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OED SPECIAL STUDIES

85035--03

Power - Closing Report

1974 (Oct-Nov)

INTERNATIONAL DEVELOPMENT ASSOCIATION | INTERNATIONAL BANK FOR RECONSTRUCTION AND DEVELOPMENT | INTERNATIONAL FINANCE CORPORATION

OFFICE MEMORANDUM

TO: Mr. Christopher Willoughby

DATE: November 26, 1974

FROM: Y. Rovani

SUBJECT: Operational Developments in Power

In my reply to the power closing report, I indicated, explaining the past that (i) our guidelines came late for impact in the period reviewed and (ii) our promotion and monitoring of newer dimensions of power operations broke down in the last year due to lack of staff. I also said concerning the future, that visible changes would take place as Regions had more time to influence the design of projects and we overcame our staffing problems. Both points are illustrated in the three memos attached, one from a Region (Liberia Issues paper front page), the other two from this Department (Honduras, Chile).

Attachments

cc: Mr. van der Tak (with Chile Power only)

YRovani:em

1266
11/27/74

OFFICE MEMORANDUM

TO: Mr. J. Davis (Acting Chief, WAPPB) DATE: November 22, 1974

Rec'd. 11/26

FROM: A. Engvall, A. Conde and M. Lhardy (WAPPB)

SUBJECT: LIBERIA - Liberia Electricity Corporation (LEC)
Third Power Project
Issues Paper

This issues paper is based on the findings of an appraisal mission which visited Monrovia from October 7 to 24, 1974 in accordance with terms of reference dated September 28, 1974. The Bank has made two loans to the Public Utilities Authority (PUA) for power facilities (684-LBR in June 1970 and 778-LBR in July 1971). Because of cost overruns, the Bank granted PUA supplemental financing in October 1973 bringing total Bank financing for the sector to US$15 million. The projects have been satisfactorily executed and are completed except for distribution works which will be commissioned by the end of 1975. The Bank had been asked to finance a third project consisting of additional generating facilities, but revised demand forecasts show such investment at this time would be premature. However, the mission recommends financing of badly needed technical assistance and considers that such a loan would be in line with the policy set out in Operational Manual Statement 4.00. It is recommended that the Decision Meeting on this paper be deferred until after the return of Mr. Thalwitz to Washington. During his present mission, he intends to discuss the project with the authorities in Monrovia, and also in Frankfurt to explore the possibility of German bilateral assistance.

I. MAIN FEATURES OF THE PROPOSED PROJECT

Borrower: Liberia Electricity Corporation (LEC).

Guarantor: The Government of Liberia and LEC's holding company, the Public Utilities Authority (PUA).

Amount of Loan: US$1.8 million to cover the project's foreign exchange cost.

Terms of Loan: Standard interest rate; ten years including three years grace period, with possible refinancing should the Bank finance a third investment project.

Purpose:

(i) To prepare development plans for the power sector in Liberia and to establish a highly qualified planning unit within LEC.

(ii) To carry out an inventory of the hydroelectric potential of Liberia.

(iii) To improve the efficiency of LEC and to train Liberians to take over full responsibility over LEC.

II. BACKGROUND

The Power Sector

1. The Liberia Electricity Corporation (LEC) supplies about 40 percent of the power consumed in Liberia, the remaining 60 percent is supplied mainly by the iron ore mining companies. LEC's system is the main source of public power and serves the capital Monrovia and its environs. LEC's generating plant (149 MW) consists of four 17 MW units at the Mount Coffee hydro plant, four gas turbines with a total capacity of 68 MW and six diesel units with a total capacity of 13 MW. However, since the Mount Coffee plant is a run-of-river plant and the dry season riverflow is very limited, the total firm capacity of the system is only about 80 MW and the dry season base load is mainly supplied by the thermal plant. In addition to these facilities, LEC operates seven small secondary centers as an agent for the Government. The mining companies, together with small privately-owned installations, have a capacity of about 150 MW.

Organization

2. Before 1972, the Public Utilities Authority (PUA) operated as an autonomous government-owned agency responsible for power, water supply and sewer services. In 1972 when telecommunications and broadcasting was added to its responsibilities, PUA was reorganized into a holding corporation with four subsidiary corporations, of which LEC is one and responsible for the power sector.

3. According to their statutes, each of the four subsidiary corporations should be run as a separate entity with full financial autonomy. However, the law establishing PUA as a holding corporation is unclear concerning the authority and responsibility of PUA and in practice, due not least to the strong personality of the previous Chairman of PUA, PUA is very much involved in LEC's day-to-day operations. It seems, however, that Government's intention when establishing PUA as a holding corporation was to have PUA giving policy directives to the subsidiary corporations and serving as a link to the Government.

Management

4. LEC is extremely short of qualified and experienced staff; staff motivation is low. The number of Liberians in senior positions is very small and, in our opinion, none have the necessary experience and qualifications to properly manage an entity such as LEC which has now US$55 million in assets and annual revenues of US$14 million. Over the past ten years, LEC has had to rely heavily on expatriate assistance; at present, this is being provided by three experts from the USA consulting firm, Sanderson & Porter, who are engaged in senior capacities, and seven directly-employed expatriates for intermediary positions. In spite of long-term assistance, little improvement has been shown in the capability of the Liberians to manage LEC; consequently, to improve management, Government

has decided to employ a new team which will take over full responsibility for the management of LEC and carry out extensive training (see Chapter IV).

5. Poor management is reflected in LEC's operations in which there is ample scope for improvements in efficiency. In this respect, it seems that poor maintenance practices cost LEC about US$400,000 in additional fuel expenses during the 1974 dry season when LEC was unable to fully utilize its diesel units (50 percent better fuel efficiency than gas turbines) and that a further loss of US$50,000 in revenues has been incurred so far this year by frequent interruptions in supply to the Bong mining company. Furthermore, system losses and unrecorded consumption--24 percent of total generation--, and collection losses--10 percent of total billings--are extremely high.

6. LEC's management is preoccupied with operations and forward planning is badly neglected. There is no planning unit within LEC and in the past, LEC has relied almost exclusively upon consultants and financing agencies (e.g., USAID and the Bank) to determine its investment programs. Unfortunately, consultants employed by LEC have been provided with inadequate help and support and have been given no supervision; this has resulted in low quality work and many decisions have been taken on the basis of poor information.

Finances

7. Mainly due to droughts in recent years which have reduced hydro output, and to the sharp increases in fuel prices, LEC's financial position is very weak. LEC is presently unable to pay its fuel bills and it is estimated that it will owe the Liberian refinery US$4.2 million by the end of 1974. In spite of two substantial tariff increases this year (a total of 40-60 percent increase depending on consumer class), LEC's earnings are still too low and inadequate to support even a modest investment program. The rate of return is estimated at 5.4 percent in 1974 and at 6.5 percent for 1975; this compares with 10 percent in the covenants governing the Bank loans. LEC's debt equity ratio of 76/24 is high.

8. On several occasions, the Bank has pointed out to Government the need for taking measures to solve LEC's financial problems; on the last occasion, in a letter dated July 30, 1974, Government was informed that the adoption of such measures would be a condition for further Bank financing. The Deputy Minister of Finance informed us that since LEC had already increased tariffs twice this year, following which demand growth had sharply fallen (see paragraph 11), a further tariff increase at this stage would be unacceptable. The Deputy Minister however said that the Government was considering utilizing IMF's oil facility to provide LEC with working capital but declined to comment on whether funds would be provided to LEC in the form of equity, as recommended by the Bank, or in the form of a loan. According to IMF, the Government should be in a position to make a strong case justifying Liberia drawing funds from the oil facility; this had apparently been discussed during the annual meeting in September 1974. However, even without this financing source, it seems that Government possesses adequate funds to solve LEC's financial problems.

9. Since in the past Government has been extremely reluctant to invest in LEC (paid-in capital amounts to only US$750,000), the mission together with the Comptroller of LEC calculated the minimum equity contribution required to make LEC's financial position acceptable. This proposal calls for the Government to make an equity contribution to LEC of US$5.34 million, consisting of US$4.5 million in cash and the cancellation of LEC's payables to the Government from 1973 operations (US$840,000). The cash contribution would be used to pay the refinery (US$4,200,000) and to meet Government's share of the cost overruns on the Bank projects (US$310,000) which the Government agreed to meet during negotiations for the Supplemental Loan. Such an equity contribution would improve LEC's financial position substantially, although LEC would be temporarily two months in arrears to the refinery at the end of the 1975 dry season, and a tariff increase could be delayed until late 1975. Even allowing for possible efficiency improvements, LEC's projected earnings would be too low without such a further tariff increase.

III. INVESTMENT PROGRAM

Load Forecasts

10. LEC's consultants, Oskar von Miller (OVM, Germany) have recommended the installation of additional 30 MW of thermal plant by 1978. OVM's recommendations are based on an average generation growth rate of 10.5 percent per annum. This forecast, which was made in 1973, does not take into account recent events and is therefore considered unrealistic and too high. Our revised forecast indicates a generation growth rate of not more than 7 percent per annum until 1980 for the following reasons:

(i) Non-mining load growth was comparatively stable at 7.5 percent per annum during the three-year period 1973-75.

(ii) LEC's two tariff increases this year have reduced the non-mining load growth to an estimated 2 percent for 1974. Moreover, a further tariff increase will be necessary by late-1975 (see paragraph 9 above) and would have a further depressive effect on load growth.

(iii) All large industrial consumers are now supplied by LEC, thus there is no further scope for growth through transfer from captive power plants to LEC (this was one reason for high load growth in the 1960s).

(iv) There are no large power-consuming projects in the pipeline in Liberia; the only exception are new mining operations to which LEC cannot supply thermal power at competitive prices, and which consequently would generate their own power.

(v) LEC's power losses and unrecorded consumption of 24 percent of total generation indicate the existence of a margin in present plant which, with improved system control, could be used to meet a higher sales growth.

11. Based on the above forecast, the present firm capacity of about 80 MW would be sufficient to meet peak demand until the end of 1981. There is presently no information on whether there is any feasible hydro site which could be developed before 1982 and therefore the only generation alternatives available today are thermal plants. However, the lead time necessary for developing a small thermal plant (30 MW) would not exceed four years and we, therefore, conclude (contrary to OVM's recommendations) that a decision to go ahead with a thermal plant is premature for about two years. Our forecast, which we believe is on the high side for the next few years, is of course based on very limited information and LEC should start gathering information to carry a proper demand study study (see paragraph 14).

Development Strategy

12. It is our firm belief that hydro generation will in the long run be the least-cost solution for meeting Liberia's basic electric power requirements. Moreover, it is possible that the planned new mining operations could feasibly be supplied by hydro power and provide the necessary demand to justify the early development of relatively large hydro sites. However, since we lacked information on possible hydro sites and since LEC cannot produce thermal power cheaper than the mines themselves, we had to rule out the possibility of LEC supplying additional power to mining companies at this stage.

13. According to information received in Liberia, the Wologizi mining project, which is situated close to the Mano river in the north of Liberia, is scheduled to start production by the early-1980s; the eventual output is set at ten million tons of pelletized iron ore. This production level would require a minimum firm capacity of 100 MW, i.e., almost double LEC's present peak demand. A similar size operation (Putu) is being planned in the south close to the Cavalla river; this mine might come into operation by the mid-1980s.

14. In order for Liberia to find the most economic solutions of providing the public as well as the big mining companies (if economical) with electric energy in the future, it is necessary that LEC carries out a proper demand study and improves its knowledge of possible hydro sites in order to be able to develop them within the lead time available. It is therefore important that:

(i) studies be undertaken to investigate the potential hydro sources within Liberia;

(ii) studies be undertaken of the border rivers (Mano and Cavalla) and the administrative problems of developing a project jointly with the neighboring countries be investigated; and

(iii) discussions start with neighboring countries on interconnection for sale/purchase of power (e.g., the Bumbuna hydro project in Sierra Leone might be developed for initially providing power to the Wologizi mine).

15. LEC has so far employed consultants (Tractionell, Belgium) to find possible means of firming up the dry season capacity of the Mount Coffee plant (preliminary results show that this would be too expensive at this stage); the African Development Bank has also been requested to finance a study of the Cavalla river. However, considering LEC's management problems (see paragraphs 4-6 above), it is apparent that LEC is not equipped to or capable of properly carrying out and coordinating the above work. The Government is aware of LEC's deficiencies and has decided upon a technical assistance program for LEC, for which Bank financing is being sought.

IV. TECHNICAL ASSISTANCE

16. The objectives of the technical assistance program would be to:

(i) make a complete inventory of hydro resources in Liberia;

(ii) establish a long-range development plan for the power sector in Liberia based on a demand study and prepare a detailed investment program which should include the next addition of generating capacity;

(iii) establish a properly staffed and equipped planning unit within LEC;

(iv) train Liberians to eventually run LEC; and

(v) generally improve LEC's management capability and overall efficiency.

17. Engineering consultants would be employed for item (i). The Government has initiated action to find a team from a power utility capable of carrying out items (ii)-(v); such a team would be employed under terms of reference acceptable to the Bank. Sanderson and Porter's contract expires in November 1975 and it is planned that the new team would commence work in July 1975, thereby providing adequate continuity.

18. The estimated cost of these services during the period 1975-78 are:

	Foreign Costs	Local Costs	Total Costs
	US$		
Hydro Studies	500,000	150,000	650,000
Three-Year Management Contract	1,300,000	850,000	2,150,000
	1,800,000	1,000,000	2,800,000

The proposed Bank loan would finance the foreign exchange costs of US$1.8 million and LEC would finance the remaining US$1.0 million from its internal resources; the latter would of course only be available if the Government

take appropriate action towards solving LEC's financial problems (see paragraphs 9 and 26). We recommend a loan for ten years including a three-year grace period, with possible refinancing should a subsequent project loan be made.

V. JUSTIFICATION

19. With a highly competent management team, LEC would be able to carry out the studies and coordinate the work mentioned under paragraph 14. If the results from these studies are not known in the near future, the new mining companies would have to install their own thermal generation plant. Such plant might be very expensive compared with potential hydro plants and would give no benefits to LEC's power system. Moreover, even without additional mining load, it might be possible to locate a small hydro plant which could feasibly be developed to provide the next addition to generation capacity (expected to be made by 1982).

20. It is expected that the establishment of a highly qualified planning unit will enable LEC:

(i) to draw up plans for and know about major new projects in time to be able to supply power at economical prices;

(ii) to (a) make better use of outside consultants by defining the services they are to perform and the input data they are to receive; and to (b) properly supervise and evaluate consultants' work;

(iii) to base investment decisions on a proper evaluation of costs and benefits to be derived from the investments; and

(iv) to be better equipped to adjust its investment programs when planning parameters change.

21. Since the management team would initially take full responsibility over LEC's operations, it is expected that LEC's efficiency will improve substantially. However, the benefits of the efficiency improvements are difficult to quantify. The team would perform extensive training of Liberians and it is hoped that the latter would acquire the necessary skills to gradually take over responsibility for management during the course of the team's assignment. It is expected that this training would have substantial long-range benefits particularly in the form of cost savings since in the future, if the training proves successful, LEC would not have to seek expensive expatriate assistance for operations.

VI. ISSUES

Financing Sources

22. The Government is exploring the possibility of bilateral aid for financing the technical assistance. The German Government recently

made a DM 10 million credit (US$4 million) to LEC for financing distribution facilities; the Bank has therefore taken steps to find out whether the German Government would be interested in financing the proposed technical assistance. The Bank should continue to assist the Government in exploring other possibilities of obtaining non Bank group financing, but except for possible German financing, these efforts are not likely to be fruitful. The UNDP Resident Representative informed us that the IPF for Liberia is fully committed.

23. Should there be no bilateral financing sources available, the main issue is whether the Bank would be willing to finance this kind of technical assistance rather than have LEC and/or the Government finance it. Bank financing would (i) increase the leverage available to the Bank in agreeing with the Government on measures for solving LEC's financial problems and (ii) increase the Bank's influence in planning and formulating LEC's next investment program. Since the technical assistance program includes preparation of LEC's next investment program, Bank financing of the technical assistance would in principle commit the Bank to finance a third power project in Liberia.

Staffing

24. In order to fully benefit from the proposed technical assistance program, LEC would need to take on a minimum of ten additional Liberian graduate engineers and accountants for training under the program. According to LEC, its salary structure is not competitive for senior positions and therefore difficulty is experienced in recruiting qualified staff. However, bearing in mind that qualified people are in short supply in Liberia, LEC would have to make a major recruitment effort even if it could offer competitive salaries. The staffing issue should be given high priority and the new management team should be required (i) to study LEC's salary structure and implement necessary changes to make LEC's salaries competitive and (ii) to take all necessary measures to recruit and train additional staff, who, after training, would be capable of filling senior positions.

Organization

25. During the mission, it was agreed with the Deputy Minister of Finance that the management team would have full responsibility and authority over LEC. However, to safeguard against unnecessary interference from PUA, the Government should be asked clearly to define the rules of PUA (policy-making) and LEC (executing) and to confirm that LEC would have adequate autonomy.

Finances

26. In our opinion, the proposed equity contribution of about US$5 million is the minimum amount required for making LEC's financial position acceptable. We recommend that this equity contribution be made a condition of negotiations and that the Bank insist that the amount be made available as equity and not as a loan. The Bank should then waive the rate of return

covenant until the beginning of 1976; the Government should, however, be asked for a commitment to raise tariffs by no later than January 1, 1976 in order to achieve subsequently a minimum 10 percent rate of return.

VII. RECOMMENDATIONS

27. Covenants relating to the previous loans (684/778-LBR) are still valid and should be repeated for the proposed loan. These covenants were modified under the Supplemental Loan to reflect the transformation of PUA into a holding corporation.

28. PUA is the borrower of the previous loans and the Bank has a project agreement with LEC. However, since LEC has full legal status and will be the beneficiary of the technical assistance, we recommend that LEC be made the borrower; PUA would then enter into an agreement with the Bank guaranteeing that it will not take any action that would adversely affect LEC, without the Bank's consent.

29. The Bank should inform the Government as soon as possible whether it will consider financing the technical assistance program.

AEngvall:fk

cc: Messrs. Chaufournier (Vice President, WA)
Thalwitz (Director, WAP)
Pouliquen (Asst. Dir., WAP)
Rowe (Asst. Dir., WAP)
King (Asst. to the Dir., WAP)
Wadsworth (Chief, WAPA1)
Van Gigch (Chief, WAPA2)
Brandreth (Chief, WAPTR)
Soges (Chief, WAPH)
Lethem (Chief, WAPED)
Ribi (Chief, WAPPB)
Wright (Director, WA1)
Dutt (Chief, WALDB)
Denning (Program Coordinator, WA)
Schmedtje (Senior Economist, WA)
Reitter (Res. Rep., WAFGA)
Mirza (Chief, WAFNG)
El Maaroufi (Chief, WAFUV)
Wyss (Chief, WAFWA)
van der Tak (Director, PAS)(5)
Rovani (Director, PBP)(5)
Gulhati (EDD)
Singh (IFD Commodity & Export Proj.)
Bowron (P & B)
Mayer (Controller's)
Mwine (Legal) (2)

Mr. W.C. Baum, VPSVP (through Mr.Y.Rovani, Director, PBP)
Richard H. Sheehan, Senior Adviser, PBP

November 20, 1974

HONDURAS - Sixth Power Project
Green Cover Appraisal Report

We have the following comments on the above report:

1. In common with the past practice in power appraisal reports, there is no analysis of the tariff structure; information in this case being restricted to a listing in an annex. Also typical is the fact that the structure is complex, with different schedules for residential, "general" and large industrial users, each of which show declining block rates. There is no reference to time of day metering. Since the ultimate justification for power projects depends heavily upon pricing structures that reflect incremental costs, the absence of such analysis is a weakness. While it is rather late in the day to influence the present project by revision of the tariff structure (and the declining block rate stands out as a policy that deserves special attention), the reference to the proposed study (paragraph 3.08) should as a minimum refer to the need to include economic efficiency as an important objective of pricing policy, against which other objectives such as subsidies to low income groups could be weighed. During negotiations the Bank should discuss with the Hondurans the need to expand the terms of reference for the tariff studies to go beyond the normal, purely accounting approach and to analyze the scope for using incremental systems costs as the basis for charging policy.

2. We use this occasion to inform you that we are at present preparing a memorandum to the regional public utilities division chiefs saying that henceforth, we will expect tariff policy, with particular reference to structure, to be dealt with in project analysis, and that this should be recognized in appraisal reports along the lines set out in our paper Economic Evaluation of Public Utilities Projects (P.U. Department, September 30, 1974). We will ask the division chiefs at the outset to look especially critically at (i) the declining block (or promotional) energy charges, for which we see little or no justification, and (ii) the adequacy of tariffs in reflecting the costs of consumption at different times of the day or year.

3. Listed below are some minor points which can be taken care of in the gray cover version of the appraisal report:

- Paragraph 4.03, last sentence should end ".....ENEE should demonstrate to the Bank that the selected extensions are the least cost method of meeting demand, before proceeding with them."

- Paragraph 4.06, last sentence delete "in today's inflationary situation" and substitute something along the following line: "in view of the 248 GWh/yr of additional hydro generation."

- Annex 10 paragraph 4, last sentence should read: "Since the capital costs of the two are of the same order of magnitude, and the river diversion scheme does not entail any fuel costs, it is the least cost method.....etc."

RHSheehan/JWarford:smo
cc: Messrs. Alter, LCNVP, van der Tak, VPSVP
Weissman, LC2DC, Dickenson, LCPPT
LAC Files, PBP Files

OFFICE MEMORANDUM

TO: Mr. Christopher Willoughby DATE: November 25, 1974

FROM: Y. Rovani

SUBJECT: First Draft of Closing Report of Electric Power Evaluation

1. My colleagues and I appreciate the generally balanced substance of your report. We have had some successes and disappointments, and you have identified a representative sample of both. In this reply I would like to comment on a few of the sections; and the conclusions and some of the recommendations with which I differ. But I would also like to try and relate your original recommendations, and their consequences, to the question of internal responsibilities, priorities and resources, which may be of lesser interest or relevance to the Executive Directors, but which are vital to your audience inside the Bank. I shall begin with this latter point.

2. As you are aware, a number of us are somewhat schizophrenic about your suggestions: I, in particular, have liked many and have appreciated the better understanding that our sectors have enjoyed from your interest; on the other hand, there is reluctance on the part of managers in the Bank to be saddled with open-ended, uncosted commitments that do not relate to the resources at hand, and that seem to confuse responsibility and lines of authority; this problem is compounded ex post when performance is measured against those ambitiously stated objectives, again, without reference to resources.

but these were supposed to be considered in your original reply.

3. The solution to this is not to change the nature of your suggestions but to organize the response of those concerned with the suggestion, and the actions which follow. In effect, each unit concerned should systematically consider your suggestions, reject those it disagrees with, and indicate what it intends to do about those it accepts, in the context of its resources and other priorities. Each unit would then report on its performance in implementing its own targets, following the regular channels and lines of authority. This is fairly easy when research, issues papers etc... are concerned, as illustrated by our own example. It is very difficult as far as operational impact is concerned, as we lack a simple management tool to plan qualitative improvements in the work within sectoral lending allocations, and to relate existing and new resources to the desirable qualitative targets.

4. In respect to the first point, as you remember, I replied at your request to every one of your suggestions in December 1972, indicating why I rejected some, and what was planned about the others by way of research, issues papers etc...; my reply tied into the Public Utilities Department Work Program which had taken them into account against the set of our priorities and resources. That Work Program, approved by Mr. Baum and endorsed by Management, in effect constituted this Department's commitment.

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11/26

5. But in respect of operational impact, no such specific targets were agreed upon. First, because most of your suggestions required to be processed in CPS through research, issues papers, field demonstration, guidelines, checklists etc... before becoming operationally feasible, which, by the original schedules, would take most of the period under your review. Second, as already indicated above, because there is no system for planning qualitative improvements in the selection and design of projects within the lending program allocations for the sector. Indeed, improvements take place through a variety of initiatives from the Regional utility divisions, CPS via the review process, and others in the Bank. The point is that opportunities are missed, for lack of planning tools, of maximizing the development impact of our projects. The reorganization, by decentralizing decision making as far as sectoral aspects are concerned, has made these planning tools particularly necessary: for us to perform our advice and support functions for the Regional utility divisions and project and program management to have better opportunities to consider in making their operational decisions, and for all of us to use more effectively existing resources and develop a better basis for justifying extra needs. Another benefit would be to enable operating units to relate your suggestions both ex ante and ex post to some operational benchmarks.

6. With these aims in mind, we started three exercises last year which, despite the significant potential we saw in them, had to be interrupted in December for losses of staff to other activities or units: a qualitative analysis of sector knowledge by family of issues rather than in total (leading inter alia to the obvious conclusion that we know a lot about almost everything in some countries' power sector, but little or nothing about the users); a qualitative analysis of the power and water lending programs (leading in some cases to a preliminary conclusion: "more of the same"); development of a system for identifying, recording, and following the progress toward achievement of the main objectives of projects as they enter the pipeline and proceed to completion (a somewhat similar system was instituted for rural development projects recently). The dialogue we initiated with the Regions on these ideas appeared very promising indeed. From this we intended to proceed towards gradually developing commonly accepted targets for the power and water components of the lending program, which would be consistent with available resources and would lead to a closer integration of our Work Program with the operations programs of the Regions. Your recommendations would have been, of course, taken into account in this process. We will, in the coming weeks, pick up from where we left off last year, with a view to developing at minimum cost a simple and workable system.

7. Turning now to those of your conclusions and recommendations with which I disagree:

(a) I think you are too uniformly critical of the operational impact of your suggestions, in that you understate the time that was required to process your suggestions to the point where they became operationally feasible. For example, in village electrification (which falls into your category of system extensions), I regard the record as quite good: our issues paper came out in July, according to the original schedule and despite delays outside our control

in the supporting research project; one year earlier, at the initiative of the Regions or ourselves several projects started to be identified; one has been appraised (India), others are being actively considered (Iran, Thailand, Mexico Rural Development etc...). As to monitoring indices, the sample of projects appraised since the issues of our guidelines at the end of last year is too small for drawing a conclusion.

(b) For some other suggestions where earlier implementation would have been feasible, I obviously share your disappointment. General explanations are the large amount of lending in power in the last year, the temporary impact of the reorganization and the energy crisis. My own department has certainly contributed less in operational advice and support for power than water in the last year due to this simple fact: of four power engineers and economists originally, one has devoted his full time to the energy task force, another left the department in January, a third in July (the fourth will leave in February of this year). As to economists, the situation has changed since your draft report was written: all vacant positions are now filled, committed or about to be committed. Regarding the past, my view is that power economists have been regionalized too soon, before they were accepted in the sector and knew how to make themselves useful. This problem has already been resolved in some instances and I am confident that with the help of our strengthened staff visible improvements will take place in economic analysis in the coming years. As this develops, new economist posts will be created by the units concerned. The only way I could think of to accelerate this process would be to introduce the planning tool I referred to earlier as a means of determining more clearly the kind of skills needed for the kinds of targets expected. One of them is distribution expertise to help extend access to service and raise our appraisal standards for distribution to the same levels as for generation and transmission. We are seeking one post to support the Regions in this area. Having completed our commitments for papers, and resolved our staffing situation, we have now resumed and plan to expand, more effective support to the Regions' work.

(c) In view of these explanations and our view that the constraints are planning tools and resources, rather than some insensitivity of operational staff to new ideas or practices, I must disagree with the suggestion that more sustained attention by the Executive Directors would help speed up the operational impact of your work. I also question the wisdom of encouraging the Board to go into discussions of methodology while considering loans and credits. The format of Board meetings does not lend itself to carefully considered questions and responses that go deeply enough into these complicated matters. Off-the-cuff answers by the staff may do more harm than good.

8. With reference to your concluding proposed actions numbered 1 through 5, I agree that the principal need now is to apply to future operations the research results already achieved, but I do not think the closing report should go into the details of how this is done and I would suggest you delete these items. (Item 3, an EDI course for managers of electric power utilities, is in the program for FY'76, Item 2 is a standard practice of this department, only limited by resources, and Item 5, an updating of the appraisal checklist is in our Work Program and under preparation.)

9. The following comments relate to the numbered recommendations:

(5) Distribution Reliability Standards

The Bank's Research Committee has just authorized an extension of the study on "Standards of Urban Electricity Distribution" to include two case studies and the preparation of guidelines to judge the adequacy of distribution plans and to present methods of quantifying the benefits.

(9) Fiscal Contribution of Power Companies

We are now revising the appraisal checklist to include a reminder that fiscal effects of projects should be included in appraisals. We are also in the process of completing short guidelines on this subject.

(11) Power Planning Units

In connection with the recent IAEA study on the market for nuclear power in developing countries, an electric utility optimal generation expansion planning program was prepared called (WASP) - the Wien Automatic System Planning package. We intend to send one or two of our staff to Vienna next spring for actual practice with this program and then adapt it for use by the Bank's staff and borrowers. We may also in due course include the use of this program in the proposed EDI course.

(13) Financial Recording and Planning

I would not stress the proposal to use auditors to achieve accounting improvements. Accounting firms engaged as auditors routinely suggest minor changes in accounting systems to deal with problems uncovered in the audit. Good firms need no encouragement from the Bank for this, since it is their bread and butter. However, our borrowers frequently have difficulty in finding good auditors. Where the competence of the firm is in doubt, we would be doing the borrower no favor by asking them to expand their terms of reference. Significant modifications to the system should be done as a separate exercise, and the auditor may, or may not, be the best source of help. This question should be decided on its merits. There is no reason for the Bank to encourage use of the auditor, particularly if it is a government body, as is frequently the case.

(15) Sales of Participating in Bank Loans

I would suggest eliminating this item altogether. As a substitute for joint financing, prospects of obtaining substantial funds would appear too doubtful (not necessarily the same people and motivations apply in investment and export financing), and in any case there is too limited a scope to use this paper as a means of channeling oil surpluses. Sales of participations is just one of a number of ways that are available to mobilize funds, and others in the Bank are aware of it.

cc: Mr. Baum

YRovani/RSheehan:em

FORM NO. 75
(7–73)

WORLD BANK GROUP

ROUTING SLIP	DATE Nov. 18/74
NAME	ROOM NO.
Mr McDonaghy	

	APPROPRIATE DISPOSITION		NOTE AND RETURN
	APPROVAL		NOTE AND SEND ON
	COMMENT		PER OUR CONVERSATION
	FOR ACTION		PER YOUR REQUEST
	INFORMATION		PREPARE REPLY
	INITIAL		RECOMMENDATION
	NOTE AND FILE		SIGNATURE

REMARKS

NOV 19 1974

FROM	ROOM NO.	EXTENSION
F Rydell		

GAS 9

INTERNATIONAL BANK FOR RECONSTRUCTION AND DEVELOPMENT

INTERNATIONAL DEVELOPMENT ASSOCIATION

PUBLIC UTILITIES DEPARTMENT

GUIDELINES SERIES

ILLUSTRATIVE AUDIT REPORT FOR A POWER COMPANY

November 15, 1974

Central Projects Staff
Public Utilities Department

For additional copies, please call extension 5459

ILLUSTRATIVE AUDIT REPORT FOR A POWER COMPANY

ABSTRACT

This Illustrative Audit Report was prepared in response to a need expressed by a number of utility staff members for a document which could be given to borrowers and their auditors to help clarify the Bank's concept of a satisfactory audit report.

It may be used outside the Bank with the understanding that it is only indicative of the scope and depth of the audit procedures, and the kinds of information the report should contain. It does not diminish the auditor's professional responsibility for these matters, which have to be considered in light of the circumstances in each audit.

Although it is prepared in the format of a power company audit, it is intended to serve, aside from the obvious technical differences, other kinds of utilities as well.

Prepared by: Ferd Rydell

Date : November 15, 1974

PREFACE

Loans of the International Bank for Reconstruction and Development (World Bank) and credits of the International Development Association (IDA) to electric power utilities all contain an auditing covenant in the loan and credit documents. This Illustrative Form of Audit Report, commonly referred to as a "long-form audit report", is intended for guidance in connection with financial statements and audits of power utilities that have obtained World Bank loans and IDA credits. It gives a clear indication of the views of the World Bank and IDA with regard to the content, form and arrangement of financial statements and the form, content and scope of auditors' reports.

Standardization is not the purpose of this Illustrative Audit Report. The report is merely one presentation of the type of auditors' report, including the financial statements, that would fulfill the requirements of the World Bank and IDA. Generally, long-form audit reports consist of: the auditor's opinion, the financial statements with appropriate notes, supplementary data pertaining to the statements, and a description of the scope of the audit work. A fictitious currency, X$, is used in this report.

The contents of audit reports vary with the circumstances in each case and in each country. For example, in this report, Note A-8 on page 7, states that foreign loans are revalued on the basis of the prevailing exchange rates at the end of the year and the increase or decrease is recorded in the revaluation reserve account. The increase or decrease (loss or gain) could have been charged or credited to the related fixed asset accounts. In such a case, the loss or gain is realized through the depreciation process. The loss or gain could have been recorded as a deferred credit or deferred charge subject to future amortization. If the loss or gain was a relatively small amount, it could have been charged directly to income or expense in the income statement. These are acceptable methods for revaluing foreign loans in different countries.

There are many areas where there are a variety of methods for recording the facts. Some examples of such areas are: revaluation of assets (Note A-2), treatment of interest during construction (Note A-4) and inventory valuation (Note A-6). It is the responsibility of the auditor to disclose in his report the accounting treatment of the subjects discussed above and to render an opinion as to whether such treatment is appropriate in the circumstances.

Any deficiency in accounting practices or procedures identified in the course of the audit should be described in the scope of audit section of the report or in a supplementary letter, and corrective measures should be recommended to overcome it in the future. Some of the areas of particular concern are:

a. Internal auditing;

b. Internal control;

c. Budgetary control;

d. Training of accounting staff;

e. Comprehensive reporting system;

f. Mechanizing accounting system;

g. Accounting manual, chart of accounts, and job descriptions;

h. Billing and collecting procedures; and,

i. Inventory control.

This llustrative eport has been prepared assuming there are no situations which would require qualifications to the accountant's opinion. However, in some cases deficiencies may be so serious that the independent auditor will not be in a position to issue an unqualified opinion. Such might be the case when limitations have been placed on the scope of the audit, unacceptable or inconsistent accounting practices were used, internal control was very poor, or records were missing. In such cases, a qualified opinion may be given. The auditor should indicate the effect of the qualification, but such effects are not always measurable. The auditor may also disclaim an opinion, or in extreme cases, may render an adverse opinion stating that the financial statements do not present fairly the financial position and results of operations of the company. The type of opinion to be rendered will be based on the professional judgment of the auditor.

ILLUSTRATIVE AUDIT REPORT FOR A POWER COMPANY

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OPINION OF INDEPENDENT ACCOUNTANT

(ACCOUNTANT'S LETTERHEAD)

To the Board of Directors
XYZ Power Company

_____, _____
(City) (Country)

We have examined the balance sheet of the XYZ Power Company as of December 31, 1974, and the related statements of income, changes in shareholders' equity, and changes in financial position for the year then ended (Exhibits 1 through 4). Our examination was made in accordance with generally accepted auditing standards, and accordingly included such tests of the accounting records and such other auditing procedures as we considered necessary in the circumstances.

In our opinion, the accompanying balance sheet and statements of income, changes in shareholders' equity and changes in financial position, present fairly the financial position of XYZ Power Company at December 31, 1974, and the results of operations and changes in the financial position for the year then ended, in conformity with generally accepted accounting principles applied on a consistent basis.

The accompanying supplemental data, though not necessary for a fair presentation of the financial position and results of operations, changes in stockholders' equity and changes in financial position, are included principally for supplementary analysis purposes. While our examination was made primarily for the purpose of formulating our opinion on the current year's basic financial statements (Exhibits 1 through 4), the additional data has been subject to the same audit procedures and, in our opinion, are stated fairly in all material respects when considered in conjunction with the financial statements taken as a whole.

_____, _____
(City) (Country)

_____
A, B and C
Certified Public Accountants

_____
(Date)

EXHIBIT 1

XYZ POWER COMPANY

Comparative Balance Sheet

December 31, 1974 and 1973
(Expressed in X$)

ASSETS

	1974	1973
Fixed Assets		
Gross fixed assets in operation (Notes A & B)	1,278,990	1,051,179
Less accumulated provision for depreciation (Notes A & B)	234,618	179,770
Net fixed assets in operation	1,044,372	871,409
Work in progress (Note A)	82,049	91,407
Total fixed assets	1,126,421	962,816
Investments (Note A)	10,000	10,000
Current Assets		
Cash	16,426	15,697
Accounts receivable (net)	24,628	19,608
Materials and supplies	21,858	13,232
Other current assets	830	492
Total current assets	63,742	49,029
Deferred Charges	2,842	2,325
Total assets	1,203,005	1,024,170

SHAREHOLDERS' EQUITY AND LIABILITIES

Shareholders' Equity		
Common Stock - par value 100--Authorized 10,000 shares, issued and outstanding 3,869 at December 31, 1974 and 3,800 shares at December 31, 1973	386,900	380,000
Premium on common stock	33,100	30,000
Retained earnings	75,708	62,438
Government grants	17,000	6,000
Legal reserve	21,135	16,438
Surplus arising from revaluations (Note A)	122,063	52,500
Total shareholders' equity	655,906	547,376
Long-term Debt		
Loans (Notes A and C)	512,580	454,400
Less current maturities	17,200	17,200
Long-term debt	495,380	437,200
Current Liabilities		
Accounts payable	10,684	8,107
Consumers' deposits	1,942	1,578
Short-term notes	16,000	7,500
Current maturities of long-term debt	17,200	17,200
Other current and accrued liabilities	1,792	1,666
Total current liabilities	47,618	36,051
Deferred Credits	1,770	1,605
Contributions in Aid of Construction	2,331	1,938
Total shareholders' equity and liabilities	1,203,005	1,024,170
Commitments and Contingent Liabilities (Note D)	38,500	26,000

The accompanying notes are an integral part of these statements.

XYZ POWER COMPANY

Statement of Changes in Shareholders' Equity

For the Year Ended December 31, 1974
(Expressed in X$)

	Common Stocks	Premium on Common Stocks	Retained Earnings	Government Grants	Legal Reserve	Surplus Arising From Revaluation	Total
Balance January 1, 1974	380,000	30,000	62,438	6,000	16,438	52,500	547,376
Add: Net income - year ended December 31, 1974 (Exhibit 3)			46,967				46,967
Allocation from retained earnings (Note A)					4,697		4,697
Sale of common stock	6,900						6,900
Premium on sale of common stock		3,100					3,100
Government grants				11,000			11,000
Surplus arising from net revaluation of fixed assets in operation and accumulated provision for depreciation (Note A)						94,943	94,943
Deduct: Common stock dividend declared and paid			29,000				29,000
Allocation to legal reserve (Note A)			4,697				4,697
Surplus arising from revaluation of long-term debt (Note A)						25,380	25,380
Balance December 31, 1974	386,900	33,100	75,708	17,000	21,135	122,063	655,906

EXHIBIT 2

EXHIBIT 3

XYZ POWER COMPANY

Income Statement

For the Years Ended December 31, 1974 and 1973
(Expressed in X$)

	1974	1973
Operating Revenues		
Sales of electricity	248,209	220,972
Other operating revenues	1,750	1,600
Total operating revenues	249,959	222,572
Operating Expenses		
Operation	102,279	97,631
Maintenance	15,430	14,148
Depreciation (Notes A & B)	36,819	32,031
Income taxes	18,340	16,075
Amortization of net deferred charges and credits	108	95
Other expenses	7,058	5,707
Total operating expense	180,034	165,687
Operating Income	69,925	56,885
Net Non-Operating Income	2,300	1,890
Income before Interest Charges	72,225	58,775
Interest Expense		
Total interest charges	28,150	25,801
Less interest charged to construction (Note A)	2,892	5,887
Interest charged to operations	25,258	19,914
Net Income	46,967	38,861

The accompanying notes are an integral part of these statements.

EXHIBIT 4

XYZ POWER COMPANY

Statement of Changes in Financial Position

For the Years Ended December 31, 1974 and 1973
(Expressed in X$)

	1974	1973
Resources Provided		
Income before interest charges	72,225	58,775
Depreciation (Notes A & B)	36,819	32,031
Amortization of net deferred charges and credits	108	95
Internal cash generation	109,152	90,901
Long-term borrowing	50,000	20,000
Contributions in aid of construction	393	281
Government grants	11,000	2,000
Sale of common stock	10,000	10,000
Sale of fixed assets	700	-
Total resources provided	181,245	123,182
Resources Used		
Construction expenditures (excluding interest charged to construction)	103,289	56,688
Debt service		
Amoritization	17,200	9,000
Interest	28,150	25,801
Total debt service	45,350	34,801
Dividends declared and paid	29,000	27,000
Long-term investments	-	3,000
Net deferred charges and credits	460	385
Increase in net working capital (excluding current maturities of long-term debt)	3,146	1,308
Total resources used	181,245	123,182

The accompanying notes are an integral part of these statements.

The concept of "resources" underlying the preparation of the statement of changes in financial position should be broader than that of working capital and can be characterized or defined as "all financial resources", so that the statement will include the financial aspects of all significant transactions, e.g., "non-working capital" transactions such as the acquisition of property through the issue of securities.

XYZ POWER COMPANY

Notes to Financial Statements

Note A - Summary of Significant Accounting Policies

1. Basis of Accounting

Assets and liabilities, and revenues and expenses are recognized on the accrual basis of accounting;

2. Fixed Assets

Fixed assets in operation and accumulated provision for depreciation are revalued at the end of each fiscal year based on the cost of living index issued by the Department of Government Statistics. The net effect of this revaluation is recorded in the surplus arising from revaluations account.

Maintenance, repairs and minor renewals are charged to expense as incurred. Major renewals and betterments are capitalized. When depreciable assets are retired or otherwise disposed of, the cost and related accumulated provision for depreciation are removed from the accounts and the resulting gain or loss is reflected in earnings.

3. Depreciation

Depreciation rates, based on the straight-line method, applicable to the various classifications of fixed assets are in accordance with the depreciation rate schedule included in the XYZ Power Company's license, which reflects satisfactory estimates of the useful lives of the assets which range principally from 10 to 40 years.

4. Interest During Construction

Interest paid on funds borrowed for construction purposes is charged to work in progress during the construction period. Imputed interest on the Company's own funds used for construction purposes is not charged to the fixed assets during the construction period.

5. Investments

Investments are carried at cost. Gains and losses are recognized when securities are sold.

6. Inventories

Inventories of materials and supplies are carried at the lower of cost (primarily on the first-in, first out basis) or market.

7. Legal Reserve

Annual appropriations to the legal reserve are 10% of net income as required by law. Appropriations cease after the legal reserve balance reaches 10% of the par value of the outstanding common stock. The purpose of the legal reserve requirements is to limit the amount of funds available for dividend payments.

8. Foreign Exchange

It is the established practice of the company to revalue its outstanding foreign loans in accordance with the prevailing rate of exchange at the end of each fiscal year. The resulting increase or decrease is recorded in the surplus arising from revaluations account.

Note B - Fixed Assets in Operation

A detailed analysis of fixed assets in operation and the related accumulated provision for depreciation is as follows:

Fixed Assets in Operation	Revalued Balance 12/31/73	Additions 1974	Retirements 1974	Balance 12/31/74	Revaluation	Revalued Balance 12/31/74
	----------X $ ----------					
Generation	420,472	75,731	-	496,203	49,620	545,823
Transmission	199,724	11,350	-	211,074	21,107	232,181
Distribution	399,448	23,258	3,000	419,706	41,971	461,677
General plant and equipment	31,535	5,200	1,000	35,735	3,574	39,309
Total	1,051,179	115,539	4,000	1,162,718	116,272	1,278,990

Accumulated Provision for Depreciation	Balance 12/31/73	Depreciation 1974	Accumulated Depreciation on Retirements	Balance 12/31/74	Revaluation	Revalued Balance 12/31/74
Generation	61,121	12,614	-	73,735	7,373	81,108
Transmission	32,359	6,650	-	39,009	3,901	42,910
Distribution	79,099	15,978	2,500	92,577	9,258	101,835
General plant and equipment	7,191	1,577	800	7,968	797	8,765
Total	179,770	36,819	3,300	213,289	21,329	234,618

Note C - Long-term Debt

	Gross Amount Outstanding 12/31/74	Maturities Due within One Year	Net Amount Outstanding 12/31/74
	X$		
International Bank for Reconstruction & Development (guaranteed by the government), US$____, 7%, payable in 40 varying semi-annual payments commencing on June 30, 1976 (original amount X$ 169,200) revalued at Dec. 31, 1974 (see Note A)	194,580	-	194,580
5% General Mortgage Bonds - X$ 20,000 payable annually, commencing March 15, 1977	200,000	-	200,000
7% Bank loan - National State Bank - original amount X$ 90,200, X$8,200 payable annually on September 30, secured by the general credit of the company	82,000	8,200	73,800
4-1/2% Bank loan - Federal Trust Bank - original amount X$ 90,000, X$ 9,000 payable annually on December 31, secured by the general credit of the company	36,000	9,000	27,000
Total	512,580	17,200	495,380

During 1974, the final drawdown, amounting to X$ 50,000 was made from the IBRD loan. Also, during 1974, X$ 8,200 was repaid on the National State Bank loan and X$ 9,000 on the Federal Trust Bank loan.

Note D - Commitments and Contingent Liabilities

At December 31, 1974, purchase commitments in connection with the Company's plant expansion program amounted to X$ 38,500 (X$ 26,000 at December 31, 1973).

The Company is a defendant in an action in which the plaintiff alleges damages and injuries, amounting to X$ 50,000, resulting from an accident involving one of the Company's trucks. The Company has denied the allegations of the complaint. In the opinion of counsel for the Company, based on the information which has come to their attention, the plaintiff's claims are without merit. Management also believes that this action is without merit.

SUPPLEMENTARY DATA

A. Operations

Sales

Revenues from sales of electricity in 1974 amounted to X$ 248,209, an increase of X$ 27,237 or 12.3% over 1973 sales. A detailed comparative analysis of the sales revenue and the kWh sold during these years are shown in the following schedules.

Sale of Electricity (Currency)	1974	1973	Amount of Increase in 1974	Percent Increase in 1974
	---X $---			
Government & local authorities	22,239	21,520	719	3.3
Residential	115,902	102,475	13,427	13.1
Commercial	67,024	58,743	8,281	14.1
Industrial	34,508	30,231	4,277	14.1
Other	8,536	8,003	533	6.7
Total	248,209	220,972	27,237	12.3
Sales of Electricity (kWh millions)				
Government and local authorities	1.112	1.054	0.058	5.5
Residential	5.447	4.714	0.733	15.5
Commercial	3.841	3.407	0.434	12.7
Industrial	3.675	3.204	0.471	14.7
Other	0.825	0.760	0.065	8.6
Total Sales	14.900	13.139	1.761	13.4
Losses & internal consumption	1.482	1.288	0.194	10.8
Total Generation	16.382	14.427	1.955	13.6

Tariffs remained unchanged during 1974 and 1973. The overall percentage increase in kWh sold during 1974 is slightly greater than the overall percentage increase in sales revenue which is accounted for by increased sales at lower tariff blocks.

Operating Expenses, Operating Income and Rate of Return

Operating expenses increased X$ 14,347 in 1974, or about 8.7% compared with 1973. This increase was largely due to increased fuel prices, a new labor union contract, and a net increase of 46 employees. Operating income in 1974, increased X$ 13,040 or about 23% over 1973. Operating income of X$ 69,925 in 1974 was equivalent to a rate of return on the average net fixed assets in operation of 7.3% (6.8% in 1973). The rate of return in 1974 is in compliance with the revenue covenant in the IBRD loan agreement, which covenant became effective in 1974. The operating ratio improved slightly from 74.4% in 1973 to 72.0% in 1974.

Net Income Per Share

Net income in 1974 was X$ 46,967 which was equivalent to X$ 12.14 per share outstanding at the end of the year compared to X$ 10.23 per share in the previous year.

B. Internal Cash Generation and Construction Costs

Exhibit 4 shows the changes in the Company's financial position. As shown below during 1973 the Company provided X$ 24,407 from its own net internal cash generation or about 39% of the funds for construction purposes, including interest during construction. The construction program expanded considerably in 1974, from X$ 62,575 in 1973 to X$ 106,181 including interest during construction. Net internal cash generation in 1974 provided about 29% of the total construction costs. The balance of construction costs was mainly financed by long-term borrowing, government grants and the sale of additional share capital. Details are shown in the following schedule.

	1974	1973
	------X $------	
Internal Cash Generation	109,152	90,901
Less:		
Debt Service (excluding interest charged to construction)	45,350	34,801
Dividends declared and paid	29,000	27,000
Long-term investments	-	3,000
Net deferred charges and credits	460	385
Increases or (decrease) in net working capital (excluding current maturities of long-term debt)	3,146	1,308
Total deductions	77,956	66,494
A. Net internal cash generation	31,196	24,407
Construction expenditures	103,289	56,688
Interest charged to construction	2,892	5,887
B. Total construction costs	106,181	62,575
A ÷ B	29%	39%

Annual debt service coverage (internal cash generation ÷ debt service) was 2.6 times in 1973 and 2.4 times in 1974. A test was made to determine the maximum future debt service coverage as required by the IBRD loan agreement. As of December 31, 1974, this coverage was 1.7 times and would allow more borrowings to be incurred within the debt limitation covenant.

C. Financial Position

Investments

Investments consist of ten Series B Government Bonds with interest at 6%. These bonds mature in 1985. The market value at December 31, 1974, was X$ 10,500 (X$ 10,200 at December 31, 1973).

Net Working Capital

	X $		
	December 31		Increase
	1974	1973	1974
Current assets	63,742	49,029	14,713
Current liabilities, excluding current maturities of long-term debt	30,418	18,851	11,567
Net Working Capital	33,324	30,178	3,146

The current ratio decreased from 2.6:1 in 1973 to 2.1:1 in 1974. The decrease in the current ratio was substantial, but nevertheless the net working capital position is still satisfactory.

Cash

	X $	
	December 31	
	1974	1973
Cash on hand at:		
Headquarters	4,600	1,752
Branch office	845	681
Bank balances:		
National State Bank	5,981	9,764
Federal Trust Bank	5,000	3,500
Total	16,426	15,697

Accounts Receivable

Details of accounts receivable are shown below:

Consumer Accounts	-----X $----- -December 31- 1974	1973	% of Total 1974	1973
Government and local authorities	2,300	2,125	9	10
Residential	10,860	8,019	43	40
Commercial	7,616	5,785	30	29
Industrial	2,747	2,784	11	14
Other consumers	999	795	4	4
Other Accounts Receivable	625	578	3	3
Total	25,147	20,086	100	100
Less allowance for uncollectible accounts	519	478		
Accounts receivable - net	24,628	19,608		

An analysis of the accounts receivable as to age is provided in the following schedule:

	-----X $---- -December 31 1974	1973
Consumer Accounts		
Current accounts	15,191	11,827
Past due (days)		
1 -30	8,074	6,250
31-90	1,006	1,004
91-180	251	402
over 180	-	25
Total consumer accounts	24,522	19,508
Other Accounts Receivable		
Current accounts	375	305
Past due (days)		
1 -30	210	170
31-90	30	76
91-180	10	27
over 180	-	-
Total other accounts receivable	625	578
Total accounts receivable	25,147	20,086

Meter reading is a daily operation and each meter is read once a month. Billings are issued within ten days of the meter readings and are due for payment within 15 days after issuance.

The collection of accounts receivable deteriorated somewhat in 1974 as reflected by the decrease in the turnover of receivables. The turnover in 1973 was 11.1 times while in 1974 it was 9.9 times. This indicates that in 1973 the average number of days sales uncollected was 32 days and in 1974 this increased to 36 days. Sales revenues increased 12.3% in 1974 but accounts receivable increased 25% at December 31, 1974. After testing the ageing schedule and reviewing the accounts, the allowance for uncollectible accounts was considered adequate.

Materials and Supplies

Inventories of materials and supplies consist of the following:

	------X $------ --December 31--	
Classification	1974	1973
Fuel	14,750	6,438
Materials	4,926	4,769
Maintenance and other supplies	2,182	2,025
Total	21,858	13,232

Ending inventories of materials and supplies at December 31, 1974, increased X$ 8,636 or about 65% over the previous year. This increase appears justified since about 96% of the increase was in fuel supplies. In the latter part of 1974, increased purchases of fuel were made in anticipation of higher future fuel prices. Construction materials are carried in the work in progress account.

Equity

In June 1974, 69 additional capital shares were sold to the government for X$ 10,000. Of this amount, X$ 6,900 was credited to the common stock account and X$ 3,100 was credited to the premium on capital stock account. The retained earnings account in 1974 was increased by X$ 13,270 after providing X$ 29,000 for dividends and a X$ 4,697 allocation to the legal reserve account as required by law.

Current Liabilities

Short-term notes were local bank loans taken to cover temporary cash shortages. The X$ 7,500 note outstanding at December 31,1973, was paid in full in February 1974. The Company obtained the X$ 16,000 bank note in November 1974 and expects to repay this in March 1975.

SCOPE OF AUDIT

In conformity with the terms of our engagement, we have made an examination of the balance sheet of the XYZ Power Company as of December 31, 1974, and the related statements of income, changes in shareholders' equity, and changes in financial position for the year then ended. Our examination was carried out in accordance with generally accepted auditing standards and included the testing of the assets and liability accounts and an analytical review by test of the expense and revenue records - accounts, transactions, and supporting evidence. We reviewed the accounting system and system of internal control and found them satisfactory except as noted below.

All fixed asset additions and deductions were verified by inspection of the Minutes Book for authorization, by voucher examination, and by vouching all transactions to the accounts; we found that all capital charges were correctly recorded. The subsidiary plant accounts were in agreement with the controlling accounts. Additions and deductions to the accumulated provision for depreciation were examined and found to be correct. The work order system for control over the work in progress accounts was reviewed and found to be adequate.

The long-term investments were verified by examining the contents of the Company's safe-deposit box at the Federal Trust Bank.

Cash on deposit at the National State Bank and at the Federal Trust Bank were verified by certificates obtained from the Banks, which amounts were reconciled with the records of the Company. Cash on hand at headquarters and branch offices were verified by count.

Accounts receivable were verified by confirmation; requests for confirmation were sent to 75% of the consumers and 63% replied. All exceptions noted were only of a minor nature and adjustments were accordingly made. The ageing schedule of accounts receivable shown in an earlier section of this report was sufficiently tested to determine that it was substantially correct. The chief accounts receivable clerk determines the uncollectible accounts from an analysis of the ageing schedule and from all other known facts and these amounts are immediately written-off against the allowance for uncollectible accounts. The current year's write-off appears adequate. To strengthen this procedure it is recommended that the write-off of accounts should be authorized by a more responsible person, i.e., the chief accountant or the administrative officer. It is also recommended that after accounts have been written-off some follow-up should be made for possible future recovery or that such accounts should be turned over to a collection agency.

Materials and supplies were tested for quantity. Our representatives were present during the taking of the inventory, at which time the tests were made. Prices, extensions, and footings of the inventory sheets and summaries were thoroughly tested. Tests and checks were made of the perpetual inventory cards. Only a very few items in stock were inactive and no obsolote items were noted. Many adjustments were required to reconcile the physical inventory to the perpetual inventory cards and a minor shortage of fuel was uncovered. To improve control over materials and supplies we strongly suggest the implementing of the inventory control system recommended in our separate report to the Company.

The calculations of prepaid insurance were verified. Copies of all insurance policies were obtained and analyzed. The various types of insurance coverage appeared to be adequate, with the exception of insurance against fire loss. With the increase in value of the fixed assets it is recommended that the fire insurance coverage should be increased. One fire insurance policy was not renewed because of an oversight on the part of the insurance broker. The renewal was made during the audit.

In respect to capital stock, the Company acts as its own registrar and transfer agent. These records were examined and found to be in agreement with the outstanding shares. Receipts of the government grants were traced to the bank deposits.

Outstanding bonds and loans were verified by direct confirmation from the respective banks.

Accounts payable were reviewed and analyzed. The sum of the subsidiary account balances was in agreement with the balance of the controlling account. Based upon our examination of the subsidiary records, aided by inquiry and certification, we are satisfied that the accounts payable accurately reflects all such unpaid amounts at the end of the year. We examined invoices, inventory records, and purchase records for the first few days in January 1975, and the last few days in December 1974, and are assured that the cut-off periods are proper. Other current liabilities were tested and verified. We also obtained a liability certificate from the Company's controller in respect to the amount of liabilities shown on the balance sheet at December 31, 1974.

INTERNATIONAL DEVELO .T ASSOCIATION | INTERNATIONAL BANK FOR RECONSTRUCTION AND DEVELOPMENT | INTERNATIONAL FINANCE CORPORATION

OFFICE MEMORANDUM

TO: Mr. Raymond M. Frost

DATE: November 14, 1974

FROM: Y. Rovani

SUBJECT: Power Course

This is to confirm my 'phone call of yesterday enquiring about the plans we had discussed last year for an EDI power course starting in FY'76.

I would like to be able to count on this course which I view, in the light of the experience in water supply, as an important means of furthering our own objectives and disseminating the results of our work to an audience of power managers.

It follows that we will give your staff every assistance we can in planning and implementing the course.

cc: Mr. Baum
Mr. Willoughby

YRovani:em

1189
NOV 15 1974

INTERNATIONAL DEVELOPMENT ASSOCIATION | INTERNATIONAL BANK FOR RECONSTRUCTION AND DEVELOPMENT | INTERNATIONAL FINANCE CORPORATION

OFFICE MEMORANDUM

TO: Mr. Christopher R. Willoughby, Director, OED DATE: November 5, 1974

FROM: G. Mackay, Assistant Director, Eastern Africa Projects

SUBJECT: Closing Report to Electric Power Evaluation

1. I attach comments by Messrs. Morse and Erkmen on the twenty suggestions regarding future Bank activity in the field of electric power listed by you in your first draft Closing Report. As you will note some of these comments are at variance on technical and other issues with the views expressed in your paper.

2. With regard to the conclusions and, in particular, the five proposed courses of action I have the following comments:

(a) The proposal to recruit more power economists would not, of itself, serve much purpose. Many of the Report's recommendations require more staff time in all disciplines. The economists, to be effective, need engineers and financial analysts to dig up many of the facts and figures they require. This indeed is the major impediment to progress on all the recommendations. Everyone comes up with **ideas**, good ideas, to have this or that further degree of sophistication -- except at budget time. This proposed course of action, if it is to go forward, should perhaps be reworded as follows:

> "Assess the Bank's specific needs and possible sources of additional power economists, engineers and financial analysts to carry out the program and then prepare a plan for recruitment."

(b) Agreed.

(c) There is a shortage of indigenous senior power utility staff in many of this Region's countries: would the EDI courses be available to expatriate staff who will probably have short-term but major responsibility for the next ten years or so?

(d) Agreed (although it should be made clear that the guidelines, on certain subjects, must not be regarded as a substitute for the exercise of professional judgment).

(e) Agreed.

Attachment.

GMackay:cba

cc: Messrs. H. Adler, Morse, Erkmen

Comments on "Closing Report on Actions Relating to Recommendations of the Electric Power Evaluation Report" of September 1974, by Messrs. Morse and Erkmen

1. System Extensions

CPS is conducting the work to develop means for analyzing the economic validity of extending public power to unserved areas. The 1974 East Africa power projects included three supplemental loans and two new projects in Malawi and Zambia; these were aimed at primarily increasing the generating and transmission facilities of the total power investment program which included some distributing facilities outside the Bank-financed portion of the program. Although there is some rural electrification in all countries, the amount is fairly modest and handicapped by small demand, large distances and general inability to pay even subsidized power costs. In fact, we have had no success in getting power service included in urban site and service projects in the region, reflecting, perhaps, the relatively low value inhabitants place on these services.

2. New Connection Policies

Connection policies are routinely appraised at appraisal and during supervision. Many utilities have concessionary arrangements for lower income residents with little apparent result. As an example, a Government housing development in Blantyre, Malawi, included wiring of individual houses which was not used by the occupants because at their income level their preferences did not include, probably due to lack of learned appreciation, the use of electricity. This supports the alleged lack of interest in house connections in urban site and service projects cited in the preceding paragraph. This does not mean that we are doing nothing about it, but that results will be very slow. Interestingly enough, a very high premium is reportedly placed on street lighting for personal security purposes.

3. Self-help for Distribution Expansion

Little opportunities appear for action under this rubric. The unskilled labor which would presumably be available under a self-help arrangement would constitute an insignificant part of the cost of extension of electricity services, and not worth the difficulty in organizing it.

4. Generation and Transmission Reliability Standards

There is not a single rational standard established for any given set of circumstances even in the developed world. Differing practices are observed all over the world. For each East Africa project, the feasibility

study does include a safety criterion. Appraisals make sure that these criteria are reasonable. This is long established standard practice, which is why they are not mentioned in appraisal reports.

5. Distribution Reliability Standards

Similar comments to the above would apply here as well; a reliability criterion would be employed which would reflect the merits of a particular case and the judgment of the engineer. There is no specific pattern that can be followed but certain generally accepted principles which are applied as appropriate.

6. Urban Context

The proposal that appraisal and sector reports explicitly discuss the balance between power and other services and facilities in urban areas appears to be one of the least practical. Sector missions and program officers are not equipped to assess overall urban requirements. This is best met by an urban sector review, which has limitations of its own in terms of time and expertise. Attempts in this regard (Bombay and Calcutta) have not been very useful.

We are further handicapped in the East Africa region because of the emphasis we give to rural areas. Even if a water supply mission, say, were to identify telecommunications or urban transport as deserving higher priority, there could be a number of institutional, project preparation, and/or local politics in addition to Bank sectorial priorities which would prevent us from doing something about it.

7. Tariff Structures

We have begun looking at the power tariff structures in Sudan and Malawi and intend to review them in all countries of the region in which we are active in the power sector as manpower and the opportunity permit.

8. Shadow Prices

The only problem with using shadow prices, is getting shadow prices. Considering the difficulties that we have had these many years in getting a shadow price for the opportunity cost of capital, we are not sanguine about them for other project inputs. There is no difficulty with the concept or the methodology, only with the numbers. This is precisely the reason that the two tariff case studies in Tunisia and Sudan did not discuss shadow prices.

9. Fiscal Contribution of Power Companies

There is little conceptual difficulty with the idea that power companies should make a contribution to development -- presumably non-power development. Many utilities do pay dividends and taxes and the major obstacle to greater contribution to the Government coffers is Government reluctance to increase the power rates for political reasons.

10. Utility Performance Indicators

These have always been used implicitly in the project appraisal; the difference now is that they are explicitly mentioned. This is being increasingly done.

11. Power Planning Units

With the possible exemption of the Sudan and Madagascar, there still are not enough qualified and experienced indigenous personnel to do even the more routine power management tasks. Most of the utilities are staffed at the wide senior levels with expatriates. Given this situation and the extensive turnover in expatriate employees, it will probably be necessary to continue to depend on outside consultants for most of the power planning and only in the long run can effective power planning units be established.

12. Training

Training is included in all of our power projects, although the attention given may need to be expanded. Training for technician level, is active and growing. The principal difficulty at the professional level lies in the scarcity of engineering and other university graduates. The immediate problem is to produce more university graduates, really to produce more secondary school leavers capable of entering engineering courses in the university.

13. Financial Recording and Planning

Yes, there are substantial weaknesses in borrowers' accounting systems and procedures, particularly with regard to cash-flow planning. With the continuing loss of expatriates, the situation is generally deteriorating and that we are often concerned on the elementary level of getting accounts posted and bills issued and collected. This is an area we are very concerned with and most projects provide for assistance in this area, including the assistance of auditors -- which has proved to be an uncertain aid.

14. World Trends in Power Financing

This is an area in which senior management and CPS can provide general guidance. However, in specific cases, the region has encouraged countries to supplement Bank lending in power with suppliers' credits or financing from national export agencies and bilateral and multilateral sources. Although a worldwide overview is of value, actual application is done at a country basis and falls primarily on the responsible Program Division to encourage countries to contact, or to do so on their behalf, potential financiers.

15. Sales of Participation in Bank Loans

No comment.

16. Follow-up Evaluation Studies

As far as the Bank financing local procurement of electrical equipment and the contribution this might have made to the growth of domestic equipment industry, there has been none in this region.

17. Central Power Institutions

A strong central institution in a power sector exists or is in the process of creation (Zaire) in all of the countries in the East Africa Region.

18. Unified Jurisdiction of Local Power Companies

Zaire is the only country where there is not a unified jurisdiction. Even here government policy seems to be to unify all power activities under a single national company, a process we do not consider urgent.

19. Institution-Building Delays

We agree that holding back a loan in order to achieve institutional improvements should be treated pragmatically. In the case of the Sudan, we would claim that considerable results have already been achieved in institution-building as a consequence of our heel-dragging. Happily, this does not seem to have caused any cost to the economy, as a more recent analysis of power demand showed that earlier projections were high and no shortage of power will occur as a result of the delay.

You suggest that any such proposed delay should include the consequential cost of power shortage to the national economy, with the implication that the delays may be unwise. This will obviously be a matter of judgment but we have difficulty imagining any other useful leverage in obtaining necessary reforms.

20. Construction Cost Estimates

We have been addressing ourselves to the problem of cost overruns and have made a number of suggestions, including the use of cost specialist consultants. These recommendations have also included better data, realistic implementation schedules, and consideration of presenting the loan to the Executive Directors later on in the Project cycle when estimates are more firm.

CMorse/EErkmen:aca/cba
November 5, 1974

OFFICE MEMORANDUM

TO: Mr. Yves Rovani

DATE: October 24, 1974

FROM: Dennis Anderson

SUBJECT: TUNISIA - Electricity Tariffs
Report on Discussions in London of October 7 and 8

1. The following are notes by Professor Turvey (Consultant) and myself on the above discussions with Societe Tunisienne Electricite et du Gaz (STEG).

2. Since our visit in October 1972, STEG has redone (with no major changes) the calculations of the costs and tariffs discussed in our report. Their main effort has been to put in additional metering for their 150 largest consumers in order to calculate how much each of them would pay under alternative tariffs, and to compare it with what they pay under current tariffs. They attach a great deal of importance to this, appearing frightened of making any tariff change which would significantly alter any large consumer's bill.

3. The new tariff which they have been considering for their large consumers is an improvement on one of the two tariffs currently applied to such consumers in that it replaces declining KW-related KWh blocks with time-of-day charges. But the new tariff would involve different KW and KWh charges for each of high, medium, and low load-factor consumers, even though the marginal costs of supplying KW and KWh are the same for each of these consumers.

4. We suggested that this form of triple tariff was undesirable; there should be only one. Accepting, for the sake of argument, that such a single tariff would produce unacceptably large fluctuations in individual consumers' bills, we argued for a two-phase strategy:

(i) Get the form right and fix the levels of the various components to achieve acceptability;

(ii) Thereafter, gradually change the various components over a period of years until they reflect marginal costs, modified as necessary to ensure that revenue requirements are met.

5. A further oddity of the proposals is that, in order to minimise the impact of tariffs on consumers' bills, STEG plan to retain the old tariffs for consumers whose demands are believed to be particularly inelastic. This is untidy and may also raise questions about discrimination when the new tariffs are announced; rather than make implementation easier, it could make it more difficult. The idea of the triple tariff has undoubtedly stemmed from STEG's desire to minimize the new structure's impact on the consumers' bills; however, they have not investigated if a simpler and better structure would be more acceptable than their proposals. (As an exercise we suggested that a multiple regression analysis of existing bills against the new tariff components(i.e. the new structure) might help ascertain suitable initial levels for the price of each of these components; the idea would be to ascertain the tariff levels which would minimise the sum of the (squared) changes in consumers' bills; this could be used as a reference point for discussions on acceptability, and to see

if a marginal cost structure is as unacceptable as supposed.)

6. STEG's tentative new medium voltage tariff which we thus criticised is not a firm proposal made by the enterprise, it is only a tentative proposal confined within the Direction des Etudes Economique. That it has taken two years to get only this far is explained by M. Rekik as due to the time required to organise, make and analyse the measurements referred to in paragraph 2. But the real ex post facto justification of the delay is the rise in oil prices. Except for petrol for cars, oil and natural gas prices in Tunisia have been maintained at their pre-October 1973 levels by Government. STEG, in our opinion justifiably, is waiting for the Government to raise them, as it apparently may do, before altering electricity tariffs. It could then combine a change in structure with a change in level and might even feel able to go further towards marginal cost pricing in the first phase than it would if, as originally contemplated, only a change in structure were involved.

7. It is expected that the Government will announce its decision on oil and natural gas prices in about 6 months time, at which time STEG said they would be prepared to initiate a new pricing policy too. We encouraged them to calculate what would be their pricing policy under a range of possible oil prices.

8. STEG does not want to alter the form of low voltage tariffs until work now in train has provided important information which is now lacking about distribution costs. But their notions of a peak/non-peak time-of-day tariff for larger low voltage consumers, and of cheap supplies restricted to non-peak hours for pumping and for water treating, seem sensible. (They now have tele-control in the major part of their system and use it for time-switching with much greater reliability than clocks. We pointed out that they can also use it to do load research.)

9. M. Rekik was open-minded about all our arguments and, though he may not accept them in the end, will obviously consider them seriously and fairly. Since we wrote our original report only as a case study, this seems sufficient. The question which remains is whether the Bank should tackle the Tunisian Government on the problem of raising oil and natural gas prices to world levels.

10. In conclusion:

(1) The new tariff proposals for large consumers (the medium voltage tariff) would undoubtedly be an improvement on existing tariffs, but we have two reservations:

(a) there is no economic case for three kinds of time-of-day tariffs for consumers on the medium voltage levels; and

(b) the idea of retaining the old tariffs for some consumers is discriminatory and not convincing.

(2) Even with the above reservations, however, STEG would deserve and perhaps require our support in implementing them: they are undoubtedly worried about Government reactions. Their strategy for implementing them (when oil prices in Tunisia are changed) makes sense.

(3) STEG still have quite a lot of preparatory work to do; in particular:

- to revise their calculations for a range of oil prices;

- on LV tariffs; and

- on determining if a simpler and better structure than the one they propose would indeed be less acceptable.

(4) The Government's pricing policy on oil and natural gas is probably causing a number of distortions in the economy which we might usefully question.

DAnderson:mds

cc: Messrs. Sheehan,
Haynes,
Wyatt,
Fish,
Kupper,
Buphomene,
Russell;
Turvey
Blue Book; Files

INTERNATIONAL DEVELOPMENT ASSOCIATION | INTERNATIONAL BANK FOR RECONSTRUCTION AND DEVELOPMENT | INTERNATIONAL FINANCE CORPORATION

OFFICE MEMORANDUM

TO: Mr. C.R. Willoughby DATE: October 18, 1974

FROM: W.A. Wapenhans

SUBJECT: First Draft of Closing Report to Electric Power Evaluation

In accordance with your memo of September 23, 1974 I am forwarding herewith comments from the Power and Energy Development Division, with which I concur.

cc: Mr. Wyatt
EMENA, Div. & Chron. Files

JJFish:pww

1137
10/23

221

OFFICE MEMORANDUM

TO: Mr. W.A. Wapenhans

DATE: October 16, 1974

FROM: James J Fish JJF

SUBJECT: Mr. Willoughby's Memo of September 23, 1974
"First Draft of Closing Report to Electric Power Evaluation"

Appraisals
Syria May 73 & Feb 74
Iran Sept-Oct 73
Turkey Sept-Oct 73
Algeria Oct-Nov 73
Iceland Jan-Feb 73

This note consolidates the Division comments.

There are two major comments and several minor ones:

a) The review is premature -- specific guidelines to the staff have been issued only recently (e.g. the paper on economic evaluation of power projects was issued only two weeks ago, and is not yet available in sufficient quantity for distribution to all power staff) and considering the length of the project cycle it is unreasonable to expect significant results this early -- many of the projects investigated in this review were appraised before, or only shortly after, the distribution of the original report (Spring 1972).

b) The report (again) fails to establish priorities among the various recommendations. The most difficult part of any appraisal (or more lately, of sector reviews) is to identify the specific sub-sector areas where Bank involvement will pay greatest dividends; I do not accept the implied premise that we are misallocating staff resources in our present operations, therefore, unless we are willing to provide additional staff there is no way that the bulk of the recommendations can be implemented. The proposals on distribution alone, applied uniformly, would require doubling present appraisal manpower (a careful and, I feel, conservative estimate). Perhaps what is needed is a more positive attempt by the Bank to encourage the organization of a new multilateral advisory body which would provide most of the consulting-type services recommended by the paper. UNIPEDE (and its Central American equivalent) do provide some useful services, but generally not on a specified-country basis; there is no FAO, WHO, ITU etc., for power and energy. (See Mr. Wyatt's comment on the original paper.)

Specifically:

c) Pg. 4. Distribution. The drop in loans for distribution should not be surprising because the FY74 program was jelled before the original paper was produced; sub-sectoral shifts are not likely to be evident before FY77, if then. The discussion also ignores the substantial distribution component in loans in other sectors, chiefly agriculture (e.g. 754-GR, 991-GR, 975-SYR, 777-YUG, Romania - Giurgui Razmiresti, Cyprus - Paphos in EMENA; there must be others). I also disagree with the implication that it is necessary to lend for a distribution project in order to effect improvements in the distribution sub-sector. While we should not refuse such projects in general they are poor vehicles for Bank lending.

d) Pg. 7. System Extension (1). Suggest reword last paragraph to eliminate inference that the FY74 projects should have reflected the new electrification guidelines -- these were issued only on July 25, 1974.

e) Pg. 8. Connection Policies (2). This is a difficult subject to assess quantitatively -- we are still awaiting guidelines for procedure, hence no explicit progress. In any event, "rigorous application of the proposed new approach" will not be possible until we can afford the luxury (?) of an economist for each appraisal mission.

f) Pg. 10. Reliability (4.5). Quantification of reliability criteria is extremely difficult -- computer techniques are only just becoming available, and generally are inapplicable to LDC's. This presents a real operational problem to translate into specific instructions e.g. for consultants, even when we do have an opportunity to comment on the terms of reference (engineering work often is substantially completed by the time the Bank becomes involved). It is untrue to state categorically that "feasibility studies are not reviewed ... (for) these matters". Partly as a result of the original recommendation and follow-on work by CPS, staff are more aware of reliability standards and this has been a significant factor in recent work e.g. Yugoslavia, Romania, Turkey.

g) Pg. 14. Tariff Structures (7). As a postscript to the Tunisia study mentioned, it should be noted that STEG has decided that the net differences between their "conventional" tariffs and those resulting from the marginal-cost study are so small as to question the effort and disruption required for their introduction -- this emphasizes the importance of attention to the transitional stage, hitherto ignored. I consider that the main constraint is not shortage of staff but rather honest doubts as to the worth of the exercise, by both the Bank and our borrowers.

h) Pg. 16. Fiscal Contribution (9). The Bank's conventional model of a utility assumes that it reacts generally as a privately-owned profit-motivated corporate animal. The real situation in most of our countries is quite different, and these differences usually can be identified by the kind of fiscal audit proposed, leading to more consistent treatment of our various borrowers. Mr. Willoughby deserves credit for pushing this issue.

i) Pg. 17. Performance Indicators (10). Each of our appraisals since the guidelines were issued (late 1973) has included a set of performance indicators, to be maintained through the reporting requirements (Iceland, Algeria, Romania, Turkey, Iran, Syria). I consider this more than "perfunctory" attention. It is true that we have not yet learned how to evaluate the indicators so that we can establish efficiency targets.

meaning

Algeria, yes.

Here is nothing in appr. reports unless he means basic sector data.

j) Pg. 19. Planning (11). Iran does not belong in the list -- virtually all planning work is done by outside consultants. Turkey would be a more suitable example.

k) Pg. 20. Financial Recording (13). Reliance on borrower's auditors for upgrading accounting is not feasible in EMENA -- as a general rule, the auditors are barely a notch above the borrowers and usually are less familiar with the specifics of public utility accounting.

l) Pg. 20-22. Financing (14, 15). Global inflation and utilization of poorer-quality resources are ballooning investment requirements such that shortage of capital could pose serious constraints on the LDC's power programs. The Bank should seek an active role along the lines proposed by Mr. Willoughby. I suggest introducing quantitative examples to reinforce this part of the paper.

m) Pg. 27. Conclusions The comment on shortage of economists struck a responsive note but (see b above) I'm not yet convinced that a worth-analysis will verify that the Bank should be using its resources to pursue all the various recommendations particularly in view of the difficulty we have in recruiting good power economists. The paper should consider this aspect as defense for recommendation 1. (recruiting economists).

We endorse recommendation 2, (practical demonstrations) and are indifferent on 3, 4, and 5.

cc: Messrs. Wyatt, Haynes, Sheehan, Jennings
EMENA Files
Division Staff
Chron. File

JJFish:pww

INTERNATIONAL DEVELOPMENT ASSOCIATION | INTERNATIONAL BANK FOR RECONSTRUCTION AND DEVELOPMENT | INTERNATIONAL FINANCE CORPORATION

OFFICE MEMORANDUM

TO: Mr. Christopher R. Willoughby, Director
Operations Evaluation Department

DATE: October 9, 1974

FROM: Raymond M. Frost, Deputy Director, EDI RMF

SUBJECT: First Draft of Closing Report to Electric Power Evaluation

Thank you for your memorandum of September 23. We have no changes to suggest in the reference to EDI in this draft report in paragraph 3, page 29.

RMFrost/rob

cc: Mr. Lamson-Scribner (with report)

1079
OCT 10 1974

Mexico Integrated Rural Dev. Project I (Papaloapan Basin) approved in October 1974

electricity will be installed in about 106 villages with 137,000 inhabitants

Electricity represents 7% of total project cost.
$ 5.830 mln + 71% contg. =
$ 9.969 mln

Bank contribution all fx
30% for social infrastructure
29% of l.c. cost = 70%

∴ 100% x 30% x 9.969 = 2.991
29% x 70% x 9.969 = 2.024
20.3% 5.015

to bring electricity to an additional 7% of the people of the Papaloapan basin. (41% now).

Total project cost $ 138.5 mln
loan $ 50.0 mln

FIDIC

Scott – confidentiality of reports – Private G.

OFFICE MEMORANDUM

TO: Mr. C. R. Willoughby, Director, Operations Evaluation Department

DATE: October 24, 1974

FROM: J. Blaxall, Acting Director, LCP

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

The following points are submitted for your consideration:

Preamble, page 2 - In addition to the scale economies resulting from the amalgamation of regional power companies, perhaps a mention should be made of international cooperation and exchange of power through network interconnections. This is becoming of increasing significance in Latin America and can lead to major economies under present conditions where costs of thermal generation have increased significantly and where hydro-electric or geothermal resources may be concentrated in specific countries.

Preamble, page 3 - Reference might be made to the need to review the economics of replacing separate facilities (autogeneration) by means of distributed power. In the Preamble, page 3, System Extensions, page 5 and New Connection Policies, page 8, there are references to providing power at less than cost and setting tariffs initially below long-run marginal cost and with an emphasis on economic validity and social effects rather than meeting financial viability criteria. Report No. 517, "Issues in Rural Electrification", on its part, while outlining the need for coordination between investments in various sectors, also indicates how tariff increases to urban consumers might be utilized to finance rural electrification programs and favors this as giving the utility autonomy in running the program. There are two aspects of this matter which are of concern to us. One is the problem of providing adequate rates of return under conditions where governments are trying to limit inflation and are not receptive to tariff increases (even where required to meet the increased cost of thermal generation). The other is the problem of deciding on inter-sector priorities and meeting demands of other Government development projects such as agro-industry, which might justify departing from the development pattern utilities would normally follow and which are normally governed by financial criteria. Rural electrification should form part of the comprehensive development program. It is considered therefore that the best approach might be for the respective governments to decide on the areas to be developed after due consideration of priorities for the economy as a whole and to provide funds on a concessionary basis even through these might have to be financed through a tax on consumers. (In the case of IDA countries, the proceeds of IDA credits for rural development could be made available to the entity as equity, or as loans with lower interest rates and for longer terms than would apply under a Bank loan). Whatever is decided on the basis of funding or subsidization of rural electrification, there is a very real need for a statement of Bank policy to guide appraisal missions.

1148

New Connection Policies, page 8 - On the question of projections of new customers connected, we have now started to include this information in appraisal reports such as that for Honduras. A point which might be made here which is of significance in the development of rural electrification is the cost of wiring the individual families' premises. This is in many cases a limiting factor in accepting service.

Generation and Transmission Reliability Standards, page 10 - Although with some difficulty, we might be in a position to estimate savings in systems costs which result from adoption of lower standards of reliability. There are possible serious economic costs involved in adopting such lower standards, particularly if they lead to load shedding and it would appear desirable to consider these two factors in relation to one another. The statement: "Apparently largely at the initiative of the consultant" in relation to the study of CFE's reliability standards is inaccurate and should be deleted. We are still in process of reviewing this study.

Urban Context, page 13 - Confirming the view expressed in the report, it is not seen how individual staff members who have trained in a particular discipline can possibly assess the question of balance between power and other services.

Tariff Structures, page 14 - Essentially the inelastic customers are industry and business. Additional taxation of these may result in indirect taxation of the elastic consumers who are not only customers for electricity but for the products produced and sold by industry and business. It would seem appropriate that public utilities should be subject to normal taxation provisions existing for other industries (plus possibly a tax for rural development) and that the tariff structure should be based on the cost of services provided which would of course take into account any subsidization provided by government to foster rural development.

Shadow Pricing, page 15 - While it is helpful to review the situation on the basis of shadow pricing, we have found that in some cases public utilities wish, on grounds of financial costs and viability, to use actual pricing. In most cases involving the power sector, however, large hydro projects have a glamour appeal and this generally results in a willingness to adopt shadow pricing. Nonetheless, some consideration might be given on whether entities should be compensated for adopting solutions in the interest of the economy rather than their own financial benefit.

World Trends in Power Financing, page 20 - Although a considerable amount of work has already been done in this connection, it would seem that there is a continuing need to study the effect of future oil price trends on the economics of provision of hydro and nuclear plants.

Institution Building Delays, page 24 - While noting the comments made in the report, it is nonetheless the case that the Bank rightly emphasizes the importance of institution building and in many cases desirable changes have been delayed by Government or the borrower for no particularly valid reason.

Conclusions, page 27 - Discussions at Board meetings would be more meaningful, it is felt, if directed to consideration of policy papers and issues such as those raised in the report on rural electrification rather than individual appraisal reports.

On the question of participation of economists in the study of power projects, it is felt that increased participation would be extremely useful. However, in view of the scarcity of economists with experience in public utilities, budgetary limitations and the economic use of what must be a small group of staff, this could best be obtained by attaching them at least initially to Central Projects and arranging that they should participate in missions in the various Regions. This would require some restraint on the part of higher management in placing conflicting demands on Central Projects.

Conclusions, page 28 - We have heard complaints from some power sector borrowers that the World Bank is requiring changes in the organization and insisting on increasing amounts of information while providing a declining share of financial requirements. It may therefore be difficult to achieve the improvements in analysis envisaged in the larger countries - where the potential impact is greatest.

CRDickenson/jk

cc Messrs. Knox (o/r)
Geli
Dickenson

DOCUMENT OF

INTERNATIONAL DEVELOPMENT ASSOCIATION

NOT FOR PUBLIC USE

IDA/SecM74-291

FROM: The Secretary

October 11, 1974

NOTICE OF INTENTION TO NEGOTIATE

SUDAN: SECOND POWER PROJECT

The Association is planning to invite the Government of Sudan to send representatives to Washington to negotiate a proposed credit of $23.0 million to help finance a Second Power Project.

Distribution:

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

FORM NO. 678
(7–73)

Mr. McNaughtay

CONFIDENTIAL

INTERNATIONAL BANK FOR RECONSTRUCTION AND DEVELOPMENT
INTERNATIONAL DEVELOPMENT ASSOCIATION

POLICY REVIEW COMMITTEE

PRC/C/74-10

October 3, 1974

ECONOMIC EVALUATION OF PUBLIC UTILITIES PROJECTS

Attached is a revised version of the paper 'Economic Evaluation of Public Utilities Projects' prepared by the Public Utilities Department. The paper was distributed for staff level comments on July 2, 1974, and has since been revised in the light of the comments received.

It is distributed for information only; no meeting of the PRC is planned.

Frank Vibert
Secretary
Policy Review Committee

Distribution:
PRC Members
Vice President - IFC
IBRD Department Directors
Regional Chief Economists
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ECONOMIC EVALUATION OF PUBLIC UTILITIES PROJECTS

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C O N T E N T S

ECONOMIC EVALUATION OF PUBLIC UTILITIES PROJECTS

SUMMARY AND CONCLUSIONS

i. This paper attempts to place in proper perspective the significance of the internal economic return (IER) calculation as applied to investments in the public utility sectors, which are defined here to include water supply, power and telecommunications. The paper is explanatory in nature, and does not raise new conceptual issues.

ii. Economic evaluation of such projects involves consideration of three basic factors:

(a) The demand forecast;

(b) The least-cost method of meeting the predicted consumption; and

(c) The comparison of project costs and benefits.

This analysis should be carried out in the context of a development program for the whole of the relevant sector. This involves consideration of competing demands of various types of consumer, of overall institutional implications, and of technical systems effects on costs of supply.

iii. With respect to demand estimates, a useful distinction can be made in less developed countries between established markets, where consumers have adapted to the supply of public utility services, and potential new markets, where people currently do not obtain public water supply, electricity or telephone service. In the case of established markets, projections of past growth trends have generally been the principal basis for demand forecasts. This technique is often subject to considerable error, particularly where there has been a history of shortages, for example, supply of water for only a few hours a day, power outages, and waiting lists for telephone service. However, it is difficult to prescribe a general remedy.

iv. Where new markets are being considered, it is even more difficult to make predictions of demand. Surveys of the current reliance on alternatives, income, and ability to pay, may be helpful. In new low-income markets it is important to determine the "threshold" level of development where demand begins to develop. This involves consideration of agricultural and industrial activity in the region,

government plans for the area, local wage levels, householders' priorities and needs, and the income levels at which demand for the utility services becomes effective. The Bank is currently carrying out a number of research projects in this area.

v. However, accurate prediction of demand, at given prices, is not an end in itself. The basic question is whether the predicted rate of consumption is desirable in the sense that project benefits -- broadly defined to include economic and social goals-- exceed, by as much as possible, project costs.

vi. This requires that two considerations be satisfied. First, projects need to be built and operated to meet a given level of output and a given standard of service as cheaply as possible. Selection of least-cost facilities, including proper timing and sizing of projects, is based on comparison of the present worth of the construction, operating and maintenance costs of various feasible alternatives, using the opportunity cost of capital as the discount rate. Shadow pricing may be employed to determine the least-cost solution from the viewpoint of the economy.

vii. Second, the expected benefits should exceed by as much as possible the costs (of the least-cost program). A comparison of project costs and benefits (such as are carried out, for example, for agricultural and industrial projects) is usually frustrated in the case of public utilities by the difficulty of quantifying benefits. Some attempts have been made to quantify benefits by examining the contribution which project outputs make to other activities and so assessing their value.1/ Research of this nature has been undertaken in the telecommunications sector in Pakistan, and other studies are currently underway in El Salvador (village electrification) and Costa Rica (telecommunications). Similarly, attempts have been made to estimate the benefits from water supply and sewerage projects by determining the impact of such investments on property values, and a number of unsuccessful attempts have been made to measure the health benefits of improved water supplies. The general conclusion reached is that this approach to quantification of benefits of public utility projects is generally too difficult and time consuming to be applied routinely in the appraisal process. Possible exceptions to this may however include evaluation of the productive application of electricity in rural areas.

viii. Revenues are therefore normally used as a substitute measure of the economic benefits of public utility projects. However, revenues may be only a partial expression of economic benefits (measured in monetary terms). People may value service by more than the amount they

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1/ Similar to the measurement of the benefits of irrigation projects which are evaluated not in terms of sales of irrigation water, but of induced increases in agricultural output.

have to pay for it, and to that extent economic rate-of-return calculations based on revenues provide only a "minimum" measure of economic benefits. In addition there may be external benefits, such as community health benefits from improved water and sewerage supplies. It follows that if prices (and thus revenues) reflect costs, economic benefits will be at least as large as costs. Finally, social reasons may suggest that services are worth more (or less) to people than they are willing to pay, and providing subsidized services for poor customers may have favorable income distribution benefits.

ix. In order to arrive at economically sound investment decisions, consumers should be asked to pay a price for service which reflects the cost of supplying additional output. This would require the traditional accounting approach to tariff setting to be replaced by one that not only provides a satisfactory financial performance but relates to the costs (the marginal or incremental costs) of providing additional capacity and output. Practical problems of implementing this latter approach, including analysis of tradeoffs between various objectives -- financial, economic and income distribution -- of pricing policy, are currently being studied within the Bank.

x. Project evaluation in the course of the Bank's appraisal process includes a calculation known as the internal financial return (IFR) adjusted to be the economic return (IER). The IFR is the discount rate which equalizes the present worth of incremental costs of construction and operation and incremental revenues due to the project over its life; it is an estimate of the financial profitability of the project. The IER is, in principle, the rate of discount which equates the present worth of economic benefits and economic costs. In practice, however, an estimate of the IER is derived from the IFR by adjusting costs in economic terms (e.g. through the substitution of shadow prices for market prices), while using revenues as a minimum measure of benefits. Hence it simply shows the relationship between the price and the cost of additional -- or incremental -- output. This means that the IER requires a special interpretation.

xi. To interpret the IER, it is useful to distinguish between existing and new markets. In existing markets, with a regular growth in demand from established consumers of the utility services, a major issue is usually not whether capacity should be expanded, but when. The relevant alternative to be considered in the IER calculation is then whether the project should be postponed. This can be evaluated by comparing the cost-savings of postponing the project with the revenues which are then lost (or by comparing the incremental costs of advancing the project with the incremental revenues this generates). If this IER is low, it may suggest that prices should be raised or restructured so as to slow down the rate of growth of

demand. (Often, this does not mean postponing the project in question since it takes time to change prices and to adjust demand; sometimes, however, postponement may be warranted if the value of the additional output made possible by additional capacity is very low.)

xii. In the case of new markets, postponing a project for long periods, or rejecting it altogether, is often feasible because people are adapted to the use of substitutes. If the IER, based on a comparison of the revenues and costs of serving new markets and connecting new customers, is low, this indicates that either the tariffs are too low or that the project is not justified, or both.

xiii. In rural areas, low IERs based on revenue-cost comparisons can sometimes be expected to be low. There may be economic reasons for keeping prices down in the early years (to promote use of the service) and social reasons (to help small businesses). It is then necessary to look beyond the revenues and estimate additional benefits people obtain (though this is, as discussed in para. vii., a difficult exercise).

xiv. In both new and established markets, the IER thus provides a test of pricing policy, as well as of project acceptability. When the IER is low, the required action is to revise prices; this has the effect of revising the level and growth of demand such that the benefits to consumers exceed the costs of supply.

I. INTRODUCTION

1.01 This paper attempts to place in proper perspective the significance of the internal economic return (IER) calculation as applied to investments in the public utility sectors, which are defined here to include water supply, power and telecommunications. The paper is explanatory in nature, and does not raise new conceptual issues.

1.02 The IER is generally used in the Bank as a test of a project's economic desirability; high IERs are interpreted to signify an acceptable project, low IERs one that, on economic grounds, should be rejected. However, with public utility projects there is a complication to this rule arising from the extensive control of the utility over the access to services and the prices charged for them.

1.03 Indeed, while the IER derived from the existing tariff structure may provide a rough initial guide as to the merits of a proposed investment, it usually reveals more about the adequacy of the level of the utility's tariffs. Since the IER is derived from revenues, and therefore reflects the level of tariffs, it can point to the way in which prices should be adjusted in order to provide a better signal for the justification of investment. Tariffs are thus important, not only from the viewpoint of the enterprise's financial viability, but also because they can influence consumer behavior and thus eventually the allocation of resources.

1.04 This paper, in reviewing the procedures for public utility project evaluation, discusses such interpretations of the IER.

1.05 The economic evaluation of public utility projects involves consideration of three basic factors:

(1) The demand forecast;

(2) Selection of the least-cost method of meeting the predicted rate of consumption; and

(3) Comparison of project costs and benefits.

1.06 These three aspects are dealt with in order in the rest of the paper. It is, however, important to emphasize at the outset that in the case of public utilities the "project," as defined by the Bank, may be a somewhat arbitrary concept. It is necessary for project evaluation to be dealt with in the context of a development program for the whole of the water, power or telecommunications sector. On the demand side, there are many markets to study, new areas to be served, and demands stemming from

many types of consumers; on the supply side the institutional implications of project selection and operation have to be considered and the technical impact of a project on the operation of the whole utility system estimated. Project evaluation can frequently be performed satisfactorily only when it stems from or is accompanied by a study of the sector.

II. THE DEMAND FORECAST

2.01 The first stage of appraisal consists of a forecast of demand. While any forecast requires an assessment of the quantity and quality of service demanded by various categories of consumer -- urban, rural, domestic or industrial -- a particularly useful distinction in the context of less developed countries is that between established markets, where there is historical and current evidence about demand by existing consumers, and new markets, where no such evidence exists.

2.02 In the case of an established market where supply has been reasonably adequate, the customers have had access to service for some time and have taken its availability into account in establishing their living patterns and consumption habits. In such cases it is common to find sustained trends in the growth of demand of various consumer groups. Although simple trend projections, supplemented by econometric or other analysis of the industrial and domestic markets and of government plans, are subject to considerable error, it is difficult to make general recommendations as to improvement in generally accepted techniques.

2.03 There are, however, many instances of established markets where supply has fallen short of demand so that past consumption levels and trends provide no firm basis for estimating future trends in growth of demand. Proposed investments frequently do little more than bring the quantity and quality of service to a level that matches the existing level of (unsatisfied) demand. Such improvement, necessary to catch up on overdue investment, is often an important economic justification of projects, which may be reinforced by pressing social needs, for example, to ensure minimum health or sanitary conditions.

2.04 These considerations are illustrated by the following examples:

(1) Bombay Water Supply and Sewerage Project:

> "...unless urgent measures are taken to improve water supplies and sanitary systems, living conditions will be intolerable. This program is to improve living conditions by (i) alleviating the existing water shortage and increasing the present 3-5 hours of

intermittent supplies to 7-8 hours supply daily; and (ii) mitigating the present dangerous and offensive sanitary conditions by providing an effective sewerage and sewage disposal system." 1/

"Currently 71% of the domestic demand is estimated to be satisfied, by irregular and inconvenient supply hours, but by 1981, supply hours would be doubled and about 80% of domestic demand satisfied."

(2) Istanbul Power Distribution Project:

"...between 1967 and 1971 system outages increased by 20% annually in number and 24% in duration... In 1971 at least 70% of the outages were due to inadequate facilities."

"...local industry lost working days...(with a) resulting loss in industrial output...conservatively estimated at US$20 million."

2.05 Where established markets have become dependent, at least in part, on the availability of a service, there may be a prima facie case for installation of new facilities to meet increasing demand or to maintain the quality of service at a reasonable standard. Without such additonal facilities the inevitable consequences are deterioration in the quality and continuity of supply and ultimately, rationing; subsequent water or power shortages can disrupt industrial production; commercial activity may be damaged by congested telephone networks; water shortages may endanger health. In these cases, short-term demand may be so great as to clearly warrant investment in additional facilities, although tariff increases to reflect rising costs of supply may dampen further growth of demand.

2.06 A different situation obtains in the case of new markets. Where service is not yet provided, the possibility of continued reliance on alternatives must be taken into account, and since there is no direct experience of consumers' willingness to pay for the service provided by the utility, surveys of income and ability to pay for service may be necessary. In new high-income markets, forecasts can be made by comparison with the consumption of similar existing customers in other

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1/ This and other quotations in this paragraph are from the Appraisal Reports for these projects.

areas. For new, low-income markets, forecasting is more difficult. One problem is that of estimating the "threshold" level of development in a region, above which the project's output will be demanded. It becomes necessary to consider the extent of agricultural and industrial activity in the region; government plans for the area; local wage levels; householders' priorities and needs; and the minimum income levels necessary to generate a demand for the utility service.

2.07 In view of the increasing emphasis being placed on rural development, research in these areas is now underway. Bank-sponsored research activities in El Salvador (village electrification) and in Costa Rica (telecommunications) are studying projects in various environments to develop an understanding of the factors which affect consumer behavior. For the same reason the Bank is also paying particular attention to monitoring the results of projects of this type. This approach is being followed in Ecuador (village electrification), in Brazil (Minas Gerais water supply) and initiatives are being taken elsewhere in telecommunications, as well as power and water supply. In general, these studies seek information in five major areas:

(1) The use of substitutes, which generally declines following the project's operation;

(2) The quality of supply, particularly in the case of water, where decisions must be made between house connections and use of standpipes;

(3) The aims of the project, which may be e.g. the use of more water per capita or use of electricity for agro-industries;

(4) More comprehensive understanding of the consumer: literacy, income level, business profitability, etc.; and

(5) Better appreciation of the community: local infrastructure, credit availability, government support, etc.

Development of this information gives a clearer picture of a project's impact, desirability, and areas of possible improvement, which in turn will form a more reliable basis for predicting the demand for potential projects in similar areas.

2.08 Much can be done along the above lines to improve demand forecasts, but no matter how sophisticated the predictive method, uncertainties remain. Changes in tastes, in the composition of industrial output

and -- particularly in the case of water supply -- in the location of economic activity, all introduce an element of risk and indicate that continual updating of demand projections is necessary.

2.09 One such uncertainty is associated with the impact of price changes on demand. In practice, demand forecasts are rarely adjusted to reflect projected changes in tariffs. This is due to a variety of reasons, such as the knowledge that forecasts are, at best, only approximations; information on price elasticity is limited; price changes are usually slight in real terms, being made largely to keep pace with inflation rather than to reflect changes in marginal costs of supply; and there is often a pre-existing inadequacy of supply. While this failure to adjust demand forecasts is a shortcoming of the conventional approach, it may not be too serious in the short run as price changes have in practice to be implemented gradually. Rather more serious is that while predictive accuracy is an important objective of utility management, much less attention is paid to whether or not the predicted demand target should in fact be met. This is discussed further in Section IV.

III. THE LEAST COST SOLUTION

3.01 The second principal stage in the appraisal of a public utility project is a consideration of all realistic alternatives that would meet the projected demand in order to assure that the one selected will provide the service required at the least cost. Techniques for doing so are straightforward in principle (although their application may be complex) and generally well understood by public utility engineers. Systems effects are of course important. The addition or removal of a component of a water, power or telephone system may affect the behavior of other components. Therefore, what must be compared is not simply the costs of alternative components, but the costs of expanding and operating the whole system with alternative components.

3.02 In the basic cost comparisons outlined above, it is appropriate to incorporate the use of shadow pricing in the decision-making process. Hydro projects, for example, usually require more capital than thermal projects but much less foreign exchange, and exchange rates may not correctly value the latter. Similarly, the choice between coaxial cable and microwave systems for long-distance telecommunications extensions are materially affected by the use of a shadow price for labor when substantial unemployment exists, because the proportionate labor content for coaxial systems is much higher.

3.03 In such situations it is important to recognize the difference between the least cost solution to the utility and the least cost solution

to the country. The use of financial cost criteria produces the least cost solution to the utility, while the use of shadow prices in project design results in the least cost solution to the economy.

3.04 The problems of uncertainties in costs and effects of changes in growth of demand or delay in construction, and combinations of these factors, are treated by sensitivity analysis. This gives a range of the probable alternative solutions. However, sector studies of power, energy, water resources or communications may be a necessary prelude to this. Moreover, there is often a long lead time between the initial sector study and selection of the appropriate investment program. System planning techniques may have to be improved, research in low cost technology undertaken, and feasibility studies made to consider a wide range of technical options. Least cost solutions are sometimes not found because of failure to devote adequate time and effort to study and research.

3.05 The project selection process is carried out by the utilities or their consultants often with guidance from the Bank from the early stages of the project cycle. When the choice between alternatives is particularly doubtful and complex, or involves issues beyond the scope of utilities and consultants, the Bank often makes its own investigations. Particularly significant examples include the Indus Basin Development in Pakistan, the Elbistan lignite-fired plant in Turkey, and the water supply project in Nairobi.

IV. MEASUREMENT OF THE BENEFITS OF PUBLIC UTILITIES PROJECTS

4.01 Comparison of the costs and benefits of public utility projects is usually frustrated by the difficulties of benefit measurement. Some attempts have been made to quantify the benefits which result from public utility projects by examination of the use made of project outputs and assessing their value. Such calculations are being undertaken in the study of village electrification in El Salvador for a variety of farm, commercial, and agro-industrial activities. The process of quantifying such benefits is difficult and can generally only be done in special cases. In the study in El Salvador it was necessary to consider and quantify benefits arising from such items as lighting, ironing, refrigeration, water pumping, radio and television in homes, motive power for farms and for sugar, cotton and coffee processing, and electric welding. Projects supplying large urban markets are even more difficult to evaluate by this approach. Since project outputs are normally both final consumer goods and intermediate goods used for a wide array of commercial and industrial activities, the information required to permit an independent assessment of their value is normally overwhelming. Generally, it is only possible to undertake such

studies routinely when the applications are less diversified and more elementary (though nevertheless important) such as in the productive uses of electricity in rural areas.

4.02 Similar research work done in the Bank in water supply and telecommunications confirms the research experience in village electrification, namely the difficulty of estimating project benefits by means other than the demonstrated willingness of consumers to pay a price established by the public utility or regulatory authority. Attempts have been made by the Bank to estimate the benefits of water supply and sewerage projects by determining the impact of such investments on property values. Data on property transactions in Nairobi and Kuala Lumpur, two cities in which records are particularly good, were analyzed. It proved to be impossible to disentangle the impact of water sewerage investments from the many other variables influencing property values in the areas concerned. 1/ Similarly, a survey of attempts to quantify the impact of improved water supplies on public health showed that statistically significant results were exceptionally difficult to obtain (despite large sample surveys) and were of little use in quantifying benefits. Problems arise not only in quantifying the economic and social benefits of an improvement in health, but also in disentangling the influence of improved sanitation facilities on health from all the many other influences, such as nutrition, climate, and household income and assets.

4.03 Attempts have also been made to quantify the benefits that arise from investments in telecommunications projects, such as time savings, marketing advantages and so on, compared with alternative forms of communication. A particularly detailed analysis was carried out by the Bank in Pakistan. However, since the qualitative superiority of telecommunications over its alternatives is so great, it is not surprising that such studies are unsuccessful in fully measuring benefits. The general conclusion stemming from these research efforts, which are continuing in the Bank, and from our experience in public utilities is that benefit measurement along these lines is at present too difficult to be applied routinely in the appraisal process, though such studies have considerable heuristic value.

4.04 In many other sectors benefit measurement is somewhat easier. In the agricultural and industrial sectors, for example, it may often be possible to use import or export prices of products to measure the value of additional output, while certain transportation projects may be evaluated to some degree by the cost savings that accrue in the private sector. In irrigation projects measurement of benefits on the

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1/ For example, in one case the installation of sewers was accompanied by a rezoning ordinance which simultaneously tended to increase property values.

basis of water revenues faces similar difficulties as in public utilities, but benefits can be assessed by considering the impact on agricultural output. This latter approach, as pointed out above, has proven to be not feasible in public utility projects. In most public utility projects, the only concrete information available on the benefit side relates to incremental revenues. This is generally a minimum measure of economic benefits because:

- people may value service by more than the amount they pay to obtain it;
- in the case of water and sewerage systems, there may be additional health benefits to the community;
- in the case of telecommunications, new consumers also increase the benefits of telecommunications for existing consumers (because the extent and value of communications increases for the latter);
- the government may attach more value to a service than the beneficiaries themselves, or consumers may not be fully aware of the benefits they obtain from improved service (this may apply particularly to water supply and sanitation); and
- subsidized services for poor consumers may have income distributional benefits (which may or may not be judged to outweigh the cost of the subsidy).

4.05 Moreover, there are problems with using revenues as a minimum measure of benefits for public utility projects because:

- the price structure often does not correspond to the cost structure; and
- sometimes, average prices may be below costs.

This results in misleading signals since, in this situation, customers are not paying for the incremental costs of additional output and therefore are not given the opportunity to reveal the value they place upon it. Further, even if tariff structures and levels do reflect incremental costs, reliance upon consumers' willingness to pay for project outputs ignores -- as in other sectors -- income distribution and other social factors. These matters are further discussed in the next section.

V. PRICING POLICY AND THE INVESTMENT DECISION

5.01 Public utility pricing policies are generally dominated by financial considerations, in particular by the need to maintain tariffs at levels that will help finance the large capital requirements of continually expanding systems; and also by a questionable accounting approach to the design of tariff structures. Other objectives, however, also need to be incorporated into pricing policy to respond, for example, to the following kinds of questions: How fast should expansion be? How should output be divided, say, between industry and homes and between rich and poor? How can capacity be more fully utilized? The answers to these questions require a broader approach to pricing policy than traditional practice.

5.02 The traditional accounting approach for example is concerned with the recovery of sunk costs, whereas for efficient resource allocation it is the amount of resources currently used or saved by consumer decisions which is important. Prices are the amounts paid for increments of consumption and, social objectives aside, they should therefore be related to the increments of cost thereby incurred. If new consumers are connected to the system, or if existing ones increase the amount of power, water or telephone service they use, it is important that prices should signal to consumers the costs of such changes in their consumption. Hence prices need to be related to the value of resources used (or saved), and the valuation of these resources (the estimation of their costs) requires a forward-looking estimate. The backward-looking estimate of the accounting approach creates the illusion that resources which can be used or saved are as cheap or as expensive as in the past; that is, that resources are as abundant or as restricted as in the past. On the one hand, this may cause over-investment and waste; and on the other, under-investment and unnecessary scarcity.

5.03 The traditional accounting approach to pricing is preoccupied mainly with average costs, so that large discrepancies often appear between the structure of prices and costs. This (1) generates large cross subsidies and (2) often results in prices too low when demand is high, and too high when demand is low. To promote better utilization of capacity, and to avoid unnecessary investments to meet peak demands (which tend to grow very rapidly), it is often useful to structure prices so that they vary according to the costs of serving demands:

- of different consumer categories;
- in different seasons;
- at different hours of the day; and
- in different geographical areas.

5.04 Another shortcoming of the traditional approach is that it considers "fairness" from the rather narrow point of view that consumers should pay for the share of accounting costs allocated to them. As just explained, these costs may very well differ from the costs which consumers are currently causing the economy, and such cost allocation involves (often arbitrary) judgements. However, the cost allocation per se is neither fair nor unfair; whether tariffs are fair depends on who is required to pay them. While questions of fairness and the need to raise sufficient revenue to permit system growth are relevant for tariff making, separate analysis of these aspects is necessary. Many of the fairness aims of the traditional approach were, in any case, conceived for urban projects in North American or European conditions, and obviously do not relate to the problems of developing countries.

5.05 The foregoing suggests that if price is to be used to signal the economic justification of investment (social matters are discussed later), the traditional approach to tariff setting has to be replaced by one that allows price to reflect the cost of the resources used up in making additional consumption possible. This would permit consumers to reveal, expost facto, whether the value that they place upon additional output at least equals the additional (or incremental) cost of a water, power or telephone system, thus signalling the justification of investment in additional capacity. This policy requires, inter alia, that differences in incremental costs attributable to different consumers or types of consumption should be reflected in the prices charged. This may include variations in costs of supply according to the geographic location of consumers, or to the time pattern of consumption. A number of case studies dealing with the problems of obtaining efficient pricing policies in public utilities have now been completed in the Bank. 1/

5.06 If it is impossible, in practice, to establish price in the foregoing manner, economic justification of a project is made very difficult, for reasons explained in Section IV. If price is less than the incremental cost of expanding a power, water or telephone system, there is no evidence as to whether or not consumers would pay for it if they were given the choice. On the other hand, if price is greater than incremental system cost, demand may be unnecessarily restricted, and the project smaller than optimal; how much smaller is however unknown. Moreover, even if on average prices equal incremental system costs, project justification will not be automatically signalled by consumer behavior if differences in the cost of various types of consumption are not recognized in the tariff structure.

1/ For example, Electricity Pricing Case Study - Tunisia, Public Utilities Department, June 1973 (draft), and Lahore Water Supply Tariff Study, Public Utilities Department, August 1974.

5.07 However, in addition to the problem of externalities, referred to earlier, there are a number of practical difficulties that confront us in attempting to rely upon pricing policy as a better means of signalling the justification of investment. These include:

(1) Cost of Implementation - Pricing itself may be costly. For example, the cost of special metering of domestic consumers to distinguish peak from off-peak electricity consumption may be greater than the benefits. Furthermore, price changes themselves may be difficult -- and costly -- to implement.

(2) Fiscal and Financial Constraints - Public utilities may be an efficient means of raising revenues for general governmental purposes. The gains from taxing them should therefore be weighed against or reconciled with the objective of using price to determine the justification of system expansion. Similarly, the financial viability of the public utility could conceivably be at odds with the approach to pricing described here, and reconciliation may be necessary.

(3) Social Objectives - As the pricing concept is related to an effective willingness to pay, it depends in part upon the pattern of income distribution in a particular society. Thus, the very poor may lack an effective willingness to pay for water from a public supply, but they should not therefore be denied access to service. In other words, social objectives often are in conflict with the policy of allocating resources in accordance with willingness to pay, and appropriate adjustments to prices are necessary in these circumstances (in the absence, of course, of any measures to deal with the social objectives in more effective ways). Providing the service to the poor will then involve cross subsidization either by other consumers or by general taxpayers in the municipality itself or the country at large. Subsidies and taxes should be made explicit and justified in the overall assessment of the pricing policy for the service.

(4) Forecasting Problems - Investment decisions will certainly be assisted by pricing according to marginal cost, differentiated by classes of consumer, etc. However, evidence as to consumers' willingness to pay a price for a service at a given point in time does not entirely remove the difficulties of predicting demand, which will in subsequent years be influenced by a number of variables, including changes in income, population movements and tastes.

5.08 Reconciliation of the various objectives of pricing policy efficiency in the allocation of resources, financial, fiscal, income distributional and other social goals -- may be a complex task, as is being increasingly recognized in Bank appraisal reports. While tradeoffs between the various objectives may often be necessary (being reflected, for example, in tariff structures which allow poor consumers to obtain a basic supply of water for health purposes at a subsidized rate, while wealthier consumers pay more than cost), it remains true that pricing according to incremental or marginal cost remains the most direct, simple and practical method by which reasonable resource allocation can be achieved. In a well functioning private sector, prices are determined by market mechanisms. In the public sector, prices are determined by regulation. However, by attempting to reflect the level and structure of costs in tariffs, utilities also can secure an efficient use of resources; where necessary, they can adapt those tariffs to achieve social goals and mobilize resources for expansion.

VI. THE INTERNAL ECONOMIC RETURN

6.01 Project justification rests, as a rule, upon a calculation of the internal economic return (IER) which is the discount rate that equates the present value of economic benefits and costs associated with a project. Since economic benefits of public utility projects cannot as explained previously, usually be estimated directly, economic appraisal normally starts with a calculation known as the internal financial return (IFR) on the project investment (or program of which the project is a part). This return is the discount rate that equalizes the present worth of incremental costs (construction and operating) and incremental revenues resulting from the project over its life. This rate presents an estimate of the financial impact of the project on the utility.

6.02 A further calculation, adjusting the data for costs and benefits, produces a rough estimate of the IER. In this calculation, costs are adjusted so that they reflect costs to the economy as a whole rather than just to the utility, e.g. taxes on project inputs are not treated as economic costs, but subsidies are. Further adjustments may be made in cases where the market for productive factors does not provide an adequate measure of their real cost to society and shadow prices may be substituted for market prices. In both calculations, IFR and IER, revenues are used as a minimum measure of benefits. In the IER revenues are adjusted to include such items as consumption taxes, and then compared with the social opportunity cost of capital i.e. the return on capital in its most productive alternative use, in order that a judgement may be made as to the economic justification of the project.

6.03 To interpret the IER, it is useful to distinguish between two markets:

- existing markets, where the local economy is highly adapted to service; and
- new markets, where the local economy is adapted to using substitutes or doing without.

Existing Markets

6.04 The rate of growth of demand for the outputs of public utilities depends upon economic growth, the pace of industrialization and other such factors. It is also influenced by tariffs. Thus, while a utility cannot choose the rate of growth directly (except for the number of new consumers connected), it can influence the rate of growth by pricing policy. In the case of projects to supply existing consumers IER analysis can be used to indicate whether the rate of growth should be faster or slower, with corresponding implications for project timing. For this purpose, an IER should be calculated which equates the present value of the change in system costs from bringing forward or postponing the project -- say by one year -- with the present value of the change in revenues that would be gained or lost by the change in timing.

6.05 In carrying out IER calculations, it is important to note that the addition to system operating costs in any one year will not be the same as the cost of operating the new capacity, i.e. there is usually a "systems effect." This is because the efficient operation of the system as a whole may involve fairly full utilization of the new, efficient plant and lower utilization of older existing capacity. Similarly, the relevant returns are neither the selling value of the production from the new capacity nor the whole of the year's increase in revenue. They consist only of the revenue from that part of this increase which could not have been achieved if the installation had been postponed. In most cases this will consist of revenue from extra peak sales, since existing capacity can normally accommodate some increase in off-peak sales.

6.06 If the rate of return so calculated on investment this year instead of next year is high, the message is that to expand capacity sooner rather than later will be profitable. If this rate of return is low, the message is that rapid expansion will subtract from the utility's performance. Extra capacity to meet an increase of peak hour or peak season sales is particularly expensive; the economic message of a low return is that the resource costs to the country of providing the extra capacity are not covered by the extra revenues from sales

during the peak periods. The reason may be that consumers are getting the extra capacity too cheaply and tariffs should be raised, with the structure probably altered as between peak and off-peak consumption, thus slowing down the general growth of demand for capacity and output. Or if tariffs do reflect the (short run) cost of additional supplies, it may signal that investment in additional capacity is premature.

6.07 There are of course problems in raising tariffs suddenly: both equity and politics argue against it. In any case, demand may be fairly inelastic in the short run, since it takes time for consumers to adjust their usage of equipment that is competitive with or complementary to the services of the utility in question. In cases where capacity is fully utilized at a less than optimal price, some capacity expansion is likely to be justified to avoid the problems associated with water and power shortages, telephone service congestion, and so on, during the period required to revise tariffs upwards, and the growth of demand for services to adjust itself downward.

New Markets

6.08 In the case of a project serving new markets and connecting new consumers, as with rural water supplies or rural electrification, the rate of return has a somewhat different significance. Here costs include connections and the construction of the new distribution system as well as the addition to system costs of supplying water or power to the new network. The returns include the whole of the revenue from the new consumers. A high rate of return would then indicate that the geographical extension of the system is justified since, with the proposed tariffs, consumers value the new service at more than its cost. A low rate of return indicates either that the project is not economically justifiable, or that the proposed tariff is too low, or both. The point is again that the tariff and the project have to be considered together rather than separately. The question is whether there is any tariff which will lead to a consumption level and hence a revenue which will yield an acceptable rate of return. (As noted earlier, the analysis should of course also take account of any relevant social, or income distributional considerations.) The rate of return may need to be calculated for several alternative tariff levels in order to see whether the initially calculated low return argues against the project or for a modification of the proposed tariff. If it argues against the project, the project should be postponed until development in the area has become more favorable for investment.

6.09 There is one special problem to note regarding projects serving rural areas. The IER based on revenues may often be below the opportunity cost of capital even if pricing policy is satisfactory:

- initial fixed costs, and thus the average costs in early years, are high; to promote use of the service, without holding back consumption unnecessarily on account of large "sunk" costs, prices may need to be below average costs in early years; and

- it may be desirable to keep prices down to help consumers from small businesses and low-income families.

Often it may be necessary to look beyond the revenues and try to estimate some of the additional benefits consumers obtain; this can be done for productive uses of electricity in rural areas. But the extent to which it is necessary is partly a function of the acceptability of subsidizing the project -- if a long-run view is taken, recovery of sunk costs may be desirable. These matters are discussed in the Issues Paper on rural electrification.

Conclusion

6.10 In both established and new markets, the analysis of tariffs and their relation to the IER should consider both the structure and the levels of tariffs. Alternative tariff structures affect the IER directly through their impact on revenue and, to a varying degree, on the pattern of demand. Conversely, the tariff structure should reflect variations in costs of supply according to the type of service, the geographic location of consumers, or the time pattern of consumption.

6.11 The foregoing discussion of the role of pricing and the IER does not lead to any firm rules, but provides "guidelines" which need to be adapted to the circumstances of any particular project. The IER analysis is a starting point for the examination of both pricing policy and the justification of the proposed investment. It focuses on the relationship between price and marginal cost and tests investment decisions against the willingness of consumers to pay for additional consumption, rather than a more intuitive judgement that the project is economically justified.

relatively insignificant

provision

		IBRD	total cost incl contig Elect.	loan
Ln 953	Korea Kyongju Tourism	2.4 mn	3.7	out of 25.0
991	Greece Northern Yannitsa Ioanina [?]	1.0 mln	2.2	out of 30.0

~~1. Look at Mexico Rural Elec.~~

2. Give Yves Rovani memos received
3. Meeting to discuss outstanding individual points
Rovani's own memo
& Clarity — e.g. need for guidelines on new connection pols.
(but new Chile one has been) → Fish's idea of performance indicators
shd all ? be in CPS → Fits w. regard to economists
Effects of our tariff advice, on basis of marginal cost. 8
9
10
11

Extremely useful comments 13
We were probably too emphatic about 16
problem of research impact on ops. 18
& not a good idea about EDs' permit, 19
& many other useful changes. 20
but 23-4
(now we have to report re →) suggestions. Fiscal contrib'n general 26
(wh we wd. keep fairly much the same) agreement. 29
We need more: either you say yes
or no; & then we think again
& decide whether to raise higher.

[but we would clarify — so informal meet]

Economists - ✓ Jerry Warford.
✓ Bob Saunders
[D. Anderson leaving now] full
✓ Mukherjee appt. pty. full
✓ Boussier a little.

not [4]
2 m-y. Work on power.

2 Bernard Russell EMENA
+ 1 filled.

1 LAC none but 1 post.

1 Montfort Asia.

not recruitment of lending program.

Mar 6 Seminar on Research in Power.

Paper will be applied as far as resources permit to it on appl now - a mole on ~~sector~~ sector work later.

Priorities in applications:

cause regions to see opportunities for improving dev impact of projects.

Qualitative analysis of lending prog: final decisions w regions.

Rural Dev Unit tried to measure dev. impact of rural dev projects called PIB. Statement in timetables — aggregate it.

Power Follow-up

not much difference on objectives pursued.
tool for specific targets.

Difficulties in raising revenue in inflationary situ.

Kirk says Bank has been influential in Turkey
RE pols without any lending for it.

Research
Policy – where distortion input
Look at in every project.

New Connection Policies

Kim – 15 power countries – only 5 a single entity.

Access to service

Rovani – basic data collection worldwide.

Fact-finding on appraisals

When it is a GTD entity should include assessment of
new connection pols.
When it is a GT unit, entity, it is v. difficult –
more in the sector policy context, sector knowledge
Need sector studies – separate – eg. Turkey,
half a dozen in depth.

Project 76 – research on marginal areas –
(sensitive to improve cost effectiveness) (case studies) – produce guidelines.

There does seem to be quite general agreement that it's a subject
to be looked at.

Lender of last resort } makes difficulty
Projects coming up at last minute

joined	74/75	replaced 3 months (4) 73-74	72-73	71-72
1969	1	Anderson – research		research
July 71		Bates W. Africa (water)	water.	power (Wyatt).
1968		Berrie out	research s/ru power papers, guidelines advice to op depts – energy	→ ditto
1972		Bolte (EAf.) water	water/power feasibility upt reviews appraisal Malawi (tariffs) power	←
1971		Jennings (YP) water grad. Feb 1'73	Minas Gerais water; Mexico water; small: Ecuador 15 village elect. survey; water/power sector brief.	YP in CES.
1970	1	Montfort power	Power: India RE & generally; advised on econ justification of dev projects; helped evaluate reports	Power: Indonesia Deltaic; India Power transm; Brazil power & advising on econ justification.
1968	1	Russell power	Power: coordinate sector surveys/notes; Syria pumping; Iceland Sigalda appraisal; Turkey Elbistan preappr.	Power: start RE research; coordinate sector reviews; Pak power & sector
	1	Mukherjee		
	1	Warford/Saunders/Bosson		
Now		Research 1	1/1	1/1
		Operations 2	2½	3

position vacant

Berrie — supplemented by:

Shaham econ — some YPs.

2nd econ EMENA — some consultants.

(5) & will rise to 7 when 2 further position filled, one already committed

or could say 4 rise to 6

need for distribution specialist

better plg tools to maximize dev impact of our projects.

This will certainly not enable oversight application of all new techniques —

altho even with this the new techniques will have, as long and, to be applied selectively

To get better planning & a better allocation of the scarce manpower resources envisaged qual.-depn of lending prog