Report No. 7

CONFIDENTIAL

INTERNATIONAL BANK FOR RECONSTRUCTION AND DEVELOPMENT

AUDIT OF EARLY POWER & TELECOMMUNICATIONS LENDING TO ICE (COSTA RICA)

October 20, 1972

Programming and Budgeting Department
Operations Evaluation Division

PREFACE

The Operations Evaluation Division is testing procedures for evaluation and audit of Bank activities. This paper summarizes the main results of a so-called 'series audit' (the first of its type) of Bank lending to the Instituto Costarricense de Electricidad (ICE) for electric power and telecommunications projects, with principal focus on the earlier loans (276-CR of 1961 and 346-CR of 1963) which were fully disbursed some years ago. The primary purpose of such an audit is to determine, by brief analysis and by short discussion with those who have been involved, the extent to which the basic project objectives and loan covenants were fulfilled, reasons for significant deviations, and implications regarding the efficacy of Bank action. To the extent possible, lessons are sought as to how the lending activity might have been improved. The 'series' characteristic of the audit arises from the fact that the Bank has made a series of loans to the borrower and that the individual loans cannot be reviewed in isolation from one another.

Early Bank lending to ICE was chosen for series audit because disbursements on the second loan (346-CR) were completed in 1968, the year from which it was decided to select projects for initial attempts at auditing. The interim period of five years is considered adequate for the project's outcome to be fairly fully visible, although much of the benefits should still lie in the future.

To prepare the audit relevant Bank files and documents were briefly reviewed and the projects discussed with staff who had been involved. A one-week mission was undertaken to complete basic tables and to gather impressions about the projects from the management and staff of ICE.

The considerable assistance provided by the staff of the Instituto Costarricense de Electricidad is gratefully acknowledged.

Note: Currency Equivalent
US$ 1.00 = 6.65 colones (₡)
(From 1961 to 1971)

SUMMARY

The Bank has made six loans totalling US$ 73.3 million to the Instituto Costarricense de Electricidad (ICE), which is the principal power agency in Costa Rica and also responsible since 1964 for all internal telecommunications (except telegraph) and some international services. Loans 276-CR of February 1961 for US$ 8.8 million for power and 346-CR of July 1963 for US$ 22.0 million (US$ 12.5 million for power and US$ 9.5 million for telecommunications) were fully disbursed some years ago. The other four loans, signed in 1969 and 1972, are under disbursement.

The principal direct objectives of the Bank's early loans were effective construction and operation of the projects supported and improvement in ICE's financial performance, which had been weak.

Total generating capacity installed in Costa Rica has increased from 111 MW in 1961 to 244 MW at the end of 1971. 103 MW, or more than 75% of this net increase, has been partially financed out of loans 276-CR and 346-CR. Electricity generation in Costa Rica has been growing at about 9-10% per annum, and a rapidly increasing share has been going to commerce and industry, although household consumption continues to account for a rather unusually high proportion of total -- for instance, more than 55% on the principal Interconnected System. ICE, with the addition of the Bank-assisted plants and some small supplementary thermal units, has been able to provide a generally adequate and reliable power supply, without significant load shedding.

The Bank's power lending has been primarily in support of major hydroelectric projects. These projects have suffered increasingly severe cost and time overruns. The 30 MW Rio Macho plant, the major item in loan 276-CR, was completed in September 1963, five months behind schedule, at a cost of US$ 452/kw, 16% above estimates. The 64 MW Cachi plant, supported by loan 346-CR, was completed in February 1967, fourteen months behind schedule at a cost of US$ 395/kw, 27% above estimates. The 60 MW Tapanti scheme, the centerpiece of the 1969 loan for power, is running twenty-four months behind schedule and is expected to cost US$ 560/kw, 65% above estimates. These cost overruns are principally in local currency. They result mainly from soil and rock conditions being poorer than expected; this has particularly affected the tunnelling involved, requiring more time, special measures to deal with water seepage, and increased concrete. Tunnelling is a main component of the Tapanti project. Despite the cost overruns Rio Macho and Cachi still appear economically justified; the incremental investment in Rio Macho compared with a thermal plant of equivalent size was expected to yield a 13% rate of return and probably does yield 12%, while Cachi, with its lower unit cost and higher capacity factor, would show a higher return on a similar calculation; returns on Tapanti may prove lower.

Modern automatic telephone facilities were introduced in Costa Rica for the first time under the 1963 project which the Bank supported with technical assistance (under a UN Special Fund project for which the Bank was Executing Agent) and part of loan 346-CR. Most of the existing system was built under this project, which was executed well. By December 1971 Costa Rica had 27 exchanges with 40,000 connected lines, of which 30,000 in the San Jose area. Telephone subscribers have been growing at an average annual rate of 20% since 1965, limited only by the availability of lines, and as of December 1971 there was still a waiting list of some 5,000. To avoid saturation of its facilities, ICE requested and the Bank accepted, an increase from 26,000 to 33,680 in the number of automatic exchange lines provided under loan 346-CR and this was feasible within original estimates of foreign exchange costs due to bids being lower than expected. A similar expansion was requested and agreed under the 1969 loan for telecommunications.

ICE's financial rate of return on assets in operation has improved sharply, from some 2-4% in the years before 1960 to well over 10% in each of the last three years. This improvement is due partly to the rapid growth of the profitable telecommunications services, but more to a sharp rise in the real price of electricity, from an average US¢ 1.30 equivalent in 1961 to US¢ 1.82 in 1970, along with a small reduction in average costs, from US¢ 0.95 to US¢ 0.78 over the same period. The Bank has strongly encouraged ICE and the Government to introduce and maintain remunerative tariffs and ICE has met tariff covenants with the Bank in all years except 1964 and 1967 when there were slight shortfalls. Minimum rates of return required under these covenants have been raised several times and are now 9% and 12% for Electricity and Telecommunications respectively.

Despite the sharp improvement in returns earned, and in important part because of the major cost overruns on the hydroelectric schemes, ICE has been able to finance much less of its investment than expected from internally generated funds, even on a deferred basis; project financing plans have been upset within a matter of months of their being made; and ICE has confronted repeated financial difficulties. It has not received budget support since 1967 and it has been enterprising in selling locally its own ten- and twenty-year bonds, but it has also had to raise relatively large amounts on short and medium term from banks and other financial institutions, mainly abroad. This borrowing has further added to later financial difficulties.

There are two principal lessons which emerge for the Bank from this audit. One concerns continuity. Assistance to ICE appears to have suffered to some extent from lack of continuity at certain times, illustrated for example by varying advice about engineering help needed, apparent neglect to learn the lessons of the early cost overruns and try to apply them to later projects, repeated shortcomings in financial plans. Despite inevitable change in staff assigned, these problems could probably have

been reduced had appraisal reports been more candid and complete in their historical perspective, systematically citing and dealing with cost overruns, shortfalls in self-financing, problems of delay, and actual sources and uses of funds. Second, ICE's situation might have been eased had more attention been given to contingency planning -- both in the sense of trying harder to ensure that engineering contingency allowances were adequate and, especially where there was uncertainty about these, in the sense of discussing more deliberately, regularly and systematically questions such as: which parts of the investment program would be postponed in the event of cash shortage? what debt can be renegotiated? where might additional borrowings be made on longer term with sufficient advance planning?

AUDIT OF EARLY POWER & TELECOMMUNICATIONS LENDING TO ICE (COSTA RICA)

Introduction

The Bank has made six loans totalling US$ 73.3 million to the Instituto Costarricense de Electricidad (ICE) for development of power and telecommunications systems. Two of these loans, 276-CR of February 1961 for US$ 8.8 million and 346-CR of July 1963 for US$ 22.0 million are completely disbursed and are the main focus of the present evaluation. The other loans are 631-CR and 632-CR of 1969 and 800-CR and 801-CR of 1972, the first in each case being for power and the second for telecommunications.

ICE is a Government-owned autonomous entity originally established in 1949 to plan and carry out a coordinated program of electrification of the country; in practice it has been mainly a bulk supplier from plants it has built, although it has significant distribution responsibilities in areas not otherwise served. In 1968 ICE bought from American and Foreign Power 92.3%[1/] of the stock of Compania Nacional de Fuerza y Luz (CNFL), which is primarily responsible for distribution in the capital San Jose. The two companies continue to operate as separate entities, but their facilities have long been linked in the Interconnected System serving the Central Zone of Costa Rica which contains two-thirds of the country's population and accounts for well over 80% of GNP. To the Interconnected System are also connected more than a dozen small additional plants, mainly hydroelectric, belonging to municipal and private enterprises. Outside the Central Zone the towns are served by isolated plants mainly run by municipal and private companies and, in a few cases, rural electric cooperatives. Due to financial and technical difficulties of a few of these companies, ICE has been assuming managerial responsibilities and, in some cases, their assets and ownership.

Total generating capacity installed in Costa Rica increased from 111 MW in 1961 to 244 MW at the end of 1971, with 57 public utilities operating 220 MW and 120 auto-producers the remaining 24 MW. This capacity is installed at 201 power stations, all of which are very small except for ICE's several main plants in the 20-60 MW range. The Bank loans to ICE have helped finance 103 MW already installed, or more than 75% of the national net increase since 1961, and a further 110 MW are under construction. The Interconnected System accounts for about 90% of total utilities' installed capacity and 93% of total gross generation. ICE produced about 70% of Interconnected System generation in 1971, CNFL 22% and the small entities 8%.

1/ This was the total American and Foreign Power shareholding; remaining shares are owned by private individuals.

ICE's separate Telecommunications Department was set up in 1964 when ICE purchased the entire existing (manual) telephone network of CNFL. Since then ICE has been responsible for providing all of the country's internal telecommunications, except the public telegraph service which will be taken over from the Ministry of the Interior in 1975. Central American regional telecommunication facilities in Costa Rica are also owned and operated by ICE, and all other international services are planned to be fully taken over in 1977.

While power generation has been growing about 9-10% per annum, telecommunications services have been growing much faster. Most of the existing telecommunications system was built under ICE's Stage I expansion plan, partially financed by Loan 346-CR. In December 1971 there were 27 exchanges with an installed capacity of 42,500 automatic exchange lines and 40,000 connected lines (DELs).1/ The subscriber networks are mainly concentrated in the San Jose area (30,000 DELs). There were over 500 long distance circuits in service at the end of 1971.

ICE has a seven-member Board of Directors, of whom one represents the Government and the others are appointed by the Government for eight-year terms on a staggered basis. The Board appoints the General Manager. Government approval is required only for tariff changes and bond issues. ICE has in fact enjoyed capable management and a high degree of autonomy, largely free from political interference in personnel appointments and investment decisions. Internal organization of the now greatly expanded entity is the subject of a consultant study being financed under the Bank's latest loan.

The Two Projects

The Government and ICE first approached the Bank in 1957 because it appeared to be the only available source of long-term financing for electric power; the 30 MW Garita hydroelectric plant was being completed, and assistance was requested for the next development envisaged, on the Rio Macho. The Bank sent a number of missions, ICE completed the feasibility report in July 1959 and the project was appraised by the Bank in October 1959. The Bank's dominant concerns were that the project would be effectively built and operated and that ICE's weak financial situation would be strengthened. These were the principal direct objectives of the loan extended in February 1961 (276-CR), mainly to cover the foreign exchange costs of the Rio Macho hydroelectric project and related transmission; the plant was to be built for an ultimate capacity of 90 MW, but only 30 MW would be installed initially. The loan became effective in July 1961, after a delay caused by difficulties in finalizing complementary financing from commercial banks.

1/ Direct exchange lines.

Discussion about financing the next stage of power development began in 1962 when ICE was also beginning to take up actively the responsibilities it had been assigned in the telecommunications field. For power the scheme envisaged involved a thin arch dam at Cachi, and, with little hesitation, ICE acceded to the Bank's suggestion that specialist technical advice be obtained. In ICE's new field of telecommunications considerable technical assistance was obtained and a team of local engineers began to be built up. To appraise the telecommunications project a Bank mission was sent in January 1963, which was later extended to cover power in addition, on the basis of the Cachi feasibility study completed the previous September. In July 1963 loan 346-CR was signed, to contribute to the costs of a 56 MW hydroelectric plant at Cachi and to provide the nucleus of a modern telephone system, both local and long distance. The main objectives underlying this loan were again effective construction and operation of the projects supported and improvement of ICE's financial performance, with particular attention in both respects to telecommunications.

A characteristic feature of the Bank's power lending to ICE has been that commitment of loans has followed commencement of construction of the main hydroelectric projects by substantial periods. Loan 276-CR was signed and became effective 36 and 41 months, respectively, after start of construction of Rio Macho. Loan 346-CR was signed and became effective 18 and 21 months, respectively, after start of construction of Cachi. Loan 631-CR of 1969 was signed and became effective some 18 and 21 months, respectively, after start of construction of the main hydroelectric works covered. The Bank has not been closely associated with the basic selection of the projects, particularly the original Rio Macho and Cachi schemes. The lengthy periods between start of construction and agreement on loans result mainly from late completion of feasibility reports, but construction of each project appears to have been slowed down in some degree by delays that ICE had not expected in Bank funds becoming available; this was particularly true in the case of the original Rio Macho scheme, when a six-month delay in loan commitment from 1960 to 1961 resulted from disagreement on tariff covenants. 1/ Delays in construction for each project, partly for these reasons and partly for others discussed below, have required addition of expensive small-scale thermal plants in 1961, 1965 and 1972 on an emergency basis to enable ICE to keep up with expected demand.

1/ It is not possible at this late date to unravel with precision the full effects of the Bank's insistence on more rapid tariff increases. It is noteworthy that the difference between Costa Rican and Bank proposals regarding the timing of tariff increases was estimated shortly after negotiations broke down to be limited to the equivalent of some ¢ 7 million in tariff revenues in 1960-63, whereas the addition to the cost of Rio Macho which eventually resulted from the delay was estimated a short time later to be about ¢ 5 million. The solution to the disagreement which was finally found by the Bank and the Costa Ricans was expected to generate additional tariff revenue of about the ¢ 7 million. Loads fell somewhat short of expected, so it is doubtful whether the direct net gain from the exercise was more than ¢ 1 million or so. But, on the other hand, the Bank's strong emphasis on this matter may well have helped to generate wider consciousness of the need for remunerative electricity tariffs.

Project Costs and Construction Schedules

The various components of the projects supported by loans 276-CR and 346-CR are now operating satisfactorily, but many of them were only completed after substantial overruns in time and costs. The following table summarizes the increases that occurred in the course of project execution, and Table III at the end of the report gives more details.

Loans 276-CR and 346-CR - Project Construction Periods and Costs

	Construction Period (mos.)			Construction Cost (US$ mln)[a]		
	Forecast	Actual	% Increase	Forecast[b]	Actual	% Increase
Loan 276-CR						
Rio Macho Plant	62	67	8%	11.73	13.55	16%
Colima Diesel	14	n.a.	n.a.	2.29	1.77	-23%
Transmission	n.a.	n.a.	n.a.	2.76	2.61	- 5%
Total Project	62	67	8%	17.01[c]	18.09[c]	6%
Loan 346-CR						
Power						
Cachi Plant[d]	47	61	30%	17.36	25.29	46%
Transmission[e]	36	48	33%	5.97	3.85	-35%
Total Power	47	61	30%	23.33	29.14	25%
Telecommunications[f]	30	42	40%	12.60	16.60	29%

a/ Including interest during construction.
b/ Including contingencies.
c/ Components do not add to totals because minor elements not shown; for detail see Table III.
d/ Plant was also built with somewhat greater capacity than originally envisaged, 64 MW against 56 MW, with the dam higher.
e/ Scope of this part of project substantially reduced in course of execution.
f/ Increases in construction period and costs were primarily due to increased scope of project.

The main problem has been the large cost overruns on the main hydroelectric works. Time delays and cost increases have been even more serious with the hydroelectric works financed under loan 631-CR of 1969: Cachi Stage 2 and Rio Macho-Tapanti are estimated to be 12 and 24 months behind schedule, respectively, and likely to show a cost overrun of 70% or more. All the cost overruns have been very predominantly in local currency expenditures, but only a very minor proportion seems attributable to sheer price inflation, which has been relatively small in Costa Rica. In the case of Cachi Stage I a small part of the cost increase relates to a change in design to increase capacity from 56 MW to 64 MW. But in all cases the main factor accounting for cost increases has been that soil and rock conditions proved poorer than expected, and this has particularly affected the tunnelling involved, requiring more time, special measures to deal with water seepage, and increased concrete.

The deteriorating trend over time with regard to cost and time overruns is undoubtedly partly due to the fact that the successive projects have been of increasing complexity. But it has not been possible in the course of this brief review to form an independent judgment as to whether the engineering problems that arose were of such a nature as to be more or less unavoidable, once the projects were started, or whether, as the Bank has tended to claim in recent years, they arose at least partly because ICE was not prepared to get sufficient technical and contractual help from abroad. In an effort to save money and develop its own staff, ICE's policy has been to do much of the engineering in-house and to carry out the construction work with its own crews. The Bank was concerned about this, especially at the start of its association with ICE. At that time it eventually decided that ICE's experience in building Garita combined with retention of the engineer who had been ICE's general consultant would be adequate to warrant going ahead with Rio Macho. In the case of Cachi the Bank contributed usefully by suggesting, as mentioned, that a technical specialist be hired and by going over his reports in detail. In 1965 a thermal plant was envisaged as the next major system addition, and the Bank again urged retention of an appropriate technical consulting firm -- whose scope of work, it then suggested, should be extended to cover system planning as a whole. ICE, initially reluctant to hire assitance in system planning, eventually obtained help from SOFRELEC, whose team eventually produced a report merely confirming the validity of ICE's broad plans. On the other hand, the need for technical advice on the hydroelectric tunnelling which had proved so troublesome in earlier projects and which represented a main component of Tapanti seems to have been lost from view, seemingly due in part to rather numerous changes in Bank personnel responsible. ICE eventually brought in specialist consultants but only when the problems arose during execution. Most recently the Bank has tended more to question ICE's reluctance to use contractors, and ICE's policy in this regard is to be studied as part of a consultant review of ICE organization agreed in connection with the 1972 loans.

Since the projects proved so difficult to build it is useful to compare the contingency allowances made in the cost estimates with the overruns which actually occurred; for purposes of comparability, overruns have to be defined in a slightly abnormal way, namely in relation to the basic cost estimate (excluding contingencies) instead of relative to the original cost estimate including contingencies. This comparison is made in the table on the following page; all projected costs shown are those given in original appraisal reports except for the revised estimate on Cachi, which is important since it represents the outcome after the specialist consultant on thin arch dams had made certain changes in design and allowances for poor geological conditions. It must be stressed that much of the work involved in all the projects, especially Tapanti, was underground and that it is particularly difficult to make satisfactory forecasts of the costs of such work even when an adequate number of borings are feasible and carried out. Moreover, the purely numerical analysis contained in this table cannot of course do full justice to the differing weights of probability that it seemed correct at the time, in light of data availability, to place on the different basic estimates. However it shows the facts. The contingency allowance which proves most nearly adequate is the one which was increased at the specific advice of the Bank for the Rio Macho scheme of 1961. Larger contingency allowances (in percentage terms) were made for Cachi, but they proved more inadequate. There is no evidence that the Bank undertook a systematic analysis of these overruns and the causes for them or requested such an analysis from ICE. And despite the previous experience smaller contingency allowances (in percentage terms) were made for the projects approved in 1969, and they proved more inadequate.

By contrast with the hydroelectric schemes, the cost increase on the telecommunications component of the 1963 loan (entirely in local currency) results principally from expansion in the scope of the project and to only an apparently small extent from cost overruns. Foreign bids were lower than expected and demand for telephone connections was stronger than had been expected, so that in July 1965 the Bank gave permission to expand the number of automatic exchange lines to be installed under the project from 26,000 to 33,680 (17,600 in the principal San Jose exchange and 16,080 in 24 other exchanges). The San Jose exchange began operation in May 1966, about six months later than originally scheduled, and most of the others were completed before the end of 1967.

Power Load Growth and Quality of Supply

Well-coordinated national power planning has not existed in Costa Rica and in its 1972 appraisal report of loan 800-CR the Bank pointed out that "the sector's unsatisfactory organization and regulation have led to duplication of facilities, too many small and inefficient power stations, no coordinated planning, lack of standardization and uneconomic tariffs." Another consultant study, financed out of the Bank loan, is to be undertaken.

Hydroelectric Schemes: Cost Estimates, Contingencies and Overruns
(Excluding Transmission: All Costs Include Interest During Construction)

	Costs (in US$ millions)			% Increase		
	Foreign Exchange	Local Currency	Total	Foreign Exchange	Local Currency	Total
Rio Macho Hydroplant (Loan 276-CR of February 1961)						
1. Base Cost	4.69	5.93	10.62			
2. Contingency	0.53	0.58	1.11	11%	10%	10%
3. Projected Cost	5.22	6.51	11.73			
4. "Overrun" on Base	0.79	2.14	2.93	17%	36%	28%
5. Actual Cost	5.48	8.07	13.55			
Cachi Hydroplant (Loan 346-CR of July 1963)						
1. Base Cost	7.59	7.58	15.17			
2. Contingency	1.12	1.07	2.19	15%	14%	14%
3. Projected Cost	8.71	8.65	17.36			
4. "Overrun" on Base	1.28	8.84	10.12	17%	117%	67%
5. Actual Cost	8.87	16.42	25.29			
Cachi Hydroplant (Revised Estimate of September 1964)						
1. Base Cost	9.43	10.04	19.47			
2. Contingency	0.76	1.03	1.79	8%	10%	9%
3. Projected Cost	10.19	11.07	21.26			
4. "Overrun" on Base	(0.56)	6.38	5.82	(6%)	64%	30%
5. Actual Cost	8.87	16.42	25.29			
Tapanti Hydroscheme (Loan 631-CR of 1969)						
1. Base Cost	8.74	9.43	18.17			
2. Contingency	1.20	0.89	2.09	14%	9%	12%
3. Projected Cost	9.94	10.32	20.26			
4. "Overrun" on Base	1.78	13.57	15.35	20%	144%	84%
5. Current Estimate	10.52	23.00	33.52			
Cachi Reservoir Raising (Loan 631-CR of 1969)						
1. Base Cost	1.17	1.99	3.15			
2. Contingency	0.15	0.19	0.34	13%	10%	11%
3. Projected Cost	1.32	2.18	3.49			
4. "Overrun" on Base	(0.32)	3.44	3.13	(27%)	173%	99%
5. Current Estimate	0.85	5.43	6.28			

Nonetheless within its main service area, the Interconnected System -- its contribution to which alone accounts for some 65% of total national generation[1/] -- ICE has generally managed to provide an adequate and reliable bulk supply, despite plant construction delays and the tight demand-supply situation which has sometimes resulted. In face of the delays small, and relatively expensive, thermal plants were added on a number of occasions in time to meet requirements as noted before. Overload capacity has sometimes had to be used, but at no time during the last 10 or 12 years has ICE been involved in significant load shedding.

Both loans 276-CR and 346-CR were justified primarily in terms of helping to meet the growing demand for power. Use of electricity in Costa Rica has long had an unusually high residential (household) component, but this has fallen over time; the residential share of sales on the Interconnected System has come down rapidly, and faster than anticipated, from over 70% in 1961 to well under 60% in 1971, with industrial and commercial uses becoming relatively more important (see Tables II.A-1 and 2). System peak loads have actually grown a little faster than anticipated, averaging 8.5% per annum increase 1961-71, but loads in the first year projected were somewhat overestimated in Bank appraisal reports, so that absolute levels of load were slightly below forecast; but the striking fact about the load forecasts is their relatively high degree of accuracy. On the other hand the share of load and energy demand on the Interconnected System to be met by ICE, crucial from the financial point of view as well as others, was quite significantly overestimated for most years -- partly due to the delays in completion of the new plants and partly because dispatching difficulties apparently sometimes prevented optimal utilization of ICE capacity, indicative of the coordination problems previously mentioned. Nonetheless there is no evidence that ICE's major plant additions could have been postponed if the standards of system reliability accepted by the Bank in making the loans were to be maintained.

The scope of the audit did not include full investigation for alternative possible power schemes nor comparison of alternative system development plans. However there is no evidence to hand that economically superior alternatives to the Rio Macho and Cachi projects financed by loans 276-CR and 346-CR were available, despite the cost overruns suffered. A calculation in the appraisal report for loan 276-CR suggested a return of 13% to the incremental investment required to build Rio Macho rather than a thermal plant of equivalent size. Recalculation along the same lines and allowing for the cost overrun indicates a return of 12%. Cachi, despite its much higher percentage cost overrun, had a lower actual unit cost (US$ 395/kw compared with US$ 452/kw for Rio Macho) and has a higher capacity factor, so that it would show a higher rate of return in a similar

1/ ICE accounts for about 70% of generation on the Interconnected System which in turn accounts for about 93% of total electricity generation in the country, as mentioned above.

calculation. A more adequate analysis would have to consider these plants in system context, take into account the provisions included in the original schemes for the subsequent developments now being realized,[1] and compare then with alternatives.

Load growth on ICE's main networks does not appear to have been significantly slowed by distribution bottlenecks, even though planned expenditure on distribution by ICE and by the other companies more heavily involved has frequently had to be cut back due to shortage of funds. Both IDB and USAID have supported distribution investment; no provisions were made in the Bank loans.

Telecommunications System Growth

Original plans for the telecommunications project were prepared by ICE with the assistance of ITU experts provided under UN financing and of a French PTT team provided with UN Special Fund financing under the Central American Telecommunications Project for which the Bank was Executing Agent. ICE's Telecommunications Department has greatly developed its own planning capabilities since then and is currently working with ITU experts in setting up a training school; consultant assistance is now required only for special problems.

Modern automatic telephone facilities were introduced in Costa Rica for the first time under the Bank-supported project. The project was well executed and could probably usefully have been somewhat larger in view of the heavy demand for facilities. Growth in the number of telephone subscribers has averaged 20% annually, limited only by the availability of lines. Local telphone calls have increased in number at an average annual rate of 46% over the period 1965-71, long-distance calls within the country at 6% and international calls at 49%. In 1971 there was still a waiting list of some 5,000 for telephone connections, equivalent of nearly 15% of the number already connected. To avoid saturation of its facilities ICE has had to increase the number of lines envisaged in both Stage I (loan 346-CR) and Stage II (loan 632-CR) programs and has embarked on Stage III (loan 801-CR) earlier than originally contemplated.

Financial Aspects

ICE's financial rate of return on assets in operation has improved sharply, from some 2-4% in the years before 1960 to well over 10% in each of the last three years.[2] But net internal self-financing, to which the

1/ According to the appraisal report for loan 631-CR the incremental investment in Tapanti compared with a thermal alternative was expected to yield 12% return; this might be lower now in view of the 65% cost overrun currently expected, implying a unit cost of about US$ 560/kw.

2/ ICE is not subject to taxes (nor to duties on imports).

Bank attributed considerable importance, has consistently fallen substantially below target, although in absolute terms it has improved somewhat in recent years and exceeded 20% for the first time in 1970 and 1971. The recent improvements have been helped by the rapid development of the profitable telecommunications service, although power still accounts for nearly 65% of gross revenues.

For both Electricity and Telecommunications Departments ICE's rate of return on assets has shown steady improvement. All Bank loans have included tariff covenants specifying minimum rates of return to be earned, although it was finally agreed in connection with the 1961 loan that this return would apply only from 1964 onwards, with an agreed program of phased tariff increases covering the interim. These minimum rates have been increased several times, reaching 9% and 12% for Electricity and Telecommunications respectively under the most recent loans. ICE has met the tariff covenants in all years except 1964 and 1967 when the Electricity Department showed slight shortfalls from the then required 7.5%. Both during the negotiations for the original loan in 1961 and again in 1964-65 the Bank devoted considerable effort to urging ICE and the Government to introduce electricity tariff increases in a more timely and systematic manner in order to permit ICE to maintain the agreed upon rate of return.

The increasing rates of return on electricity operations have been obtained mainly by increasing the real price of electricity, although average unit costs have at the same time shown some reduction. Average revenue per kwh sold has risen from US¢ 1.30 equivalent in 1961 to US¢ 1.82 in 1970, while average costs have fallen from US¢ 0.95 equivalent to US¢ 0.78 in 1970. Prices are above those forecast in loan 346-CR appraisal report (US¢ 1.70 in 1970) and costs are about as forecast.

Despite ICE's relatively good performance with respect to rate of return earned, net internal self-financing of investment has been very low. The appraisal report for loan 276-CR projected only 9% internal self-financing for 1960-63 but 50% for the years after 1964 when the tariff covenant would apply; a supplementary letter to the Loan Agreement stated that the 7.5% rate of return should be enough to enable at least 40% self-financing. The situation was altered when ICE entered the telecommunications field as well, and the corresponding supplementary letter for loan 346-CR was made more vague referring only to "reasonable portions of the costs of further expansion" that would be financed internally with the 7.5% rate of return. The appraisal report for this loan projected net internal self-financing of about US$ 6 million equivalent or 16% of total requirements for the period 1963-66 and nearly US$ 25 million or 32% for the period 1963-70; actual net self-financing has been only about US$ 3 million equivalent for 1963-70 and accounts for only a few percentage points of total requirements. The improvement in self-financing in 1970 and 1971 remains less than what was projected in loan 631-CR appraisal report (1969).

In spite of the higher than projected prices for electricity net operating income fell some 15% short of projected levels for the 1963-70 period due to the shortfall in sales referred to before. But the more important factor accounting for the low level of net self-financing is the large amount of borrowing, much of it on relatively short term, that ICE has had to undertake. This is well illustrated by the fact that, for the 1963-70 period, gross internal self-financing (i.e. including debt service) has been 40% compared with a projected 50%, while net internal cash generation plus amortization represent 28% of total requirements for investment and amortization compared with 41% projected, yet net internal cash generation has been only 3.5% compared with the projected 32%.[1/] For this period interest payments were 36% above the level projected and amortization was 140% above the projections.

The heavy additional borrowing reflects the fact that the financing plan for each of the Bank-supported projects has been upset within a matter of months of its being made, not usually because ICE failed to raise tariffs to the extent agreed but for a variety of other reasons. The most important was the substantial cost overruns on the major schemes. Other factors were: underestimate of amortization obligations[2/] (in all financing plans to date), insufficient allowance for other on-going investment, over-estimate of sales, under-allowance for the effects of interim delays on projects costs and on the need for additional thermal generating capacity to meet imminent demand growth. In a number of instances it appears that these difficulties could have been avoided -- or at least better foreseen -- with better coordination within ICE and/or within the Bank and with better familiarity of concerned Bank staff with earlier experience. Most of the shortages were in local currency. ICE was enterprising in selling locally its own ten- and twenty-year bonds, to the extent of some US$ 16 million equivalent between 1963 and 1970. But these sales had to be supplemented with substantial short- and medium-term borrowing from banks (about US$ 19 million equivalent), most of this being in foreign exchange for conversion into colones. Under the loan agreements the Bank's permission had to be sought for almost all of these borrowings.

Procurement

Loans 276-CR and 346-CR were intended entirely for foreign exchange expenditures, and foreign procurement appears to have been consistent with the Bank's guidelines for international competitive bidding. A very

1/ Adjustment of the actual figures to omit the effects of the purchase of CNFL in 1968, which could not have been foreseen in 1963, does not alter them significantly. The purchase price was US$ 10.5 million, of which US$ 1 million was down-payment (financed by ICE almost entirely by medium-term borrowing) and the US$ 9.5 million balance was payable over 17.5 years with interest at 7-3/4% on the outstanding balance; this repayment schedule for the balance was arranged so that it could be met from CNFL's own internal cash generation.

2/ For the first two or three years following loan agreement interest payments have been rather accurately forecast but amortization obligations appear to have been persistently underestimated.

small amount of local cost financing eventually took place out of loan 346-CR for contracts won under 15% tariff preference. Later, in 1965, to help deal with the large local cost overruns on Cachi and in connection with the introduction of electricity tariff increases, the Bank gave special permission for up to US$ 2 million of savings from cutting back the transmission program to be used to pay contracts in colones; US$ 1.6 million was eventually used in this way. The more recent loans have included provisions for small amounts of local or regional procurement under preference (of up to 15%) forsuppliers from Central American Common Market countries. ICE has expressed the view that the Bank could usefully contribute more to regional industrial development by being more flexible in this connection, allowing higher preference.

Conclusion

The objectives of the Bank's loans to ICE were partially attained. Most of the plant originally envisaged was eventually built and it is operating satisfactorily. A small modern telecommunications system, and an effective organization to run it, have been built virtually from scratch. Power demand has grown approximately as projected, and serious power shortages have been successfully avoided. ICE's overall financial performance, in terms of rate of return on assets, has improved markedly. On the other hand, cost and time overruns on the main hydroelectric works built have been increasingly serious. ICE has faced continuing financial problems which it has had to deal with by substantial additional borrowing and its ability to finance expansion out of internally generated funds, even on a deferred basis, has continued to fall short of targets. The poor cost estimates are the most important cause of the disappointing financial performance.

The Bank has contributed very usefully to ICE's growth with both financing and advice. Major accomplishments were help in achieving a more adequate level of power tariffs, early advice about the need for specialist engineering assistance, and close association with ICE's development in the telecommunications field. The Bank also missed some opportunities for providing more effective assistance, particularly with regard to the engineering of the later projects, project cost estimating and financial planning under the given circumstances.

Lessons

A number of lessons for the Bank emerge from this audit:

1. Bank Continuity - It appears that the Bank could probably have helped ICE more effectively to avoid some of the problems that arose -- increasing cost overruns and poor financial planning -- had there been more consistency and continuity in its

advice and analyses. Changes in Bank personnel assigned seem to have been more frequent in this case than usual. Such changes are often unavoidable, but their effects might have been more effectively mitigated by better coordination and also by closer review of history by those newly assigned. Since what is needed for project appraisal reports has tended to control the extent and nature of the appraisal undertaken and since these reports have also been the main means for conveying information and modes of analysis among those successively involved, it would probably have been desirable had the reports been more candid and complete in their treatment of the issues and problems which arose in connection with previous projects; not one of the appraisal reports for ICE to date quotes cost overruns on earlier projects or considers actual self-financing performance against earlier targets. In addition, it does not appear that adequate attention has been paid in Bank documents to the reasons for delays between the submission of successive projects and the presentation of loans to the Board. In view of the special difficulties in financial planning and projection of amortization requirements, it might also have been useful to have required inclusion in the appraisal report of an actual Sources and Applications of Funds table for the preceding five years, along with the actual Balance Sheets and Profit and Loss Statements normally provided.

2. Contingency Planning - Lending to ICE has suffered from inadequate allowance in financial plans for engineering contingencies on projects and seemingly so from inadequate consideration of earlier experience in this regard. But there is also another type of contingency planning -- which would be all the more important to the extent that preliminary engineering simply cannot provide adequate answers and which the Bank does seem to have suggested late in 1964 although there was no real follow-up -- namely financial contingency planning in the sense of advance consideration, for instance at time of project appraisal, of what will be done in the event of problems arising despite use of the best possible engineering estimates of contingencies: which parts of the investment program would be postponed in the event of cash shortage? what debt can be renegotiated? where might additional borrowings be made? These questions were of course considered from time to time, but apparently only on an emergency basis. Had more forethought been taken, so that more time was available to prepare for possible borrowing, it is likely that ICE would have been able to borrow on longer term, at least in some instances. (The question whether the Bank should have lent more on its long terms to help cover local currency requirements is outside the purview of this audit since it can only be considered in country context.)

3. Sector Coordination and Planning - Sector coordination seems to have received inadequate attention in this case until very recently. CNFL was ofcourse a foreign private company until 1968 but coordination between it and ICE appears to have been relatively good; the problem seems to lie rather with the very numerous smaller companies. It seems to have hampered attainment of project goals directly, for instance by its effect on ICE sales and by making load forecasting for ICE (as opposed to the Interconnected System as a whole) particularly difficult. In spite of the marked advantages, financial, technical and economic, from centralized planning of power systems, the problems arising from the fragmentation of the non-ICE part of the utility industry in Costa Rica, and ICE's general mandate to deal with the matter, the Bank does not seem to have raised the matter either with ICE or with the Government, and the 1972 appraisal report was the first to refer to it in any depth. Agreement was reached before the last loan was signed that consultants would be hired to study the matter.

4. Other ICE Suggestions - It is worth recording that various members of ICE's management independently brought up three topics which did not figure among the Bank's concerns in connection with the loans reviewed but did emerge as important in the recent general review of past Bank operations in the electric power field (IBRD Report No. Z-17, dated March 10, 1972: "Operations Evaluation Report: Electric Power"). They indicated that they would be receptive to Bank assistance in these areas not only for power but also for telecommunications: (i) develop an approach for analyzing the economics of system extension to marginal and rural areas, (ii) study the relationship between social marginal costs and tariff structures and justify departures, and (iii) evaluate Bank's actual and potential contribution to industrial growth through financing and otherwise stimulating local procurement. An innovative study which the Bank is considering undertaking in Costa Rica on the cost structure of telecommunications services could help significantly on the first two topics.

LIST OF TABLES

COSTA RICA: Instituto Costarricense de Electricidad - Electricity Department

Operations		1956	1957	1958	1959	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	Average Annual Increase Rate (%) 1956-61	1961-66	1966-71	1961-71
1. Installed Capacity (nameplate capacity at end of year)																					
ICE-Central System: Hydro	MW	1.1	.9	31.2	30.9	30.0	30.0	30.0	61.5	61.5	61.5	92.0	124.0	124.0	124.0	125.5	125.5	94.0	25.0	6.4	15.4
: Diesel	MW	13.3	12.9	12.4	12.3	12.3	11.9	19.5	19.5	19.5	27.5	27.5	19.5	19.5	19.5	19.5	19.5	(2.3)	18 2	(7.1)	5.1
: Total	MW	14.4	13.8	43.6	43.2	42.3	41.9	49.5	81.0	81.0	89.0	119.5	143.5	143.5	143.5	145.0	145.0	24.0	23.0	4 0	13.2
ICE-Isolated Systems (Diesel)	MW	4.9	5.2	5.9	6.0	5.9	6.4	7.4	3.8	4.8	4.8	4.8	9.7	10.9	11.8	12.0	12.8	8.4	(5.9)	21.5	7.2
Total ICE	MW	19.3	19.0	49.5	49.2	48.2	48.3	56.9	84.8	85.8	93.8	124.3	153.2	154.4	155.3	157.0	157.8	20.0	21.0	4.9	12.6
Total Interconnected System	MW	57.6	59.2	89.1	87.8	87.9	87.3	95.0	126.5	126.5	134.5	164.9	189.5	193.8	193.8	195.9	195.9	8.7	13.6	3.5	8.4
Total Country[a]	MW	n.a.	n.a.	n.a.	n.a.	113.4	111.2	117.5	152.3	150.9	159.4	196.1	236.0	236.6	237.2	243.7	244.0		11.8	4.5	8 1
Total Interconnected System as % of Country	%	n.a.	n.a.	n.a.	n.a.	78	78	81	83	84	84	84	80	82	82	80	80				
2. Peak Demand:																					
Interconnected System	MW	59.0	70.0	75.0	86.0	93.1	94.1	103.0	113.6	118.4	132.8	135.9	145.5	148.4	168.4	195.0	211.9	9.7	7.6	9.3	8.5
Load Factor	%	49	47	46	42	46	49	48	49	52	49	52	52	56	53	53	55				
3. Gross Reserves:																					
Interconnected System [b]	MW	n.a.	n.a.	n.a.	n.a.	6.4	6.2	5.4	29.0	24.2	17.8	52.8	75.0	75.6	55.6	30.6	13.7				
Reserves as % of Peak Demand: Interconnected System	%	n.a.	n.a.	n.a.	n.a.	7	7	5	26	20	13	39	52	51	33	16	6				
4. Effective Peak Spare Capacity: [c]																					
Interconnected System	MW	n.a.	n a.	n.a.	n.a.	3.3	5.5	3.1	4.3	9.9	8.9	13.2	38 0	41.3	17.6	29.0	12.1				
5. Gross Generation:																					
ICE Central	Gwh	29	53	98	176	200	224	248	298	372	345	365	418	474	533	612	725	51.0	10.3	14.7	12.5
Interconnected System	Gwh	254	286	303	320	375	402	428	484	538	575	615	668	727	787	908	1027	11.4	8.3	10.8	9.5
6. Total Sales:																					
ICE Central (including purchased energy)																					
Bulk Sales to Interconnected System	Gwh	13	37	75	154	162	184	211	228	281	271	280	318	363	416	464	530				11.2
Bulk Sales to Large Industries	Gwh	-	-	-	-	-	-	-	7	30	30	32	35	40	46	58	94				38.0 [f]
ICE Distribution System	Gwh	13	15	18	19	26	32	33	51	51	34	39	42	52	56	60	65				7.4
Sub-Total	Gwh	26	52	93	173	188	216	244	286	362	335	351	395	455	518	582	689	52.0	10.2	14.5	12.3
ICE Isolated Systems	Gwh	18	19	21	24	24	23	25	11	12	13	15	17	20	22	25	31	5.0	(8.9)	15.6	3.0
Total ICE	Gwh	44	71	114	197	212	239	269	297	374	341	366	412	475	540	607	720	40.5	8.9	14.5	11.7
Total Interconnected System	Gwh	208	250	266	291	328	356	381	408	464	497	531	578	640	688	774	884	9.1	8.3	10.7	9.5
7. Sales by Class of Consumer in Interconnected System:																					
Residential	Gwh	169	182	195	213	235	253	272	n.a.	n.a.	310	333	358	384	406	443	n.a.	8.4	5.7		6.4 [g]
Industrial	Gwh	14	17	19	22	31	36	41	n.a.	n.a.	107	114	129	154	168	199	n.a.	21.0	26.0		21.0 [g]
Commercial	Gwh	35	36	37	40	45	50	54	n.a.	n.a.	70	73	79	88	99	114	n.a.	7.4	7.9		9.6 [g]
Other	Gwh	13	15	15	16	17	17	14	n.a.	n.a.	10	11	12	14	15	18	n.a.	5.5	(9.1)		0.6 [g]
Total	Gwh	231	250	266	291	328	356	381	408	464	497	531	578	640	688	774	884	9.1	8.3	10.7	9.5
8. Number of Employees:																					
Electricity Dept. Only [d]	No.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	538	594	587	855	920				14.4 [h]
Electricity Dept. plus share of ICE Joint Services [e]	No.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	1035	1073	1074	1187	1381				7.5 [h]
9. System Losses $\left\{\frac{5-6}{5}\right\}$:																					
ICE	%	10.3	1.9	5.1	1.7	6.0	3.6	1.6	4.0	2.7	2.9	3.8	5.5	4.0	2.8	4.9	5.0				
Interconnected System	%	18.1	12.6	12.2	9.1	12.5	11.4	11.0	15.7	13.8	13.6	13.7	13.6	12.0	12.6	14.8	13.9				
10. Average Capacity Out of Service % of Installed Capacity																					
ICE	%	n.a.	n.a.	n.a.	n.a.	9.8	0	0	2.0	8.2	5.3	18.5	10.4	2.5	10.0	0.7	0.8				
Interconnected System	%	n.a.	n.a.	n.a.	n.a.	6.2	0.4	0	1.4	6.0	5.0	15.2	8.4	3.1	9.0	0.9	0.7				

a/ Includes captive plants or privately owned generation.
b/ Total Installed Capacity (nameplate capacity + peaking or overload capacity) less peak demand.
c/ Effective Peak: Critical time in the year when the margin between demand and available capacity is least or load shedding greatest (excluding short-term outages).
d/ Number of employees of Electricity Department refers to those exclusively related to electricity operations (not including construction labor force).
e/ This figure represents an approximation only, based on the above figure plus a certain proportion (based on proportion that electricity net operating income represents of total ICE net operating income), of those employees in the accounting, financial and management divisions which are shared by both the electricity and telecommunications departments.
f/ 1963-1971
g/ 1961-1970
h/ 1967-1971

COSTA RICA: Instituto Costarricense de Electricidad - Telecommunications Department

			1964	1965	1966	1967	1968	1969	1970	1971	Average Annual Increase Rate 1964-1971
	Telecommunications Operations (December 31 of each year)										
1.	Number of Telephones (manual & automatic) Per 1000 of Population		19.8	19.9	34.4	41.3	50.1	56.3	61.7	67.6	19.2
2.	Number of Telephone Subscribers:										
	Automatic	000's	0	0	17.0	23.4	28.5	32.9	35.8	40.3	18.9 i/
	Manual & Semi-automatic	000's	11.7	11.7	1.4	1.2	1.1	1.9	2.3	2.7	
	Total	000's	11.7	11.7	18.4	24.6	29.6	34.8	35.1	43.0	20 0
	% automatic	%	0	0	92.4	95.1	96.3	94.5	94 0	93 8	
3.	Installed Capacity a/	000's	n.a.	9.5 b/	22.0 c/	31.2	32.7	36.1	39 7	42 5	28 0 i/
4.	Main Subscriber Lines (DELs) d/	000's	n.a.	9.4	17.5	23 2	29.0	33 8	37.1	40 0	27 0 i/
5.	Number of Telephone Exchanges		n.a.	n.a	n a.	n a	24	24	25	27	
6.	Exchange Occupation Factor (4 ÷ 3)	%	n.a.	98.9	79.5	74 4	88.7	93.6	93 2	94 1	
7.	Number of Long Distance Circuits	No.	n.a.	n.a.	n.a.	390	500	n.a.	n.a.	n a.	
8.	Total Mileage of Long Distance Circuits										
	Microwave	000's km	n.a.	n.a.	n a.	n.a.	14.4	15.8	15.8	16.4	
	V.H F	000's km	n.a.	n.a.	n.a.	n.a	1.4	2.3	2.6	3.3	
	Coaxial	000's km	n.a.	n.a.	n.a.	n.a	3.2	4.2	4.2	4.4	
	Standard Telephone Line	000's km	n.a.	n a.	n.a.	n.a.	7.6	8.2	8.7	11 2	
	Total	000's km	n.a.	n.a.	n.a.	n.a.	26.6	30.5	31.3	35.3	
9.	Number of Telephone Calls										
	Local	mln	n.a.	75.0	76.5	199.9	354.3	476.6	592.6	715.9	46 0 k/
	Long distance (national)	mln	n.a.	45.0	44.0	25.6	32.7	42.2	52 5	64.4	6.2 k/
	International	mln	n.a.	0.2	0 5	0.7	0 9	1.3	1.7	2 2	49 0 k/
	Total	mln	n.a.	120.2	121.0	226.2	387.9	520.1	646.8	782.5	37 0 k/
10.	Number of Telegraph Offices f/		n.a.	n.a.	n.a	570	584	601	618	635	2.8 i/
11.	Number of Telex Subscribers g/		n a.	n.a.	n.a.	125	142	150	165	187	10 6 i/
12.	Number of V.H.F. Stations		-	-	-	-	-	2	7	21	
13.	Number of Microwave Stations		-	-	-	5	7	9	11	12	
14.	International Service - Direct Access to:										
	Satellite (thru Panama)		-	-	-	-	-	x	x	x	
	Submarine cable (thru Panama)		-	-	-	-	x	x	x	x	
	HF radio		x	x	x	x	x	x	x	x	
15.	Categories of Subscribers										
	Commercial	%	n.a.	n a	28 1	28.4	28 1	27.8	27 6	27 2	
	Residential	%	n a.	n a.	59.9	60.4	61.0	61.7	62 0	63 3	
	Party lines	%	n.a.	n a	4 9	5.5	5.4	5 0	4.8	4 2	
	P.B.X	%	n a.	n.a.	7 1	5.7	5 5	5.5	5 6	5 3	
16.	Number of Employees										
	Telecommunications Dept Only h/	No.	n a.	n.a.	n a.	686	708	730	762	900	7.0 i/
	Telecommunications Dept. plus share of ICE Joint Services i/	No.	n.a.	n.a.	n a.	861	876	938	911	1098	6.3 i/

a/ In telephone line units (LU).
b/ Manual lines.
c/ First year of operation of automatic telephone installations financed by Loan 346-CR, San Jose main exchange started operations in May.
d/ DEL = Direct Exchange Line.
e/ Ratio of direct exchange lines to equipment capacity.
f/ Currently operated by the Ministry of the Interior.
g/ Currently operated by Radiografica Costarricense, S. A.
h/ Number of Employees of Telecommunications Department refers to those exclusively related to telecommunications operations (not including construction labor force).
i/ This figure represents an approximation only, based on the above figure, plus a certain percentage (based on proportion that telecommunications net operating income represents of total ICE net operating income) of those employees in the accounting, financial and management divisions which are shared by both the electricity and telecommunications departments
j/ 1966-1971
k/ 1965-1971
l/ 1967-1971

COSTA RICA - INSTITUTO COSTARRICENSE DE ELECTRICIDAD: ELECTRICITY AND TELECOMMUNICATIONS DEPARTMENTS

FINANCIAL & MANAGEMENT INDICATORS

	Unit	1956	1957	1958	1959	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	Average Annual Increase Rate (%) 1956-61	1961-66	1966-71	1961-71
Electricity Department																					
1. Operating Revenues a/	colones mln	4.6	7.0	9.7	16.0	17.6	20.7	27.3	29.4	33.8	41.6	42.5	47.6	56.7	64.2	73.3	84.8	35.0	15.5	14 8	15.1
2. Operating Costs c/	colones mln	4.7	8.1	9.2	12.3	13.3	15.0	18.3	18.5	20.3	22.3	20.1	28.2	27.8	30.8	31.6	39.4	26 0	6.1	14 4	10.1
3. Average Sales Revenue/Kwh Sold	colones ¢	10.5	9.9	8.5	8.1	8.3	8.7	10.1	9.9	9.0	12.2	11.6	11.6	11.9	11.9	12.1	11.8				
4. Average Cost/Kwh Sold	colones ¢	10.6	11.4	8.1	6.2	6.3	6.3	6.8	6.2	5.4	6.5	5.5	6.8	5.9	5.7	5.2	5.5				
5. Exchange Rate: US$1 = 6.65 colones																					
6. Average Sales Revenue/Kwh Sold	US¢	1.6	1.5	1.3	1.2	1.2	1.3	1.5	1.5	1.4	1.8	1.7	1.7	1.8	1.8	1.8	1.8				
7. Average Cost/Kwh Sold	US¢	1.6	1.7	1.2	0.9	0.9	0.9	1.0	0.9	0.8	1.0	0.8	1.0	0.9	0.9	0.8	0.8				
8. Net Operating Income (1 - 2)	colones mln	(.1)	(1.1)	.5	3.7	4.3	5.7	9.0	10.9	13.5	19.3	22.4	19.4	28.9	33.4	42.1	45.4		32.0	15 2	23.0
9. Gross Fixed Investment	colones mln	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	51.3	56.5	92.0	33.4	22.0	24.4	32.1	63.7	100.3				
10. Net Fixed Assets in Operation g/	colones mln	35.9	31.2	111.2	115.8	114.4	112.5	131.6	229.7	223.9	234.5	233.3	384.2	383.8	380.2	382.5	381.3	26.0	15.7	10.3	13.0
11. Average Net Fixed Assets in Operation	colones mln	27.3	33.6	71.2	113.5	115.1	113.5	122.1	180.7	226.8	229.2	233.9	308.8	384.0	381.4	381.3	382.0	33.0	15 6	10 3	13.0
12. Rate of Return (8 ÷ 11)	%	-	-	.7	3.3	3.7	5.0	7.4	6.0	6.0	8.4	9.6	6.3	7.5	8.8	11.0	11.9				
13. Self-financing Rate d/	%	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	16.9	2.3	3.9	0	18.9	0	19.3	18.6	15.9				
14. Energy Sales per Employee	Mwh	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	398	443	503	511	521			. 7.3	
Telecommunications																					
1. Operating Revenues e/	colones mln										4.9	9.0	16.0	24.2	30.9	38.4	47.0			39.0	
2. Operating Costs c/	colones mln										4.6	7.6	9.2	13.9	16.4	19.9	27.8			29.5	
3. Net Operating Income (1 - 2)	colones mln										0.3	1.4	6.8	10.3	14.5	18.5	19.2			67 0	
4. Gross Fixed Investment	colones mln								7.7	4.0	24.6	33.1	25.5	25.3	10.6	11.2	31.0				
5. Net Fixed Assets in Operation g/	colones mln								5.9	5.8	6.0	35.0	78.2	91.4	102.3	112.8	122.4			28.0	
6. Average Net Fixed Assets in Operation	colones mln								3.0	5.9	5.9	20.5	56.6	84.8	96.9	107.6	117.6			42.0	
7. Rate of Return (3 ÷ 6)	%										5.1	6.8	12.0	12.1	15.0	17.2	16.3				
8. Self-financing Rate d/	%								0	0	0	0	0	0	7.2	44.3	28.0				
9. Main Subscriber Lines per Employee	No.								n.a.	n.a.	n.a.	n.a.	26.9	33.1	36.0	40.6	36.4			7 9	
Consolidated Accounts																					
1. Operating Revenues a/ e/	colones mln	4.6	7.0	9.7	16.0	17.6	20.7	27.3	29.4	33.8	46.5	51.5	63.6	80.9	95.1	111.7	131.8	35.0	20.0	21.0	20.5
2. Total Income b/	colones mln	5.3	6.0	10.0	14.8	17.6	20.7	27.3	30.6	34.7	47.6	53.9	65.2	83.6	104.3	122.6	139.6	32.0	21.0	21.0	21.0
3. Operating Costs c/	colones mln	4.7	8.1	9.2	12.3	13.3	15.0	18.3	18.5	20.3	27.0	27.9	37.4	41.7	47.2	51.5	67.2	26.0	13.2	19.2	16.2
4. Net Operating Income (1 - 3)(before interest)	colones mln	(.1)	(1.1)	.5	3.7	4.3	5.7	9.0	10.9	13.5	19.5	23.6	26.2	39.2	47.9	60.2	64.6		33.0	22 0	27.5
5. Net Income (2 - 3)(before interest)	colones mln	.6	(2.1)	.8	2.5	4.3	5.7	9.0	12.1	14.4	20.6	26.0	27.8	41.9	57.1	71.1	72.4		35.0	23.0	29.0
6. Gross Fixed Investment	colones mln	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	59.0	60.5	116.6	66.5	47.5	49.8	42.7	74.9	131.3				
7. Net Fixed Assets in Operation	colones mln	35.9	31.2	111.2	115.8	114.4	112.5	131.6	235.6	229.7	240.5	268.3	462.4	475.2	482.5	495.3	503.7	26.0	19.0	13.4	16.2
8. Average Net Fixed Assets in Operation	colones mln	27.3	33.6	71.2	113.5	115.1	113.5	122.1	183.6	232.7	235.1	254.4	365.4	468.8	478.9	488.9	499.5	33.0	17.5	14.4	16.0
9. Rate of Return (4 ÷ 8)	%	-	-	.7	3.3	3.7	5.0	7.4	5.9	5.8	8.3	9.3	7.2	8.4	10.0	12.3	12.9				
10. Financial Rate of Return (5 ÷ 13)	%	2.2	-	1.1	2.2	3.7	5.0	7.4	6.6	6.2	8.8	10.2	7.6	8.9	11.9	14.5	14.5				
11. Self-financing Rate d/	%	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	16.9	1.2	1.7	0	6.5	0	15.7	24.2	19.8				
12. Operating Ratio (3 ÷ 1)		102.2	115.7	94.8	76.9	75.6	72.5	67.0	62.9	60.1	58.1	54.2	58.8	51.5	49.6	46.1	51.0				
13. Debt Service Coverage f/	times	0.3	0	0.3	0.8	2.2	1.6	2.0	1.7	1.3	1.5	1.4	1.3	1.7	2.0	2.4	2.2				
14. Debt/Equity Ratio	%	42/58	40/60	39/61	19/81	20/80	27/73	36/64		43/57	55/45	57/43	57/43	60/40	58/42	57/43	56/44				

a/ Revenues from electricity operations only (there are no indirect taxes on the sale of electricity).
b/ Total revenue from all sources (for years 1957 & 1959 operating revenue is lower than sales revenue due to accounting adjustments which were made to correct accounting errors during those years of operation).
c/ Including depreciation, but excluding interest (ICE pays no direct taxes).
d/ Net internal cash generation as % of total sources of funds.
e/ Revenues from telecommunications operations only (there are no indirect taxes on telecommunications operations).
f/ Times interest payable was covered by net operating income (before interest).
g/ For the years 1963-1967 the breakdown of the net fixed assets in operation between the Telecommunications and Electricity Departments is somewhat imprecise in that a small portion (5% of total for 1963 and 1967 and approximately 10% of total for 1964, 1965, 1966) of the total assets was not clearly separated in ICE's accounts.

COSTA RICA - INSTITUTO COSTARRICENSE DE ELECTRICIDAD: ELECTRICITY DEPARTMENT
LOAN 276-CR (Feb., 1961)

TABLE I-A

		1961	1962	1963	1964	1965	1966	1967	1968	Average Annual Increase Rate (%) 1961-1968
	LOAD FORECASTS (MW)[a]									
1	Installed Capacity (nameplate capacity) of Interconnected System	94.1	102.1	132.1	132.1	162.1	162.1	162.1	192.1	10.7
2.	Annual Peak Demand of Interconnected System	98.7	109.1	116 2	122.7	129.5	136.4	143.7	151.5	6.3
3.	Gross Reserve Capacity (1-2) of Interconnected System	(4.6)[b]	(7 0)[b]	15 9	9.4	32.6	25.7	18.4	40.6	
	ACTUAL LOAD (MW)									
4	Installed Capacity (nameplate capacity) of Interconnected System	87 3	95.0	126.5	126.5	134.5	164.9	189.5	193.8	12.1
5.	Annual Peak Demand of Interconnected System	94.1	103.0	113.6	118 4	132.8	135.9	145 5	148.4	6.8
6.	Gross Reserve Capacity ($\frac{6}{5}$-5) of Interconnected System[b]	(6.8)	(8.0)	12.9	8 1	1.7	29.0	44.0	45.4	
7	Effective Peak Capacity of Interconnected System[c]	98 7	100.3	110.0	123.5	132.1	149.1	183.5	186 0	9 4
8	Effective Peak Demand of Interconnected System[c]	93.2	97.2	105.7	113.6	123.2	135.9	145.5	144.7	6 5
9.	Effective Peak Spare Capacity of Interconnected System[c]	5.5	3.1	4 3	9.9	8.9	13.2	38.0	41.3	
	LOAD FORECAST ACCURACY[d]									
10	Installed Capacity of Interconnected System	108	107	104	104	121	98	85	99	
11.	Annual Peak Demand of Interconnected System	105	106	102	104	98	101	99	102	
12	Gross Reserve Capacity of Interconnected System	68	88	123	116	1918	89	42	89	
	SALES FORECAST (Gwh)									
13.	Gross Generation of Interconnected System[a]	407.2	449.0	478.4	505.3	533.1	561.6	591.8	623 6	6.3
14	Total Sales									
	ICE - Retail	53.9	59 3	65 1	71.4	78.2	85.5	93.3	101.4	9.4
	Wholesale	195.8	231.2	271.4	288.2	318.5	352.8	387.5	419.7	11.5
	Total	249 7	290.5	336 5	359 6	396.7	438.3	480.8	521.1	11 1
	Interconnected System - Residential	253.9	273.5	293.6	311.5	330.5	349.0	369.2	390.6	6.3
	Commercial & Industrial	68.0	82.5	86.2	90.0	94.0	98.0	102.2	106.5	6.6
	Other	17.3	18.0	18.7	19.4	20.1	20.8	21.6	22 4	3.8
	Total	339.2	374.0	398.5	420.9	444.1	467.8	493.0	519 5	6 3
	ACTUAL SALES (Gwh)									
15.	Gross Generation of Interconnected System	402	428	484	538	575	615	668	727	8.8
16.	Total Sales									
	ICE - Retail	55	58	69	93	70	86	94	112	10 7
	Wholesale	184	211	228	281	271	280	318	363	10.2
	Total	239	269	297	374	341	366	412	475	10 3
	Interconnected System - Residential	253	272	n.a.	n.a.	310	333	358	384	6 1
	Commercial & Industrial	86	95	n.a.	n.a.	177	187	208	242	15 9
	Other	17	14	n.a.	n.a.	10	11	12	14	(2.8)
	Total	356	381	416	461	497	531	578	640	8 8
	SALES FORECAST ACCURACY[d]									
17.	Gross Generation of Interconnected System	101	105	99	94	93	91	89	86	
18	Total Sales ICE	105	108	113	96	116	120	117	110	
	Interconnected System	95	98	96	91	89	88	85	81	
	RETURN FORECAST (Colones mln)									
19	Operating Revenues[e]	21.6	27.4	35.2	39.2	43 2	47.7	52.3	56.7	14.8
20	Less Operating Costs[f]	15.9	17.7	21.9	23.2	25 2	28 6	30.0	31 8	10 4
21	Net Operating Income	5.7	9 7	13 3	16.0	18 0	19 1	22.3	24 9	23 0
22	Rate of Return on Average Net Fixed Assets in Operation (%)[g]	5.0	8 8	6.4	7.8	6.5	7.1	8 5	7 3	
	ACTUAL RETURN (Colones mln)									
23.	Operating Revenues[e]	20.7	27.3	29.4	33.8	41.6	42.5	47.6	56 7	15 5
24	Less Operating Costs[f]	15.0	18 3	18.5	20 3	22.3	20.1	28 2	27.8	9.2
25	Net Operating Income	5.7	9.0	10 9	13.5	19 3	22.4	19.4	28 9	26.0
26.	Rate of Return on Average Net Fixed Assets in Operation (%)[g]	5.0	7.4	6.0	6.0	8.4	9 6	6 3	7 5	
	RETURN FORECAST ACCURACY[d]									
27	Operating Revenues	104	100	120	116	104	112	110	100	
28	Operating Costs	106	97	118	114	113	142	106	114	
29	Net Operating Income	100	108	122	119	93	85	115	86	

a/ No forecasts were presented in Loan 276-CR Appraisal Report for ICE only as distinct from Interconnected System.
b/ Actual gross reserves as indicated in Table 1 are larger due to the fact that overload capacity is included while for reasons of comparison with Appraisal Report forecasts only nameplate capacity is included in the figures in this table
c/ Effective peak the critical time in the year when margin between demand and available capacity was least or load shedding greatest (excluding short-term outages)
d/ Defined by the ratio Forecast/Actual
e/ Revenues from electricity operations only (there are no indirect taxes on the sale of electricity)
f/ Including depreciation, but excluding interest (ICE pays no direct tax).
g/ Net operating income as % of average net fixed assets in operation.
h/ The Appraisal Report predicted that the forecast gross deficits for these 2 years could be overcome or met by operating all available plant on overload.

COSTA RICA INSTITUTO COSTARRICENSE DE ELECTRICIDAD - ELECTRICITY DEPARTMENT
LOAN 346-CR (JULY, 1963)

TABLE II - A. 2

		1964	1965	1966	1967	1968	1969	1970	Average Annual Increase Rate (%) 1964-1970
	Load Forecasts (MW) a/								
1	Installed Capacity (nameplate capacity) of Interconnected System	131.7	157.1	190.2	190.2	190.2	205.2	235.2	10 2
2.	Annual Peak Demand of Interconnected System	133 2	148.3	159.5	171.0	181.2	191 0	202.1	7.2
3.	Gross Reserve Capacity (1-2) of Interconnected System	(1.5) b/	8.8	30.7	19 2	9.0	14.2	33.1	
	Actual Load (MW)								
4.	Installed Capacity (nameplate capacity) of Interconnected System	126.5	134.5	164.9	189.5	193.8	193.8	195.9	7.6
5	Annual Peak Demand of Interconnected System	118.4	132 8	135.9	145.5	148.4	168.4	195.0	8 7
6	Gross Reserve Capacity (4-5) of Interconnected System b/	8.1	1.7	29.0	44.0	45.4	25 4	0.9	
7	Effective Peak Capacity of Interconnected System c/	123.5	132.1	149.1	183.5	186.0	186.0	224.0	10.4
8.	Effective Peak Demand of Interconnected System c/	113.6	123.2	135.9	145.5	144 7	168.4	195.0	9.4
9	Effective Peak Spare Capacity of Interconnected System c/	9.9	8.9	13 2	38.0	41.3	17.6	29.0	
	Load Forecast Accuracy d/								
10	Installed Capacity (nameplate capacity) of Interconnected System	104	116	115	100	98	106	120	
11	Annual Peak Demand of Interconnected System	113	111	118	117	122	114	104	
12.	Gross Reserve Capacity of Interconnected System	-	518	106	44	20	56	3678	
	Sales Forecast (Gwh)								
13.	Gross Generation of Interconnected System a/	587 5	652.4	702.1	752.3	797.2	840.7	889.0	7.2
14	Total Sales								
	ICE - Retail	83.4	91.6	100 4	108.7	117.2	125.7	134.6	8 3
	Wholesale	306.0	356.5	407.2	436.6	467.6	497.4	527.8	9.5
	Total	389.4	448.1	507.6	545.3	584.8	623.1	662.4	9 3
	Interconnected System - Residential	316.7	338.9	362.7	388.2	411.5	436.2	462.4	6.5
	Commercial & Industrial	160.2	192.9	209.8	228 3	244.5	258.3	272 4	9 3
	Other	15.0	15.4	15.6	15.9	16.2	16.4	16.6	1 7
	Total	491.9	547.2	588 1	632.4	672.2	710.9	751.4	7 3
	Actual Sales (Gwh)								
15	Gross Generation of Interconnected System	538	575	615	668	727	787	908	9 1
16	Total Sales								
	ICE - Retail	93	70	86	94	112	124	143	7 4
	Wholesale	281	271	280	318	363	416	464	8.7
	Total	374	341	366	412	475	540	607	8.4
	Interconnected System - Residential	n a	310	333	358	384	406	443	7 4 i/
	Commercial & Industrial	n a	177	187	208	242	267	313	12 0 i/
	Other	n a	10	11	12	14	15	18	12 5 i/
	Total	461	497	531	578	640	688	774	9 0
	Sales Forecast Accuracy d/								
17	Gross Generation of Interconnected System	109	113	114	113	110	108	98	
18	Total Sales ICE	104	131	140	132	123	115	109	
	Interconnected System	107	110	111	109	105	103	97	
	Return Forecast (Colones mln)								
19.	Operating Revenues e/	42 6	49.3	54 2	60.0	65 6	71.0	75.3	10 0
20	Less Operating Costs f/	27.5	30.9	29 4	30.7	32.4	34.1	34.6	3 9
21	Net Operating Income	15.1	18.4	24.8	29 3	33.2	36 9	40.7	18.0
22	Rate of Return on Average Net Fixed Assets in Operation (%) g/	6.8	6 5	7 2	7 8	8.8	8 8	8 8	
	Actual Return (Colones mln)								
23	Operating Revenues e/	33 8	41 6	42 5	47 6	56 7	64 2	73.3	13 8
24	Less Operating Costs f/	20 3	22 3	20 1	28 2	27 8	30 8	31 6	7 7
25	Net Operating Income	13 5	19 3	22 4	19 4	28.9	33.4	42 1	20 0
26	Rate of Return on Average Net Fixed Assets in Operation (%) g/	6 0	8 4	9 6	6 3	7 5	8 8	11 0	
	Return Forecast Accuracy d/								
27.	Operating Revenues	126	119	128	126	114	111	103	
28.	Operating Costs	135	139	146	109	117	110	109	
29.	Net Operating Income	112	95	111	151	115	110	97	

a/ No forecasts were presented in Loan 346-CR Appraisal Report for ICE only, as distinct from Interconnected System
b/ Actual gross reserves as indicated in Table I are larger due to the fact that overload capacity is included while for reasons of comparison with Appraisal Report Forecasts only nameplate capacity is included in the figures in this table
c/ Effective peak The critical time in the year when margin between demand and available capacity was least or load shedding greatest (excluding short-term outages)
d/ Defined by the ratio Forecast/Actual
e/ Revenues from electricity operations only (there are no indirect taxes on the sale of electricity)
f/ Including depreciation but excluding interest (ICE pays no direct tax)
g/ Net operating income as % of average net fixed assets in operation
h/ The Appraisal Report predicted that the forecast gross deficit for this year would be overcome or met by operating all available capacity on overload
i/ 1965-1968.

TABLE II-A.3

COSTA RICA - INSTITUTO COSTARRICENSE DE ELECTRICIDAD: TELECOMMUNICATIONS DEPARTMENT
LOAN 346-CR (July, 1963)

	1964	1965	1966	1967	1968	1969	1970	Average Annual Increase Rate (%) 1965-1970
FINANCIAL RETURN FORECAST (Colones mln)								
1. Operating Revenue[a/]	3.7	9.6	12.7	14.7	15.5	18.7	22.4	18.5
2. Less: Operating Costs[b/]	2.8	6.8	9.3	10.4	10.6	12.1	14.2	15.9
3. Net Operating Income	0.9	2.8	3.4	4.3	4.9	6.6	8.2	24.0
4. Rate of Return on Net Fixed Assets in Operation (%)[c/]	32.3	7.8	4.7	5.3	6.3	7.9	8.6	
ACTUAL FINANCIAL RETURN (Colones mln)								
5. Operating Revenue[a/]		4.9	9.0	16.0	24.2	30.9	38.4	50.0
6. Less: Operating Costs[b/]		4.6	7.6	9.2	13.9	16.4	19.9	34.0[e/]
7. Net Operating Income		0.3	1.4	6.8	10.3	14.5	18.5	67.0[e/]
8. Rate of Return on Net Fixed Assets in Operation (%)[c/]		5.1	6.8	12.0	12.1	15.0	17.2	
RETURN FORECAST ACCURACY[d/]								
9. Operating Revenue		196	141	92	64	61	58	
10. Operating Costs		148	122	113	76	74	71	
11. Net Operating Income		933	243	63	48	46	44	

a/ Revenues from telecommunications operation only (there are no indirect taxes on telephone calls).
b/ Including depreciation, but excluding interest (ICE pays no direct tax).
c/ Net operating income as % of average net fixed assets in operation.
d/ Defined by the ratio: Forecast/Actual.
e/ 1966-1970.

COSTA RICA - INSTITUTO COSTARRICENSE DE ELECTRICIDAD: ELECTRICITY AND TELECOMMUNICATIONS OPERATIONS COMBINED
LOAN 346-CR (July, 1963)

TABLE II-A.4

	1964	1965	1966	1967	1968	1969	1970	Average Annual Increase Rate (%) (1964-1970)
FINANCIAL RETURN FORECAST (Colones mln)								
1. Operating Revenue[a/]	46.2	38.8	66.8	74.8	81.2	89.7	97.7	13.5
2. Less: Operating Costs[b/]	30.2	37.8	38.7	41.1	43.1	46.2	48.8	8.3
3. Net Operating Income	16.0	21.0	28.1	33.7	38.1	43.5	48.9	20.0
4. Rate of Return on Net Fixed Assets in Operation (%)[c/]	7.2	6.7	6.7	7.3	8.4	8.6	8.8	
5. Debt Service Coverage[d/]	1.5	1.6	1.9	2.2	2.3	2.4	2.6	
6. Debt/Equity Ratio	51/49	53/47	52/48	50/50	52/48	51/49	48/52	
ACTUAL FINANCIAL RETURN (Colones mln)								
7. Operating Revenue[a/]	33.8	46.5	51.5	63.6	80.9	95.1	111.7	22.0
8. Less: Operating Costs[b/]	20.3	27.0	27.9	37.4	41.7	47.2	51.5	16.8
9. Net Operating Income	13.5	19.5	23.6	26.2	39.2	47.9	60.2	29.0
10. Rate of Return on Net Fixed Assets in Operation (%)[c/]	5.8	8.3	9.3	7.2	8.4	10.0	12.3	
11. Debt Service Coverage[d/]	1.3	1.5	1.4	1.3	1.7	2.0	2.4	
12. Debt/Equity Ratio	43/57	55/45	57/43	57/43	60/40	58/42	57/43	
RETURN FORECAST ACCURACY[e/]								
13. Operating Revenue	137	126	130	118	101	94	87	
14. Operating Costs	149	140	139	110	103	98	95	
15. Net Operating Income	119	108	120	129	97	91	81	

a/ Revenues from electric power and telecommunications operations only (there are no indirect taxes on power sales or telephone calls).
b/ Including depreciation, but excluding interest (ICE pays no direct tax).
c/ Net operating income as % of average net fixed assets in operation.
d/ Times interest payable is covered by net operating income (before interest).
e/ Defined by the ratio: Forecast/Actual.

INSTITUTO COSTARRICENSE DE ELECTRICIDAD - ICE
SOURCES AND APPLICATIONS OF FUNDS - 1963-1971
ELECTRICITY AND TELECOMMUNICATIONS OPERATIONS COMBINED
(in million ¢)

TABLE II-B

	LOAN 276-CR (1961) Period 1960-1963 a/				LOAN 346-CR (1963) Period 1963-1966				LOAN 346-CR (1963) Period 1963-1970			
	Forecast		Actual		Forecast		Actual		Forecast		Actual	
SOURCES OF FUNDS	Total	% of Total	Total	% of Total	Total	% of Total	Total	% of Total	Total	% of Total	Total	% of Total
1. Net Internal Cash Generation	10.7	8.8	12.8	n.a.	42.2	16.0	1.6	0.1	160.8	31.6	20.0	3.5
2. Borrowings												
Domestic:												
ICE Bonds							57.3	17.4			109.2	19.0
B.N.C.R.					1.2		16.5	5.0	1.2		16.5	2.9
Other	12.0	9.9			15.9		43.7	13.2	18.9		22.2	3.9
Sub-total	12.0	9.9	n.a.	n.a.	17.1	6.5	117.5	35.6	20.1	3.9	147.9	25.8
Foreign:												
IBRD 276-CR	49.4	40.9	48.4	n.a.	13.4	59.7	13.6	39.7	13.4	31.2	13.6	32.7
IBRD 346-CR					144.2		117.1		145.7		146.4	
IBRD 631 & 632-CR											27.9	
Future Foreign Exchange Loan									112.6	22.1		
IDB					17.7	6.7	8.8	2.7	17.7	3.5	17.7	3.1
CABEI							7.3	2.2			8.1	1.4
Suppliers Credit											6.1	1.1
Private Banks							10.0	3.0			82.4	14.4
Other	18.6	15.4										
Sub-total	68.0	56.3	n.a.	n.a.	175.3	66.4	156.8	47.6	289.4	56.8	302.2	52.7
3. Other (consumer deposits, CNFL amortization payments, gov't contributions, reductions in working capital)	30.0	25.0	n.a.	n.a.	29.3	11.1	55.4	16.7	39.0	7.7	103.9	18.0
4. Total Sources of Funds	120.7	100.0	n.a.	n.a.	263.9	100.0	331.3	100.0	509.3	100.0	574.0	100.0
APPLICATION OF FUNDS												
5. Construction Expenditures (excluding interest during construction)												
Power	111.3		144.3		180.5		233.2		352.6		375.5	
Telecommunications					80.8		69.4		149.8		142.0	
Total	111.3		144.3		261.3		302.6		502.4		517.5	
6. Others	10.0						7.8				15.9 b/	
7. Total Application of Funds	121.3		144.3		261.3		310.4		502.4		533.4	
8. Net Cash Surplus (Deficit)	(0.6)		n.a.		2.6		20.9		6.9		40.6	
9. Debt Service	41.2		33.9		72.4		98.7		187.3		329.6	

a/ Precise actual figures for years 1960 & 1961 were not available, hence estimations could be made only for net internal cash generation, debt service and construction expenditures over the whole 1960-63 period.

b/ This figure includes approximately ¢6.7 million of down payment that ICE paid in 1968 for the purchase of CNFL assets from EBASCO (former owners of CNFL). The balance of the ¢70 million purchase was paid by ICE in the form of 7-3/4% negotiable notes redeemable over a period of 17½ years. CNFL is required to provide ICE funds on an annual basis to pay for meeting debt service payments to EBASCO.

COSTA RICA - INSTITUTO COSTARRICENSE DE ELECTRICIDAD
PROJECTS IMPLEMENTATION

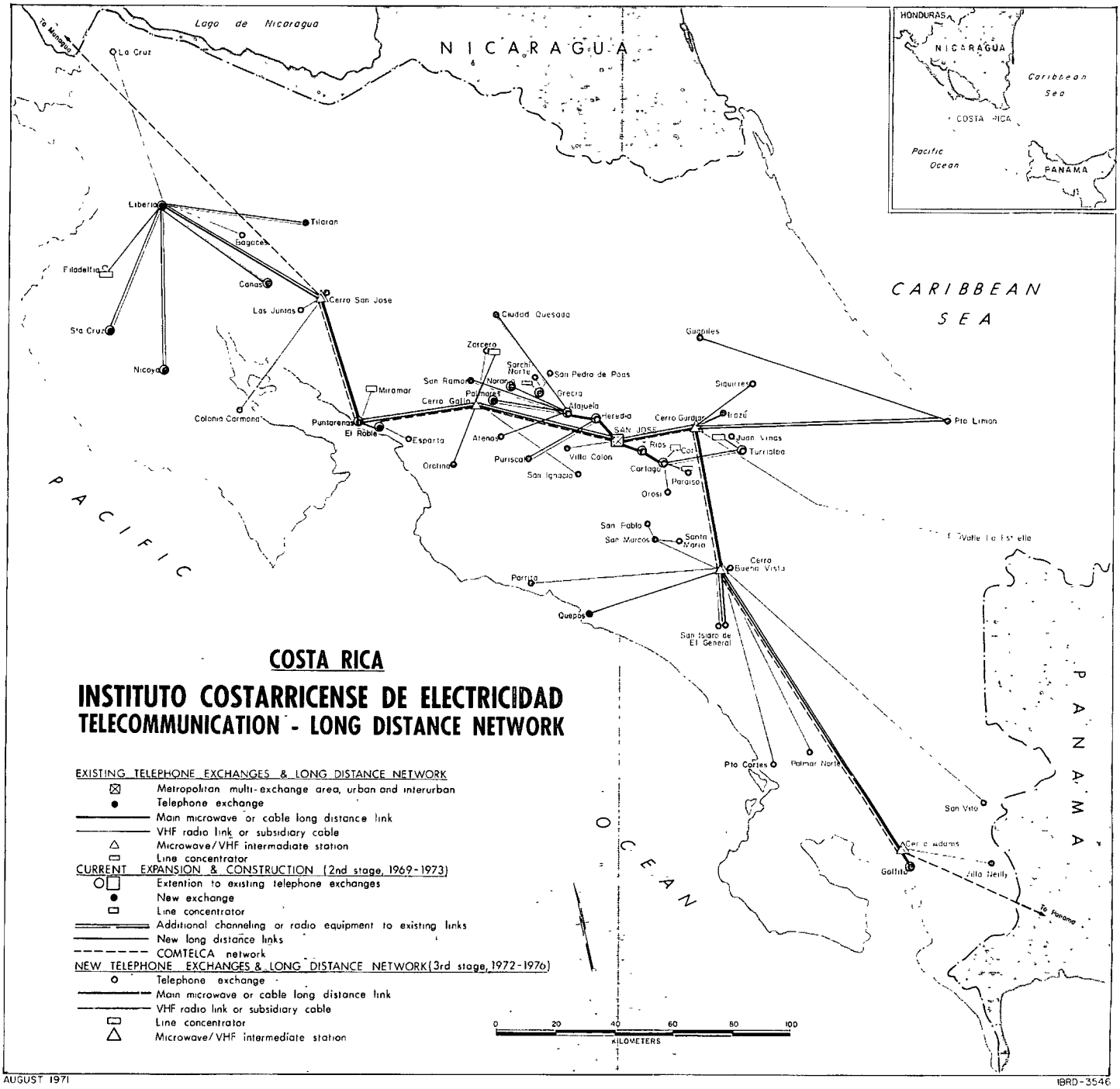
TABLE III

		Start Construction	Commissioning Date	Construction Period (months)	Project Scope	CONSTRUCTION COST[a] (US$ millions) L.C.	F.X.	Total
LOAN 276-CR (US$8.8 million)								
Rio Macho Plant	Forecast	Feb., 1958	April, 1963	62	2 x 15 MW Hydro	6.51	5.22	11.73
	Actual	Feb., 1958	Sept., 1963	67	2 x 15 MW Hydro	8.07	5.48	13.55
Colima Diesel Plant	Forecast	Feb., 1961	April, 1962	14	2 x 4 MW Diesel	0.66	1.63	2.29
	Actual	Feb., 1961	n.a.	n.a.	2 x 4 MW Diesel	0.31	1.46	1.77
Limon Diesel Plant	Forecast	n.a.	n.a.	n.a.	2 x 0.5 MW Diesel	0.07	0.16	0.23
	Actual	n.a.	n.a.	n.a.	2 x 0.5 MW Diesel	0.02	0.14	0.16
Transmission System	Forecast	n.a.	n.a.	n.a.	80 km 138 kv	0.97	1.79	2.76
	Actual	n.a.	n.a.	n.a.	n.a. n.a.	0.89	1.72	2.61
LOAN 346-CR (US$22.0 million)								
Part A: Power (US$12.5 million)								
Cachi Hydro Plant	Forecast	Jan., 1962	Dec., 1965	47	2 x 28 MW Hydro	8.65	8.71	17.36
	Actual	Jan., 1962	Feb., 1967	61	2 x 32 MW Hydro	16.42	8.87	25.29
Associated Transmission and System Extensions	Forecast	1963	1966	36	(185 km 33 kv (190 km 138 kv	1.87	4.10	5.97
	Actual	1963	1967	48	n.a. n.a.	1.44	2.41	3.85
Part B: Telecommunications (US$9.5 million)								
Total Expenditures[b]	Forecast	Jan. 1964	mid-1966	30	26,000 DELs	3.10	9.50	12.60
	Actual	mid-1964	Dec., 1967	42	33,680 DELs	7.10	9.50	16.60

LOANS DISBURSEMENT PATTERN

			1961	1962	1963	1964	1965	1966	1967	1968
LOAN 276-CR	Forecast:	Amount (US$ mln)	4.69	3.89	.22					
		% of total	53	44	3					
		Cumulative %	53	97	100					
	Actual:	Amount (US$ mln)	2.42	4.34	1.89	0.15				
		% of total	28	49	21	2				
		Cumulative %	28	77	98	100				
LOAN 346-CR	Forecast:	Amount (US$ mln)			3.94	7.81	6.86	3.17	0.22	
		% of total			18	36	31	14	1	
		Cumulative %			18	54	85	99	100	
	Actual:	Amount (US$ mln)			.82	3.15	9.37	4.39	4.0	0.27
		% of total			4	14	43	20	18	1
		Cumulative %			4	18	61	81	99	100

a/ Includes interest during construction, and contingencies for forecast figures.
b/ Due primarily to changes in project content during implementation, detailed breakdown of actual expenditures are difficult to directly compare to original project cost estimates; hence only the total figure appears here for direct comparison.



COSTA RICA

INSTITUTO COSTARRICENSE DE ELECTRICIDAD
TELECOMMUNICATION - LONG DISTANCE NETWORK

EXISTING TELEPHONE EXCHANGES & LONG DISTANCE NETWORK

- ⊠ Metropolitan multi-exchange area, urban and interurban
- ● Telephone exchange
- ——— Main microwave or cable long distance link
- ——— VHF radio link or subsidiary cable
- △ Microwave/VHF intermediate station
- ▭ Line concentrator

CURRENT EXPANSION & CONSTRUCTION (2nd stage, 1969-1973)

- ○□ Extention to existing telephone exchanges
- ● New exchange
- ▭ Line concentrator
- ═══ Additional channeling or radio equipment to existing links
- ——— New long distance links
- - - - - - - COMTELCA network

NEW TELEPHONE EXCHANGES & LONG DISTANCE NETWORK (3rd stage, 1972-1976)

- ○ Telephone exchange
- ——— Main microwave or cable long distance link
- ——— VHF radio link or subsidiary cable
- ▭ Line concentrator
- △ Microwave/VHF intermediate station

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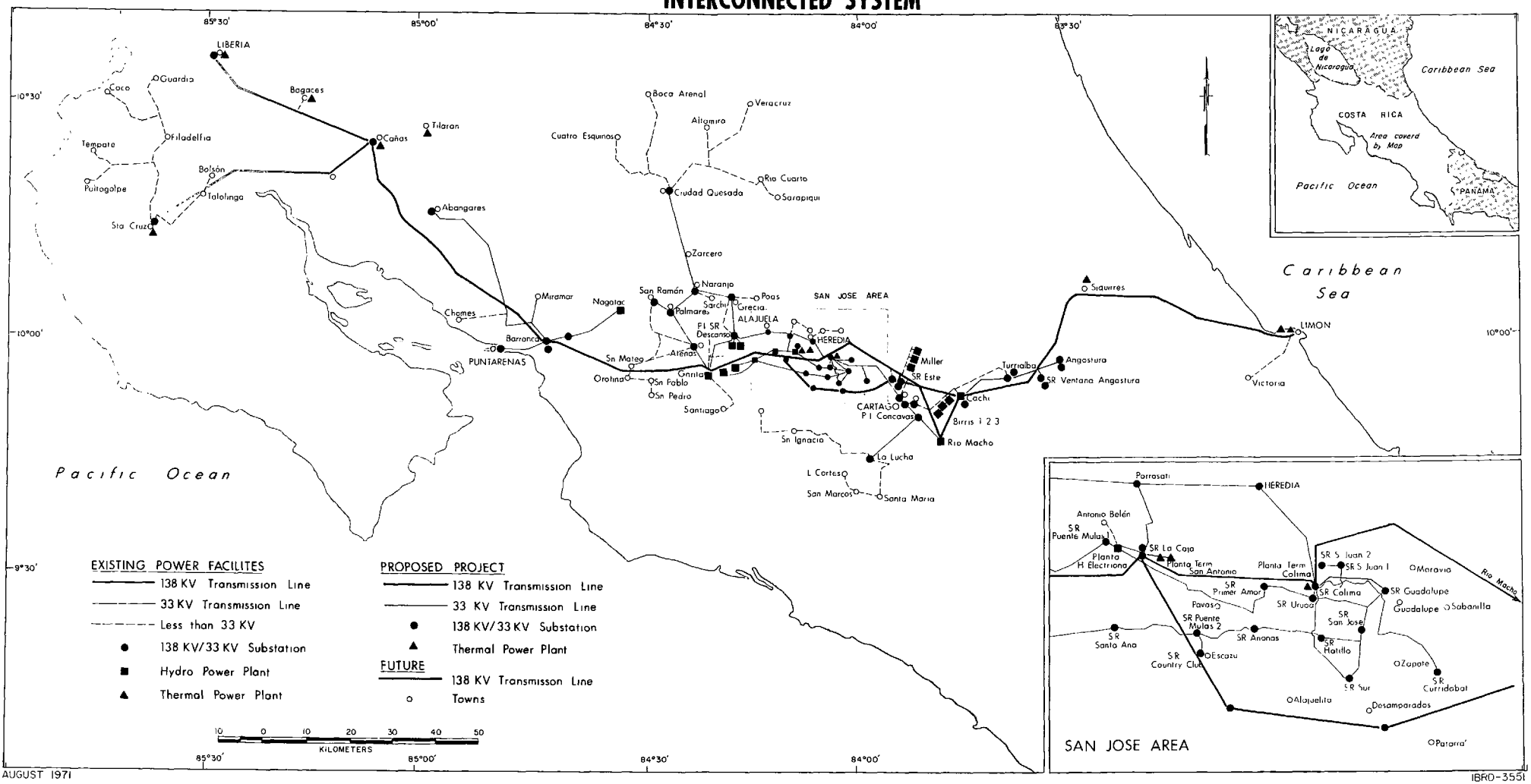
COSTA RICA
INSTITUTO COSTARRICENSE DE ELECTRICIDAD
INTERCONNECTED SYSTEM



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