the system to cover costs or yeild a certain return).

d. Financial situation and organization of the water and sewerage systems. Their profitability. In case of deficit, who subsidizes the systems? Changes in amounts of subsidies in the past five years. Accounting methods used in the systems. Profit-and-loss statements, balance sheets of most important systems or relevant chapters of the national budget. Auditing policy. Effectiveness of billing and collecting.

7. Value of water supply and sewerage assets. How determined?

8. Investment program for water supply and sewerage for the next five years or any other period covered by the national plan.
Classification of investments by size of urban centers.
List of priority centers. Criteria for assigning priorities.

Financing planned for new investments.

9. Method used in the development of new projects or expansion of existing systems. Design criteria for water supply systems; for sewerage systems. Procurement procedures. Equipment manufactured locally. Preference given to local manufacturers

and contractors. Customs policy. Magnitude of import duties. Responsibility for construction of civil works. Technical support available for the national authority, number and competence of local consultants.

Availability and capability of local contractors.

- 10. Man-power resources in the sector. Problems of recruitment. Use of foreign personnel in consultative or operational executive roles. Training facilities and policy. Is information being collected on hydrology and hydrologic and groundwater resources? Responsible agency and status of the data.
- 11. Second Development Decade (1970-1980) target established by the UN for water and sewerage for urban populations have been established at 40% to be served by water in houses and 60% from public standpipes, with 27% to be connected to sewer systems in the next ten years. After ten years, on the basis of present investment program?

ANNEX 3 Page 4 of 4 Pages

- 12. For rural populations, the Second Development Decade target is 20% to be served by safe water. What is the present situation in the country? After ten years, on the basis of proposed programs?
- 13. Per capita capita cost estimates (existing and future facilities).
- 14. Housing conditions in major centers.
- 15. City planning and master plans for development.
- 16. National development plan and its priorities.

November 9, 1973

#### CHECKLIST FOR IDENTIFICATION OF PROBLEMS

NOTE: The answers to many of the questions below are subjective judgments. Where these judgments are reflected in the sector report, the writers should try to make clear the comparative basis for the judgments.

# Man-power

- a. Are local personnel technically competent and sufficient in number to carry out the development plan?
- b. How effective are man-power training schemes?
- c. Could adequate skilled and semi-skilled man-power be supplied if the development plan were expanded?
- What are the management, man-power and training needs, both water and sewerage? Detail as to professional, sub-professional and skilled labor by area: (i) investigation and design, (ii) construction and (iii) operation and mainteannce.

#### Technical - Managerial - Planning

- a. Is there sufficient knowledge of surface and groundwater resources, and how effective are methods of investigation?
- b. Is investment planning of high standard? Are alternatives adequately examined?
- c. Is there a backlog of investment? Why?
- d. What are criteria for the selection of water supply projects - high incidence of waterborne diseases, grossly inadequate existing facilities, inability to meet future demands, etc?

- e. Are design standards satisfactory?
- f. Have past projects been well constructed?
- g. Are existing systems adequately maintained and operated?
- h. How is consideration of the need for safe quality as well as adequate quantity of drinking water reflected in frequency of water inspection and testing, nature of surveillance, adequacy of laboratory services, etc?
- i. Are there particular health problems associated with the sector?
- j. Are there major water pollution problems associated with industry, or with community sewerage systems? What are the criteria used for selection of sewerage schemes?
- k. How severe are problems caused by conflicting demands for water use?
   What are the means for allocating water resources where they are scarce?
- 1. To what extent can or should equipment and materials be supplied locally?
- m. Are procurement, contracting and bidding procedures satisfactory?
- n. To what extent can local consultants or government engineers be relied upon to carry out hydrological, preliminary engineering and feasibility studies?
- o. Are local contractors available and efficient?
- p. To what extent will development of water supplies create additional waste disposal problems?
- q. Are adequate pre-investment studies available or planned?
- r. What are the needs of preliminary engineering and feasibility studies, in both the water and sewerage areas?

s. What are the country's water and sewerage targets for the Second UNDP Development Decade (1971-1980)? Have they been incorporated in the national development plan? t. What attention is being given to solid waste problems? Are concepts reasonable? Are practices effective in terms of health and sanitation.

#### Financial - Economic

- a. Are accounting systems satisfactory? Is there an adequate budgeting and financial planning system?
- b. How are water supply and wastes services charged for?
- c. Do charges reflect economic costs of providing the services?
- d. Are water and wastes disposal undertakings financially viable?
- e. Are water metering policies rational?
- f. What has been the level of investment per year in the past?
- g. What are terms and interest rates of local funds provided for the sector? What are the procedures by which they are made available?
- h. Are methods of subsidizing the sector, if any, likely to result in misuse of resources?
- i. Is foreign aid to the sector likely to be maintained, increased or reduced? Are terms and interest rates likely to be changed?
- j. Where there are extreme budgetary constraints, has the possibility of raising funds in the private sector been adequately examined?

Organizational - Administration - Legal

a. How satisfactory are the laws, codes and decrees regulating water supply and wastes disposal systems, and the allocation and consideration of water resources generally? Are they enforced?

- b. Is the division of responsibility for policy, construction and operation adequate?
- c. Are the roles of national, regional and local public authorities clearly defined and satisfactory?
- d. Is there need to change the legal status of any of the parts of the system (commercial corporations, concessions, administrative bodies, etc.)?
- e. Are organizational structures of individual water and sewerage utilities conducive to efficient operation?
- f. Are local officials aware of the requirements of international lending agencies for project preparation?
- g. Is there sufficient coordination with other agencies with interests in water resources and waste disposal or with responsibility for industrial or infrastructure development, urban planning, and so on?

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ea:	Country:	Sector(s):	
NAME OF PROPOSED STUDY			
PURPOSE			
SCOPE:			
BACKGROUND: (a) Relat	ed Studies (b) Other Avai	lable Data	(c) Expected Data Problems
i a constanti a			
TIMING: (a) Dura	tion and Phasing of Study		(b) Desired Starting Date
COMMENT ON POTENTIAL S	TUDY SPONSORS:		
PROJECT(S) EXPECTED TO (a) Description	RESULT FROM STUDY (if known):	(b) Estimated In (c) Financing No	nvestment (US\$ equivalent) eed and Potential Source
ORDER OF MAGNITUDE OF	STUDY COST (US\$ equivalent):	Sheet Prepared Dept. or Agenc Date:	l by: y:
STAFF'S COMMENT ON PRIORITY RANKING OF STUDY: Sheet Revised by: Item(s) Revised: Dept. or Agency:		by: ed:	

Date:
## INFORMATION TO BE PROVIDED ON STUDY DATA SHEETS

- Item I: Give an appropriate name to the proposed study for identification purposes.
- Item 2: State the purpose of the study, giving the main issues to be resolved and indicating development objectives relevant to the study.
- Item 3: Summarize the scope of work envisioned. In this space give (a) limits of subject, geographic area and time to be covered by the study, (b) major types of required field investigations, mapping, laboratory work etc., (c) categories of analytic work, and (d) alternatives to be studied.
- Item 4: Indicate related studies which preceded or are to be undertaken concurrently with or subsequent to the proposed study. Outline the types of basic data which will be used in conducting the proposed study and indicate any special problems in data collection which are expected.
- Item 5: Indicate the likely duration and desired starting date of the proposed study and, where applicable, give the scope of suggested phases in which the studies are to be executed, together with the duration of each phase.

Example: "Phase | - Site selection and functional design ------ 4 months

Phase 2 - Preliminary engineering and economic analysis ----- 6 months

Total duration (including approval of site selection) ------ 12 months"

- Item 6: If agencies are known to be potential sponsors of the proposed study, indicate their name and comment on the prospective role of the agency in conducting the study. For instance, give relevant information on government participation in the country of the study, such as the responsible ministry or technical agency dealing with the sector; mention any agency which may have expressed the intention to administer the study as "Executing Agency" (FAO, Bank, UNESCO, etc.); and record any expressions of interest in providing funds for the study.
- Item 7: Give a brief description of the projects to be prepared by the study (if known), together with an indication of the estimated investments and the likely need for foreign financing. If the project is being discussed in terms of Bank Group financing, this should be indicated; if alternative sources of finance have been named, this should also be noted.
- Item 8: Indicate the order of magnitude of the cost of the study, based on an assessment of the information given in Items 3, 4 and 5 of the "Study Data Sheet" and, where possible, support this information by filling in Items 1 and 2 of the "Study Data Supplement."
- Item 9: Give staff's view on the priority ranking of the study, indicating year in which study should start and importance of study to sector development.
- Note: Use "Study Data Supplement" to give any comments or data for which space on this sheet is insufficient.

FORM	No.	386.01	
	(11-	69)	

INTERNATIONAL BANK FOR RECONSTRUCTION AND DEVELOPMENT INTERNATIONAL FINANCE CORPORATION

Page 3 of 4 Pages

## PREINVESTMENT PROGRAM - STUDY DATA SUPPLEMENT

(to be filled in when possible)

TENTATIVE STAFFING	Type of	Specialist	Number on Team	Total Man-Months
(a) Foreign Professional Staff:				
		·		
		The data of the state		
		Total:		
(b) Local Professional Staff : (c) Local Supporting Staff :	-			
(b) Local Professional Staff : (c) Local Supporting Staff : 		Foreign Currency	Local Currency	Total
<ul> <li>(b) Local Professional Staff :</li> <li>(c) Local Supporting Staff :</li> <li>TENTATIVE STUDY BUDGET (US\$ equivalent)</li> <li>(a) Professional Staff Costs :</li> <li>(b) Equipment :</li> <li>(c) Other (Travel, non-prof. staff, etc.):</li> </ul>		Foreign Currency	Local Currency	Total

Supplement Prepared by: Dept. or Agency: Date:	
Supplement Revised by:	
Item(s) Revised:	
Dept. or Agency:	
Date:	

## INFORMATION TO BE PROVIDED IN STUDY DATA SUPPLEMENT

- Item 1: Indicate the likely staff effort required for completion of the study. In I-(a), give the mission's estimate of the main categories of foreign specialists, their number, and the total number of man-months of work (field and home office work combined). I-(b) should be completed only if it is intended that professional staff of domestic firms participate in the study; this part should be left blank if the only professional contribution by the member country will be "government counterpart personnel" of the sponsoring agency. (Tentative staffing and budgets should exclude personnel who would not be responsible for completing the study). In I-(c) indicate the type, approximate number and man-months of local supporting staff required (i.e. survey crews, draftsmen and other non-professional staff).
- Item 2: Give the tentative budget estimate for the proposed study. This should be based on the staffing given in Item 1 and on unit prices for various professional services of each category which will be provided for budgeting purposes by each Projects Department. The estimate should also include the cost of foreign and local travel, subsistence for foreign staff, and the cost of major pieces of equipment or supplies required during the execution of the study. (The estimate should not include amounts required for fellowships or other training related to the subject unless this is required for the execution of the study.)

Item 3: In this space give any comments or data for which space on "Study Data Sheet" is insufficient.

## OUTLINE FOR SECTOR STUDY REPORTS

#### I. SUMMARY AND CONCLUSIONS

#### II. INTRODUCTION

Brief background of the reasons for the study, the importance on the sector in the economy, its social implications, Bank involvement in the past and future, etc.

#### III. THE SECTOR

- A. Organization
- B. Policies
- C. Water Supply in 197
- D. Sewerage in 197\_'

Present situation

- E. Sector Finances
- IV. PRINCIPAL PROBLEMS AND CONSTRAINTS
- V.

PRINCIPAL ISSUES FOR SECTOR DEVELOPMENT

- A. The Development Program (alternative goals)
- B. Organization
- C. Planning and Project Preparation
- D. Man-power
- E. Finance

#### VI. RECOMMENDATIONS

VII: SPECIFIC STEPS NEEDED TO ADVANCE DEVELOPMENT (or an Annex)

1/ This outline is for a report reflecting a thorough and complete sector study. If the scope or depth of the study is restricted, the outline will need to be modified accordingly.

November 9, 1973



Power - follow - up .

October 8, 1973

AT

Mr. John A. King

Al

Y. Rovani Y.Rovani

Draft Public Utilities CPM on Project Monitoring

We prepared some time ago, with the assistance of the five Regional Utility Divisions, a draft CPM on Project Monitoring designed to implement in our sectors an earlier suggestion of Mr. Willoughby.

Following your indication that Program Coordinators wished to comment on this type of document, I sent you last August 23 a memorandum attaching this draft CPM for their review. I would appreciate a reply in order both to put this memorandum into effect, and to decide on how to process further several other CPM drafts of a similar type being finalized currently in this Department.

cc: Mr. Willoughby Mr. Friedmann

YRovani :em

#### **DOCUMENT OF**

INTERNATIONAL BANK FOR RECONSTRUCTION AND DEVELOPMENT

### NOT FOR PUBLIC USE

#### CONFIDENTIAL

# DECLASSIFIED

R73-228-L

FROM: The Secretary

JAN 1 0 2023

October 3, 1973

## WBG ARCHIVES

LIBERIA - Proposed Amendment to the Second Power Loan (778-LBR of July 8, 1971)

In connection with the President's Memorandum dated September 21, 1973 (R73-228) on proposals for a Supplemental Loan to the Public Utilities Authority of Liberia (PUA) to help meet cost increases on the First and Second power projects for which the Bank made two loans (684-LBR of June 4, 1970 and 778-LBR of July 8, 1971), and for amending the documents of Loan 778-LBR to take into account some institutional changes affecting the PUA, one copy of each of the following legal documents is attached:

1. Draft Agreement Amending Loan Agreement

2. Draft Agreement Amending Guarantee Agreement

3. Draft Project Agreement

4. Statutory Committee Report

5. Text of draft Resolution

#### Distribution:

Executive Directors and Alternates President Senior Vice President, Operations Vice Presidents, Bank, and Officers of IFC Directors and Department Heads, Bank and IFC



MT/ST #L-488 Legal Department CONFIDENTIAL DRAFT September 20, 1973

# DECLASSIFIED

JAN 1 0 2023

## WBG ARCHIVES

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LOAN NUMBER 778 LBR (Amendment)

#### AGREEMENT AMENDING

### LOAN AGREEMENT

(Second Power Project)

between

INTERNATIONAL BANK FOR RECONSTRUCTION AND DEVELOPMENT

and

PUBLIC UTILITIES AUTHORITY

Dated \_\_\_\_\_, 1973

AGREEMENT, dated \_\_\_\_\_, 1973 between INTERNATIONAL BANK FOR RECONSTRUCTION AND DEVELOPMENT (hereinafter called the Bank) and PUBLIC UTILITIES AUTHORITY (hereinafter called Borrower).

WHEREAS (A) By a Loan Agreement (Power Expansion Project) dated June 4, 1970 between the Bank and the Borrower (hereinafter called the 1970 Agreement), the Bank granted to the Borrower a loan in various currencies equivalent to seven million four hundred thousand dollars (\$7,400,000);

(B) By a Loan Agreement (Second Power Project) dated July 8, 1971 between the Bank and the Borrower (hereinafter called the 1971 Agreement), the Bank granted to the Borrower a loan in various currencies equivalent to four million seven hundred thousand dollars (\$4,700,000);

(C) The Borrower has incurred additional costs in carrying out the Projects described in Schedule 3 to the 1970 Agreement and in Schedule 2 to the 1971 Agreement and has requested the Bank to assist in financing the additional costs as well as costs for the expansion of said Project by amending the 1971 Agreement by adding two million nine hundred thousand dollars (\$2,900,000) to the amount granted under 1971 Agreement;

(D) By agreement of even date herewith between the Republic of Liberia (hereinafter called the Guarantor) and the Bank, amending the Guarantee Agreement between the Guarantor and the Bank dated July 8, 1971, the Guarantor has agreed to guarantee the said additional amount;

(E) The Project will be carried out by the Liberia Electricity Corporation, a corporate body established by an act to amend the Public Authorities Law to create the Liberia Electricity Corporation, of July 12, 1973 (hereinafter called LEC), with the Borrower's assistance and, as part of such assistance, the Borrower will make available to LEC the \$2,900,000 referred to in (C) above as well as the proceeds of the loans under the 1970 and 1971 Agreements as hereinafter provided;

(F) By an Act dated January 30, 1973 to amend Chapter 3 of the Public Authorities Law, the Borrower shall serve as a Holding Corporation for LEC, the Liberia Water and Sewer Corporation, the Liberia Broadcasting Corporation and the Liberia Telecommunications Corporation;

WHEREAS the Bank is willing to amend the 1971 Agreement as hereinafter set forth and to enter into a Project Agreement of even date herewith with LEC;

NOW THEREFORE the parties hereto hereby agree as follows:

#### ARTICLE I

The 1971 Agreement is hereby amended as follows: The following is added to Article I:

Α.

"Section 1.02. Wherever used in this Agreement, unless the context otherwise requires, the several terms defined in the General Conditions have the respective meanings therein set forth and the following additional terms have the following meanings:"

 (a) "Project Agreement" means the agreement between the Bank and LEC of even date herewith, as the same may be amended from time to time, and such term includes all schedules to the Project Agreement;

(b) "Subsidiary Loan Agreement" means the agreement to be entered into between the Borrower and LEC pursuant to Section 3.01(b) of this Agreement, as the same may be amended from time to time, and such term includes all schedules to the Subsidiary Loan Agreement."

B. Section 2.01 is amended to read:

"The Bank agrees to lend to the Borrower, on the terms and conditions in the Loan Agreement set forth or referred to, an amount in various currencies equivalent to seven million six hundred thousand dollars (\$7,600,000)."

C. Section 2.04 is amended to read:

"The Closing Date shall be June 30, 1975, or such other date as shall be agreed upon between the Borrower and the Bank."

D. Section 2.05 is amended to read:

"The Borrower shall pay to the Bank a commitment charge at the rate of three-fourths of one per cent (3/4 of 1%) per annum on the

- 3 -

unwithdrawn amount of four million seven hundred thousand dollars (\$4,700,000) up to the date of this Agreement and thereafter on the unwithdrawn amount of seven million six hundred thousand dollars (\$7,600,000) in accordance with the provisions of Section 3.02 of the General Conditions."

E. Section 3.01 is amended to read:

"(a) Without any limitation or restriction upon any of its other obligations under the 1970 Agreement, and the 1971 Agreement as hereby amended, the Borrower shall cause LEC to perform in accordance with the provisions of the Project Agreement and the Subsidiary Loan Agreement all the obligations therein set forth, shall take and cause to be taken all action, including the provision of funds, facilities, services and other resources, necessary or appropriate to enable LEC to perform such obligations, and shall not take or permit to be taken any action which would prevent or interfere with such performance.

(b) The Borrower shall make the proceeds of this Loan as well as the proceeds of the loan under the 1970 Agreement available to LEC under a Subsidiary Loan Agreement to be entered into between the Borrower and LEC under the same terms and conditions as in the Loan Agreement as amended.

(c) The Borrower shall exercise its rights under the Subsidiary Loan Agreement in such manner as to protect the interests of the Borrower and the Bank and to accomplish the purposes of the Loan, and

- 4 -

except as the Bank shall otherwise agree, the Borrower shall not assign, nor amend, abrogate or waive the Subsidiary Loan Agreement or any provision thereof."

F. Section 5.02 is amended to read:

"The Borrower shall and shall cause all its Subsidiary Corporations to have separate accounts and audits for their respective operations."

G. Section 5.06 shall be amended to read:

"Except as the Bank shall otherwise agree, the Borrower shall cause LEC's revenues to be exclusively used for financing the current and capital costs of LEC's operations."

H. Sections 5.08(a)(ii) is amended to change the date from "January 1, 1974" to "January 1, 1975."

I. Section 5.09 and 5.11 of the 1971 Agreement are deleted.

J. Section 8.02 shall be amended to read:

"(d) LEC shall have failed to perform any of its obligations under the Project Agreement and the Subsidiary Loan Agreement;

(e) any provision of the Subsidiary Loan Agreement shall have been amended, suspended, abrogated, repealed or waived, or shall cease to be in force without the prior approval of the Bank."

K. Paragraph 1 of Schedule 1 is amended to read:

#### SCHEDULE 1

Withdrawal of the Proceeds of the Loan

1. The table below sets forth the categories of items to be financed out of the proceeds of the Loan and the allocation of amounts of the Loan to each category:

	Category	Amount of the Loan Allocated (Expressed in Dollar Equivalent)
Ι.	CIF costs of 17 MW Turbine Generator units with associated civil works and installation; and transmission line from Mt. Coffee to Bushrod	4,200,000
II.	CIF of materials, equipment, and costs of services for civil works and in- stallation of two 19 MW Gas Turbines	650,000
111.	CIF costs of transmission line, under- ground cable and distribution line and of materials and equipment for sub- stations and part 5 of the project, and of tools and equipment, and in- stallation	2,135,000
IV.	CIF cost of service vehicles	175,000
V.	Engineering consulting services	240,000
VI.	Unallocated	200,000
	TOTAL	7,600,000

L. Schedule 2 is amended to read:

Description of the Project

The Project consists of the following Parts:

Part 1:

The procurement and installation of the third and fourth 17 MW turbine-generator units together with associated civil works, and excavation only for the fifth turbine-generator unit for the Mt. Coffee hydro-electric plant.

- 6 -

Part 2:

Two 19 MW gas turbines including switchgear and step-up transformers for installation at Bushrod (Monrovia). Part 3:

The construction and installation of the 69/12.5 kV Newport substation; the expansion of the Capital substation; and the rehabilitation of the main substation at Bushrod. Part 4:

The procurement and installation of about 18 miles of 69 kV transmission line including the transmission line from Mt. Coffee to Bushrod (Monrovia) and 2.5 miles of 69 kV underground cable and associated terminal facilities and transformers. Part 5:

The procurement and installation of 12.5 kV overhead distribution lines in Monrovia and in the outlying areas; the conversion of the 2.4 kV system to 12.5 kV; the procurement and installation of pole-mounted 12.5 kV/120-240 V transformers with a total rated capacity of about 30 MVA; and 120-240 V service connections. Part 6:

The procurement of service vehicles for use in the construction and maintenance of power facilities.

Part 7:

The procurement of tools and equipment for use in the construction and maintenance of power facilities. Part 8:

Engineering consulting services to (i) assist in carrying out Parts 1 to 5 of the Project, (ii) carry out a study of an underground distribution system for downtown Monrovia, and (iii) review expansion plans beyond 1977.

The Project is expected to be completed by December 30, 1974.

M. Schedule 3 is amended to read:

Amortization Schedule

		8	Payment of Principal
Date Pays	ment Due		(expressed in dollars)
	1075		145 000
July 1,	1975		149,000
January	1, 1976		150,000
July 1,	1976		155,000
January	1, 1977		160,000
July 1,	1977		165,000
January	1, 1978		170,000
July 1,	1978		180,000
January	1, 1979		185,000
July 1,	1979		190,000
January	1, 1980		200,000
July 1,	1980		205,000
January	1, 1981		215,000
July 1,	1981		220,000
January	1, 1982		230,000
July 1,	1982		235,000
January	1, 1983	8	245,000
July 1.	1983		255,000
January	1, 1984		265,000
July 1.	1984		275,000
January	1, 1985		285,000
July 1.	1985		295,000
January	1, 1986		305,000
July 1.	1986		315,000
January	1. 1987		325,000
July 1.	1987		340,000
January	1. 1988		350,000
July 1.	1988		365,000
January	1. 1989		375,000
July 1	1989		390,000
January	1. 1990		410,000
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#### ARTICLE II

Section 2.01. This Agreement shall come into force and effect on the date upon which the Bank dispatches to the Borrower notice of its acceptance of evidence that:

 (a) the execution and delivery of this Agreement on behalf of the Borrower have been duly authorized or ratified by all necessary governmental action;

(b) the execution and delivery of the Project Agreement on behalf of LEC have been duly authorized or ratified by all necessary corporate and governmental action;

(c) the execution and delivery of the Subsidiary Loan Agreement on behalf of the Borrower and LEC, respectively, have been duly authorized or ratified by all necessary corporate and governmental action; and

(d) an opinion or opinions satisfactory to the Bank of counsel acceptable to the Bank showing that this Agreement, the Project Agreement and the Subsidiary Loan Agreement have been duly authorized or ratified by, and executed and delivered on behalf of, the Borrower and that, therefore, the 1971 Agreement as amended by this Agreement constitutes a valid and binding obligation of the Borrower in accordance with its terms as so amended.

Section 2.02. If this Agreement shall not have come into force and effect by \_\_\_\_\_\_\*, this Agreement and all obligations of the parties hereunder shall terminate, unless the Bank, after consideration of the reasons for the delay, establishes a later date

\* A date approximately 90 days after the date of signture of this Agreement will be inserted here.

for the purposes of this Section. The Bank shall promptly notify the Borrower of such date. If this Agreement shall terminate under the provisions of this Section, the 1971 Agreement shall continue in full force and effect, as if this Agreement had not been executed.

IN WITNESS WHEREOF, the parties hereto, acting through their representatives thereunto duly authorized, have caused this Agreement to be signed in their respective names and delivered in the District of Columbia, United States of America, as of the day and year first above written.

PUBLIC UTILITIES CORPORATION

By

Authorized Representative

INTERNATIONAL BANK FOR RECONSTRUCTION AND DEVELOPMENT

By



MT/ST #L-488 Legal Department CONFIDENTIAL DRAFT September 20, 1973

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JAN 1 0 2023 WBG ARCHIVES

LOAN NUMBER 778 LBR

AGREEMENT AMENDING

GUARANTEE AGREEMENT

(Second Power Project)

between

REPUBLIC OF LIBERIA

and

INTERNATIONAL BANK FOR RECONSTRUCTION AND DEVELOPMENT

Dated \_\_\_\_\_, 1973

AGREEMENT, dated \_\_\_\_\_\_, 1973 between REPUBLIC OF LIBERIA (hereinafter called the Guarantor) and INTERNATIONAL BANK FOR RECONSTRUCTION AND DEVELOPMENT (hereinafter called the Bank).

WHEREAS (A) By a Loan Agreement (Power Expansion Project) dated June 4, 1970 (hereinafter called the 1970 Agreement) between the Bank and Public Utilities Authority (hereinafter called the Borrower), the Bank granted to the Borrower a loan in various currencies equivalent to seven million four hundred thousand dollars (\$7,400,000);

(B) By an Agreement between the Guarantor and the Bank dated June 4, 1970 (hereinafter called the 1970 Guarantee Agreement), the Guarantor agreed to guarantee said Loan;

(C) By a Loan Agreement (Second Power Project) dated July 8, 1971 between the Bank and the Borrower (hereinafter called the 1971 Agreement), the Bank granted to the Borrower a loan in various currencies equivalent to four million seven hundred thousand dollars (\$4,700,000);

(D) By an Agreement between the Guarantor and the Bank dated July 8, 1971 (hereinafter called the 1971 Guarantee Agreement), the Guarantor agreed to guarantee said Loan;

(E) Supplemental financing is now necessary to assist in the financing of the expansion and estimated increases in the cost of carrying out the Project described in Schedule 3 to the 1970 Agreement and Schedule 2 to the 1971 Agreement; (F) The Bank has agreed to amend the 1971 Agreement by adding two million nine hundred thousand dollars (\$2,900,000) to the amount of said Loan upon terms and conditions set forth in the 1971 Agreement as amended;

WHEREAS the Guarantor, in consideration of the Bank's entering into an agreement to amend the 1971 Agreement with the Borrower, has agreed to guarantee such obligations of the Borrower;

NOW THEREFORE, the parties hereto hereby agree as follows:

(a) The first WHEREAS clause in the 1971 Guarantee Agreement is amended to read as follows:

"WHEREAS by an Agreement amending the Loan Agreement (Second Power Project) of even date herewith between the Bank and Public Utilities Authority (hereinafter called the Borrower), the Bank has agreed to make to the Borrower a loan in various currencies equivalent to seven million six hundred thousand dollars (\$7,600,000) on terms and conditions set forth in said Agreement, but only on condition that the Guarantor agree to guarantee the obligations of the Borrower in respect of such loan as hereinafter provided."

(b) All references to the Secretary of Treasury are hereby changed to Minister of Finance.

(c) Section 2.03(ii) is amended to read:

"Whenever funds available to the Borrower or any of its Subsidiary Corporations are inadequate to meet their respective cash operating cost and debt service requirements, to provide the Borrower with such funds as are needed."

- 2 -

IN WITNESS WHEREOF, the parties hereto, acting through their representatives thereunto duly authorized, have caused this Agreement to be signed in their respective names and delivered in the District of Columbia, United States of America, as of the day and year first above written.

REPUBLIC OF LIBERIA

By \_\_\_\_

Authorized Representative

INTERNATIONAL BANK FOR RECONSTRUCTION AND DEVELOPMENT

By



MT/ST #L-488 Legal Department CONFIDENTIAL DRAFT September 20, 1973

# DECLASSIFIED

JAN 1 0 2023

WBG ARCHIVES

LOAN NUMBER LBR

### PROJECT AGREEMENT

(Second Power Project)

between

INTERNATIONAL BANK FOR RECONSTRUCTION AND DEVELOPMENT

and

LIBERIA ELECTRICITY CORPORATION

Dated \_\_\_\_\_, 1973

#### PROJECT AGREEMENT

AGREEMENT, dated \_\_\_\_\_, 1973, between INTERNATIONAL BANK FOR RECONSTRUCTION AND DEVELOPMENT (hereinafter called the Bank) and LIBERIA ELECTRICITY CORPORATION (hereinafter called LEC).

WHEREAS by the Loan Agreement dated July 8, 1971 as amended on

between Public Utilities Authority (hereinafter called the Borrower) and the Bank, the Bank has agreed to make available to the Borrower an amount in various currencies equivalent to seven million six hundred thousand dollars (\$7,600,000), on the terms and conditions set forth in the Loan Agreement, but only on condition that LEC agree to undertake such obligations toward the Bank as hereinafter set forth; and

WHEREAS by a subsidiary loan agreement to be entered into between the Borrower and LEC, the proceeds of the loans provided for under the Loan Agreement as amended and under the 1970 Agreement will be made available to LEC on the terms and conditions therein set forth; and

WHEREAS LEC, in consideration of the Bank's entering into the Loan Agreement with the Borrower, has agreed to undertake the obligations hereinafter set forth;

NOW THEREFORE the parties hereto hereby agree as follows:

## ARTICLE I

- 2 -

## Definitions

Section 1.01. Wherever used in this Agreement, unless the context shall otherwise require, the several terms defined in the Loan Agreement as amended and in the General Conditions (as so defined) have the respective meanings therein set forth.

#### ARTICLE II

### Execution of the Project

Section 2.01. LEC shall carry out the Project described in Schedule 2 to the Loan Agreement as amended with due diligence and efficiency and in conformity with appropriate administrative, financial and engineering practices, and shall provide, or cause to be provided, promptly as needed, the funds, facilities, services and other resources required for the purpose.

Section 2.02. Section 2.03 of the 1971 Agreement and Schedule 4 thereto are hereby incorporated in this Agreement.

Section 2.03. (a) LEC undertakes to insure, or make adequate provision for the insurance of, the imported goods to be financed out of the proceeds of the Loan made available to it by the Borrower against hazards incident to the acquisition, transportation and delivery thereof to the place of use or installation, and for such insurance any indemnity shall be payable in a currency freely usable by LEC to replace or repair such goods.

(b) Except as the Bank shall otherwise agree, LEC shall cause all goods and services financed out of the proceeds of the Loan made available to it by the Borrower to be used exclusively for the Project.

Section 2.04. (a) LEC shall furnish to the Bank, promptly upon their preparation, the plans, specifications, reports, contract documents and work and procurement schedules for the Project, and any material modifications thereof or additions thereto, in such detail as the Bank shall reasonably request.

#### - 3 -

(b) LEC: (i) shall maintain records adequate to record the progress of the Project (including the cost thereof) and to identify the goods and services financed out of the proceeds of the Loan made available to it by the Borrower, and to disclose the use thereof in the Project; (ii) shall, without limitation upon the provisions of Section 5.03 of this Agreement, enable the Bank's representatives to examine the Project, the goods financed out of such proceeds and any relevant records and documents; and (iii) shall furnish to the Bank all such information as the Bank shall reasonably request concerning the Project, the expenditure of the proceeds of the Loan so made available to it and the goods and services financed out of such proceeds.

Section 2.05. LEC shall duly perform all its obligations under the Subsidiary Loan Agreement. Except as the Bank shall otherwise agree, LEC shall not take or concur in any action which would have the effect of amending, abrogating, assigning or waiving the Subsidiary Loan Agreement or any provision thereof.

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#### ARTICLE III

## Management and Operations of LEC

Section 3.01. LEC shall at all times manage its affairs, maintain its financial position, plan its future expansion and carry on its operations, all in accordance with sound engineering, administrative, financial and public utility practices and under the supervision of experienced and competent management assisted by experienced and competent staff in adequate numbers.

Section 3.02. (a) LEC shall maintain its existence and right to carry on operations, and shall take all steps necessary to acquire, maintain and renew all interests in land and other properties and all rights, powers, privileges and franchises which are necessary in the carrying out of the Project or in the conduct of its business.

(b) LEC shall at all times operate and maintain its plants, facilities, equipment and other property, and promptly as required make all necessary repairs and renewals thereof, in accordance with sound engineering and public utility practices.

(c) Except as the Bank shall otherwise agree, LEC shall not sell, lease, transfer or otherwise dispose of any of its property or assets, which shall be required for the efficient operation of its business and undertaking.

- 5 -

Section 3.03. LEC shall take out and maintain with responsible insurers, or make other provisions satisfactory to the Bank for insurance against such risks, and in such amounts as shall be consistent with appropriate practice. LEC shall review its insurance periodically to determine the adequacy of its coverage in view of expansions of LEC's assets and operations.

Section 3.04. LEC shall at all times employ a qualified and experienced executive officer and shall inform the Bank about any proposed appointment to the position of said officer.

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### ARTICLE IV

#### Financial Covenants

Section 4.01. LEC shall maintain records adequate to reflect in accordance with consistently maintained appropriate accounting practices its operations and financial condition.

Section 4.02. LEC shall: (i) have its accounts and financial statements (balance sheets, statements of income and expenses and related statements) for each fiscal year audited, in accordance with appropriate auditing principles consistently applied, by independent auditors acceptable to the Bank; (ii) furnish to the Bank as soon as available, but in any case not later than four months after the end of each such year, (A) certified copies of its financial statements for such year as so audited and (B) the report of such audit by said auditors, of such scope and in such detail as the Bank shall have reasonably requested; and (iii) furnish to the Bank such other information concerning the accounts and financial statements of LEC and the audit thereof as the Bank shall from time to time reasonably request.

Section 4.03. Except as the Bank shall otherwise agree, LEC shall cause its revenues to be exclusively used for financing the current and capital costs of its operations.

Section 4.04. Except as the Bank shall otherwise agree, LEC shall not incur any debt, other than for money borrowed for financing the Project, unless its net revenues for the fiscal year immediately preceding such incurrence or for a later twelve-month period ended

- 7 -

prior to such incurrence, whichever is the greater, shall be not less than 1.5 times the maximum debt service requirements for any succeeding fiscal year on all debt, including the debt to be incurred. For the purposes of this Section:

(a) The term "debt" means all debt of LEC, including debt for the service of which LEC is responsible, maturing by its terms more than one year after the date on which it is originally incurred.

(b) Debt shall be deemed to be incurred on the date of execution and delivery of a contract, loan agreement or other instrument providing for such debt.

(c) The term "net revenues" means gross revenues from all sources, adjusted to take account of LEC's tariffs in effect at the time of the incurrence of debt even though they were not in effect during the fiscal year or twelve-month period to which such revenues relate, less all expenses of operation and maintenance, administration, and taxes, if any, but before deduction of provision for depreciation and amortization of assets, interest and other charges on debt.

(d) The term "debt service requirements" means the aggregate amount of amortization (including sinking fund payments, if any) of, and interest and other charges on, debt.

Section 4.05. (a) Except as the Bank shall otherwise agree LEC shall:

- not reduce tariffs prior to the Closing Date;
- (ii) take all such action as may be necessary to ensure, starting from January 1, 1975, an annual return of not less than ten per cent of the current value of its net fixed assets in service.

- 8 -

- (b) For the purposes of this Section:
- (i) The annual return shall be calculated in respect of each fiscal year by relating net income before interest and other charges on debt for that year to the average of the current value of net fixed assets in service at the beginning and at the end of that year.
- (ii) The term "current value of net fixed assets" means the gross value of fixed assets including the value of any intangible assets subject to amortization, as revalued from time to time, less the accumulated amounts similarly revalued in respect of depreciation and amortization of assets, based on appropriate methods of valuation acceptable to the Bank.
- (iii) The term "net income" means all revenues of LEC less all its power operating expenses.
- (iv) The term "operating expenses" means all expenses of operation, maintenance and administration including adequate provision for depreciation, and for taxes, if any, but excluding provision for interest and other charges on debt.
- (v) The term "debt" has the meaning set forth in Section 4.04 of this Agreement.

Section 4.06. Prior to the Closing Date, except as the Bank shall otherwise agree, LEC shall not declare or pay any dividend, or make any other distribution on its capital.

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#### ARTICLE V

# Consultation, Information and Inspection

Section 5.01. The Bank and LEC shall cooperate fully to assure that the purposes of the Loan will be accomplished. To that end, the Bank and LEC shall from time to time, at the request of either party, exchange views through their representatives with regard to the performance of their respective obligations under this Agreement, the administration, operations and financial condition of LEC and other matters relating to the purpose of the Loan.

Section 5.02. The Bank and LEC shall promptly inform each other of any condition which interferes with, or threatens to interfere with, the accomplishment of the purposes of the Loan, or the performance by either of them of its obligations under this Agreement or the performance by the Borrower and LEC of their respective obligations under the Subsidiary Loan Agreement.

Section 5.03. LEC shall enable the Bank's accredited representatives to examine all plants, sites, works, properties and equipment of LEC and any relevant records and documents.
#### ARTICLE VI

## Effective Date; Termination; Cancellation and Suspension

Section 6.01. This Agreement shall come into force and effect on the date upon which the Loan Agreement as amended becomes effective.

Section 6.02. (a) This Agreement and all obligations of the Bank and of LEC thereunder shall terminate on the earlier of the following two dates:

- (i) the date on which the Loan Agreement shall terminatein accordance with its terms; or
- (ii) a date twenty years after the date of thisAgreement.

(b) If the Loan Agreement as amended terminates in accordance with its terms before the date specified in paragraph (a)(ii) of this Section, the Bank shall promptly notify LEC of this event.

Section 6.03. All the provisions of this Agreement shall continue in full force and effect notwithstanding any cancellation or suspension under the Loan Agreement.

## ARTICLE VII

## Miscellaneous Provisions

Section 7.01. Any notice or request required or permitted to be given or made under this Agreement and any agreement between the parties contemplated by this Agreement shall be in writing. Such notice orrequest shall be deemed to have been duly given or made when it shall be delivered by hand or by mail, telegram, cable, telex orradiogram to the party to which it is required or permitted to be given or mad at such party's address hereinafter specified or at such other address as such party shall have designated by notice to the party giving such notice or making such request. The addresses so specified are:

For the Bank:

International Bank for Reconstruction and Development 1818 H Street, N.W. Washington, D.C. 20433 United States of America

Cable address:

INTBAFRAD Washington, D.C.

For LEC:

Liberia Electricity Corporation P.O. Box 105 Monrovia Liberia

Cable address:

PUTUA Monrovia, Liberia Section 7.02. Any action required or permitted to be taken, and any documents required or permitted to be executed, under this Agreement on behalf of LEC may be taken or executed by the Chirman of its Board or such other person or persons as he shall designate in writing.

Section 7.03. LEC shall furnish to the Bank sufficient evidence of the authority and the authenticated specimen signature of the person or persons who will, on behalf of LEC, take any action or execute any documents required or permitted to be taken or executed by LEC pursuant to any of the provisions of this Agreement.

Section 7.04. This Agreement may be executed in several counterparts, each of which shall be an original, and all collectively but one instrument.

IN WITNESS WHEREOF, the parties hereto, acting through their representatives thereunto duly authorized, have caused this Agreement to be signed in their respective names and delivered in the District of Columbia, United States of America, as of the day and year first above written.

## INTERNATIONAL BANK FOR RECONSTRUCTION AND DEVELOPMENT

Ву \_\_\_\_\_

# LIBERIA ELECTRICITY CORPORATION

By \_\_\_\_\_\_ Authorized Representative



#### STATUTORY COMMITTEE REPORT

## To: The President, International Bank for Reconstruction and Development

Report of Loan Committee under Section 4(iii) of Article III of the Articles of Agreement on the Proposed Additional Loan (Second Power Project) to Public Utility Authority to be Guaranteed by Republic of Liberia

The undersigned Committee constituted under Section 7 of Article V of the Articles of Agreement of International Bank for Reconstruction and Development (the Bank) hereby submits its report pursuant to Section 4(iii) of Article III of said Articles in respect of the proposal that the Bank grant to Public Utility Authority a loan in an amount in various currencies equivalent to U.S. \$2,900,000. The purpose of said loan is to provide additional funds to supplement the financial assistance furnished by the Bank under Loan Agreement (Second Power Project), dated July 8, 1971, between Public Utility Authority and the Bank.

1. The Committee has carefully studied the merits of the proposal to grant such a loan, and of the purposes to which the proceeds of the loan are to be applied.

2. The Committee is of the opinion that the project toward the financing of which the proceeds of such loan are to be applied continues to come within the purposes of the Bank as set forth in Article I of said Articles of Agreement, and that said project is designed to promote the development of the productive facilities and resources of Republic of Liberia and is in the interests of Republic of Liberia and of the members of the Bank as a whole. 3. Accordingly, the Committee finds that said project merits financial assistance from the Bank, and hereby recommends said project for such assistance.

#### COMMITTEE

/s/	J. Burke Knapp
	Senior Vice President, Operations
	and an response to a second of
/s/	George B. Cooper
Constitution of the local distance	Expert selected by Governor for
	the Republic of Liberia
/s/	Simon Alderwereld
	Controller
/s/	A. Broches
	Vice President and General Counsel
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	in the second
<u>/s/</u>	Roger Chaufournier
	for Regional Vice President
	western Africa
/s/	Warren C. Baum
	Vice President, Projects Staff
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Dated at Washington, D. C. /Nairobi September 24,1973

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## INTERNATIONAL BANK FOR RECONSTRUCTION

#### AND DEVELOPMENT

#### (DRAFT)

#### RESOLUTION NO.

Approval of Amendment to Loan Agreement No. 778 LBR increasing amount of the Loan by US \$2,900,000 equivalent to be guaranteed by Republic of Liberia. RESOLVED:

THAT the Bank shall enter into an agreement with Public Utilities Authority amending the Loan Agreement (Second Power Project) dated July 8, 1971 between Public Utilities Authority and the Bank to increase the amount of the loan provided for thereon by an amount in various currencies equivalent to two million nine hundred thousand United States dollars (US \$2,900,000), to be guaranteed by Republic of Liberia, such an amount to mature prior to July 1, 1990, to bear an interest at a rate of seven and one-fourth of one per cent (7-1/4%) per annum, and to be upon such other terms and conditions as shall be substantially in accordance with the terms and conditions set forth in the form of Agreement Amending Loan Agreement (Second Power Project) between the Bank and Public Utilities Authority, the Project Agreement (Second Power Project) between the Bank and Liberia Electricity Corporation and Agreement Amending Guarantee Agreement (Second Power Project) between Republic of Liberia and the Bank, which have been presented to this meeting.

> Legal Department September 20, 1973

	INTERNATIONAL DEVELOPMENT ASSOCIATION	INTERNATIONAL BANK RECONSTRUCTION AND DEVE	FOR INTERNAT LOPMENT COR	PORATION
A1.	Messrs: Arnold, Kromb	CE MEMORA	NDUM	pri II I
TO:	Morse, Sheehan, Wyatt		DATE: Sep	tember 27, 1973
FROM:	Y. Rovani			Fil- Power
SUBJECT:	Rural Electrification a Basic Data	and Water Supply Proj	ects.	Follow-up

For your information I am attaching a list of questions which we have prepared for a specific Rural Development Project in Mexico. I think this list may be helpful in connection with other projects of a similar nature which you staff may have to appraise.

Attachment

cc: Messrs. Willoughby, van der Tak, Berrie, Anderson, Friedmann

Files

EFriedmann:jr

## Basic Information to be requested for Rural Development Project - Mexico

- 1. Rural and urban population by State or Region. Rural population served by public water supply (house connection and standpipe), and electricity.
- 2. Number of rural communities by size (500-2,500 inhabitants), and by State or Region.
- 3. Identification of Federal, State, Municipal, Public and Private Organizations working in the field of rural waterworks for design, construction and operations. Same for power.
- 4. Capital investment in rural water supply programs: period 1965-1973. Projection for 1974-1980. Source of financing (Grants and Loans). Same for power.
- 5. Past and present participation of international and bilateral organizations in rural water and electricity supply programs (IBD, PAHO, UNICEF, AID, etc.).
- 6. Average per capita cost of rural water supply systems: (24 hours service) with house connection:
  - a) surface intake with treatment/without treatment
  - b) ground water.
- 7. Community participation in money or kind in rural water and electricity programs (construction and/or operation).
- 8. Rural water and electricity tariffs. Comparison with urban. What are the connection charges, if any, and what payment terms are provided? Are there any assessments to cover construction cost? Are there any taxes (real estate) to cover construction and operating costs?
- 9. Liquid and solid wastes disposal program in rural areas.
- 10. Average rural family size by State or Region.
- 11. Average monthly family income per State or Region in rural areas. Any data on income distribution.
- 12. Control of construction works in rural water and electricity supply programs:
  - a) Federal level
  - b) State or Regional level
  - c) Local level.

- 13. Management of rural water and electricity systems (operation and maintenance):
  - a) Federal level
  - b) State or Regional level
  - c) Local level.
- 14. Water quality control of rural water supplies. What is water demand (per capita, per connection)?
- 15. Design and construction standards for rural water and sewerage projects. Same for electricity.
- 16. Training program for rural water supply operators. Same for electricity.
- 17. The rural electrification program includes isolated systems (diesel or others) or is totally connected to the national grid?
- 18. What is the effect of the rural electrification load on (a) peak demand,(b) energy demand and (c) load factor?
- 19. What is the expected (a) percentage of initial water/electricity connections, (b) growth rate of connections and (c) growth rate of load and consumption per connection?
- 20. What is the expected distribution of total electricity consumption over (a) strictly domestic use (lighting, ironing, etc.), (b) productive use (shop refrigeration, irrigation, etc.)?
- 21. Are answers to some of the above questions based on (a) studies of presently supplied villages (either water or electricity), (b) experiences in other countries, and (c) independent market studies?
- 22. What criteria have been used in the past for assigning priorities in rural electrification and water supply projects? What significant changes are now proposed?

- 2 -

RCasanueva/DAnderson/JGunning/EFriedmann:jr

INTERNATIONAL DEVELOPMENT ASSOCIATION INTERNATIONAL B. NK FOR RECONSTRUCTION AND DEVELOPMENT INTERNATIONAL FINANCE CORPORATION

the Isner

# OFFICE MEMORANDUM

TO: See Distribution List \*

DATE: September 13, 1973

Y. Rovani

FROM:

SUBJECT: Invitation to Public Utilities Seminar on "Status and Outlook of Geothermal Energy", October 3, 1973

> Geothermal energy has been in use for many decades in a number of countries: Italy (1904), New Zealand (1925), USA, Japan, USSR (since the 60's). More recently, with substantial support from the U.N. some 25 countries have begun to explore and develop their geothermal resources for possible commercial use. Current technological developments in this area are also encouraging. In the USA alone 1.5 million kW of capacity are forecasted for 1975 and possibly 7 million kW for 1985. The Bank has assisted two projects involving geothermal sources, one in Iceland (for heating) and another in El Salvador (for power). Others are likely to occur in the future.

In view of the above, as part of our Public Utilities Seminar Series, we have now asked Dr. G. E. Coury, a geothermal plant specialist with experience in Grenoble (France) and the USA, to give a talk on the subject. An outline of his talk is attached. Other details are given below:

Lecturer:	Dr. GlennE. Coury
Title:	"Status and Outlook of Geothermal Energy"
Date/Hour:	Wednesday, October 3, 1973 from 2.30 - 5 p.m
Place:	Room D-956

As in previous cases we would appreciate if you let us know the names of those members of your staff wishing to attend by calling Mr. Friedmann's secretary (Ext. 5369).

Below we indicate suggested number of participants.

#### Attachment

*	Distri	ibution List						
	(with	attachments):	: Messrs:	Foster,	Fuchs (2	2), Sa	adove, E. Ste	ern, Weiss
	11	11	Messrs:	Arnold (	5), Kron	nbach	(2) Morse (1	1)
	11	11		Sheehan	(5), Wya	att (1	4)	
	tt	11	P.U. Adv	isors			1	
cc	(with	nout attachmen	nts)					
	for i	information:	Messrs: C	hadenet;	van der	Tak,	Willoughby,	Yudelman
			Mr. Jeffri Files	es, Mrs.	Blitte			

EFriedmann: jr

### DOCUMENT OF

### INTERNATIONAL BANK FOR RECONSTRUCTION AND DEVELOPMENT

## NOT FOR PUBLIC USE

DECLASSIFIED

JAN 1 0 2023

# WBG ARCHIVES

R73-228

FROM: The President

September 21, 1973

SUBJECT: LIBERIA - Proposed Amendment to the Second Power Loan (778-LBR of July 8, 1971)

1. I submit the following proposals for a Supplemental Loan of US\$2.9 million to the Public Utilities Authority of Liberia (PUA) to help meet cost increases on the First and Second power projects for which the Bank made two loans (684-LBR of June 4, 1970 and 778-LBR of July 8, 1971) of US\$7.4 and US\$4.7 million respectively, and for amending the documents of Loan 778-LBR to take into account some institutional changes affecting the PUA.

### Historical

2. PUA operates about 35 percent of installed generating capacity in Liberia, the remaining 65 percent being owned mainly by the mining companies which mine and export iron ore. PUA's Monrovia system serves an area 70 miles x 125 miles in extent, from Totota in the north-east to Buchanan in the south-east and Bomi Hills in the north-west (see the attached map). This system is the main source of public power, although PUA also operates six secondary centers in rural towns/villages as an agent of, and with funds provided by, the Government of Liberia. These secondary centers generate about 5 percent of total output, and separate accounts are kept for them.

3. PUA, the recipient of the two power loans, was previously responsible for power and water supply/sewerage operations. In early 1972, the Government decided to expand PUA's responsibilities to include telecommunications and TV/radio broadcasting and in January 1973, the Government adopted new legislation, based partly on recommendations from the Bank. This established PUA as a holding company with four subsidiaries -the Liberia Electricity Corporation (LEC), the Liberia Telecommunications Corporation, the Liberia Broadcasting Corporation and the Liberia Water and Sewer Corporation.

### Distribution:

Executive Directors and Alternates President Senior Vice President, Operations Vice Presidents, Bank, and Officers of IFC Directors and Department Heads, Bank and IFC 4. Under the new legislation, LEC will be responsible for operation and development of the power sector. It will take over the assets and liabilities of PUA's power division and its revenues will be used only for power operation and development. However, PUA will retain the authority for raising loans on behalf of LEC and PUA will also approve tariff proposals from LEC.

5. Almost the entire staff of PUA concerned with power operations will be transferred to LEC, only a small number remaining in the holding company for overall coordination of PUA's activities. This change will take place over a reasonable transition period and the LEC has been assured of management assistance from a competent consulting firm as well as guidance from PUA to insure sound management in the new enterprise.

6. Paragraph 15 explains the proposed amendments in the loan documents resulting from the foregoing institutional changes.

7. In June 1970, the Bank made its first loan of US\$7.4 million to PUA to assist expansion of generating facilities (Loan 684-LBR) and the loan included funds for a consultants' study of PUA's transmission and distribution requirements over a longer period to the mid-seventies. The study was completed in the beginning of 1971 and, based on its recommendations, a second loan of US\$4.7 million was made in July 1971 (Loan 778-LBR) for the expansion of transmission and distribution facilities and an additional turbine generator unit for the Mount Coffee hydroelectric plant. Thus, the two loans finance different but interrelated components of PUA's 1970-1974 power expansion program.

8. When all the new generating facilities are commissioned in 1973 PUA's generating capacity will increase to 149 MW, or almost double its 1971 capacity. The projects expand the Mount Coffee hydroelectric power plant and add two more gas turbines to the Bushrod thermal power station; they greatly improve PUA's presently inadequate transmission and distribution network by providing for new transmission lines with associated substation facilities and additional distribution lines in Monrovia and outlying areas. The works are being well executed; except for the distribution component, they will be substantially completed in 1973, generally in accordance with the schedule. There have been some delays in distribution works which will be completed in late 1974.

#### Cost Estimates

9. The revised cost estimate of the projects is given below. The foreign component is based on the current exchange rates. No contingency provision is included as almost all contracts have been awarded.

		Revis			
		(In Local	<u>US\$ t]</u>	housands) Offshore	Total
1.	Mount Coffee Plant: Turbine Generator Units and Civil Works	1,140		7,490	8,630
2.	Gas Turbines and Civil Works	190		4,520	4,710
3.	Substations, Transmission and Distribution Facilities	980		2,750	3,730
4.	Consulting Services	180		690	870
	TOTAL	2,490	а. 4	15,450	17,940

## 1/ Liberia uses US currency

10. The two Bank loans were expected to finance fully the foreign exchange components of the projects, but the revised estimates substantially exceed the aggregate US\$12.1 million of the two Bank loans. The increase in the foreign exchange component of US\$3.35 million is explained by three main factors tabulated below:

			Cost In	creases becaus	se of		
		Appraisal Estimates 1/	(a) Cur- rency Rea- ′ <u>lignments</u> (In	(b) Increase in Size of <u>Gas Turbines</u> US Dollar the	(c) Reasons Other Than (a) & (b) ousands)	Total Cost Increases	Revised Estimate
1.	Mount Coffee Plant: Turbin Generator Uni and Civil Wor	e ts ks 5,760	720	-	1,010	1,730	7,490
2.	Gas Turbines Civil Works	and 2,910	760	800	50	1,610	4,520
3.	Substations, Transmission Distribution Facilities	and 2 <b>,</b> 290	520	_	(60)	460	2,750
4.	Consulting Services	1,140	100	-	(550)	<u>(450</u> )	690
	TOTAL	12,100	2,100	800	450	3,350	15,450

1/ The contingency allowance has been distributed among the various components of the projects.

- The increases of the foreign component arose as follows:
- (a) Realignments of Currencies (US\$2.1 million):

The major contracts are denominated in German Marks and Swiss Francs which is the reason for the large increase.

(b) Change in the Size of the Gas Turbines (US\$0.8 million):

> The change involved increasing the size of the two gas turbines to be financed by Loan 684-LBR from 15 to 19 MW. It was agreed by both PUA and the Bank after signature of the Loan that, considering PUA's new existing facilities and growth prospects, it would be advisable to allow for a range of turbine sizes in the tender documents. Subsequently, in evaluating the bid, it was evident that it would be in the best operating and economic interests of PUA to install larger units. The operating experience in the last several years has also shown that the reliable output at Mount Coffee hydroelectric plant during the dry season is less than planned, thus increasing the need for thermal power.

(c) Increased Cost of Equipment Over Appraisal Estimates (US\$0.45 million):

Had there been no additional cost arising from currency realignments and change in scope of the project, the foreign component of the project would have been US\$0.45 million (or 4 percent) over the originally estimated cost of US\$12.1 million, which included contingency allowances of US\$1.2 million. The bulk of this increase was for civil works and generators, which is explained by the rapid rise in cost on the world market for power equipment and civil works since 1970 and 1971. On the other hand, there were considerable savings in the cost of consulting services, because PUA managed to get assistance from European consultants at a time when their prices were very competitive.

12. The Government has currently heavy debt service obligations (22% of current Government revenues) and budgetary commitments related to other ongoing high priority capital programs and has requested the Bank to provide supplemental financing of US\$2.9 million to cover the higher costs described in para. 11 (a) and (b) above. The Government has confirmed that it would provide PUA with the balance of US\$450,000 described in paragraph 11 (c).

11.

- 4 -

The rate of return covenant in the two previous Bank loans 13. requires PUA to earn a return of ten percent on its net fixed power assets beginning 1974. The rate of return was eight percent in 1972, which is satisfactory considering the lower than projected load growth. However, the financial forecast based on existing tariffs indicates that the rate of return might remain at this same level over the next few years. Because of PUA's high debt/equity ratio (73/27 in 1972), the funds available after debt service for financing the future development program would be very limited at this present level of tariffs. PUA will, therefore, review its future cash generation in the context of its financing requirements to be defined when PUA's consultants complete their study by about the end of 1973. In order to be able to make a proper contribution to the financing of its program, PUA will probably need a tariff increase in the course of 1974. To allow PUA time to review its tariffs after completion of the consultants' study, it is proposed to change the rate of return covenant to defer the requirement that PUA earns a ten percent return until the beginning of 1975, one year later than originally agreed.

14. An "internal financial rate of return" of approximately 20 percent was estimated on the projects financed by the two loans at the time the loans were made. The increase in foreign cost of US\$3.35 million has the effect of reducing this return to 17% which is still satisfactory. Even if the increase in cost had been foreseen, the project as originally defined (the expansion of Mount Coffee hydroelectric station, provision of the gas turbines, and the expansion of the transmission and distribution systems) would still represent the lowest cost alternative for meeting PUA's requirements.

## Legal Instruments

15. PUA will enter into a subsidiary loan agreement with LEC, on terms and conditions satisfactory to the Bank, under which it will make the balances of the two previous loans, as well as the proceeds of the Supplemental Loan, available to LEC. This is provided for in an agreement amending Loan Agreement 778-LBR. LEC has concluded a Project Agreement with the Bank, under which LEC will undertake PUA's obligations agreed in connection with Loans 684-LBR and 778-LBR. Moreover, to ensure the creditworthiness of PUA, the debt service covenant has been expanded in the Loan Agreement with PUA to include all of PUA's activities.

- 5 -

16. A draft Agreement Amending Loan Agreement 778-LBR between the Bank and PUA, a draft Agreement Amending the Guarantee Agreement between the Bank and the Republic of Liberia, a draft Project Agreement between the Bank and LEC, a draft resolution and the Statutory Committee Recommendation will be circulated later.

#### Recommendation

17. I recommend that the Government's request for a Supplemental Loan of US\$2.9 million equivalent be granted. In the absence of objection (to be communicated to the Secretary or to the Deputy Secretary by close of business on October 5, 1973) the Supplemental Loan will be deemed approved, and the Government and PUA will be informed accordingly.

Robert S. McNamara

Attachment: Map IBRD 3357



ASSOCIATION -

RECONSTRUCTION AND DEVELOPMENT

CORPCTATION

File Power Follow-up

# UFFICE MEMORANDUM

TO: Mr. A. Ray

DATE: August 29, 1973

EROM: Thomas W. Berrie

SUBJECT: FY 74 Allocation for RPO 267

Thank you for your memo of August 14, 1973 increasing the allocation for the State-of-the Art paper for the Standards of Urban Electricity Distribution project to \$26,000 from \$20,000.

We still intend to proceed with our original plan of carrying out at least one carefully selected case study on a research basis following the digestion of the State-of-the-Art paper and the locating of suitable consultants. The estimated amount of this case study is still \$16,000, as shown under Stage I(b) of my memo to you dated April 2, 1973. It is now expected to commence early in calendar 1971, and to be formally submitted to the Research Committee in the session following that of October 1973.

cc: Messrs. Dunkerley Willoughby Rovani Howell Warford Anderson Friedmann Bateman

TWBerrie:cdd

INTERNATIONAL DEVELOPMENT ASSOCIATION INTERNATIONAL BANK FOR RECONSTRUCTION AND DEVELOPMENT

INTERNATIONAL FINANCE CORPORATION

# OLICE MEMORANDUM

TO: Files

DATE: August 13, 19

FROM: E. Friedmann

SUBJECT: KENYA - Terms of Reference Second Pover Loan

> I called Mr. Morse to give him some comments on the Terms of Reference of August 6 regarding the above subject. I expressed concern with the fact that they provided no clue about the scope of the proposed loan and that only by going to the CPP files I have learned that it might be for the expansion of a generating station. He confirmed this to be the case. Then I mentioned the need for investigating carefully the possibility of including in this loan lending for distribution to low income urban groups. I recalled my experiences in other African countries where only 10-15% of the urban population of the main cities enjoyed electricity supply and how this was the result of very conservative practices, mostly inherited from colonial times, regarding standards of distribution (high connection costs and lack of adequate financing terms). I also raised the question of rural areas and Mr. Morse explained that in this respect some Swedish programs were underway. Mr. Morse was very sympathetic to the above comments and said he would ask Mr. Bailey to get in touch to discuss in more detail the suggestions, and particularly, existing experience on how to reduce connection costs through inexpensive meters, current limiters, household kits for self-installation, etc.

cc: Messrs: Rovani, Howell, Berrie, Anderson, Willoughby, Friedmann

EFriedmann:jr

#### DOCUMENT OF

INTERNATIONAL BANK FOR RECONSTRUCTION AND DEVELOPMENT

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## WBG ARCHIVES

R73-201

For consideration on

September 4, 1973

FROM: The President

August 7, 1973

CHILE - Fifth Power and Second Highway Maintenance Projects (Loans 479-CH and 558-CH) Amendments to the Loan Agreements

1. On December 23, 1966, the Bank made a loan to Empresa Nacional de Electricidad S.A. (ENDESA) and Corporacion de Fomento de la Produccion (CORFO) guaranteed by the Republic of Chile for the expansion of ENDESA's facilities and power system (Loan No. 479-CH, \$60 million equivalent), and on September 18, 1968, it made a loan to the Republic of Chile to assist in the financing of a Government highway maintenance program (Loan No. 558-CH, \$11.6 million equivalent). Annex I gives details on the two projects and their progress, as well as brief statements on the status of other projects in execution in Chile. Annex II presents the usual statistical statement regarding Bank loans and IDA credits in Chile as of June 30, 1973.

The Chilean Government has requested the Bank to help alleviate 2. the country's very stringent foreign exchange situation by financing interest and other charges during construction during the remaining period of execution of the two above mentioned projects. In view of the sharply deteriorated foreign exchange situation of the country (see paragraphs 10 and 11 below), which was not foreseen at the time the Bank made the two loans in question, I propose to amend the two corresponding loan agreements to provide financing for the interest and other charges during construction payable on Loan No. 479-CH from January 1, 1973 through January 1, 1974 (construction of the project is continuing into the early months of calendar 1974) and on Loan No. 558-CH during calendar 1973 and 1974 (last two years of construction of the project). This would require increasing Loan No. 479-CH by \$6.7 million and Loan No. 558-CH by \$1.6 million. Any amount of the proposed increases which has not been used by, respectively, January 1, 1974 and October 1, 1974, in the financing of interest and other charges will be cancelled. The proposed increases would bear interest and carry a commitment charge at the Bank's current standard rates. (The original interest rate on Loan No. 179-CH was 6 percent and on Loan No. 558-CH was 62 percent. The commitment charge was 3/8 of 1 percent on 479-CH and 3/4 of 1 percent on 558-CH.) The original amortization schedule for each loan would be revised to assure full repayment of the increased Loans within the term originally agreed.

Distribution:

Executive Directors and Alternates President Senior Vice President, Operations Vice Presidents, Bank, and Officers of IFC Directors and Department Heads, Bank and IFC 3. A report entitled "Current Economic Position and Prospects of Chile" (WH-202b) was circulated to the Executive Directors on September 10, 1970. A small economic mission visited Chile in the fall of 1971, and more recent information has been obtained from an IMF mission report dated June 14, 1973 and a supplement dated July 5.

4. The present Government took office in November 1970 and succeeded during its first year in reaching its objectives of raising output and employment and increasing workers' real wages. These achievements were accompanied, however, by a reduction in investment, the buildup of severe inflationary pressures and a sharp decline in foreign exchange reserves.

5. In 1972, Chile suffered serious economic and financial setbacks. After substantial growth in 1971, GDP showed only a modest increase (2.6 percent compared with 8.3 percent in 1971), as agricultural production declined and manufacturing and construction activity slowed down, while the mining sector stagnated. With a continued rapid rise in aggregate demand, inflation reached record proportions and the balance of payments came under heavy pressure. Despite the suspension and rescheduling of service payments on most of its external debt, Chile suffered a major loss of external reserves.

6. Real GDP is not expected to show any significant increase in 1973 and may even contract somewhat. With continuing large wage adjustments and a substantial increase in the deficit of the public sector, inflation is expected to accelerate further. Despite a recovery and extraordinary rise of copper prices, balance of payments pressures are expected to continue as still unresolved technical problems and strikes affect copper production.

7. In the past two years, the Government has proceeded to implement important structural changes, including: nationalization of big copper and iron mines; State control over coal and nitrate production; State ownership of a large segment of the banking system; the transfer to "social property" of large enterprises in industry and commerce: substantial acceleration of the agrarian reform; and State control of foreign trade. Most of the intended changes in the structure of the economy have now been completed. However, at least in the short-term, the economy's reaction was negative as output in agriculture declined, expected increases in copper production failed to materialize, organizational and managerial problems became acute, and public investment was unable to offset the lack of private investment, thereby eroding the basis for future growth. The Government has become increasingly aware of the urgent need for measures to resolve existing conflicts between production, income distribution, and stabilization goals, and some price and exchange rate adjustments were introduced during June and July of 1973.

The public sector deficit has increased considerably during 8. the last two years. Tax revenues, in real terms, rose in 1971 by 3 percent and suffered in 1972 a 14 percent decline, after several years of sustained growth. Redistribution of income in favor of wage earners reduced income tax collection and maintenance of low official prices led to lagging indirect tax collection, while Government proposals for tax increases were to a large extent rejected by Congress. In parallel, Central Government current expenditures (in real terms) in 1972 were 61 percent higher than in 1970, while capital expenditures declined by 5 percent during the same period. During the last two years, while the rate of inflation has accelerated rapidly, controlled prices have not been adjusted in line with the increase in production costs. This price policy has contributed to a critical deterioration in the financial performance of the public enterprises which abide by the official prices more strictly than private enterprises.

9. Exchange rate adjustments have not kept pace with changes in relative production costs since the authorities abandoned a flexible exchange rate policy in mid-1970. The complicated system of multiple exchange rates which is now in existence and a number of payment restrictions have considerably impaired the effectiveness of the exchange rate as an instrument of balance of payments management. The Government is in the process of simplifying the exchange rate structure and adjusting exchange rates on a selective basis.

10. After several years of steady improvement Chile's balance of payments situation deteriorated sharply in 1971 and 1972. In 1971, the international reserves of the banking system declined by \$305 million, notwithstanding the suspension of external debt service payments amounting to \$54 million in the last two months of the year. The situation further worsened in 1972, when net international reserves dropped by another \$328 million despite debt relief of \$361 million resulting from the suspension and rescheduling of service payments on most of the country's external debt. As of March 1973 short-term foreign liabilities of the banking system (\$445 million) exceeded shortterm foreign assets (\$236 million) by \$209 million as the banking system has increasingly relied on short-term foreign borrowing to finance imports.

11. Despite somewhat improved prospects for exports, no reversal is expected in the overall balance of payments situation in 1973, with the overall deficit presently projected at some \$630 million compared with \$700 million in 1972 prior to debt relief. With regard to debt service payments, the Chilean authorities have requested that major creditors reschedule some \$260 million due in 1973. A meeting of the creditors was held in Paris on July 12-13 to consider this request but action was deferred pending the preparation of an economic recovery program by the Chilean Government and its review by the IMF. An IMF mission is scheduled to visit Chile in September to review the Government's plans, and a further meeting of Chile and its creditors is envisaged for late October. In the meanwhile the service on most of Chile's external debt remains in suspense. Chile has arranged for the postponement of some \$30 million of payments to various U.S. banks and firms during 1973, but even if it succeeds further in rescheduling the \$260 million due to major creditors this year, the estimated balance of payments gap would still amount to some \$340 million. A substantial increase in short-term liabilities may therefore be unavoidable and in addition Chile may well have to reduce imports and accept a reduction in industrial production, consumption and investment.

#### Recommendation

12. I recommend that the amount of Loan No. 479-CH be increased by \$6.7 million to finance the interest and other charges on the Loan due on January 1, 1973, July 1, 1973 and January 1, 1974, and that the amount of Loan No. 558-CH be increased by \$1.6 million to finance interest and other charges due on April 1 and October 1, 1973 and April 1 and October 1, 1974. Attached hereto are the proposed draft Agreements to accomplish this purpose, the respective Reports of the Committees provided for in Article III, Section 4(iii) of the Articles of Agreement of the Bank concerning the proposed increases, and the text of two draft Resolutions approving the proposed loan increases.

Robert S. McNamara

Attachments:

Annexes I and II Draft Amending Agreements Statutory Committee Recommendations Draft Resolutions

ANNEX I Page 1 of 7

## STATUS OF PROJECTS TO BE AMENDED

## I. FIFTH POWER PROJECT (LOAN 479-CH)

Project Data

1.

Amount of Amount I Date of Effectiv Closing	of Loan Disbursed Loan Agre Te Data Date	(June 30 ement	,	1973)	US\$60 mil US\$58.7 m December February December	llion 1111 23, 17,	n 1966 1967
•					pacempet.	31,	1713

The project included several components of Chile's power system expansion and strengthening. The local, foreign and total cost of the works covered under the Loan were estimated originally as follows:

<u>u</u>	S\$ equiva	alent (in m	millions)
	Local	Foreign	Total
El Toro hydroelectric scheme Transmission system expansion Rapel hydroelectric scheme expansion Distribution system expansion ENDESA office building Studies and consulting services	87.7 24.8 3.8 17.4 6.9 <u>3.9</u>	47.1 7.8 2.0 1.7 0.6 0.8	134.8 32.6 5.8 19.1 7.5 4.8
	144.6	60.0	204.6

2. The main item of the project is a 400MW hydroelectric plant located about 150 km east of Consepcion. By diverting the outlet of Laja Lake, located in the Andes mountains, through an 8.9 km tunnel and utilizing a head of 562 m, an estimated annual output of 1,800 GWh will be obtained. The underground power house is equipped with four 100MW generating units. The construction of these works was done by ENDESA's own construction force and two of the generating units have been in operation since May 1973. To increase the water inflow to the Laja Lake, a diversion from the Polcura river through a tunnel of 8.6 km is now under construction. Originally this was done by contractors but later its construction was transferred to ENDESA's construction department.

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3. The transmission components consist of a 160 km 220kV westward line from El Toro to Concepcion (double-circuit from El Toro to Charrua and single-circuit between Charrua and Concepcion) and a double-circuit 420 km 220kV northward line from Charrua to Santiago. These lines built by ENDESA's construction forces have been in operation since June of this year; the northward circuits are being operated at 115kV because of delays in the delivery of the 220/115kV auto-transformers at Santiago's end.

4. Four 70MW generating units at the Rapel hydroelectric project were financed under Loan 244-CH of December 30, 1959. Later a fifth 70MW generating unit was installed, and financing of the equipment associated with this unit was included in Loan 479-CH. The loan also covers the foreign exchange component of ENDESA's distribution equipment required by the expansion program for the period 1966/72 which consists of distribution lines and substations of 66, 23 and 13.8kV to feed ENDESA's subsidiary distributing companies. Some imported equipment for ENDESA's 19-story 34,000 sq.m. office building located in Santiago is also financed under Loan 479-CH. The building was completed in 1969. Finally, the loan provides financing for part of the foreign component required for studies and consulting services for projects to be carried out after 1972, such as the Antuco and Colbun hydroelectric schemes.

5. Execution of the project has generally been satisfactory and on schedule. Installation of the remaining 200MW of the 400MW of generating units is expected to be completed at the end of 1973 and the 220kV transmission system early in 1974. A brief extension would be made in the closing date.

6. Total project costs, expressed in U.S. dollars, are expected to be within the original estimate, although individual cost items have changed and the list of goods had to be revised twice. Tariffs were increased at the end of 1971, but due to the rapid inflationary increase in operating costs the rate of return on assets in operation fell below the level provided in the Loan Agreement. In order to compensate for the rising costs, the Government is considering a substantial increase in ENDESA's power tariffs.

ANNEX I Page 3 of 7

## II. SECOND HIGHWAY MAINTENANCE PROJECT (LOAN 558-CH)

#### 1. Project Data

Amount of Loan Amount Disbursed (June 30, 1973) Date of Loan Agreement Effective Date Closing Date (original) Closing Date (extended) US\$11.6 million US\$ 7.9 million September 19, 1968 April 25, 1969 June 30, 1972 December 31, 1973

The project consists of:

a. a highway maintenance program to be implemented with the assistance of consultants, including the improvement of maintenance operations, the purchase of maintenance, shop and control equipment, the extension of workshops and the training of personnel; and

b. additional consulting and expert services (i) to continue the supervision of construction works initiated under Credit 4-CH of June 28, 1961; (ii) to prepare a new highway construction program, the services to comprise the carrying out or updating of feasibility studies of thirteen road sections (about 610 km) and the review and completion of detailed engineering and bidding documents for those road sections which are justified for construction starting in 1969-70; and (iii) to advise on transport coordination and investment planning and define the scope of a comprehensive transport coordination survey.

2. The Chilean road network comprises about 60,000 km, of which only part is properly maintained, mainly because of lack of maintenance equipment. Under the First Highway Maintenance Project (Loan 287-CH of June 28, 1961) the Highway Directorate (Vialidad) assisted by the U.S. consultant IECO prepared a five-year master maintenance plan which was partially implemented using loan funds. Since Vialidad concluded that it would be too ambitious to implement the entire plan at once, it decided to establish four pilot programs which provided valuable experience for the preparation by the same consultant of an updated 1968-71 maintenance program. This program, which was the basis for Loan 558-CH, included the continuation of improvements in maintenance organization and operations, workshop construction, accounting procedures and training of personnel.

3. The U.S. consultant IECO assisted Vialidad until December 1971 for the implementation of the program. The assistance comprised inter alia the preparation of the list of equipment to be purchased and the specifications and bidding documents, as well as the analysis of bids and recommendations of contract awards. A workshop rehabilitation program and a training program for highway personnel was also prepared by IECO. International bids for the purchase of equipment were invited in early 1969 and contracts amounting to US\$6.5 million were awarded for a major portion of the agreed equipment list. The

ANNEX I Page 4 of 7

equipment was received and was put into operation immediately, thus contributing to the improvement of highway maintenance. In late 1971, international bids were opened for the purhcase of additional maintenance and workshop equipment and spare parts. Contracts for only a portion of this bidding have been awarded and, because of delays in deciding on the awards due to cumbersome administrative procedures, many items have been rebid. Completion of procurement is now expected by mid-1974. On the whole, because of the shortage of personnel and of maintenance funds, progress has been only modest on the improvement of maintenance operations in general.

4. The workshop rehabilitation program which started in 1968 has been progressing slowly because of the limited availability of local funds. The training of highway personnel which was being carried out by the IECO continued at a slower pace under Vialidad's direct supervision; the proposed training of engineers and supervisors abroad as originally contemplated did not materialize because of the shortage of Vialidad personnel.

5. The consulting services required for the continued supervision of construction works initiated under Credit 4-CH were carried out by the IECO until its contract terminated in December 1971. The only pending work at that time was the completion of the Bio-Bio Bridge, recently completed under Government supervision. The German consultant Xaver Dorsch was engaged to update, or complete as necessary, the preliminary engineering and economic studies of thirteen roads totalling about 610 km. This work was completed by early 1969 and immediately thereafter Dorsch prepared detailed engineering, or reviewed Vialidad's detailed engineering, for about 480 km. Of the latter, 145 km were selected as having the highest priority for construction. The Bank made a \$10.8 million loan in June 1970 for construction of these selected roads (Loan 668-CH).

6. For advice on transport coordination and investment planning the Ministry of Public Works engaged two independent French experts, who worked intermittently in Chile between late 1969 and mid-1971. In addition to their advisory capacity, the experts were to participate in some programs either already underway or in the course of preparation, aimed at, inter alia:

a. working out detailed methods of selection and standardization of multi-year development programs;

b. organizing the public and private transport sectors; and

c. providing training to transport economists and management controllers in the public transport agencies and large private companies.

ANNEX I Page 5 of 7

Unfortunately, because of the lack of continuity of the expert's services, unsatisfactory quality of the final report, and the numerous changes of personnel within the Ministry of Public Works transport planning in Chile has so far shown only limited improvement.

7. In spite of the above indicated shortcomings, the project has contributed to a general improvement of maintenance operations in Chile and the Government is appreciative of these results and intends to continue the program. The closing date would be extended to December 31, 1974.

## ANNEX I Page 6 of 7

## III. STATUS OF OTHER PROJECTS IN EXECUTION

## Loan No. 666-CH - Second Vocational Training Project; \$1.5 million Loan of April 23, 1970; Closing Date: December 31, 1973; Undisbursed Balance on June 30, 1973, \$0.6 million.

Considerable time was lost initially due mainly to lack of local funds and changes in the location of some training centers. However, disbursements finally got underway in the second quarter of 1972 when funds were made available for the civil works, and some equipment contracts were let (mainly equipment for the agricultural and fisheries programs). We have been informed that the contract for construction of a fishing vessel (for training purposes) had to be cancelled, and rebidding seems to be required. We are waiting for further information on the matter. One of the training centers has been completed and a second is approaching completion; work has not started on the remaining three. A major part (\$224,000) of the undisbursed funds corresponds to the unallocated category. The remainder is shared between equipment (\$158,000), furniture (\$12,000), and construction (\$168,000). No problems are anticipated in the procurement of the remaining equipment, but further progress in the civil works (the loan finances 15 percent of construction costs) will be subject to the continued availability of counterpart funds.

Loan	No.	668-CH	-	Third Education Project; \$7.0 million Loan	of
No. 17 Statement of the local state	a a catalog			May 7, 1970; Closing Date: June 30; 1975;	
				Undisbursed Balance on June 30, 1973,	
				\$7.0 million.	

Initially the main problems of this project had to do with organizing the Project Unit and with shortages of counterpart funds. In recent months, however, the major difficulties have been with contracting under usual Bank procedures. Invitations to bid for the first phase schools drew no response due to the increasing difficulties of private contractors in obtaining equipment, materials and finance. In view of this situation, the Bank agreed to let the Project Unit award contracts for the first phase schools by the system of "administracion delegada" (cost-plus-fixed-fee). Under this system, all materials and equipment are provided by the Ministry of Education; contractors provide only their services. Work is progressing on phase I schools and invitations for bids on construction and equipment for phase II are presently being prepared. It is estimated that civil works implementation is about 18 months behind schedule. The Bank is discussing with the Government suitable measures to accelerate project implementation.

ANNEX I Page 7 of 7

Loan	No.	688-CH	-	Second Highway Construction Project; \$10	.8
				million Loan of June 10, 1970; Closing I	Date:
				September 30, 1974; Undisbursed Balance	on
	•			June 30, 1973, \$10.3 million.	Name and Address of the Owner

Construction of a major road section (Loncomilla-Constitucion, 67 km), for which \$1.8 million is allocated in the Loan, began late in 1971 but owing first to legal difficulties by the Chilean-Spanish joint venture which won the contract, and later due to the financial problems of the Chilean partner, work proceeded very slowly, and so far only about 25 percent of construction work has been completed. Bidding for a second road section (Santiago-San Antonio, 26 km), is stalled as no bidders responded to the call for tenders last September due to the same type of contracting problems as those encountered under the education project (Loan 668-CH). The Bank subsequently agreed in principle to the Government's proposals for dividing the work of the Santiago-San Antonio Highway into six sections. The Bank also agreed that improvement of the highly congested first 3 km of the road between Padre Hurtado and Talagante, which is part of the Santiago-San Antonio Highway, be undertaken by negotiated contract. Work on the latter is now well underway. Only one contractor responded to the invitation to tenders for the remaining sections at a cost much higher than anticipated. In view of this second unsuccessful attempt, the Ministry has proposed to undertake the remaining work on the Santiago-San Antonio Highway also by negotiated contract. Specific proposals are being prepared by the Ministry of Public Works.

# ANNEX II

# STATEMENT OF BANK LOANS AND IDA CREDITS (as at June 30, 1973\*)

Loan or Credit		-		Amount	US\$ mil (less ca	lion ncellations)
Number	Iear	Borrower	Purpose	Bank	IDA	Undisbursed
13 loans	and one	credit fully disburs	ed	141.7	19.0	
479	1967	ENDESA and CORFO	Power	60.0	-	1.2
558	1969	Republic of Chile	Road Maint.	11.6	-	3.7
666	1970	CORFO	Education	1.5	-	0.6
668	1970	Republic of Chile	Education	7.0	-	7.0
688	1970	Republic of Chile	Road Construc.	10.8		10.3
	Total of whi	ch has been repaid		232.6 82.4	19.0 0.3	22.8
	Total no	w outstanding		150.2	18.7	
	Amount s of whi	old ch has been repaid	7.2 <u>7.0</u>	0.2		
	Total no	w held by Bank and I	DA	150.0	18.7	
	Total un	disbursed		22.8	Card Card Card Card Card Card Card Card	22.8

Prior to exchange adjustment

\*



MT/ST #L-709 Legal Department CONFIDENTIAL DRAFT August 3, 1973

## DECLASSIFIED

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WBG ARCHIVES

LOAN NUMBER 479 CH (AMENDMENT)

AGREEMENT

AMENDING

LOAN AGREEMENT

(Fifth Power Project)

Dated December 23, 1966

between

INTERNATIONAL BANK FOR RECONSTRUCTION AND DEVELOPMENT

and

CORPORACION DE FOMENTO DE LA PRODUCCION

and

EMPRESA NACIONAL DE ELECTRICIDAD S.A.

with the approval of

THE REPUBLIC OF CHILE

Dated \_\_\_\_\_, 1973
### AGREEMENT

AMENDING LOAN AGREEMENT (FIFTH POWER PROJECT) between INTERNATIONAL BANK FOR RECONSTRUCTION AND DEVELOPMENT and CORPORACION DE FOMENTO DE LA PRODUCCION and EMPRESA NACIONAL DE ELECTRICIDAD S.A. dated DECEMBER 23, 1966, with the approval of THE REPUBLIC OF CHILE.

AGREEMENT, dated \_\_\_\_\_\_, 1973, between INTERNATIONAL BANK FOR RECONSTRUCTION AND DEVELOPMENT, party of the first part (hereinafter called the Bank), and CORPORACION DE FOMENTO DE LA PRODUCCION and EMPRESA NACIONAL DE ELECTRICIDAD S.A., parties of the second part (hereinafter called the Borrowers).

WHEREAS the Bank and the Borrowers have executed and delivered a loan agreement (Fifth Power Project) dated December 23, 1966 (hereinafter called the Loan Agreement) for the purpose of assisting in financing Endesa's program for the expansion of Endesa's facilities and power system, during the 1966-1972 period;

WHEREAS the Republic of Chile (hereinafter called the Guarantor) and the Bank have executed and delivered a guarantee agreement (Fifth Power Project) dated December 23, 1966 (hereinafter called the Guarantee Agreement) whereby the Guarantor has agreed to guarantee the obligations of the Borrowers under the Loan Agreement on the terms and conditions in the Guarantee Agreement set forth;

WHEREAS the Borrowers and the Guarantor have requested the Bank to provide additional financing for the Project and, for that purpose, to amend the Loan Agreement, and the Bank is willing to agree to such request upon the terms and conditions hereinafter set forth; and NOW THEREFORE the parties hereto hereby agree as follows:

- 2 -

<u>Section 1</u>. Wherever used in this Agreement, unless the context otherwise requires, the several terms defined in the Loan Agreement shall have the respective meanings therein set forth.

<u>Section 2</u>. Section 2.01 of the Loan Agreement is amended to read as follows:

"Section 2.01. The Bank agrees to lend to the Borrowers, on the terms and conditions in the Loan Agreement set forth or referred to, an amount in various currencies equivalent to sixty-six million seven hundred thousand dollars (\$66,700,000) in two tranches, the first tranche being an amount in various currencies equivalent to sixty million dollars (\$60,000,000) and the second tranche being an amount in various currencies equivalent to six million seven hundred thousand dollars (\$6,700,000)."

<u>Section 3</u>. Section 2.02 of the Loan Agreement is renumbered as Section 2.02(a) and a new paragraph (b) is added to such Section to read as follows:

> "(b) On or before each semi-annual interest payment date the Bank shall, on behalf of the Borrowers, withdraw from the Loan Account, out of the second tranche of the Loan, and pay to itself the amount required for the Borrowers to pay, on the dates set forth in Section 2.06 of this Loan Agreement, interest and other charges accrued on each tranche of the Loan and payable on January 1, 1973, July 1, 1973 and January 1, 1974."

Section 4. Section 2.03 of the Loan Agreement is amended to read as follows:

> "Section 2.03. The Borrowers shall pay to the Bank a commitment charge at the rate of (i) three-eights of one per cent (3/8 of 1%) per annum on the principal amount of the first tranche of the Loan not so withdrawn from time to time and (ii) three-fourths of one per cent (3/4 of 1%) per annum on the principal amount of the second tranche of the Loan not so withdrawn from time to time; provided, however, that commitment charge on the second tranche of the Loan shall accrue from a date sixty days after

> > , 1973."(\*)

Section 5. Section 2.04 of the Loan Agreement is amended to read as follows:

> "Section 2.04. The Borrowers shall pay interest at the rate of (i) six per cent (6%) per annum on the principal amount of the first tranche of the Loan withdrawn and outstanding from time to time and (ii) \_\_\_\_\_\_\_ per cent (\_\_\_\_\_%) per annum on the principal amount of the second tranche of the Loan withdrawn and outstanding from time to time."

Section 6. Section 7.01 of the Loan Agreement is amended by deleting the words "December 31,1973," and substituting therefor the words "March 31, 1974,".

\*

The date of the Amending Agreement is to be inserted here.

- 4 -

Section 7. Schedule 1 to the Loan Agreement is amended to read as set forth in the Schedule to this Agreement.

- 5 -

Section 8. Any Bonds to be executed and delivered henceforth to the Bank pursuant to the Loan Agreement shall contain such modifications as the Bank shall reasonably request in order to identify the tranche of the Loan which they represent and to reflect such other changes in the terms and conditions of the amount of the Loan included in the second tranche of the Loan as are provided in this Agreement.

<u>Section 9.</u> (a) All the provisions of the Loan Agreement, as amended by this Agreement, shall remain in full force and effect.

(b) If this Agreement shall terminate pursuant to the provisions of Section 12 hereof, the Loan Agreement shall continue in full force and effect, as if this Agreement had not been executed.

<u>Section 10</u>. This Agreement shall not become effective until there shall have been furnished to the Bank:

(a) such evidence in respect of this Agreement as is required pursuant to Sections 9.01(a) and 9.02(a) of the Loan Regulations;

(b) evidence satisfactory to the Bank that the Guarantor has approved this Agreement for the purposes of the Guarantee Agreement and has agreed that the Guarantee Agreement shall remain in full force and effect with respect to (i) the Loan Agreement, as amended by this Agreement, (ii) the Loan, as increased pursuant to Section 2 of this Agreement, and (iii) the Bonds representing the principal amount of each tranche of the Loan; and (c) an opinion or opinions satisfactory to the Bank of counsel acceptable to the Bank showing on behalf of the Guarantor, that this Agreement has been duly approved by the Guarantor for purposes of the Guarantee Agreement and that the Guarantee Agreement remains in full force and effect with respect to (i) the Loan Agreement, as amended by this Agreement, (ii) the Loan, as increased pursuant to Section 2 of this Agreement, and (iii) the Bonds representing the principal amount of each tranche of the Loan.

Section 11. This Agreement shall come into force and effect on the date upon which the Bank dispatches to the Borrowers and to the Guarantor notice of its acceptance of the evidence required pursuant to Section 9 of this Agreement.

Section 12. If this Agreement shall not have come into force and effect by \_\_\_\_\_\_\*, 1973, this Agreement and all obligations of the parties thereunder shall terminate, unless the Bank, establishes a later date for the purposes of this Section.

A date approximately 60 days after the date of this Agreement will be inserted here.

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IN WITNESS WHEREOF, the parties hereto, acting through their representatives thereunto duly authorized, have caused this Agreement to be signed in their respective names and to be delivered in the District of Columbia, United States of America, as of the day and year first above written.

### INTERNATIONAL BANK FOR RECONSTRUCTION AND DEVELOPMENT

Ву \_\_\_\_\_

CORPORACION DE FOMENTO DE LA PRODUCCION

By

Authorized Representative

EMPRESA NACIONAL DE ELECTRICIDAD S.A.

By

## Authorized Representative

WHEREFORE, the Guarantor has approved this Agreement for purposes of the Guarantee Agreement and hereby states that the Guarantee Agreement remains in full force and effect with respect to (i) the Loan Agreement, as amended by this Agreement, (ii) the Loan, as increased pursuant to Section 2 of this Agreement, and (iii) the Bonds, representing the principal amount of each tranche of the Loan. IN WITNESS WHEREOF, the Guarantor, acting through its representative thereunto duly authorized, has caused this Agreement to be signed in evidence of the foregoing and to be delivered in the District of Columbia, United States of America, as of the day and year first above written.

## REPUBLIC OF CHILE

By

Authorized Representative

# SCHEDULE 1

# Amortization Schedule

	Payment of Principal of First Tranche of the Loan	Payment of Principal of Second Tranche of the Loan
Date of Payment Due	(expressed in dollars)*	(expressed in dollars)*
January 1 1974	600 000	
July 1 1974	615 000	
January 1 1975	635 000	60,000
July 1, 1975	655,000	65,000
January 1, 1976	670,000	65,000
July 1, 1976	695,000	70,000
January 1, 1977	715,000	70,000
July 1, 1977	735,000	75,000
January 1, 1978	755,000	75,000
July 1, 1978	780,000	80,000
January 1, 1979	805,000	80,000
July 1, 1979	825,000	85,000
January 1, 1980	850,000	85,000
July 1, 1980	875,000	90,000
January 1, 1981	905,000	95,000
July 1, 1981	930,000	95,000
January 1, 1982	960 000	100,000
July 1, 1982	990,000	105,000
January 1, 1983	1,015,000	110,000
July 1, 1983	1,050,000	110,000
January 1, 1984	1,080,000	115,000
July 1, 1984	1,110,000	120,000
January 1, 1985	1,145,000	125,000
July 1, 1985	1,180,000	130,000
January 1, 1986	1,215,000	135,000
July 1, 1986	1,250,000	140,000
January 1, 1987	1,290,000	145,000
July 1, 1987	1,325,000	150,000
January 1, 1988	1,365,000	155,000
July 1, 1988	1,410,000	160,000
July 1 1080	1,450,000	165,000
January 1 1000	1 540 000	120,000
July 1 1990	1 585 000	180,000
January 1 1901	1 630 000	100,000
July 1, 1991	1 680 000	200,000
January 1, 1992	1,730,000	205,000
July 1, 1992	1.785.000	215,000

. .

Date of Payment Due	Payment of Principal of First Tranche of the Loan (expressed in dollars)*	Payment of Principal of Second Tranche of the Loan (expressed in dollars)*
January 1, 1993 July 1, 1993 January 1, 1994 July 1, 1994 January 1 1995 July 1, 1995 January 1, 1996 July 1, 1996 January 1, 1997	1,835,000 1,895,000 2,010,000 2,070,000 2,130,000 2,195,000 2,260,000 2,330,000	220,000 230,000 235,000 245,000 255,000 265,000 275,000 285,000 290,000

\*

To the extent that any part of the Loan is repayable in a currency other than dollars (see Loan Regulations, Section 3.03), the figures in this column represent dollar equivalents determined as for purposes of withdrawal.

# Premiums on Prepayment and Redemption

A. The following percentages are specified as the premiums payable on repayment in advance of maturity of any portion of the principal amount of the Loan pursuant to Section 2.05(b) of the Loan Regulations or on the redemption of any Bond representing such tranche prior to its maturity pursuant to Section 6.16 of the Loan Regulations:

lime of Prepayment or Redemption	Premium	on First	Tranche
Not more than four years before maturity		1/2%	
More than four years but not more than eight years before maturity		1%	
More than eight years but not more than fourteen years before maturity		2%	
More than fourteen years but not more than twenty years before maturity		3%	
More than twenty years but not more than twenty-six years before maturity		42	
More than twenty-six years but not more than twenty-eight years before maturity		57	
More than twenty-eight years before maturity		67	

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Time of Prepayment or Redemption	Premium on Second Tranche
Not more than three years before maturity	3/4%
More than three years but not more than six years before maturity	2-1/4%
More than six years but not more than eleven years before maturity	3%
More than eleven years but not more than sixteen years before maturity	4-1/2%
More than sixteen years but not more than nineteen years before maturity	5-3/4%
More than nineteen years but not more than twenty-one years before maturity	6-3/4%
More than twenty-one years before maturity	7-1/4%

### STATUTORY COMMITTEE REPORT

# To: The President, International Bank for Reconstruction and Development

Report of Loan Committee under Section 4(iii) of Article III of the Articles of Agreement on the Proposed Additional Loan (Fifth Power Project) to Corporación de Fomento de la Producción and Empresa Nacional de Electricidad, S.A., to be guaranteed by the Republic of Chile.

The undersigned Committee constituted under Section 7 of Article V of the Articles of Agreement of International Bank for Reconstruction and Development (the Bank) hereby submits its report pursuant to Section 4(iii) of Article III of said Articles in respect of the proposal that the Bank grant to Corporación de Fomento de la Producción and Empresa Nacional de Electricidad, S.A. a loan, to be guaranteed by the Republic of Chile, in an amount in various currencies equivalent to U.S. \$6,700,000. The purpose of said loan is to provide additional funds to supplement the financial assistance furnished by the Bank under Loan Agreement (Fifth Power Project), dated December 23, 1966, between the Bank and Corporación de Fomento de la Producción and Empresa Nacional de Electricidad, S.A., guaranteed by the Republic of Chile under Guarantee Agreement (Fifth Power Project) dated December 23, 1966, between the Republic of Chile and the Bank.

1. The Committee has carefully studied the merits of the proposal to grant such a loan, and of the purposes to which the proceeds of the loan are to be applied.

2. The Committee is of the opinion that the project toward the financing of which the proceeds of such loan are to be applied continues

to come within the purposes of the Bank as set forth in Article I of said Articles of Agreement, and that said project is designed to promote the development of the productive facilities and resources of the Republic of Chile and is in the interests of the Republic of Chile and of the members of the Bank as a whole.

3. Accordingly, the Committee finds that said project continues to merit financial assistance from the Bank, and hereby recommends said project for such additional assistance.

### COMMITTEE

/s/ J. Burke Knapp Senior Vice President, Operations

/s/ Javier Urrutia Soto Expert selected by Governor for the Republic of Chile

/s/ Simon Aldewereld Vice President, Finance

/s/ A. Broches Vice President and General Counsel

/s/ G. K. Wiese for Regional Vice President Latin America and the Caribbean

/s/ Warren C. Baum Vice President, Projects Staff

### INTERNATIONAL BANK FOR RECONSTRUCTION AND DEVELOPMENT

### (DRAFT)

### RESOLUTION NO.

Approval of Amendment to Loan Agreement No. 479 CH increasing amount of the Loan by US\$6,700,000 equivalent.

### RESOLVED:

THAT the Bank shall enter into an agreement with Corporacion de Fomento de la Produccion and Empresa Nacional de Electricidad, S.A., with the approval of the Republic of Chile, amending the Loan Agreement (Fifth Power Project) between the Bank and Corporacion de Fomento de la Produccion and Empresa Nacional de Electricidad, S.A. dated December 23, 1966, to increase the amount of the loan provided for therein by an amount in various currencies equivalent to six million seven hundred thousand United States dollars (US\$6,700,000), such amount to be guaranteed by the Republic of Chile, to mature on and prior to January 1, 1997, to bear interest at the rate of seven and one-fourth per cent (7-1/4%) per annum, and to be upon such other terms and conditions as shall be substantially in accordance with the terms and conditions set forth in the form of Agreement amending the Loan Agreement (Fifth Power Project) between the Bank and Corporacion de Fomento de la Produccion and Empresa Nacional de Electricidad, S.A., with the approval of the Republic of Chile, which has been presented to this meeting.

Legal Department

August 2, 1973

MT/ST #L-710 Legal Department CONFIDENTIAL DRAFT August 3, 1973

# DECLASSIFIED

JAN 1 0 2023 WBG ARCHIVES LOAN NUMBER 558 CH (AMENDMENT)

AGREEMENT

Amending

Loan Agreement

(Second Highway Maintenance Project)

Dated September 19, 1968

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between

REPUBLIC OF CHILE

and

INTERNATIONAL BANK FOR RECONSTRUCTION AND DEVELOPMENT

Dated \_\_\_\_\_, 1973

### AGREEMENT

AMENDING LOAN AGREEMENT (SECOND HIGHWAY MAINTENANCE PROJECT) between REPUBLIC OF CHILE and INTERNATIONAL BANK FOR RECONSTRUCTION AND DEVELOPMENT.

AGREEMENT, dated \_\_\_\_\_\_, 1973, between Republic of Chile (hereinafter called the Borrower) and INTERNATIONAL BANK FOR RECONSTRUCTION AND DEVELOPMENT (hereinafter called the Bank).

WHEREAS the Borrower and the Bank have executed and delivered a loan agreement (Second Highway Maintenance Project) dated September 19, 1968 (hereinafter called the Loan Agreement) for the purpose of assisting in the financing of a highway maintenance project of the Borrower (hereinafter called the Project);

WHEREAS the Borrower has requested the Bank to provide additional financing for the Project and, for that purpose, to amend the Loan Agreement, and the Bank is willing to agree to such request upon the terms and conditions hereinafter set forth;

NOW THEREFORE the parties hereto hereby agree as follows:

Section 1. Wherever used in this Agreement, unless the context otherwise requires, the several terms defined in the Loan Agreement shall have the respective meanings therein set forth.

Section 2. Section 2.01 of the Loan Agreement is amended to read as follows:

"Section 2.01. The Bank agrees to lend to the Borrower, on the terms and conditions in the Loan Agreement set forth or referred to, an amount in various currencies equivalent to thirteen million two hundred thousand dollars (\$13,200,000) in two tranches, the first tranche being an amount in various currencies equivalent to eleven million six hundred thousand dollars (\$11,600,000) and the second tranche being an amount in various currencies equivalent to one million six hundred thousand dollars (\$1,600,000)."

Section 3. Section 2.02 of the Loan Agreement is amended to read as follows:

"Section 2.02. (a) The amount of the first tranche of the Loan may be withdrawn from the Loan Account in accordance with the provisions of Section 4.01 of the Loan Regulations and of Schedule 1 to this Agreement, as such Schedule shall be amended from time to time.

(b) On or before each semi-annual interest payment date the Bank shall, on behalf of the Borrower, withdraw from the Loan Account, out of the second tranche of the Loan, and pay to itself the amount required for the Borrower to pay,

- 2 -

on the dates set forth in Section 2.07 of this Agreement, interest and other charges accrued on each tranche of the Loan and payable to the Bank during the years 1973 and 1974." <u>Section 4</u>. A second sentence is added at the end of Section 2.04 of the Loan Agreement reading as follows:

"Commitment charge on the second tranche of the Loan shall accrue from a date sixty days after \_\_\_\_\_, 1973."\*

Section 5. Section 2.05 of the Loan Agreement is amended to read as follows:

"Section 2.05. The Borrower shall pay interest at the rate of (i) six and one-half per cent (6-1/2%) per annum on the principal amount of the first tranche of the Loan withdrawn and outstanding from time to time and (ii) \_\_\_\_\_\_ per cent (\_\_\_\_\_%) per annum on the principal amount of the second tranche of the Loan withdrawn and outstanding from time to time."

Section 6. Any Bonds to be executed and delivered henceforth to the Bank pursuant to the Loan Agreement shall contain such modifications as the Bank shall reasonably request in order to identify the tranche of the Loan which they represent and to reflect such other changes in the terms and conditions of the amount of the Loan included in the second tranche of the Loan as are provided in this Agreement.

The date of the Amending Agreement is to be inserted here.

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Section 7. Section 8.01 of the Loan Agreement is amended by deleting the words "December 31, 1973" and substituting therefor the words "December 31, 1974,".

Section 3. Schedule 1 to the Loan Agreement is amended by reallocating the proceeds of the first tranche of the Loan as set forth in Schedule 1 to this Agreement.

<u>Section 9</u>. Schedule 2 to the Loan Agreement is amended to read as set forth in the Schedule 2 to this Agreement.

Section 10. The date "December 31, 1971." in the last sentence of Schedule 3 to the Loan Agreement is deleted and the date "December 31, 1974." is substituted therefor.

Section 11. (a) All the provisions of the Loan Agreement, as amended by this Agreement, shall remain in full force and effect.

(b) If this Agreement shall terminate pursuant to the provisions of Section 13 hereof, the Loan Agreement shall continue in full force and effect, as if this Agreement had not been executed.

Section 12. (a) This Agreement shall not become effective until the Bank shall have received such evidence in respect of this Agreement as is required pursuant to Sections 9.01(a), 9.02(a) and 9.02(b) of the Loan Regulations.

(b) This Agreement shall come into force and effect on the date upon which the Bank dispatches to the Borrower notice of its acceptance of the evidence referred to in paragraph (a) of this Section.

- 4 -

Section 13. If this Agreement shall not have come into force and effect by \_\_\_\_\_\_\*, 1973, this Agreement and all obligations of the parties thereunder shall terminate, unless the Bank establishes a later date for the purposes of this Section.

\*

A date approximately 60 days after the date of this Agreement will be inserted here.

IN WITNESS WHEREOF, the parties hereto, acting through their representatives thereunto duly authorized, have caused this Agreement to be signed in their respective names and to be delivered in the District of Columbia, United States of America, as of the day and year first above written.

REPUBLIC OF CHILE

By

Authorized Representative

INTERNATIONAL BANK FOR RECONSTRUCTION AND DEVELOPMENT

By \_\_\_\_

# SCHEDULE 1

# Allocation of the Proceeds of the First Tranche of the Loan

	Category	Amout Expressed in US Dollars
I.	Acquisition of highway-maintenance, shop and control equipment, and of spare parts under Part At of the	
	Project	10,010,000
II.	Consulting services for Parts A and $B(1)$ of the Project	669,000
III.	Training of maintenance personnel abrord or in Chile under Part A of the Project, including air fares	
	and subsistence allowances	25,000
IV.	Consulting services and acquisition of equipment under Part B(2)(a) of	
	the Project	675,000
۷.	Consulting services for Part B(2)(b) of the Project	175,000
VI.	Consulting services for Part B(3) of the Project	46,000
VII.	Unallocated	
	TOTAL	11,600,000

References are to Schedule 3 of the Loan Agreement

\*

## SCHEDULE 2

# Amortization Schedule

Date Payment Due	Payment of Principal of First Tranche of the Loan (expressed in dollars)*	Payment of Principal of Second Tranche of the Loan (expressed in dollars)*
October 1, 1973	220,000	
April 1, 1974	230,000	
October 1, 1974	235,000	
April 1, 1975	245,000	35,000
October 1, 1975	255,000	35.000
April 1, 1976	260,000	35,000
October 1, 1976	270,000	40,000
April 1, 1977	280,000	40,000
October 1, 1977	285,000	40,000
April 1, 1978	295,000	40.000
October 1, 1978	305,000	45.000
April 1, 1979	315,000	45,000
Occober 1, 1979	325,000	45.000
April 1, 1980	335,000	50,000
October 1, 1980	350,000	50,000
April 1, 1981	360,000	50,000
October 1, 1981	370,000	55,000
April 1, 1982	385,000	55,000
October 1, 1982	395,000	60,000
April 1, 1983	410,000	60,000
October 1, 1983	420,000	60,000
April 1, 1984	435,000	65,000
Uctober 1, 1984	450,000	65,000
April 1, 1985	465,000	70,000
Uctober 1, 1985	480,000	70,000
April 1, 1986	495,000	75,000
Uctober 1, 1986	510,000	75,000
April 1, 1987	525,000	80,000
Uctober 1, 1987	545,000	85,000
April 1, 1988	565,000	85,000
october 1, 1988	585,000	90,000

To the extent that any portion of the Loan is repayable in a currency other than dollars (see Loan Regulation, Section 3.03), the figures in this column represent dollar equivalents determined as for purposes of withdrawal.

\*

Premiums on Prepayment and Redemption

A. The following percentages are specified as the premiums payable on repayment in advance of maturity of any portion of the principal amount of the Loan pursuant to Section 2.05(b) of the Loan Regulations or on the redemption of any Bond representing such tranche prior to its maturity pursuant to Section 6.16 of the Loan Regulations:

Time of Prepayment or Redemption	Premium on First Tranche
Not more than three years before maturity	1/2%
More than three years but not more than six years before maturity	1-1/2%
More than six years but not more than eleven years before maturity	2-1/2%
More than eleven years but not more than sixteen years before maturity	3-3/4%
More than sixteen years but not more than eighteen years before maturity	5-1/4%
More than eighteen years before maturity * *	*
Time of Prepayment or Redemption	Premium on Second Tranche
Not more than three years before maturity	1-1/4%
More than three years but not more than six years before maturity	2-1/2%

More than six years but not more than eleven years before maturity

More than eleven years but not 6% more than thirteen years before maturity

4%

More than thirteen years before 7-1/4% maturity

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### STATUTORY COMMITTEE REPORT

# To: The President, International Bank for Reconstruction and Development

Report of Loan Committee under Section 4(iii) of Article III of the Articles of Agreement on the Proposed Additional Loan (Second Highway Maintenance Project) to the Republic of Chile.

The undersigned Committee constituted under Section 7 of Article V of the Articles of Agreement of International Bank for Reconstruction and Development (the Bank) hereby submits its report pursuant to Section 4(iii) of Article III of said Articles in respect of the proposal that the Bank grant to the Republic of Chile a loan in an amount in various currencies equivalent to U.S.\$1,600,000. The purpose of said loan is to provide additional funds to supplement the financial assistance furnished by the Bank under Loan Agreement (Second Highway Maintenance Project), dated September 19, 1968, between the Republic of Chile and the Bank.

1. The Committee has carefully studied the merits of the proposal to grant such a loan, and of the purposes to which the proceeds of the loan are to be applied.

2. The Committee is of the opinion that the project toward the financing of which the proceeds of such loan are to be applied continues to come within the purposes of the Bank as set forth in Article I of said Articles of Agreement, and that said project is designed to promote the development of the productive facilities and resources of the Republic of Chile and is in the interests of the Republic of Chile and of the members of the Bank as a whole. 3. Accordingly, the Committee finds that said project continues to merit financial assistance from the Bank, and hereby recommends said project for such additional assistance.

## COMMITTEE

/s/ J. Burke Knapp Senior Vice President, Operations

/s/ Javier Urrutia Soto

Expert selected by Governor for the Republic of Chile

/s/ Simon Aldewereld

Vice President, Finance

/s/ A. Broches

Vice President and General Counsel

/s/ G.K. Wiese

for Regional Vice President Latin American and the Caribbean

/s/ Warren C. Baum

Vice President, Project Staff

Dated at Washington, D.C.

August 6, 1973

### INTERNATIONAL BANK FOR RECONSTRUCTION AND DEVELOPMENT

### (DRAFT)

### RESOLUTION NO.

Approval of Amendment to Loan Agreement No. 558 CH increasing amount of the Loan by US\$1,600,000 equivalent.

#### **RESOLVED:**

THAT the Bank shall enter into an agreement with the Republic of Chile amending the Loan Agreement (Second Highway Maintenance Project), dated September 19, 1968, between the Republic of Chile and the Bank to increase the amount of the loan provided for therein by an amount in various currencies equivalent to one million six hundred thousand United States dollars (US\$1,600,000), such amount to mature on and prior to October 1, 1988, to bear interest at the rate of seven and one-fourth (7-1/4%) per annum, and to be upon such other terms and conditions as shall be substantially in accordance with the terms and conditions set forth in the form of Agreement amending the Loan Agreement (Second Highway Maintenance Project) between the Republic of Chile and the Bank which has been presented to this meeting.

Legal Department

August 2, 1973

INTERNATIONAL DEVELOPMEN ASSOCIATION INTERNATIONAL BANK FOR RECONSTRUCTION AND DEVELOPMENT ERNATIONAL FINANCE CORPORATION

# OFFICE MEMORANDUM

TO: Public Utilities Staff (Power)

DATE: August 1, 1973

Y. Rovani FROM:

SUBJECT: Public Utility Note No. 6 The Appraisal of Village Electrification Projects

> I am attaching herewith Public Utility Note No. 6 which deals with the Appraisal of Village Electrification Projects mainly from the economic and social points of view. The object of this Note is to report on some of the operational lessons and indicators, which have emerged from the Bank's research work in this subject, mainly in El Salvador. As you know these Notes are not to be interpreted either as policy statements nor working instructions, but as a flexible framework of communicating information.

The practice has been established to have these Notes reviewed by ad hoc panels, including representatives of the utilities divisions as well as other staff. Their contribution is hereby acknowledged.

This Note will be revised at end of calendar 1974 when the El Salvador research work and the analysis from some questionnaires sent out to a number of developing countries have been completed. Meanwhile your comments on the present Note would be very welcome.

Previous Notes which have been issued are: "Petroleum Notes (No. 1), "Generating Plant Margins" (No. 3), "Standards of Urban Electricity Distribution" (No. 4) and "Pricing of Electricity and Water Supplies" (No. 5) Notes under preparation are: "Latest Developments in Nuclear Reactor Technology", "Village Water Supplies" "The Place of Gas Turbines and Diesel Generators in System Planning", "The Forecasting of Electricity Demands" and "The Practical Determination of Least-Cost Solutions". It is intended to bring out a folder to conveniently hold Public Utility Notes immediately following the issuing of this Note.

### Attachment

TWBerrie: jr

PUBLIC UTILITIES DEPARTMENT

P.U. Note No. 6

# THE APPRAISAL OF VILLAGE ELECTRIFICATION PROJECTS

-

August 1, 1973

# THE APPRAISAL OF VILLAGE ELECTRIFICATION PROJECTS

### Introduction

1. The main elements in the appraisal of a village electrification project for Bank financing are technical, financial, fiscal, economic, social and institutional. While these elements are common to the appraisal of any electrification project (or any Bank project for that matter), they have special nuances when applied to villages, as will be seen in this Note.

2. The main characteristics of village electrification are low-density loading, low utilization of equipment belonging to both the power utility and the customer, low rates of growth (at least during the early years) in numbers of customers and electricity consumption by customers, low load factor of consumption (ratio of average to maximum), high capital costs of installation for both the utility and the customer, high operating costs per unit of consumption and low annual revenues per customer.

3. The natural consequences of these characteristics are a low annual financial return to the utility, a fiscal problem for the government (involving subsidies, etc.), an economic return which is difficult to quantify, and some institutional problems, mainly within the village and between the utility and the village.

4. Most of these characteristics and consequences apply equally well to supplying electricity to small towns, the less affluent parts of large towns and entire areas of a country which do not have electricity. This Note, however, addresses itself only to the electrification of villages, since no direct research studies have been commissioned by the Bank except in the case of village electrification, although parallels can be drawn for the other cases.

5. Furthermore, this Note concentrates on the economic and social elements, although the other elements listed in para. 1 are mentioned, partly because it draws heavily upon the Bank's research study in El Salvador and partly because the technical aspects are within the normal compass of those covered in any appraisal. This Note will be revised at the end of calendar 1974 when the El Salvador research work will be completed, and the analysis from some of the questionnaires sent out on the same subject to a number of developing countries have been completed.

6. Further work on this subject will concentrate more on the institutional and administrative aspects, giving more emphasis on the topics concerned with giving access to service and less with the finer points of pricing and economic policies.

# THE APPRAISAL OF VILLAGE ELECTRIFICATION PROJECTS

# I. Criteria for Judging Village Electrification Projects

1. Although a site visit to a representative sample of village being appraised always gives an overall impression which is valuable and therefore should always be carried out, experience indicates that this is one of the occasions when first impressions can be misleading. A deeper and more systematic approach is needed; hence the criteria set out below are considered to be a necessary part of the appraisal process, though not always with equal weighting.

# Program of Rural Development

2. There must be evidence of a generally well-thought-out program of rural development, aimed directly at increasing productivity in rural areas. Electrification by itself may accomplish little unless such a program exists; within such a program electrification often can contribute a great deal. Evidence of a well-thought-out rural development program lies in plans for roads, schools, agro-industries, agriculture, village water supplies, rural credit facilities, etc. However, too much should not be expected; well-thought-out programs 1/ are likely to be the exception rather than the rule. A very common situation in practice is one in which the elements of a program exist, parts of which call for a new village electric power supply of some kind.

## Pilot Projects

3. Existing village electrification projects will provide evidence of project performance. If the program was well chosen and executed, there should be evidence of a lively consumer response, reflected in a reasonable growth over time of both (a) demand for electricity per consumer and (b) number of consumers (connections) from a wide range of consumer types/income groups. Perhaps the most important evidence to look for is the socio-economic growth of the villages themselves. A growth in population may well indicate a growing market and that the village is a desirable area for investment.

### Income Levels

4. It is becoming apparent that village electrification only becomes a "success" (however defined) when dealing with villages where the average per capita income is above a particular threshold, which may well vary from place to place and situation to situation. In the case of El Salvador (see item (c) in the Bibliography) this threshold of income seems to be in the range of US\$50-60 per capita.

1/ In the sense of an inter-sectoral development plan.

### Substitutes for Electricity

5. The costs of sources of energy (and equipment for using it) which are alternatives to electricity in the villages should already have been estimated and compared with the estimated cost of electricity (and equipment for using it). Usages should include lighting, heating, motive power, refrigeration and cooling.

### Unit Costs of Supply - Priorities

6. The costs of supply per customer and/or unit of electricity consumption can usually be estimated quite easily. As a first attempt at seeking which villages should be given priority, these should be matched against the likely responsiveness of the market for electricity consumption. This type of ranking, of course, begs several social questions and can only be used with care.

### Long-Run Effects

7. It is essential that a long-run (20-year) rather than a shortrun (5-year) view is taken, since unit costs tend to decrease rapidly with time while unit benefits tend to increase rapidly with time, always supposing that the threshold of per capita income has been reached (see para. 4 above). This seems to be true mainly because of increased network utilization through growth of both demand and new customers; improvement in load factor stemming from the growth of agro-industries, of the number and variety of domestic appliances, and of farm and commercial demands, while unit costs decrease due to economies of scale.

### Riskiness

8. Although to some extent all village electrification projects must be regarded by both the economy and the power utility as "risky" compared with most urban projects, they should not be ruled out on these grounds. All projects which make provision for the long-run are to some extent "risky"; and it has become a traditional firmly established aspect of public sector policy in all countries to support projects which may hold long-run benefits for the economy but which are too "risky" for support by the private sector. In any case, there is mounting evidence that the degree of riskiness of village electrification projects is not as great as had been traditionally anticipated. (See item (c) in the Bibliography.)

### Rate of Return

9. All the above criteria are no complete substitute for an economic calculation of the rate of return of a village electrification project, although they raise important issues and provide sensible yard-sticks for judgment. The basic questions still remain: should projects be ruled out for which the rate of return to the economy (using revenues as a measure of benefits) is less than the social opportunity cost of capital: can benefits be measured directly, thus preventing the need for

using revenues as a measure of benefits: how much should income distribution influence decision making? These and allied matters are taken up in the following sections.

## II. Measurements to be Made

A Bank mission might be faced with having to review a development 10. program for village electrification or helping the borrower prepare such a program. In either case the criteria given in paras. 1-9 should be useful. How far the justification of the program can be calculated quantitatively would depend on individual circumstances. As the type of project dealt with in such a program is very much one of giving supplies to new consumers, costs and benefits may not be as complicated as in most power appraisals with respect to attribution between existing and new parts of the power system.

Furthermore, observed and predicted willingness-to-pay of each 11. consumer type can be regarded as a measure of the most important benefits, since it captures the three main elements of net benefits:

- (a) resource savings due to lower energy costs for carrying out the same function;
- (b) value of higher quality energy (electricity vis-a-vis other types); and,
- (c) value of extra output (domestic and non-domestic), due to the lower energy costs and the higher energy quality.

In addition, many more factors (see below) should be considered as important and measured quantitively, if at all possible.

### Migration

Migration from rural areas often is towards villages, and small 12. towns as well as towards large towns and cities. Population growth in villages seems to be at rates comparable with those of towns and cities, which is a finding of great value when making market forecasts. The Schostunity ? it benefits of preventing or slowing down migration to the cities are captured in the willingness-to-pay of existing consumers (or the willingness-to-become consumers) of para. 11 above, since if people are attracted to village life partly by electricity, then they will reveal this through becoming consumers and remaining consumers.

### Consumer Response

In El Salvador, typical sustained growth rates of village demand 13. were 22% per year; 16% for existing customers and 6% for new customers. Experience in other countries suggests that consumer demand is often very lively, affecting all consumer types and a wide range of income groups.

### Domestic Consumption

14. Although domestic consumption is not usually the initial response which provides growth (it usually follows on from agricultural and agro-industrial response), it is still important to know its order of magnitude, or at least to have a "feel" for its liveliness. In El Salvador there was a good potential market: the threshold, income for making electricity connections is as low as US\$50 per capita, and the mean income in rural areas is US\$120 per capita.

### Agriculture and Agro-Industries

15. It would seem that, if there is to be a development of the village, it must usually stem from farms and agro-industries. It is most important, therefore, to "take the pulse" of the market for development for these purposes. For motive power on a large scale, electrification can prove to be financially cheaper than diesel power, the results being very sensitive to credit policy, taxes and electricity tariffs. Generally the demand for motive power itself will be quite strong, particularly when irrigation requirements are high. The basic question, however, is whether electrification is more economic than diesels. For refrigeration (shops and dairies) electrification seems to be the least-cost solution, but for heating it is the highest-cost, except for high-quality heat (for welding and ironing).

### Benefits

16. There are three main measurable components of net benefits due to village electrification which under most conditions should be quantificable to some extent (see para. 11):

- (a) Savings in resources due to lower energy costs compared with a competitor (not always positive);
- (b) Increased value due to higher energy quality (lighting, ironing, welding, electronics); and
- (c) Increased value due to extra output and activity (more motive power, better lighting, new consumer goods).

### Unit Costs

17. Typical capital costs for the distribution elements only, excluding house-wiring, are high (US\$400-500 per consumer). As load grows, unit cost will drop rapidly, particularly if agro-industry develops.

## III. Tariffs, Finance and Fiscal Effects

18. An acceptable long-run economic evaluation of a village electrification project must bear examination on other grounds. Two important
aspects are tariffs and finance. Tariffs which are set below costs will discriminate against very efficient competitiors (particularly diesels) and the economy as a whole will suffer. There is a very good case for pitching tariff levels at the level of average marginal costs over, say, a ten-year period; however, financial losses to the utility may still occur, especially in the early years of a project (care must be taken to see whether such losses are due to a poor project and not to poor tariff policies). Block declining tariffs, often used to stimulate demand, frequently fail to exploit the consumers' Willingness or ability to pay, can lead to financial losses and should normally be discouraged. Furthermore, in many instances the annual financial performance of the village electrification program is often poor because of the large cost of a current expansion program, i.e. by the large number of low electricity-consuming new customers being connected. The fact that villages which have been electrified for a period of five to ten years, depending on location, often show financial profits indicates that it is well worthwhile to seek a financial/fiscal solution to this problem (subsidies, cooperatives, grants, loans, etc.) for an economic project.

## IV. Income Distribution

19. It is more than likely that consumers with incomes of two to three times the "threshold" value will already be using some electricity, public or private, for a variety of purposes and, already being "connected" for some time, will be willing to pay the cost of supply. Similar remarks apply to the larger farms and the agro-industries. Thus, if it is decided to use village electrification tariffs as a vehicle for income distribution objectives (there may well be better ways of achieving these objectives), then some simple rules to follow are:

- (a) Subsidize domestic consumption below, say, 50 to 100 kWh per month but not over 100 kWh.
- (b) Subsidize only very small loads for commercial enterprises, cottage industries and farms but not the larger of these consumers; and
- (c) Provide some good, well-organized credit facilities for housewiring and service connections, but capitalize and recover it whenever possible.

### V. Summing-up

20. The present "state-of-the-art" with respect to the appraisal of village electrification projects would seem to follow the broad outline of:

(a) Ensuring that there is a sound basic program for rural development as a whole, but to not expect too much.

- (b) Realizing that resources are limited for fulfilling all the roles under rural development.
- (c) Basically selecting projects the first time round which, in the long-term would seem to be (i) economically viable by virtue of the existing and perceived willingness and ability to pay, and (ii) financially viable as measured by revenues collectible.
- (d) Solving the short-term economic and financial problems which match up with the long-term selection.
- (e) Dealing with any fiscal problems.
- (f) Dealing with institutional and administrative problems.

This Note has given its attention basically to points (a) through (c)(i). The other aspects will be tackled in further Notes, following the completion of the present work in El Salvador.

- 21. At present all that can be done in many cases is to:
  - (a) Say that quantitative economic justification is not possible, and explain why.
  - (b) Describe qualitatively, assisted by any quantitative evidence available, the merits of the whole village electrification program and how this program fits into the rural development program.
  - (c) Recognize that the only practical means of signalling the justification of the project is by setting price equal to marginal cost.
  - (d) Ensure that, as an integral part of program planning, steps will be taken to bring about gradually the ultimate objective that observed willingness-to-pay (and ability-to-pay) can be a reliable guide to the merits of future investment decisions.

#### Bibliography

22. Many of the points discussed herein are elaborated more fully in the following reports, to which the reader is referred for any in-depth focus he may desire:

> (a) Memorandum from Dennis Anderson to Mr. J. Fish, on Iran (February 1973).

> > 7

(b) Back-to-Office Report from Dennis Anderson to Mr. Y. Rovani and Mr. Stevenson, on El Salvador (November 1972).

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- (c) Back-to-Office and Full Report from Dennis Anderson to Mr. Y. Rovani, on El Salvador (May 1973).
- (d) Report on Costs and Benefits of Village Electrification by Marcelo Selowsky (June 1973).
- (e) Report on a Study of a Village in El Salvador by an anthropologist (April 1973).
- (f) Several reports (in Spanish) by Universidad Centro Americana (San Salvador) 1972/73.

Copies of these reports are available in the Public Utilities Department, CPS.

Power follow up

August 1, 1973

Mr. J. Sheppard Head of Engineering The Electricity Council 30, Millbank London, SWIP LAD England

Dear Jack.

# Electricity Distribution

I have just been hearing of the success of the first International Conference on Electricity Distribution. I am sorry that I could not attend and would like to have a general chat about any conclusions which have come out of the Conference, as you see them.

We are becoming more and more interested in the whole subject of electricity distribution, its design, its planning and its standards. No doubt you will have heard from Keith Shaw about one important facet of the subject, which the Overseas Consultancy Service is presently doing for us.

Would it be at all convenient for me to call in on you some time during the period September 3 to September 21? If so, please let me have the most suitable dates from your point of view so that I can get my time-table in some sort of order.

With best regards,

T. W. Berrie Power Economics Advisor Public Utilities Department

cc:

Messrs. Willoughby, Dunkerley, Ray, Rovani, Howell, Friedmann, Warford, Berrie

Files

W TWBerrie:jr

file Power. Follow-up.

August 1, 1973

Mr. F. Jenkins Planning Department Central Electricity Generating Board Sudbury House 15, Newgate Street London, S.E.1. England

Dear Frank,

### UNIPEDE Standards of Electricity Supply

I recall Colin Sinnott telling me last time we met that you had taken over the work previously done by himself (and myself before him) with respect to UNIPEDE committees and subcommittees.

I would very much like to have a chat with you about this work, and also your own latest work in connection with Risk and Standards of Electricity Supply, when I am in Europe during the period September 3 to September 21. Perhaps you could give me some dates which would be the most convenient to you as soon as convenient so that I can get my time-table in some sort of order.

With best regards,

T. W. Berrie Power Economics Advisor Public Utilities Department

cc: Messrs: Files

s: Willoughby, Dunkerley, Ray, Rovani, Howell, Friedmann, Anderson, Warford, Berrie

TWBerrie:jr

d.

August 1, 1973

Mr. R. Orson Commercial Advisor The Electricity Council 30, Millbank London SWIP 4RD England

Dear Ray,

### UNIPEDE Standards of Electricity Supply

You will recall our previous correspondence concerning the subject of "Standards of Electricity Supply", both in relation to the work in the Council and in the UNIPEDE committees. I fear that I have not had time to follow up on some of the information which you gave me.

I would, however, now like to rectify matters somewhat and would like to discuss the subject with you and your colleagues whilst I am in Europe in the period September 3 to September 21. Could you let me have some dates which are the most convenient to you as soon as possible so that I can get my time-table into some sort of order.

No doubt you will have heard from Keith Shaw something about the task which he is doing for us in one facet of this subject in the Overseas Consultancy Service. I have written directly to him concerning talking to him about that particular work. I am also writing directly to Jack Sheppard to arrange to discuss with him any conclusions to be drawn from the highly successful International Electricity Distribution Conference held recently in London.

With best wishes,

Sincerely yours,

T. W. Berrie Power Economics Advisor Public Utilities Department

cc: Messrs: Willoughby, Dunkerley, Ray, Rovani, Howell, Friedmann,

Warford, Berrie Files

TWBerrie: jr