

THE WORLD BANK GROUP ARCHIVES

PUBLIC DISCLOSURE AUTHORIZED

Folder Title: Electric Power - Book 2 - Table of Contents, Cover, 1 page insert - 1971

Folder ID: 30248184

Subseries: Early special evaluation studies working files

Series: Special Evaluation Studies

Dates: 01/01/1971 – 12/31/1971

Fonds: Records of the Office of Operations Evaluation

ISAD Reference Code: WB IBRD/IDA OPE-09-01

Digitized: 05/08/2023

To cite materials from this archival folder, please follow the following format:
[Descriptive name of item], [Folder Title], Folder ID [Folder ID], ISAD(G) Reference Code [Reference Code], [Each Level Label as applicable], World Bank Group Archives, Washington, D.C., United States.

The records in this folder were created or received by The World Bank in the course of its business.

The records that were created by the staff of The World Bank are subject to the Bank's copyright.

Please refer to <http://www.worldbank.org/terms-of-use-earchives> for full copyright terms of use and disclaimers.



THE WORLD BANK

Washington, D.C.

© International Bank for Reconstruction and Development / International Development Association or

The World Bank

1818 H Street NW

Washington DC 20433

Telephone: 202-473-1000

Internet: www.worldbank.org

PUBLIC DISCLOSURE AUTHORIZED

OED SPECIAL STUDIES
85035--003

OED Report: Elec. Power - ^{Book II} Table of Contents, Cover, 1 pg. Insert

1971



 **Archives**
A1984-141 Other #: 7 **30248184** 205079B
Electric Power - Book 2 - Table of Contents, Cover, 1 page insert - 1971

DECLASSIFIED
WBG Archives

DECLASSIFIED

NOV 03 2022

WBG ARCHIVES

STRICTLY CONFIDENTIAL

PRELIMINARY DRAFT 12/22/71

INTERNATIONAL BANK FOR RECONSTRUCTION AND DEVELOPMENT

OPERATIONS EVALUATION REPORT: ELECTRIC POWER

(in three books)

BOOK II

Chapters 7 - 12

Programming and Budgeting Department
Operations Evaluation Division

TABLE OF CONTENTS

BOOK II

	<u>Page No.</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 Inter- connection	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 Agreement Covenants	280
Conclusions	280

PART II - Power in Colombia and the IBRD

Page No.

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 (EEEB) - Colombia

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	

XII. - CVC/CHIDRAL - Colombia

	<u>Page</u> <u>No.</u>
Introduction	410
The Association between the Bank and Chidral	411
Major Issues	419
Coordination of Investments 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
Industrial Development	445
Conclusion	448

LIST OF TABLES

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
 <u>Chapter IX</u>		
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
 <u>Chapter X</u>		
10.1	EEEE - Loan 246 CO - Forecast and Actual Cost of Project	344
10.2	EEEE - Loan 313 CO - Forecast and Actual Cost of Project	347
10.3	EEEE - Loan 537 CO - Forecast and Actual Cost of Project	350
10.4	EEEE: 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

<u>Chapter XI</u>		<u>Page No.</u>
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>		
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
 <u>Appendix Table</u>		<u>Following</u>
7.1	Mexico: Covenants and Side Letters of Loan and Guarantee Agreements Between Bank and CFE-NAFINSA	<u>Page No.</u>
		257

LIST OF CHARTS AND MAPS

BOOK II

Following
Page No.

CHARTS

7.1	Costs 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: Oriental and Occidental Systems Load and Capacity Development	257
7.4	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

MAPS

Singapore:	PUB System	289
Colombia:	Electric Power Sector Generation Facilities	314
Colombia:	Electric Power Sector	314
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 Inter- connection with CHEC	457

INTERNATIONAL BANK FOR
RECONSTRUCTION AND DEVELOPMENT

INTERNATIONAL DEVELOPMENT
ASSOCIATION

INTERNATIONAL FINANCE
CORPORATION

Please place this page
immediately before p. 290.

PART II

POWER IN COLOMBIA AND THE IBRD

DECLASSIFIED

NOV 03 2022

WBG ARCHIVES

STRICTLY CONFIDENTIAL

PRELIMINARY DRAFT 12/22/71

INTERNATIONAL BANK FOR RECONSTRUCTION AND DEVELOPMENT

OPERATIONS EVALUATION REPORT: ELECTRIC POWER

(in three books)

BOOK II

Chapters 7 - 12

Programming and Budgeting Department
Operations Evaluation Division

TABLE OF CONTENTS

BOOK II

	<u>Page No.</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 Inter- connection	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 Agreement Covenants	280
Conclusions	280

PART II - Power in Colombia and the IBRD

Page No.

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 (EEEB) - Colombia

Introduction	323
The Bank and EEEB's Power Expansion Program	325
Major Issues	330
Load Forecasting and Investment Planning	332
Alternative Plans - Zipaquirá 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	

	<u>Page</u> <u>No.</u>
XII. - CVC/CHIDRAL - Colombia	
Introduction	410
The Association between the Bank and Chidral	411
Major Issues	419
Coordination of Investments 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
Industrial Development	445
Conclusion	448

LIST OF TABLES

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
 <u>Chapter IX</u>		
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
 <u>Chapter X</u>		
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 XIPage No.

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

Chapter XII

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

Appendix TableFollowing
Page No.

7.1	Mexico: Covenants and Side Letters of Loan and Guarantee Agreements Between Bank and CFE-NAFINSA	257
-----	--	-----

LIST OF CHARTS AND MAPS

<u>CHARTS</u>	<u>BOOK II</u>	<u>Following Page No.</u>
7.1	Costs 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: Oriental and Occidental Systems Load and Capacity Development	257
7.4	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
 <u>MAPS</u>		
	Singapore: PUB System	289
	Colombia: Electric Power Sector Generation Facilities	314
	Colombia: Electric Power Sector	314
	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 Inter- connection with CHEC	457