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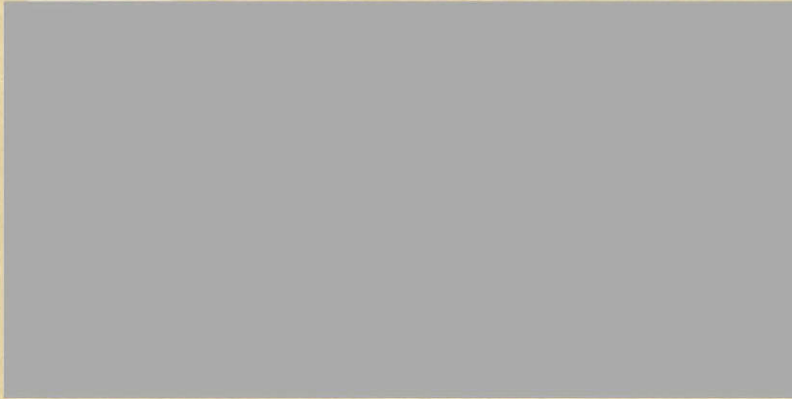
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PRELIMINARY DRAFT 12/22/71

INTERNATIONAL BANK FOR RECONSTRUCTION AND DEVELOPMENT

OPERATIONS EVALUATION REPORT: ELECTRIC POWER

(in three books)

BOOK I

Chapters 1 - 6

Programming & Budgeting Department  
Operations Evaluation Division

## PREFACE

This report originated in a study requested in December 1970 and started in February 1971 with terms of reference strictly limited to investigating the extent to which the purposes -- technical, financial and institutional -- stated in the Bank's appraisal reports for a number of past power loans had been accomplished, at what financial cost and with what delays in time. In July 1971, when work had been completed on most of the loans and the entities which had received them, it was suggested that the study be converted into an evaluation of the Bank's past work in the electric power field, on the basis of the sample of loans and entities that had been selected for review. This was obviously difficult, particularly as the main effort in the new direction had to ensue immediately upon completion, late in October, of a comprehensive evaluation report on the Bank's past operations in all sectors in Colombia. Nevertheless, by undertaking some analysis of the broad pattern of Bank lending for power, by deepening to the extent feasible work on certain aspects of the Bank's operations and of the companies reviewed, by drawing heavily on earlier research for the Colombia study, and by substantially elaborating the comparative analyses, it has been possible to put together the attempt at evaluation of past Bank work in power, as illustrated by the sample of borrowing companies chosen, which follows:

The report is principally the work of the following members of the Operations Evaluation Division of the Programming and Budgeting Department:

Christopher Willoughby, Chief of Division

Francois Ettori

Antoine Marot

Nick Anderson

Mr. Ettori had main responsibility for the companies outside Colombia and for much of the comparative analysis, while Mr. Marot is responsible for most of the basic work on the Colombian companies. Mr. Jacques Roumani contributed substantially to the writing of two chapters and to research underlying part of a third. Mr. Arne Paulson, who had worked very closely with Mr. Marot on the Colombia study, also wrote a chapter for the present report and assisted in many other ways. Miss Marie-Noelle Mulin assisted Mr. Ettori over an extended period especially with the analysis of the very complex Mexican case. Miss Ediana Harahap helped to put the whole report together at the last stages.

From outside the Division Mr. Dennis Anderson of the Economics Department had contributed importantly to earlier research on electric power in Colombia, and his work was drawn on heavily for parts of this report.

The main contacts with the borrowers reviewed took place in the first half of 1971. For the non-Colombian cases these contacts were strictly limited to the companies themselves, each of which was visited for about a week between March and May. Contacts in Colombia were naturally far more extensive since the Bank's operations in electric power there were taken as part of the more comprehensive study mentioned; some three months of field work were done on power.

The excellent cooperation afforded by all the companies involved -- principally SEGBA in Argentina, Furnas in Brazil, CVC/CHIDRAL, EEEB, EPM and ISA in Colombia, EELPA in Ethiopia, VRA in Ghana, NEB in Malaysia, CFE in Mexico, and PUB in Singapore -- is greatly appreciated. The Bogota Power Company (EEEB) undertook several small studies which particularly helped. Also in Colombia, officers of the National Planning Department (Planeacion) -- particularly Eduardo Barrera and Raul Serna -- made major and valuable contributions, especially in bringing to an operational status, and then applying, the computer models used to analyze the main Colombian power systems and the retrospective economic validity of some of the investments there.

This report, which contains a full Summary and Conclusions and 19 Chapters, is presented in three books for ease of handling; it should be noted that the books do not correspond to the various Parts into which the report is divided (see Table of Contents) but merely contain roughly equal numbers of pages.

LIST OF ABBREVIATIONS AND ACRONYMS

- AyEE (Argentina) - Agua y Energia Electrica: the national water and power authority.
- CADE (Argentina) - Compania Argentina de Electricidad: foreign owned predecessor to SEGBA.
- CEMIG (Brazil) - Centrais Eletricas de Minas Gerais: a state-owned utility supplying the state of Minas Gerais.
- CESP (Brazil) - Centrais Eletricas de Sao Paulo: a state-owned utility supplying Sao Paulo.
- CENTRO (Mexico) - Compania de Luz y Fuerza del Centro: formerly a subsidiary of MEXLIGHT, now a government-owned utility supplying Mexico City.
- CFE (Mexico) - Comision Federal de Electricidad: a government-owned authority responsible for all phases of public electricity supply in Mexico.
- CHEC (Colombia) - Central Hidroelectrica de Caldas: a subsidiary of ICEL, supplying power to Manizales and environs.
- CHIDRAL (Colombia) - Central Hidroelectrica del Rio Anchicaya Ltda.: a wholesale energy supplier to CVC and EMCALI and owned by those entities.
- CIAE (Argentina) - Compania Italo-Argentina de Electricidad: a Swiss-controlled utility supplying Buenos Aires in conjunction with SEGBA.
- CORELCA (Colombia) - Corporacion Electrica de la Costa Atlantica: a nationally chartered regional entity responsible for interconnecting major markets of the north (including Barranquilla, Cartagena, and Santa Marta).
- CVC (Colombia) - Corporacion Autonoma Regional del Valle del Cauca: an autonomous multi-purpose agency set up to supervise the overall development of the Cauca Valley (including the city of Cali).
- DAC - Development Assistance Committee: an advisory committee under the OECD, grouping representatives of non-Communist countries which supply capital to developing countries.
- ECG (Ghana) - Electricity Corporation of Ghana: a government-owned entity responsible for distribution in southern Ghana of energy generated by VRA, and for diesel generation and distribution of energy elsewhere in Ghana.

- EEEB (Colombia) - Empresa de Energia Electrica de Bogota: a municipally owned utility supplying Bogota.
- EELPA (Ethiopia) - Ethiopian Electric Light and Power Authority: a government-owned utility responsible for the electricity supply in all of Ethiopia except Asmara.
- ELECTRAGUAS (Colombia) Instituto Nacional de Aprovechamiento de Agua y Fomento Electrica: predecessor to ICEL.
- ELETRORBRAS (Brazil) - Centrais Eletricas Brasileiras: the national holding company in the power field, owned by the Federal Government and responsible for channeling Finance to regional power companies.
- EMCALI (Colombia) - Empresas Municipales de Cali: a semi-autonomous municipal agency responsible for providing public services to the city of Cali, including water, sewerage, and telephone service, and distribution of electric energy purchased from CHIDRAL.
- EPM (Colombia) - Empresas Publicas de Medellin: an autonomous municipally-owned entity which provides the city of Medellin with electricity, water, sewerage, and telephone service.
- FURNAS (Brazil) - Centrais Eletricas de Furnas: an autonomous government-owned bulk energy supplier, and largest subsidiary of ELETRORBRAS.
- ICEL (Colombia) - Instituto Colombiano de Energia Electrica: a government-owned holding company which, through its various subsidiaries, is responsible for virtually the entire public power supply in Colombia, outside the service areas of EEEB, EPM, and CVC/CHIDRAL.
- IDB - Inter-American Development Bank:
- IEMSA (Mexico) - Industrial Electrica Mexicana: formerly a foreign-owned utility based in Mexicali, now absorbed in CFE.
- ISA (Colombia) - Interconexion Electrica S.A.: a corporation jointly owned by EEEB, EPM, CVC/CHIDRAL, and ICEL/CHEC responsible for interconnecting these four main power systems and future bulk supply to them.
- KfW (Germany) - Kreditanstalt für Wiederaufbau: the bi-lateral government lending agency of the Federal Republic of Germany.
- LEBRIJA (Colombia) - Central Hidroelectrica del Rio Lebriga: a subsidiary of ICEL serving Bucaramanga.



- MEXLIGHT (Mexico) - Mexican Light and Power Co.: a foreign-owned company, formerly the owner of CENTRO and power supplier to Mexico City, now a holding company only with no power operations.
- NEB (Malaysia) - National Electricity Board: an autonomous government operating and regulatory agency responsible for coordinating the supply of power throughout the Federation and directly for supplying power throughout most of the Malayan peninsula.
- OECD Organization for Economic Cooperation and Development.
- PUB (Singapore) - Public Utilities Board: an autonomous public corporation which is the sole supplier of public electricity, water, and gas to Singapore.
- SEGBA (Argentina) - Servicios Electricos del Gran Buenos Aires: an autonomous public corporation wholly owned by the Government; the larger of two principal power utilities serving Buenos Aires.
- UNDP - United Nations Development Program.
- VALCO (Ghana) - Volta Aluminum Company: a private company, principally owned by the Kaiser Corporation, for eventually developing the aluminum resources of Ghana; the main customer of VRA.
- VRA (Ghana) - Volta River Authority: an independent government authority established with multi-purpose and regional development responsibilities, including the construction and operation of the Volta River project.

TABLE OF CONTENTSBOOK I

	<u>Page No.</u>
SUMMARY AND CONCLUSIONS	xxiii
I. INTRODUCTION	
Purpose of Report	1
Growth of Electricity Supply in the Developing Countries	6
The IBRD's Global Contribution to Financing	
Power Expansion	8
The Bank's Approach to Power Lending	14
Design of the Study	25
 <u>Part I - Seven Major Borrowers</u>	
II. SEGBA - ARGENTINA	
Introduction	28
Historical Background	30
The Association Between the Bank and SEGBA	33
Major Issues	38
Servicing the Demand in Greater Buenos Aires	38
Financial Issues	41
Load Forecasting and Investment Planning	44
Forecasting the Financial Aspects	47
Project Construction and Cost	49
Institutional Development	53
Consultants	56
Conclusion	57
III. FURNAS - BRAZIL	
Introduction	68
The Association Between the Bank and Furnas	70
The Power Sector in the South-Central Region of Brazil	76
Coordination	76
Tariffs	78
Load Forecasting and Investment Planning	81
Project Implementation and Costs	84
Financing of the Investment Program	86
Institutional Development	88
Conclusion	92

	<u>Page No.</u>
IV. EELPA - ETHIOPIA	
Introduction	100
The Association Between the Bank and EELPA	101
Major Issues	104
Shortage of Hydroelectric Power in EELPA's Interconnected System	104
Construction Delays and Project Changes	106
Rural Electrification	108
Demand Forecasting and Investment Planning	109
Forecasting the Financial Aspects	110
Project Construction and Cost	111
Institutional Development	112
Consultants	112
Management	114
Conclusion	115
V. VRA - GHANA	
Introduction	121
The Association Between the Bank and the Authority	122
The Genesis of the Project	124
Demand Forecasting and Investment Planning	133
Financing of the Project	136
Project Implementation and Cost	137
Development of the Institution	138
Conclusion	141
VI. NEB - MALAYSIA	
Introduction	149
The Association Between the Bank and NEB	151
Load Forecasting and Investment Planning	156
Project Construction and Costs	159
Forecasts of Financing	162
Institutional Development	163
Management	163
Tariffs	165
Future Expansion	166
Conclusion	167
<u>BOOK II</u>	
VII. CFE - MEXICO	
Introduction	175
History of the Power Sector in Mexico	177
The Association Between the Bank and the Comision Federal de Electricidad	180

Projects Implementation and Costs	194
Procurement	201
Rural Electrification	204
Load Forecasting, Investment Planning and Interconnection	206
Investment Planning	210
Interconnection	215
Financial Developments and Projections, Joint Financing and Tariffs	217
Financing of the Investment Programs - and the Debt Service Problem	222
Financing of the Development of the Power Sector: Conclusion	228
Joint Financing	230
National Power Tariffs	233
Management and Institutional Development	237
Conclusion	244

## VIII. PUB - SINGAPORE

Introduction	258
The Association Between the Bank and the Board	259
The Formal Management Problem of the PUB	266
Demand Forecasting and Investment Planning	269
Project Construction and Cost	272
Generation	272
Distribution	274
Procurement and Disbursement	274
Forecasting the Financial Aspects	275
Institutional Development	277
The Consultants	277
Observance of Loan Agreements Covenants	280
Conclusion	280

Part II - Power in Colombia and the IBRD

## IX. THE POWER SECTOR IN COLOMBIA

Overall Power Development 1950-70	290
Organization of the Sector and Major Institutional Developments	297
Major Problems of the Power Sector	300
Financing of the Sector	308
IBRD Financial Participation	313
IBRD Policy Advice and Project Selection	316

X. BOGOTA POWER COMPANY (EEEE) - COLOMBIA	<u>Page No.</u>
Introduction	323
The Bank and EEEB's Power Expansion Program	325
Major Issues	330
Load Forecasting and Investment Planning	332
Alternative Plans - Zipaquira 2 vs. Canoas	335
Financial Performance	337
Loan Covenant Goals	337
Accuracy of Financial Forecasts	341
Project Construction and Costs	341
Loan 246 CO	343
Loan 313 CO	345
Loan 537 CO	348
Institutional Development	349
Efficiency of Operations	353
Conclusion	355
XI. MEDELLIN POWER COMPANY (EPM) - COLOMBIA	
Introduction	366
The Association Between the Bank and EPM	367
Major Issues	
Financial Performance	374
Project Implementation: Delays and Cost Overruns	379
Loan 225 CO and 282 CO	382
Loan 369 CO	384
Load Forecasting, Investment Planning and System Development	387
Forecasting the Financial Aspects	392
Institutional Development	395
Conclusion	400
XII. CVC/CHIDRAL - COLOMBIA	
Introduction	410
The Association Between the Bank and CHIDRAL	411
Major Issues	419
Coordination of Investment in the Sector	419
Tariffs	420
Project Financing	422
Financial Performance	426
Delays and Cost Overruns	429
Load Forecasting, Investment Planning and System Development	435
Economics of Calima	440
Projects Turned Down	442
Forecasting the Financial Aspects	443
Institutional Development	445
Conclusion	448

BOOK IIIPage No.

## XIII. THE COLOMBIAN TRANSMISSION INTERCONNECTION

The Preliminary Phase (1962-67)	458
Organization and Policies of ISA	465
Bank Loans to ISA	469
Loan 575 CO - Interconnection Network	469
Loan 681 CO - CHIVOR Hydroelectric Plant	471
Future Development of the Interconnected System	475
Basic Technical and Financial Data	479
The Benefits of Interconnection	482
Interconnection and the Timing of Guatape	495
Evaluation of Economic Benefits of Interconnection	500
The Link with the Northeast	518
Conclusions	521

Part III - The IBRD in Electric Power

## XIV. COMPARATIVE PERFORMANCE UNDER THE LOANS

Introduction	527
Load Forecasts and Investment Planning	528
Project Costs and Construction Schedules	542
The Bank's Effect in the Financing of the Construction Programs	554
Operational Performance of the Companies	568
Bank Objectives and Loan Agreement Covenants	582
Tariff and Financial Covenants	583

## XV. INSTITUTIONAL DEVELOPMENT IN ELECTRIC POWER

Introduction	598
Basic Constitutional Issues	601
Means to Financial Viability	611
Management and Administration	618
Sectoral Coordination and Integration	625
Conclusions	629

## XVI. ELECTRICITY TARIFFS AND TARIFF STRUCTURES

Tariffs and Project Viability	642
Sales and Prices of the Ten Companies	649

Page No.

Principles of Power Pricing Policy	655
Evolution of Power Tariffs in Bogota	661
Electricity in the Broader Framework of Bogota	673
Conclusions	678

## XVII. ALTERNATIVE MEANS OF FOREIGN FINANCING

Introduction	682
Sources of Foreign Funds for the Companies Reviewed	687
The Financial Advantages of IBRD Loans	693
Joint Financing Arrangements	701
Conclusions	712

## XVIII. THE NEED FOR A BROADER VIEW 715

## XIX. RECOMMENDATIONS 732

Following  
Page No.ANNEX I COLOMBIA POWER: TREATMENT OF PRICES AND  
REVALUATION OF ASSETS

741

LIST OF TABLESBOOK I

<u>CHAPTER I</u>		<u>Page No.</u>
1.1	Growth of Public Electricity Generation 1950-68 in Developing Member Countries of Bank Group	7
1.2	Bank Group Commitments for Electric Power through 12/31/70	9
1.3	Bank Group Loan and Credit Disbursements to Develop- ing Countries for all Purposes and for Power through 12/31/70	10
1.4	Growth of Public Power Supply in Developing Countries 1950-70 and IBRD Contribution	12
1.5	Public Utility Generating Capacity in Developing Countries in 1968 and Bank Financed Share	13
1.6	The Eight Companies Originally Selected for Review	22
1.7	Bank Lending to the Ten Companies Reviewed in this Report	24
 <u>CHAPTER II</u>		
I	The Utility	63
II-A.1	Utility Load, Sales, Return: Loan 308 AR	64
II-A.2	Utility Load, Sales, Return: Loan 525 AR	65
II-B	Utility Investment Programs Partly Financed by IBRD	66
III	Project Implementation	67
 <u>CHAPTER III</u>		
I	The Utility	95
II-A.1	Utility Load, Sales, Return: Loan 211 BR	96
II-A.2	Utility Load, Sales, Return: Loan 403 BR	97
II-B	Utility Investment Programs Partly Financed by IBRD	98
III	Projects Implementation	99
 <u>CHAPTER IV</u>		
I	The Utility	117
II-A	Utility Load, Sales, Return: Loan 375 ET	118
II-B	Utility Investment Program Partly Financed by IBRD	119
III	Project Implementation	120



<u>CHAPTER V</u>		<u>Page No.</u>
I	The Utility	145
II-A	Utility Load, Sales, Return: Loan 310 GH	146
II-B	Utility Investment Programs Partly Financed by IBRD	147
III	Project Implementation	148

<u>CHAPTER VI</u>		
I	The Utility	169
II-A.1	Utility Load, Sales, Return: Loan 210 MA	170
II-A.2	Utility Load, Sales, Return: Loan 350 MA	171
II-A.3	Utility Load, Sales, Return: Loan 458 MA	172
II-B	Utility Investment Programs Partly Financed by IBRD	173
III	Projects Implementation	174

BOOK II

<u>CHAPTER VII</u>		<u>Page No.</u>
I	The Utility	249
II-A.1	Utility Load, Sales, Return: Loan 194-ME	250
II-A.2	Utility Load, Sales, Return: Loan 316-ME	251
II-A.3	Utility Load, Sales, Return: Loan 436-ME	252
II-B	Utility Investment Programs Partly Financed by IBRD	253
III.1	Projects Implementation	254
III.2	Projects Implementation	255
III.3	Projects/Programs Implementation	256
III.3, Annex	Projects Implementation	257

<u>CHAPTER VIII</u>		
I	The Utility	284
II-A.1	Utility Load, Sales, Return: Loan 337-SI	285
II-A.2	Utility Load, Sales, Return: Loan 473-SI	286
II-A.3	Utility Load, Sales, Return: Loan 503-SI	287
II-B	Utility Investment Programs Partly Financed by IBRD	288
III	Projects Implementation	289

CHAPTER IXPage No.

9.1	11 Latin American Countries: 1968 Income and Income per Capita and Growth of Income and Electricity Production 1950-68	292
9.2	Growth of Installed Generating Capacity in the Public Sector 1950-70	296
9.3	Colombia - Electric Energy - IBRD Loans to the Power Sector	314

CHAPTER X

10.1	EEEEB - Loan 246 CO - Forecast and Actual Cost of Project	344
10.2	EEEEB - Loan 313 CO - Forecast and Actual Cost of Project	347
10.3	EEEEB - Loan 537 CO - Forecast and Actual Cost of Project	350
10.4	EEEEB - Trends in Efficiency of Operations	354
I	The Utility	360
II-A.1	Utility Load, Sales, Return: Loan 246 CO	361
II-A.2	Utility Load, Sales, Return: Loan 313 CO	362
II-A.3	Utility Load, Sales, Return: Loan 537 CO	363
II-B	Utility Investment Programs Financed by IBRD	364
III	Projects Implementation	365

CHAPTER XI

11.1	EPM: Expected and Actual Commissioning Dates of Generating Plants	381
11.2	EPM: Loans 225 CO and 282 CO - Forecast and Actual Cost of Project	383
11.3	EPM: Loan 369 CO - Forecast and Actual Cost of Project	386
11.4	EPM: Losses in the Electric System	389
11.5	EPM: Reserve Supply Capacity 1965-70	391
I	The Utility	403
II-A.1	Utility Load, Sales, Return: Loan 225 CO	404
II-A.2	Utility Load, Sales, Return: Loan 282 CO	405
III-A.3	Utility Load, Sales, Return: Loan 369 CO	406
II-B	Utility Investment Programs Financed by IBRD	407
III	Projects Implementation	408

<u>CHAPTER XII</u>		<u>Page No.</u>
12.1	CVC/CHIDRAL - Evolution over Time of Some Financial Indicators	427
12.2	CVC/CHIDRAL: Loans 38 CO, 113 CO and 215 CO, Forecast and Actual Costs of Projects	431
12.3	CVC/CHIDRAL: Loans 255 CO and 339 CO Forecast and Actual Construction Costs	433
I	The Utility	451
II-A.1	Utility Load, Sales, Return: Loan 38 CO	452
II-A.2	Utility Load, Sales, Return: Loan 113 CO	453
II-A.3	Utility Load, Sales, Return: Loan 215 CO	454
II-A.4	Utility Load, Sales, Return: Loan 255 CO	455
II-A.5	Utility Load, Sales, Return: Loan 339 CO	456
III	Projects Implementation	457

BOOK III

<u>CHAPTER XIII</u>		
13.1	Central Interconnected System - Plants Under Construction or at a Stage of Advanced Planning in 1967	466
13.2	ISA-Loan 681 CO - Original and Revised Cost Estimates for the Chivor Hydroelectric Project	475
13.3	Expected Transmission Losses on Central Interconnected System	480
13.4	Forecast and Actual Investment Costs of Transmission Network and Substations	481
13.5	Forecast Annual Costs 1971-75	482
13.6	Economic Benefits Resulting from an Accelerated Saturation of a Large Generating Capacity	486
13.7	Central Interconnected System - Reserve Capacity Requirements in 1970, 1974, 1978	487
13.8	Central Interconnected System - Comparison Between Spare Capacity, Within the Interconnected System and Within the Individual Power Markets Assuming Interconnection in 1967	489

13.9	Central Interconnected System - Comparison Between Aggregate Excess Capacity Within the Interconnected Systems and Within the Individual Power Markets	490
13.10	Central Interconnected System - Comparison Between Total Excess Hydro Capacity within the Interconnected System and Aggregate Usable Excess Hydro Capacity in the Isolated Markets	492
13.11	Central Interconnected System - Utilization of Thermal Capacity for the 1967-70 Period	493
13.12	Central Interconnected System - Actual and Potential Expenditures on Fuel Over the Period 1962-1970 With and Without Interconnection in 1967	494
13.13	Central Interconnected System - Aggregate Excess Capacity and Excess Energy Available in the Four Subsystems taken Independently	498
13.14	Gradual Absorption of Excess Energy Available on Hypothetical Interconnected System, December 1970	499
13.15	Central Interconnected System-Demand Forecasts Prepared by Ingetec/Integral in 1968	501
13.16	Central Interconnected System - Alternative Programs of Power Installations As Prepared by Ingetec/Integral in 1968	502
13.17	Central Interconnected System - Benefits of Interconnection for the 1969-80 Period, As Calculated by Ingetec/Integral in 1968.	503
13.18	Central Interconnected Systems - Savings Through Interconnection on Capital Expenditures Necessary to Meet System Load Growth from 1969 to 1980 - Comparison Between the Stream Flows of Benefits Calculated in 1968 by Ingetec/Integral and the IBRD	505
13.19	Central Interconnected System - Actual Annual Aggregate System Peak Loads and Estimated Peak Loads Assuming Interconnection in 1967	506
13.20	Central Interconnected System - Alternative Programs of System Expansion (1967-71)	507
13.21	Central Interconnected System - Comparative Study of the Capital Expenditures Involved Respectively by Independent and Integrated System Operation, Assuming Interconnection by 1967	508
13.22	Central Interconnected System Interconnection in 1967 Savings on Capital Expenditures Necessary to Meet System Load Growth 1967-71	509
13.23	Central Interconnected System - Forecast Aggregate Peak Loads of Individual Systems and Forecast Peak Load of Interconnected System Assuming Interconnection in 1971	511

	<u>Page No.</u>
13.24	Central Interconnected System - Alternative Program of System Expansion (1971-80) 512
13.25	Central Interconnected System - Comparative Study of the Capital Expenditures Involved Respectively by Independent and Integrated System Operation, with Interconnection in 1971 513
13.26	Central Interconnected System - Interconnection in 1971 - Savings on Capital Expenditures Required to Meet Load Growth through about 1980 514
13.27	Central Interconnected System - Savings through Interconnection on Capital Expenditures Necessary to Meet System Load Growth Respectively Over the 1967-71 and 1971-80 Time Periods - Summary of Results 515
13.28	Central Interconnected System-Savings on Operating Costs Yielded by Interconnection 516
13.29	Central Interconnected System - Summary of Total Savings Yielded by Interconnection 517
13.30	Interconnection with the Northeast-Savings on Capital Expenditures Resulting From an Early Interconnection 520

CHAPTER XIV

14.1	Main Responsibility for Forecasting and Planning for Each Project Reviewed and Chief Characteristics of Planning Bases Used 530
14.2	Mean and Standard Deviation of R by Forecast Intervals for Energy Sales and Peak Loads 531
14.3	Accuracy of Load Forecasts 3-7 Years Ahead 534
14.4	Accuracy of Forecasts of Peak Loads and Gross Reserves 536
14.5	The Utilities: Forecast and Actual Peak Demands, Reserves and Load Factors, 1970 538
14.6	Average Delays in Installation of Plants 542
14.7	IBRD Projects Implementation 547
14.8	Decreasing Returns to Scale on Thermal Units 550
14.9	The Ten Companies: Bank-Financed Share of Capacity Expansion 1960-70, Cumulative Total Amounts Disbursed Through 12/31/70 and Total Disbursements for Power by World Regions 555
14.10	Investment Programs Partly Financed by IBRD 557

	<u>Page No.</u>	
14.11	Evolution Over Time of the Actual and Forecast Compositions of Sources of Funds	561
14.12	Periods Necessary to Reach the 10% and 82.5% Cut-Off Points on Cumulative Disbursements	567
14.13	Growth in Selected Basic Indicators over the Period 1960-70	569
14.14	Standard Rates of Return	571
14.15	Structure of Average Costs/Kwh in Utilities Serving Urban Areas	574
14.16	Departures From Financial Covenants With the Bank	587

#### CHAPTER XVI

16.1	Ten Power Companies - Average Prices, Costs and Profits per Unit of Electricity and Rate of Return to Average Net Fixed Assets, 1955-1970	645
16.2	Growth and Pattern of Electricity Sales in the Regions Served by the Ten Companies	650
16.3	Average Prices of Electricity to Principal Classes of Consumer 1965-70 for Seven Companies	652
16.4	Evolution of Principal Tariffs of Bogota Power Company 1960-70	662
16.5	Fixed Marginal Cost of Electricity Supply in Colombia	664
16.6	Average Residential Electricity Bills and Estimated Subsidies by Income Groups in Bogota 1968	668
16.7	Alternative Costs to Industry in Bogota of Self-Generation and Public Electricity Supply: Cost of Diesel as a Percentage of Cost of Public Electricity for Different Load Factors	671

#### CHAPTER XVII

17.1	Seven Countries: Total Foreign Public Debt Outstanding and the Share Incurred for Electric Power, 12/31/70	684
17.2	Principal Types of External Loan Financing for Developing Countries and Net Disbursements of Each 1965 and 1970	685

		<u>Page No.</u>
17.3	Nine Companies: Sources of Foreign Financing for Major Expansion Programs Supported by IBRD	688
17.4	Estimates of Total Investment in Public Power Supply in Developing Countries 1951-70 and of IBRD/IDA Share	690
17.5	Power Loan Committed by Various Public Agencies, 7/1/65 - 6/30/70	691
17.6	Amounts and Terms of Principal Loans for the Volta River Project	694
17.7	Outstanding Amounts and Original Terms of Various Countries' Public Foreign Debt for all Purposes and for Power	696
17.8	Joint Financing Schemes Sponsored by IBRD	704
17.9	Terms of Loans Provided Under Some Joint Financing Schemes	707
17.10	Sales of Participations in Loans to the Companies Reviewed	709

APPENDIX TABLES

		<u>Following Page No.</u>
1.1	Africa: Electrical Generating Capacity, Generation and IBRD/IDA Power Financing of Developing Countries 1950-70	27
1.2	America: Electrical Generating Capacity, Generation and IBRD/IDA Power Financing in Developing Countries 1950-70	27
1.3	Asia: Electrical Generating Capacity, Generation and IBRD/IDA Power Financing in Developing Countries 1950-70	27
1.4	Europe: Electrical Generating Capacity, Generation and IBRD/IDA Power Financing in Developing Countries 1950-70	27
7.1	Mexico: Covenants and Side Letters of Loan and Guarantee Agreements Between Bank and CFE/NAFINSA	257
14.1	Annual Peak Demand. Frequency Distribution of R by Forecast Interval	597

		<u>Following Page No.</u>
14.2	Energy Sales. Frequency Distribution of R by Forecast Interval	597
14.4	Investment Programs Partly Financed by IBRD: Structure of Financing	597
14.5	Power Project Review - Selected Indicators on Utilities	597
14.6	Power Projects Review: Major Covenants and Side Letters	597



LIST OF CHARTS AND MAPS

<u>CHARTS</u>	<u>Following Page No.</u>
2.1 Argentina-SEBGA: Load and Capacity Development	67
3.1 Brazil-FURNAS: Load and Capacity Development	99
4.1 Ethiopia-EELPA: Load and Capacity Development	120
5.1 Ghana-VRA: Load and Capacity Development	148
6.1 Malaysia-NEB Interconnected System: Load and Capacity Development	174
7.1 Cost per KW Installed of Thermal Generating Units in Mexico	257
7.2 Mexico: Central and Northwest Systems Load and Capacity Development	257
7.3 Mexico: Northern and Northeast Systems Load and Capacity Development	257
8.1 Singapore-PUB: Load and Capacity Development	289
9.1 Colombia: Structural Organization of the Power Sector (1971)	322
10.1 Colombia: EEEB - Load and Capacity Development	365
11.1 Colombia: EPM - Load and Capacity Development	408
12.1 Colombia: CVC/CHIDRAL - Load and Capacity Development	457
13.1 Colombia: Central Power System (EEEE, EPM, CVC, CHEC) Cumulative Total Installed Capacity and System Load	526
14.1 Cost per KW Installed of Thermal Generating Units	597
 <u>MAPS</u>	
Argentina	67
Brazil	99
Ethiopia	120
Ghana	148
Malaysia	174
Singapore: PUB System	289
Colombia: Electric Power Sector Generation Facilities	322
Colombia: Electric Power Sector	322
Colombia: EEEB General Layout of the Electric System	365
Colombia: EPM General Layout of the Electric System	408
Colombia: CVC General Layout of the System and Interconnection with CHEC	457
Colombia: Central Interconnected System	526
Colombia: Electric Power Sector Transmission Facilities	526

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Please place this  
page immediately before  
the ~~following~~ page 28



PART I

SEVEN MAJOR BORROWERS