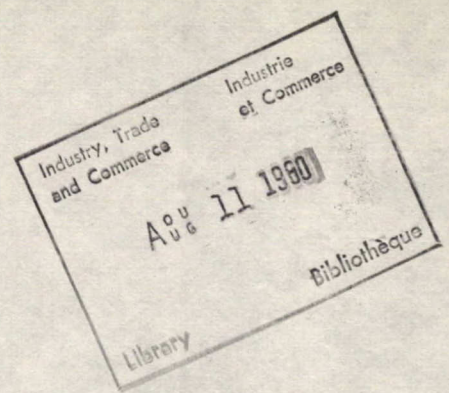


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Power Systems Market Survey

Department of Industry, Trade and Commerce, Ottawa, Canada





POWER SYSTEMS MARKET SURVEY

³ ELECTRICAL DIVISION, ELECTRICAL AND ELECTRONICS BRANCH
DEPARTMENT OF INDUSTRY, TRADE AND COMMERCE
112 KENT STREET, OTTAWA 4, CANADA

POWER SYSTEMS MARKET SURVEY

This survey, compiled by the Department of Industry, Trade and Commerce, is designed as a guide to the potential in the world market for Canadian companies engaged in power systems consulting, design and construction and for Canadian manufacturers of power equipment of all kinds.

It pays particular attention to the significant facts on the world power demand as a basis for Canadian industrial and marketing development programs. It gives details of purchasing agencies and procedures, outlines past and potential competition, recommends methods of market promotion, states followed standards, financing methods, and lists existing facilities. It covers present and future development programs.

The individual reports of the survey were digested from a detailed questionnaire completed by commercial officers of the Department's Trade Commissioner's Service stationed in 51 countries.

There are seven sections arranged in broad geographic areas: Central America; South America; Africa; the Caribbean; Europe; the Middle East and Asia. Countries within these areas are arranged alphabetically.

This document is for the use of Canadian business interests only and it is hoped that all precautions will be taken to ensure that details do not become available to competitive interests.

The opinions expressed in the survey are those of individual trade officers and may not be interpreted as reflecting official government policy.

This survey being a summary of a list of available information, only relevant facts are given. Queries, further information, corrections, comments and recommendations on the survey are welcomed and may be addressed to:

Electrical and Electronics Branch
Electrical Division
Department of Industry, Trade and Commerce
112 Kent Street
Ottawa 4, Ontario

Further information and guidance may also be obtained from the trade office given at the end of each individual report.

NOTE: Foreign currency conversion to the Canadian dollar as given in the Market Data was based upon the pegged value of the dollar.

POWER SYSTEMS MARKET SURVEY

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ABBREVIATIONS

FINANCE

ADB	Asian Development Bank
BAD	Banque Africaine de Développement
CABEI	Central American Bank for Economic Integration
CIDA	Canadian International Development Agency
EXIM	Export Import Bank (U.S.)
EIB	Export Import Bank (Washington)
EDC	Export Development Corporation (Canada)
FAC	French Government
FED	Fonds Européen de Développement
IADB	Inter-American Development Bank
IBRD	International Bank for Reconstruction and Development
IDA	International Development Association
OECD	Organization for Economic Cooperation and Development
US/AID	United States Agency for International Development

STANDARDS

ASA	American Standards Association
BSS	British Standard Specifications
CSA	Canadian Standards Association
DIN	German Standards
IEC	International Electrotechnical Commission
IEEE	Institute of Electrical and Electronics Engineers
NEMA	National Electrical Manufacturers Association
UTE	Union Technique d'Electricité (France)
VDE	German Standards

MISCELLANEOUS

CACOM	Central American Common Market
CIP	Canadian International Power Services Limited, 276 St. James Street, West Montreal, Québec
ECM	European Common Market
EFTA	European Free Trade Association
GATT	General Agreement on Tariffs and Trade
LAFTA	Latin America Free Trade Association
MFN	Most Favoured Nation

CENTRAL AMERICA AND PANAMA

Rapid expansion of the electric power development program in Central America and Panama is opening up increasing opportunities for sales of equipment and contracts for engineering services. A sustained and vigorous export marketing program, including personal visits to the area and the appointment of a qualified agent, is the key to success in this market.

Manufacturers and consultants interested should first register their firms with the procurement departments of the electricity supply authorities in each country. This can be done by writing to the organizations, introducing the company's product line and providing specifications and CIF prices. Brochures and other information about the company are also helpful.

Canadian firms will have little difficulty in meeting technical standards and specifications since they are based on North American practice.

Although tariff preferences within CACOM are extended to protect C.A. local manufacturers, limited capacity and narrow product range and high production costs leave much of the market open to foreign suppliers.

For assistance in locating suitable agents contact the Commercial Counsellor of the Canadian Embassy in Guatemala City.

COSTA RICA

MARKET DATA

Capital city	San José
Area	19,000 sq. mi.
Population (1967)	1,600,000
Language	Spanish
Currency	The Colón (= US \$0.1525)
Telephones (1968)	27,498
Televisions (1968)	75,000
Principal cities (Pop. 1968)	— San José 193,000 — Alajuela 26,000 — Heredia 21,000 — Puntarenas 21,000 — Limón 21,000 — Cartago 20,000 — Liberia 7,500

UTILITY ORGANIZATION(S)

Instituto Costarricense de Electricidad (ICE)
Apartado 32
San José, Costa Rica

Government-owned autonomous organization for transmission, generation, and distribution of electrical energy in Costa Rica. Also responsible for telecommunication services in Costa Rica.

Another major generating authority is CNFL, an ICE subsidiary which buys 66 per cent of ICE's power for distribution to its own customers.

RELATED ORGANIZATION

Grupo Regional de Interconnection Electrica — comprises managers or national power authorities of Central America countries (incl. Panama). They discuss bilateral arrangements for future interconnections such as those being discussed by ICE and ENALUF. (see Nicaragua)

OFFICIALS

Manager, ICE — Rodrigo Suarez M.

PRESENT FACILITIES — 60 HERTZ

Total installed capacity — (1968) 194 MW (hydro 150 MW; diesel 32 MW; steam thermal 152 MW)
Maximum system demand — (1969) 170 MW
Production — (1969) 850 GWH
Forecast annual production growth over next five years — 8½ per cent.
Number of customers — (1969) 140,000
Transmission — 138 kV — 270 Circuit KM
34.5 kV — 365 Circuit KM
Distribution — 13.8 kV — 800 KM (ICE)
4.16 kV — 200 KM (but change over to 13.8)
120-240 V = 3 wire — 600 KM
Service voltages — 110/220, 1 and 3 phase
Underground — none, no definite plans
System control — very little remote control, some telemetering, no data logging, just graph kept.

PROCUREMENT PROCEDURES

Equipment and materials for projects are usually called for public tender in the country's official gazette and newspapers and frequently in overseas publications. Services are normally called for proposals from a short list of firms known to them.

Projects customarily implemented in following stages:

- General study: location and type of plant, general cost estimate, etc.
- Detailed engineering study (often awarded to company undertaking the general study).

- c) Construction tenders for plants, equipment, transmission lines, generally on package basis including civil engineering and installation.

The Spanish language is used throughout.

Employment of local agents, or use of joint ventures or other alternatives, especially in construction, is advisable and frequently required.

Electrical equipment is normally duty-free as there is very little, if any, manufacturing of this type. In case of future local manufacturing, local firms (i.e. CACOM) may be given preference to the extent of duties legislated but not presently applied.

CONSULTING REQUIREMENTS

ICE is attempting to build up its own staff and tries wherever possible to handle its own consultancy. It still requires outside help for specialized jobs. ICE's consultant is SOFRELEC of France.

FINANCING

Predominantly World Bank financing has been used but in some cases IADB loans from its Ordinary Capital Resources have been used (Canada is eligible). For rural electrification and general studies US/AID and IADB fund for Special Operations have been used (Canada is not eligible). The currently uncommitted CIDA loan of Cdn. \$3.75 million to CABEL is usable, among other things, for electrical interconnections which makes it eligible for studies on equipment or implementation of a contract concerning projects connecting CACOM countries.

STANDARDS

U.S. standards, but a certain amount of European practice in technical specifications.

ENERGY RESOURCES

Bunker C and diesel fuel imported from Venezuela are used for generation. Hydro potential estimated 8,000 MW. Several geothermal steam sources considered worthwhile investigating.

DEVELOPMENT PROGRAM

Current Capital Projects

Rio Machi expansion (1972), 2 x 30 MW. Suppliers are: Vevey (Switzerland) — Pelton turbines; Mitsubishi (Japan) — generators; Sumitomo (Japan) — transformers; Asea (Sweden) — electrical substation equipment; Brown Boveri — control board requires transformers and other accessories for substation.

Future Planning

1. 40-50 MW steam generating plant at Moin near Limón. Tender invitations to be called January 1972, operations to commence 1975. Total cost of US \$8.18 million. World Bank financing of US \$830,000. Unit to be either fast steam load pickup or two gas units or combination.

2. 138 KM double-circuit transmission line. Cachi — Moin, connecting Limón with the central system, partly with cable conductor 636 MCM and partly 334.6 MCM. Tenders to be called August, 1972, completion 1975. World Bank financing about US \$830,000, total project cost about US \$1.5 million.

In both 1 and 2, ICE hopes to do own consulting, but World Bank may require outside assistance.

3. New hydro power plant about 100 MW needed by 1977.

4. New hydro power plant about 100 MW needed by 1979.

5. Next six to eight years, 3-400 KMS of 138.5 kV transmission line to be called.

6. Sub-transmission 2-300 KMS to be added.

7. No nuclear or desalination types of generation required.

MARKET FACTORS

The bulk of equipment requirements for the many projects undertaken in Central America is imported from North American, European and Japanese suppliers. The major exception is wire and cable products supplied by Phelps Dodge plant in El Salvador and soon to be supplied from the CONDUMEX wire plant under construction in Costa Rica. Other local manufacturers include Cutler Hammer's motor control facility in Costa Rica and UNIVEX's (Canadian) lighting fixtures and electric panel manufacturing operations in Guatemala.

MARKET PROMOTION

Canadian firms must make themselves and their capabilities known to the electrical utility authorities and frequent personal visits, in addition to good representation by a local associate, are necessary due to strong foreign competition both in equipment and services.

REPORTING POST

Commercial Counsellor
Canadian Embassy
Apartado 3A (airmail), 4A (seamail)
Edificio Etisa, Plazuela Espana
7a Avenida 12-19, Zone 9
Guatemala City, C.A., Guatemala

CABLE: CANADIAN
PHONE: 61560, 67227, 61005
TELEX: 206 (DOMCAN GU 206)

EL SALVADOR

MARKET DATA

Capital city	- San Salvador
Area	8,260 sq. mi.
Population (1967)	3,100,000
Language	Spanish
Currency	The Colón (=US \$0.4025)
Telephones (1968)	37,796
Televisions (1968)	75,000
Principal cities (Pop. 1967)	- San Salvador 281,122 - Santa Ana 72,839

UTILITY ORGANIZATION(S)

Comision Ejecutiva Hidroelectrica del Rio Lempa (CEL)
P.O. Box 186
San Salvador, El Salvador

Autonomous government agency for generation, transmission, and distribution of electrical energy in El Salvador

CAESS

Apartado Postal 186
San Salvador, El Salvador

A wholly owned subsidiary of CIP of Montreal responsible for distribution of electrical energy in the central region, San Salvador and eastern region.

OFFICIALS

CEL:

Executive Director — Enrique R. Lima
Executive Sub-Director — Alfonso Trigueros Alcaine

CAESS:

Chairman and General Manager — Manuel Cano G.
Chief Engineer — L. Carl Hinds
Purchasing Agent — Montreal Engineering Co. Ltd.

PRESENT FACILITIES — 60 HERTZ

CEL:

Total installed capacity — (1970) 166 MW (hydro 96.4 MW; steam thermal 63 MW; gas turbine 6.6 MW) — 87 per cent of country's installed capacity
Maximum system demand — (1969) 109 MW

Production — (1969) 496 GWH

Forecast annual production growth over next five years — 12 per cent

Number of customers — (1969) 9,662 rural — nine distributing companies

Transmission — 115/69/44/34.5/22 kV — 201/88/304/36/82 KM

Distribution — 4.16 kV

Service voltages — 240/120V, 1 phase

System control — radio and power line carrier used for communication
— end of 1970, substations will be controlled remotely

CAESS:

Total installed capacity — (1968) 12 MW (hydro 4 MW; steam thermal 5 MW; diesel 3 MW)

Production — (1968) 399.0 GWH

Purchased power — (1968) 380.4 GWH (from CEL)

Number of customers — (1968) 100,459

Transmission — 24 kV

Distribution — 4.16 kV

Service voltages — 120/240 V, 1 phase

PROCUREMENT PROCEDURES

CEL: Acquisition of goods usually exceeds \$20,000 and is made by call for public tenders. Construction of any project more than \$250,000 needs the approval of the executive authorities. English and Spanish languages are used equally.

CAESS buys about \$500,000 annually of distribution equipment through the offices of C.I. Power Services Limited in Montreal.

Central American products will be preferred to the imported ones whenever prices are the same or lower, and quality is comparable (CACOM).

CONSULTING REQUIREMENTS

Hydroelectric Projects	—	Harza Engineering Company 400 West Madison Street Chicago IL60606 U.S.A.
Thermal plants	—	Sargent & Lundy Inc. 160 Dearborn Street Chicago IL60603 U.S.A.

Nuclear projects — Kennedy & Donkin
Premier House
Woking, Surrey
England

1977 Paza del Silencio-Hydro 126
No need for EHV or HVDC lines

FINANCING

Procurement of equipment, consulting and construction services has been accomplished through loans from international institutions such as IBRD, IADB, UN Special Fund and CEL's own resources.

STANDARDS

North American standards or the equivalent of the manufacturing country.

ENERGY RESOURCES

No petroleum or coal resources. Bunker C oil is used, which is obtained from Acajutla's refinery RASA, processing Venezuelan imported petroleum.

Studies of geothermal resources (northern El Salvador) and of further hydroelectric developments on the Rio Lempa are being made to determine the next step in CEL's power development program.

DEVELOPMENT PROGRAM

Material and Equipment Requirements

Meters = US \$6,501 — Japan

Distribution transformers = US \$15,750 — U.S.A.

Transformers for electrification of rural substations =
US \$47,933 — U.S.A.

Switchgear = US \$11,623 — U.S.A.

Wire and cable = £22,241 — locally

Current Capital Projects — New substations of San Antonio Abad and Nejopa and extension of Opico and Acajutla substations (1970). Cost of project £ 48 million. Canadian G.E. involved in this project for control boards.

Future Planning — Expansion of CEL system:

Year	Project	Capacity, MW
1972	Gas Turbine in Soya-pango (£10.3 million)	33
1974	Geothermal or 3rd Steam Central Unit at Acajutla	33
1976	Steam Central at Acajutla	33

MARKET FACTORS

Local Industry — Phelps Dodge wire and cable plant.

Foreign Suppliers: METASA — steel tower manufacturer of Nicaragua. There are no special advantages for any particular country. Projects that are financed by IBRD are subject to international bid.

MARKET PROMOTION

Canadian firms must make themselves and their capabilities known to the electrical utility authorities. Frequent personal visits are necessary, even if companies are well represented by a local associate, due to strong foreign competition in equipment and services.

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Guatemala City, C.A., Guatemala

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PHONE: 61560, 67227, 61005,
TELEX: 206 (DOMCAN GU 206)

GUATEMALA

MARKET DATA

Capital city	Guatemala City
Area	42,000 sq. mi.
Population (1967)	4,900,000
Language	Spanish
Currency	The Quetzal (= US \$1)
Telephones (1968)	35,103
Televisions (1968)	60,000
Principal cities (Pop. 1967) —	Guatemala City 690,000 — Quezaltenango 56,921

UTILITY ORGANIZATIONS(S)

Instituto Nacional de Electrificación (INDE)
6a Avenida 2-73, Zone 4
Guatemala City, Guatemala

Decentralized government agency responsible for generation, transmission and distribution of electrical energy in Guatemala.

Empresa Electrica de Guatemala (EEG)

Apartado 209

Guatemala City, Guatemala

A subsidiary of EBASCO of New York, supplies electricity for the central area including Guatemala City.

OFFICIALS

Manager (INDE) — Ing. Roland Castillo Contoux

President and Gen. Mgr. (EEG) — John D. Carver

RELATED ORGANIZATIONS

Grupo Regional de Interconexión Eléctrica — see Costa Rica.

PRESENT FACILITIES — 60 HERTZ

Total installed capacity — (1969) 103 MW (Interconnected system)

— INDE 50 MW (hydro 26 MW; gas turbine 24 MW)

— EEG 53 MW (hydro MW; gas turbine 13 MW; steam thermal 30 MW; diesel 9 MW)

Maximum system peak — (1969) 100 MW

Production (1969) — 132 GWH (interconnected)

Forecast annual production growth over next five years — 13 - 14 per cent

Number of customers — (1969) 115,000

Transmission — 138 kV (INDE)
66 kV — 106 miles (EEG)

Service voltages — 120/240, 1 and 3 phase

Distribution — 2.3/4, 16/13.2 kV (EEG)

PROCUREMENT PROCEDURES

Equipment and materials for projects are usually called for public tender in the country's official gazette and newspapers, and frequently in overseas publications. Services are normally called for proposals from a list of known firms.

Projects customarily implemented in following stages:

- a) General study: location and type of plant, general cost estimate, etc.
- b) Detailed engineering study (often awarded to company undertaking general study).
- c) Construction tenders for plants, equipment transmission lines, generally on package basis including civil engineering and installation.

The Spanish language is used throughout.

Employment of local agents, or use of joint ventures or other alternatives, especially in construction, is advisable and frequently required.

Imported electrical equipment is normally duty-free as there is very little, if any, manufacturing of this type. In case of future local manufacturing, local firms (i.e. CACOM) may be given preference to the extent of duties legislated but not presently applied.

CONSULTING REQUIREMENTS

Outside consultants nearly always employed due to limited staff of INDE. Wherever the electrical authority does its own consulting work, it still requires outside help for specialized jobs. INDE's consultant is Electrowatt of Switzerland.

FINANCING

Predominantly World Bank financing has been used but in some cases IADB loans from its Ordinary Capital Resources have been used (Canada is eligible). For rural electrification and general studies US/AID and IADB Fund for Special Operations have been used (Canada is not eligible). The currently uncommitted CIDA loan of Cdn. \$3.75 million to CABEL is usable, among other things, for electrical interconnections which makes it eligible for studies on equipment or implementation of a contract concerning projects connecting CACOM countries.

STANDARDS

North American standards are acceptable.

ENERGY RESOURCES

Bunker C and diesel fuel imported from Venezuela is used for generation. Studies are underway to investigate the feasibility of using geothermal energy.

DEVELOPMENT PROGRAM

Material and Equipment Requirements:

EEG buys annually about £ 500,000 of distribution equipment and materials from North American suppliers.

Current Capital Projects:

INDE — for late 1970 or early 1971 — new 33 MW steam plant being completed and nine miles of 138 kV transmission.

Juran-Marinala 60 MW hydro plant — expected to go on line in 1970.

Future Planning:

INDE has instructed its consultants, ELECTROWATT, to report on the feasibility of Atitlan (2 x 50 MW — first stage) hydro-electric project. This report will be submitted to the World Bank in the near future as a basis for negotiating the financing of foreign exchange requirements (scheduled for 1974).

EEG's role will be confined to development of distribution facilities in the greater Guatemala City region.

MARKET FACTORS

The bulk of equipment requirements for many projects undertaken in Central America is imported from North American, European and Japanese suppliers. The major exception is wire and cable products supplied by Phelps Dodge plant in El Salvador and soon to be supplied from the CONDUMEX wire plant under construction in Costa Rica. Other local manufacturers include Cutler Hammer's motor control facility in Costa Rica and UNIVEX's (Canadian) lighting fixtures and electric panel manufacturing operations in Guatemala.

MARKET PROMOTION

Canadian firms must make themselves and their capabilities known to the electrical utility authorities. Frequent personal visits are necessary, even if companies are well represented by a local associate, due to strong foreign competition both in equipment and services.

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HONDURAS

MARKET DATA

Capital city	Tegucigalpa
Area	43,300 sq. mi.
Population (1967)	2,400,000
Language	Spanish
Currency	Lempira (2 Lempiras = US \$1)

Telephones (1968)	10,161
Televisions (1968)	10,500
Principal cities (Pop. 1967)	— Tegucigalpa 170,535 — San Pedro Sula 95,890

UTILITY ORGANIZATION

Empresa Nacional de Energia Eléctrica (ENEE)
Apartado Postal 99
Tegucigalpa, Honduras

Chief electrical authority for generation, transmission and distribution of electrical energy in Honduras.

OFFICIALS

Manager — Ing. Ernesto Crespo

RELATED ORGANIZATION

Grupo Regional de Interconexión Eléctrica — see Costa Rica

PRESENT FACILITIES — 60 HERTZ

Total installed capacity — (1970) 50 MW (hydro 28.5 MW; diesel 21.5 MW)

Maximum system peak — (1970) 49.7 MW

Production — (1969) 194 GWH

Forecast annual production growth over next five years — 20.6 per cent

Number of customers — (1969) 40,000

Transmission — 2.4 and 138 kV — five and 135 miles respectively

Distribution — 13 kV and 110 V
Service voltages — 110/220, 1 and 3 phase

PROCUREMENT PROCEDURES

Equipment and materials for projects are usually called for public tender in the country's official gazette and newspapers, and frequently in overseas publications. Services are normally called for proposals from a short list of known firms.

Projects customarily implemented in following stages:

- General study: location and type of plant, general cost estimate, etc.
- Detailed engineering study (often awarded to company undertaking general study).
- Construction tenders for plants, equipment, transmission lines, generally on package basis including civil engineering and installation.

The Spanish language is used throughout.

Employment of local agents, or use of joint ventures or other alternatives, especially in construction, is advisable and frequently required.

Electrical equipment is normally duty-free as there is very little, if any, manufacturing of this type. In case of future local manufacturing, local firms (i.e. CACOM) may be given preference to the extent of duties legislated but not now applied.

CONSULTING REQUIREMENTS

Outside consultants are nearly always employed due to limited staff of electrical authority. ENEE has agreed to engage four or five experienced and competent foreign engineers, on three-year contracts, to assist the existing staff in carrying out the Fourth Power Project and at the same time to give additional training to the ENEE staff.

FINANCING

Predominantly World Bank financing has been used but in some cases IADB loans from its Ordinary Capital Resources have been used (Canada is eligible). For rural electrification and general studies US/AID and IADB Fund for Special Operations have been used (Canada is not eligible). The currently uncommitted CIDA loan of Cdn. \$3.75 million to CABEL is usable, among other things, for electrical interconnections which makes it eligible for studies on equipment or implementation of a contract concerning projects connecting CACOM countries.

STANDARDS

U.S. standards, but a certain amount of European practice in technical specifications.

ENERGY RESOURCES

Honduras is rich in hydro power resources.

DEVELOPMENT PROGRAM

Current Capital Projects

Rio Lindo Hydro Project, 2 x 20 MW, completion 1971

Gas turbine at San Pedro Sula, 15 MW, completion 1970

Second 34.5 kV line to the Mochita mines.

Future Planning

Interim thermal project to be started in 1971 (at La Ceiba - 2 x 30 MW) for initial operation by 1974.

Major hydro project to be started in 1974 for initial operation by 1977—El Cajon Hydro — 400 MW or smaller hydro project on Ulua River.

Feasibility studies of future power projects.

Fourth Power Project, IBRD financed, 227 KM of 138 kV transmission lines, 331 KM of 69 kV transmission lines, and 138 kV and 69 kV substations with a total capacity of 103 MVA.

MARKET FACTORS

The bulk of equipment requirements for many projects undertaken in Central America is imported from North American, European and Japanese suppliers. The major exception is wire and cable products supplied by Phelps Dodge plant in El Salvador and soon to be supplied from the CONDUMEX wire plant under construction in Costa Rica. Other local manufacturers include Cutler Hammer's motor control facility in Costa Rica and UNIVEX's (Canadian) lighting fixtures and electric panel manufacturing operations in Guatemala.

MARKET PROMOTION

Canadian firms must make themselves and their capabilities known to the electrical utility authorities. Frequent personal visits are necessary, even if companies are well represented by a local associate, due to strong foreign competition in equipment and services.

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CABLE: CANADIAN
PHONE: 61560, 67227, 61005
TELEX: 206 (DOMCAN GU 206)

MEXICO

MARKET DATA

Capital city	Mexico City
Area	760,373 sq. mi.
Population (1967)	45,700,000
Language	Spanish
Currency	The Peso (12.5 pesos = US \$1)
Telephones (1968)	1,044,415
Televisions (1968)	2,200,000

Principal cities (Pop. 1967) — Mexico D.F. 6,016,000
 — Mexico City 3,118,059
 — Guadalajara 1,048,351
 — Monterrey 821,843
 — Mexicali 291,000
 — Chihuahua 206,000

UTILITY ORGANIZATIONS

Comision Federal de Electricidad (CFE)
 Rio Rodano # 14
 Mexico 5, D.F.

CFE is a decentralized federal government agency responsible for generation, transmission and distribution of electric energy throughout the United States of Mexico.

Companio de Luz Fuerza
 Del Centra S.A. y Asociadas (CLFDC)
 Calzada Melchor Ocampo No. 171
 Mexico D.F., Mexico C.A.

Affiliated with the CFE, it serves Mexico City proper and its surroundings.

OFFICIALS

CFE:

General Director — Lic. Guillermo Martinez D.
 General Manager Supplies — Rafael Vidales Mendiz
 General Manager Construction — Ing. Alfredo Granados
 Tender and Contracts Dept. — Lic. Gustavo Lialson
 Rojas

CLFDC:

General Manager — Lic. Eduardo Garduno

PRESENT FACILITIES — 50 and 60 HERTZ

Total installed capacity — (1968) 5,969 MW (hydro 2,552 MW; steam thermal 3,417 MW)

Maximum system demand — (Sept. 1968 to Aug. 1969)
 25,135 GWH

Production — (1968) 22,737 GWH plus 141 GWH imported

Forecast average annual production growth over next five years not determined (past five years 11 per cent annually)

Number of customers — 4,490,000

Transmission — 400/230/161/115/69/33/13.2 kV —
 713/174/29/921/102/1687/5085 KM

Service voltages — 50 Hertz 110/125 (Federal District)

— 60 Hertz 110/120 (rest of country, 1 and 3 phase)

Underground — in larger urban centers is implemented as a normal procedure — power and telephone lines

System control — modern — electronic computers are used and an adequate communications network including a microwave system

PROCUREMENT PROCEDURES

The CFE makes almost all international purchases by tender. Foreign manufacturers and consultants must first register their firms with the procurement department of the agency, to the attention of Lic. Gustavo Lialson Rojas, Chief of the Tender and Contracts Department. Once registered, the foreign company receives copies of tenders for equipment or engineering services to be purchased on the international market.

A local agent is highly useful for the promotion of sales in this market.

Tenders are normally in Spanish and bids should be prepared in that language. However, international bids in English or French have been accepted in the past. Bids which include some Mexican content (material and/or labour) could receive more favourable consideration, provided the DFE's high quality standards are met.

Although the Mexican Government imposes import licence control and prohibitive duties on locally available products, the CFE and similar agencies are able to import duty-free equipment which local manufacturers cannot supply. With the exception of LAFTA nations, Canada is on equal tariff footing with other traditional electrical equipment suppliers to this area, such as U.S.A., Britain, France, Spain, Japan, Switzerland and Sweden.

CONSULTING REQUIREMENTS

The CFE does employ consultants, both national and foreign, to carry out feasibility studies, and surveys related to its electrification programs and projections. These include firms such as: Kennedy and Donkin (England — local also), CGEE (France), BICA (Mexico), BECHTEL (U.S.A.), EBASCO (U.S.A.), Electroconsult (Italy — local also), TECSULT (Canada).

FINANCING

In conjunction with the World Bank the following countries have offered financing for the Mexican electrification plan: Canada, West Germany, Spain, U.S.A., France, Italy, Japan, Britain, Switzerland and Sweden. Funds have also been obtained from foreign bond issues and bank loans and from current capital resources of the CFE.

STANDARDS

CFE employs and accepts standards established by NEMA and ASA. Mexico is in the process of establishing its own electrical standards which closely follow NEMA and ASA.

ENERGY RESOURCES

In 1968, Mexico had proven petroleum reserves of 5,490 million barrels and a potential of 2.5 million kilograms of uranium oxide.

DEVELOPMENT PROGRAM

Material and Equipment Requirements for International bidding on CFE projects are as follows:

- Low pressure pipes, accessories and valves
- 250 pph steam generators
- Current and voltage transformers
- Testing equipment
- Condensing and feed heating plants
- Central controls
- Support bar insulators
- Diesel plants 150 mva and 250 mva
- Oil-immersed circuit breakers
- Telecommunication equipment
- Metallic structures
- Rotary frequency converters
- Travelling cranes 10, 90, 140 tons
- Power transformers
- Disconnecting switches, isolated phase bus, breakers, transformers and motor control centres

Current Capital Projects

Location	Plant	Capacity	Date of Completion
Cerro Prieto	Geothermic 2 units	75 MW	December, 1970
La Angostura	Hydro 3 units	468 MW	July, 1973
Salamanca	Steam 2 units	300 MW	August, 1970
Valle de Mexico	Steam 2 units	300 MW	August, 1970
Valle de Mexico	Steam 1 unit	300 MW	July, 1972
Infiernillo	Hydro 2 units	300 MW	September, 1972
La Villita	Hydro 4 units	300 MW	August, 1971
Monterrey	Steam 2 units	168 MW	December, 1971
Guaymas	Steam 1 unit	40 MW	October, 1969
Nachi Cocom II	Steam 2 units	49 MW	May, 1971

Future Planning

Between 1969-73, generating capacity will have to be increased by 3.6 million KW.

During the period 1974-1978, generating capacity will have to be increased by 5 per cent over the 1973 figure

to reach an installed generating capacity of 15 million KW. Approximately 40 per cent (US \$1,456 million) of financing for this period will have to be obtained from foreign credits.

CFE is considering the construction of a nuclear plant with a variable capacity between 650 MW and 750 MW, to be interconnected to the main system by 1976-77, as the logical alternative required to meet Mexico's future demand.

MARKET FACTORS

Local Industry — While the spectrum of electric equipment production in Mexico is large and varied, the following is a representative list of equipment available domestically:

- Motor compressors
- Single phase fractional motors (sewing machine)
- Single phase capacitor type motors
- Three phase motors
- Single phase universal type motors
- Multiple speed three phase motors
- Motors for drilling
- Induction motors with brake
- Control transformers
- Power transformers
- Neon light transformers
- Ignition transformers
- Rectifying transformers
- Variable transformers

Mexican firms are also producing electrical control panel boards. Production of electrical conductors averages 30,000 metric tons annually (7,000 different types).

Foreign Suppliers

Principal competition from Canada's point of view is from Japan, Spain, U.S.A., Switzerland, France, Germany, Sweden, Italy and Britain.

In addition, an excellent report on market factors of Mexico would be "Electrical Power and the Electrical Equipment Industry in Mexico" prepared by the Commercial Division of the Canadian Embassy in Mexico City.

MARKET PROMOTION

To improve the chance of obtaining contracts with the CFE, foreign manufacturers and engineering firms would do well to use the services of a local agent to represent them in Mexico. These agents usually have advance knowledge of upcoming tenders and can inform their Canadian principals of proposed projects. The agent also knows the local procedure for presenting the principal's proposal to the appropriate authorities.

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Mexico 5, D.F., Mexico

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PHONE: 33-14-00
TELEX: 017-71-191 (DOMCAN MEX)

NICARAGUA

MARKET DATA

Capital city	Managua
Area	54,000 sq. mi.
Population (1967)	1,800,000
Language	Spanish
Currency	The Cordoba (7 Corbodos = US \$1)
Telephones (1968)	13,200
Televisions (1968)	35,000
Principal cities (Pop. 1968) —	Managua 274,901
	— Bluefields
	— Leon
	— Chinandega
	— Granada

UTILITY ORGANIZATION(S)

Empresa Nacional De Luz y Fuenza (ENALUF)
Apartado 55
Managua, D.N. Nicaragua, C.A.

ENALUF is an autonomous government agency responsible for generation, transmission and distribution of electric energy through the vast majority of the Nicaraguan territory.

OFFICIALS

General Manager — Octavio Salinas
Electrification Manager — Alfredo Guerreo
Production Manager — Roberto Vega

RELATED ORGANIZATIONS

National Institute of Electrical Energy — to regulate power utilities in reference to tariffs and adequacy of service.

Grupo Regional de Interconecion Electrica — see Costa Rica.

PRESENT FACILITIES — 60 HERTZ

Total installed capacity — (1969) 114 MW (steam thermal 30 MW; hydro 51 MW; gas turbine 18 MW; diesel 15 MW)

Maximum system demand — (1969) 77.5 MW

Production — (1969) 438 GWH

Forecast annual production growth over next five years — 13 per cent

Number of customers — (1969) 78,000

Transmission — 240 KM of 138 kV
— 205 KM of 69 kV

Distribution — 13.8 and 24.9 kV

Service voltages — 120/240, 1 and 3 phase

System control — load dispatching and load/frequency control done by communication, assigning to each machine a previously established economic load.

PROCUREMENT PROCEDURES

The procedure for purchasing routine equipment and material as well as consulting and construction services is through international bidding. Tender documents are prepared in the form required by IBRD and are announced in the local press and world-known engineering magazines. The official language in all correspondence is Spanish. When possible, subcontracting of local firms is recommended.

ENALUF is exempted from tariffs. There are regional agreements (CACOM) which exempt from tariffs products manufactured in any Central American country.

CONSULTING REQUIREMENTS

The organization employs the following consultants: Electroconsult, Milan, Italy — for design and construction supervision of Santa Barbara hydro plant and feasibility of a new hydro project.

Sanderson & Porter, New York, U.S.A. — for supervision of construction of a 40 MW thermal power plant.

Kuljian Corporation, Philadelphia, U.S.A. — for design and construction supervision of a rural electrification project.

FINANCING

Equipment, consulting and construction services have been procured through loans from IBRD, ENALUF's funds, Agency for International Development, and government funds. ENALUF has also used a line of credit offered by a manufacturer under the following

terms: 15 per cent at signing of contract, two years grace and seven semi-annual payments for the balance of 6 1/2 per cent annual interest.

STANDARDS

North American standards are employed, such as published by NEMA, ASA, IEEE, CSA or equivalent.

ENERGY RESOURCES

Estimated 2,000 MW undeveloped hydroelectric potential. Steam and gas units depend on Bunker C and diesel fuel.

DEVELOPMENT PROGRAM

Material and Equipment Requirements — Typical estimated annual requirements are as follows:

- a) Distribution transformers ranging from 5 KVA to 167 KVA; 96,500 KVA
- b) Poles 4,512
- c) Crossarms 3,579
- d) Lightning arresters 3,203
- e) Fused disconnects 2,896
- f) KWH meters 12,000

Current Capital Projects

- a) Steam plant at Managua — 40 MW — completion 1970 — all contracts awarded — US \$5.6 million (77 per cent foreign currency)
- b) Santa Barbara hydro — 50 MW — completion 1971 — all contracts awarded — US \$15.3 million (60 per cent foreign currency)
- c) Transmission lines — 130 KM of 138 kV — completion 1972 — all contracts awarded — US \$2.2 million (67 per cent foreign currency)

Future Planning

Gas turbine 15 MW in 1975
Hydroelectric 40 MW in 1975
Steam plant 60 MW in 1977
Steam plant 60 MW in 1979

A current study of hydro-electric projects could alter the above sequence of the 60 MW steam plants.

Interconnection with Costa Rica is being contemplated.

No need for EHV or DC.

MARKET FACTORS

Local Industry — There is one steel tower manufacturer (METASA) and one of luminaires (IESCASA).

Foreign Suppliers — There are no special advantages for any particular country. Projects that are financed by IBRD are subject to international bid in which members of the Bank participate.

Phelps Dodge wire and cable plant in El Salvador has advantage in Central American market.

MARKET PROMOTION

Canadian firms must make themselves and their capabilities known to the electrical utility authorities. Frequent personal visits are necessary, even if companies are well represented by a local associate, due to strong foreign competition in equipment and services.

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TELEX: 206 (DOMCAN GU 206)

PANAMA

MARKET DATA

Capital city	Panama City
Area	29,200 sq. mi.
Population (1967)	1,300,000
Language	Spanish
Currency	The Balboa (1 Balboa = US \$1)
Telephones (1968)	57,759
Televisions (1968)	120,000
Principal cities (Pop. 1967)	— Panama City 359,301 — Colon 79,893

UTILITY ORGANIZATIONS

Instituto de Recursos Hidraulicos y Electrificación (IRHE)
Apartado 5285
Panama 5, R.P.

Autonomous government agency for generation and transmission of electrical energy in Panama. Sells power in bulk to regional distribution companies, notably CPFL.

Compania Panamena de Fuerza y Luz (CPFL)
P.O. Box 9A — 659
Panama 9A, Panama

Private organization responsible for the supply of energy, gas and telephone services to the cities of Panama and Colon. A subsidiary of EBASCO, New York.

Panama Canal Company (PCC)
Electrical Division, Drawer "C"
Balboa Heights, Canal Zone, Panama

Supplies the entire area of the Canal Zone. CPFL and PCC have interconnected their two systems.

OFFICIALS

Director General (IRHE) — Ing. Rafael Ayax Moscote
President and General Manager (CPFL) — S.G. Menocal
Chief Engineer (CPFL) — G.E. McFadden
President (PCC) — Maj. Gen. W.P. Leber
Deputy Dir. Engr. and Const. — Engr. Carl J. Browne

PRESENT FACILITIES — 60 HERTZ

Total Installed capacity — (1969) — IRHE 50 MW (hydro 6 MW; diesel 4 MW; steam thermal 40 MW)

— CPFL 88 MW (hydro 25 MW; diesel 2 MW; steam thermal 40 MW; gas turbine 14 MW)

— PCC 105 MW (hydro 46 MW; diesel 17 MW; steam thermal 22 MW; gas turbine 20 MW)

Production — (1969) — IRHE 23 GWH
— CPFL 423 GWH
— PCC 605 GWH

Forecast annual production growth over next five years — CPFL — 12 per cent

Number of customers — (1969) — IRHE 14,909
— CPFL 83,385
— PCC 6,754

Transmission — CPFL 110 kV and 44 kV — 70 miles
— PCC — 44 kV — 117 miles

Distribution — Res. 2.4 kV Com. 2.4/12 kV

Service Voltages — 110/220, 1 and 3 phase

Underground — PCC (1968-70) — approx. 13 miles additional 12 and 2.4 kV transmission

— CPFL — underground voltage distribution system is used

System control — Generating plants and substations are manually operated.

PROCUREMENT PROCEDURES

IRHE — Equipment and materials for projects are usually called for public tender in the country's official gazette and newspapers, and frequently in overseas publications. Services are normally called for proposals from a list of known firms.

CPFL obtains the necessary equipment and materials either through local distributors or Latin American distributors. When construction for the expansion of services becomes necessary, it proceeds as follows:

1. Invitations to bid are sent to local constructors through public tenders.
2. The firm's specialized and technical personnel participate and CPFL's equipment inquiries are sent direct to approved suppliers in the U.S.A. and Canada with copies to Panamanian representatives for follow up purposes.

In order to protect national industry, the Government has established legal-tariff restrictions.

CONSULTING REQUIREMENTS

IRHE nearly always uses outside consultants, due to its limited staff. It employs, at the moment, EPTISA of Spain.

CPFL always requires the consulting services of EBASCO International Corporation of New York.

FINANCING

IRHE relies primarily on World Bank financing.

CPFL uses a system of bonds and shares. World Bank financing has been required lately. Local manufacturers of equipment give financing facilities, short term credits.

STANDARDS

North American standards are acceptable.

ENERGY RESOURCES

Bunker C fuel is used for the generators. It is processed in Panama but imported from Colombia or Venezuela.

DEVELOPMENT PROGRAM

Material and Equipment Requirements — CPFL purchases electrical equipment for about \$1 million annually.

Current Capital Projects — CPFL no longer projects any generating unit installment or construction. IRHE has made all the hydro installations since 1965.

Future Planning

Project	Amount (US \$)	Foreign (US \$)	Start-up Date
Las Minas Thermal Plant No. 3, 40 MW	8.2 M	6.56 M.	1970
Canal Zone Thermal Plant, 33 MW	9.0 M.	9.00 M.	1971
Bayano Hydroelectric Plant, 200 MW	44.5 M.	30.00 M.	1973

The Fortuna hydroelectric project (150-200 MW) in the northern province of Chiriqui and associated transmission lines are in the planning stage.

The Bayano project includes a 230 kV 80 KM transmission line. EPTISA of Spain will carry out design and construction supervision of the Bayano project.

MARKET FACTORS

The bulk of equipment requirements for many projects undertaken in Central America is imported from North American, European and Japanese suppliers. The major exception is wire and cable products supplied by Phelps Dodge plant in El Salvador and soon to be supplied from the CONDUMEX wire plant under construction in Costa Rica. Other local manufacturers include Cutler Hammer's motor control facility in Costa Rica and UNIVEX's (Canadian) lighting fixtures and electric panel manufacturing operations in Guatemala.

MARKET PROMOTION

Canadian firms must make themselves and their capabilities known to the electrical utility authorities. Frequent personal visits are necessary, even if companies are well represented by a local associate, due to strong foreign competition both in equipment and services.

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PHONE: 61560, 67227, 61005
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SOUTH AMERICA

The increase in generation of electric power in South America has been continuous, although not at the same rate in all countries.

There is still a lack of electric power in many sectors of South American countries, although several large development programs have been implemented to rectify the situation. There are municipalities where electric power is still rationed and limited to daylight hours. These power uncertainties stem from political and economic conditions within the individual countries. But the future electric market in South America is definitely encouraging and offers a fine field for sales of all kinds of electrical goods from generating equipment to household items.

One of the major problems facing many South American countries is the use of several frequencies within it. Brazil, Peru and Venezuela use both 50 and 60 hertz within their individual power systems. Argentina and Chile employ 50 hertz.

There are several systems interconnections under way and under study between South American countries, offering opportunities for equipment sales and technical services.

To improve chances of obtaining contracts in South American countries, it is convenient to use local agents to represent companies.

ARGENTINA

MARKET DATA

Capital city	Buenos Aires
Area	1,072,700 sq. mi.
Population (1967)	23,100,000
Language	Spanish
Currency	The Peso (Cdn \$1 = 3.89 pesos)
Telephones (1968)	1,553,281
Televisions (1968)	2,500,000
Principal cities (Pop. 1968)	— Buenos Aires 3,375,000 — Rosario 674,000 — Cordoba 591,000 — Santa Fe 260,000

UTILITY ORGANIZATIONS

Agua Energia Electric (AYEE)
La Calle 1554
Buenos Aires, Rep. Argentina, S.A.

Federal agency for development of power and irrigation. It generates approximately 30 per cent of the electric power in Argentina.

Servicios Electricos de Gran Buenos Aires (SEGBA)
Balcarce 184
Buenos Aires, Rep. Argentina, S.A.

Federally-owned stock corporation responsible for the supply of electricity to almost two million consumers in the federal capital (Buenos Aires) and its suburbs.

Compania Italo Argentina de Electricidad S.A. (CIAE)
San José 180
Buenos Aires, C.F., Rep. Argentina, S.A.

A privately owned (Swiss capital) power company which has a government concession to supply part (15 per cent) of the capital city, and the four suburbs of Avellanda, Quilnaes, Lanus and Lomas. CIAE is interconnected with SEGBA.

Direccion de Energia de la Provincia
de Buenos Aires (DEBA)
Calle 55, No. 570
La Plata, Prov. Buenos Aires
Rep. Argentina, S.A.

Provincial organization.

Empresas Provincial de Energia de Cordoba (EPEC)
Av. Gral. Paz 374 2° Piso
Cordoba, Cordoba, Rep. Argentina, S.A.

Provincial organization.

There are several other power companies in Argentina but their installed capacity is rather small.

RELATED ORGANIZATIONS

Hidroelectrica Norpatagonia S.A. (HIDRONOR)

A state-owned stock company set up to develop the 1200 MW El Chocón-Cerro Colorado complex and 500 kV 1100 KM transmission system to Buenos Aires.

Secretaria de Estado de Energia y Minería (SEEM)

Regulates and controls the supply of electric energy in the Argentina public sector through its office, Dirección Nacional de Energia y Combustibles.

OFFICIALS

AYEE: General Manager — Engr. Jorge Alberto Pegoraro
Purchasing Manager — Antonio Vaquer

SEGBA: President — Engr. Enrique Butty
Technical Manager — Engr. Oscar L. Briozzo

CIAE: General Manager — Engr. Edmundo J. Poodts

DEBA: General Manager — Engr. Adalberto P. Lucchini

EPEC: Director General — Engr. Arturo Romero Diaz

PRESENT FACILITIES — 50 HERTZ

Total installed capacity — (1967) 3,853 MW (steam thermal 2,664 MW; internal combustion 780 MW; hydro 409 MW)

Maximum system demand — N/A

Production — (1967) 12,407 GWH

Forecast annual production growth over next five years — 12 per cent

Number of customers — N/A

Transmission — 220 kV, 132 kV, 66 kV, 33 kV, 27.5 kV, 13.2 kV

Service Voltages — 220/440, 220/380, 1 and 3 phase

Underground — trend to underground distribution and transmission (132 kV) lines

System control — unsophisticated system control

PROCUREMENT PROCEDURES

Tenders for major capital projects financed by IBRD and IADB are released for international competition following the procedures set out by these organizations.

The language used in correspondence and tender documents is Spanish.

Local industry is protected by very high tariffs ranging from 50 to 120 per cent. Canada is accorded most favoured nation treatment. Argentina is a member of the LAFTA organization and therefore accords custom duty preference to products from member countries.

A local agent or representative is a must for success in Argentina.

CONSULTING REQUIREMENTS

SEGBA's consultant company is SOFRELEC. Consultant to CIAE is the Swiss firm Motor-Colombus. AYEE employs Montreal Engineering, Kuljian (U.S.A.) and a Spanish consultant for studies of future expansion in its system. Merz-McLellan is involved in HIDRONOR's El Chocon project. Engineering consultants are always required for feasibility studies, power system studies, design, etc., by the individual power authorities.

FINANCING

Major capital projects have been and will continue to be financed by IBRD and IADB loans. SEGBA and AYEE have financed their major projects through these financing organizations and are at present negotiating future loans with World Bank and IADB. These loans have been necessary for foreign exchange requirements in electrical

power expansion. For smaller projects, supplier credit is required for foreign exchange requirements and internal generation of capital from the authorities is employed for the local costs.

STANDARDS

European standards are prevalent in Argentina but North American standards are accepted.

ENERGY RESOURCES

Argentina must import approximately 60 per cent of its needed fuel. There are several unexploited sources of hydro electric power but these sources are very remote from consumption areas.

DEVELOPMENT PROGRAM

Current Capital Projects

Futaleufu (AYEE) — Hydro 4x110 MW, total cost \$80 M, possible IADB financing for \$40 M, tenders mid-1970, in service date 1974.

Zapata (DPE) — 2x22 MW oil-fired thermal plant, cost \$13 M, Canada has bid.

Rio Hondo (AYEE) — Hydro 15 MW, IADB financing, Harza are consultants.

El Chocon (HIDRONOR) — Hydro 3x200 MW, total cost of \$500 M, IBRD financing for \$80 M, Merz-McLellan are consultants.

Yacreta — Apipe (Argentina-Paraguay) — Hydro, irrigation, navigation, total cost \$1.1 billion, feasibility study still to be let.

Mars-del-Plata (AYEE) — 1x30 MW gas turbine, \$20 M, IADB financing.

Expansion Program (SEGBA) — Transmission and distribution, IBRD financing for \$60 M, tenders called October 1969.

Salto Grande (Argentina-Uruguay) — Hydro 1400 MW, CIDA/IADB financing, feasibility study, Acres — International are consultants.

Pilar (EPEC) — Steam 2x75 MW, \$28 M financing by Province of Cordoba and supplier, equipment being ordered.

Puerto Madryn (CONADE) — Hydro, negotiating with IADB.

MARKET FACTORS

Local Industry — The electrical industry in Argentina is relatively well developed. This is due in large part to substantial government encouragement through high protective

tariffs. Three firms account for the bulk of the output of heavy electrical equipment:

CEGELEC, a subsidiary of the French firm CGE, is the oldest manufacturer of transformers in Argentina. It produces mainly power and distribution transformers and also some switchgear.

Electrica Mecanica Argentina, a subsidiary of the Italian **SACE** group, makes control panels under licence from **SACE** and also produces switching equipment.

Siam di Tella Electromechanica, with participation by **Westinghouse**, manufactures generators, transformers, motors, capacitors, electric traction equipment, and welding machines, etc.

Other smaller manufacturers are either licensees of European firms or subsidiaries:

CEE, licensee of **ASGEN** (Italy): switchgear, small oil circuit breakers, motors.

ACEC Argentina, subsidiary of **ACEC** (Belgium): motors.

Siemens, subsidiary of **Siemens** (Germany): motors, generators, switchgear, motor controls.

The industry produces the following range of equipment:

Item	Total Production	Maximum Size Produced
Motors/generators	302,182 units — 672,360 hp	800 hp motors
transformers	1245 units — 778,558 KVA	10,000 KVA generators 40 MVA — 132 kV
fusible disconnects	—	45 kV
oil circuit breakers	—	800 MVA at 66 kV
capacitors	—	20 kV
contactors	—	500 A at 500 V
disconnects	—	132 kV

Price premiums paid for local supply over world prices range from 15 per cent on medium voltage (up to 35 kV) switchgear to 40-50 per cent on transformers (40 MVA) and generators (10 MVA).

The wire and cable industry is very large and sophisticated, **Pirelli** being the principal local manufacturer. The industry is protected by high import duties.

Foreign Suppliers — The principal suppliers of electrical power equipment in the past have been Italy, Britain, West Germany, Switzerland and Japan.

MARKET PROMOTION

It cannot be over-emphasized that a good strong local representation is necessary if it is hoped to do business on a continuing basis in Argentina. Frequent visits by Canadian manufacturers to the area to meet their agent and customers are certainly desirable.

Establishing manufacturing operations either by joint ventures or licensing arrangements is also an extremely favorable method of doing business in Argentina.

It has been recommended that Canada look for smaller projects where she can be most competitive and pursue these aggressively on a bilateral basis.

Canadian consulting engineers are highly respected in Argentina and there are business opportunities open to them.

Price competition seems not nearly as fierce for much of the specialized and industrial equipment as for heavy electrical apparatus.

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BRAZIL

MARKET DATA

Capital city	Brasilia
Area	3,285,000 sq. mi.
Population (1967)	86,500,000
Language	Portuguese
Currency	The Cruzeiro (1 new Cr. approximately = US \$ 24.65)
Telephones (1968)	1,472,677
Televisions (1968)	6,000,000
Principal cities (Pop. 1968)	— Sao Paulo 5,383,000 — Rio de Janeiro 4,076,000 — Belo Horizonte 1,092,000 — Brasilia 358,000

UTILITY ORGANIZATIONS

Eletrobras — Centrais Electricas Brasileiras S/A
Av. Presidente Vargas, 642-10 and/or
Rio de Janeiro, G.B.

Light S/A — Servicos de Electricidade
Ave. Presidente Vargas 642 — 17° andor
Rio de Janeiro, G.B.

Electric power in Brazil is controlled principally by Eletrobras and its affiliated and subsidiary companies, and by Rio and Sao Paulo Light, which are subsidiaries of Brascan of Toronto

Ministry of Planning

President (Eletrobras) — Dr. Mario Penna Bhering

Vice-President Technical (Eletrobras) — Dr. Leo Amaral Penna

Vice-President (Rio Light) — Dr. Antonio Gallotti

Technical Director — Dr. Laurie D. Blatchford

PRESENT FACILITIES — 50 AND 60 HERTZ

Total installed capacity — (1968) 8,555 MW (thermal 2,372 MW; hydro 6,183 MW)

Production — (1968) 36,182 GWH

Forecast annual production growth over next five years — 10.2 to 11.3 per cent

Transmission — 440/345/230 kV — 350/1,000/3,000 mi.

Service voltages — 127/220, 220/380, 110/220, 220/440, 1 and 3 phase

System control — least satisfactory aspect of Brazilian power development — great deal of money will be invested — equipment will be imported and financing will be required.

PROCUREMENT PROCEDURES

Procurement is done by tendering through lists of suppliers maintained by both companies. Approximately 90 per cent of Light's purchases are made locally since the organization is prohibited from expanding generation and is now only distributing. Eletrobras' purchasing methods are similar, and only when national suppliers cannot produce an item or international financing is involved, is there public tendering.

Tariffs on items already manufactured in Brazil are extremely high and the Law of National Similars is applied.

Foreign firms with local agents are usually able to quote only on internationally financed projects.

CONSULTING REQUIREMENTS

Consulting engineering is mostly carried out by Brazilian consultants although on occasion foreign firms are called in to assist.

FINANCING

Financing is handled with company funds or from government grants. The majority of new generation facilities is being partially financed with international loans either bilateral or multilateral, from the World Bank, US/AID, IADB, IDA, etc.

STANDARDS

North American standards seem to be acceptable for major electrical projects. The Instituto Nacional de Pesos e Medidas is the equivalent of a national standards organization.

ENERGY RESOURCES

The total potential for future energy is extremely large, particularly in the hydro field, but the cost of transmission in many cases does not warrant development at the moment.

Petroleum is a large import for the country, so that thermal plant operation is justified where coal or petroleum deposits are abundant and no hydro is available.

DEVELOPMENT PROGRAM

Current and Future Capital Projects

POWER INSTALLATIONS OF MORE THAN 100 MEGAWATTS, PRESENT AND PLANNED

Plant	Thermal or Hydro	Pres. Cap.	Planned Cap. — MW					Ult. Cap. MW
			-70	-71	-72	-73	-74	
Ilha Solteira	H						640	3200
Paulo Alfonso	H	1215		330	165	165	330	2215
Jupiá	H	600	400	200	200			1400
Marimbondo	H							1400
Furnas	H	900		150	150			1200
Estreito	H	700			350			1050
Jaguara	H			236	236	104	104	680
Santa Cruz	H	160			200	200		560
Mascarenhas Morais	H	300						475
Cachoeira Dourada	H	136		50	52		52	426
Xavantes	H		200	200				400

**POWER INSTALLATIONS OF MORE THAN 100 MEGAWATTS,
PRESENT AND PLANNED**

Pôrto Columbia	H				160	80	320
Passo Real	H					125	250
Capivari							
Cachoeira	H		125	125			250
Tubarao	T	100			132		232
Passo Fundo	H	100			220		220
Boa Esperanca	H	108				54	216
Funil	H	70	140				210
Promissao	H					117	200
Mascarenhas	H					77	154
Jacui	H	25					150
Canditoa II	T				126		126
Paredao	H	66					100

**POSSIBLE POWER PROJECTS OF MORE THAN
500 MW, 1974 ONWARD**

Plant	1974	-75	-76	-77	-78	-79	Ult. Cap.
Sete Quedas					400	1200	10000
Xingé				600	600	600	4200
Sao Simao		100	100	200	200	200	1700
Itaparica				300	600	600	1500
Agua Vermelha				400	400	400	1200
Negra-Iguacu			100	200	200	300	1000
Mocoto (Paulo Alfonso IV)	200	200	400	200			1000
Gamba		174	174	348	348		1044
Sobradinho				300	300	300	900
Pôrto Alegre (thermal)					200	200	800
Ibo					340	340	680
Oroco				330		330	660
Nuclear			500	500			500
Itauba		200	200	100			500
Sao Felix		100	100	100	100	100	500

In addition, a number of smaller projects are in the planning stages.

These major electric power projects are to be initiated by Electrobras' subsidiary and associated companies.

A program to standardize the system frequency to 60 hertz is also under way.

MARKET FACTORS

Local Industry — The best developed of any South American country. Brown Boveri, General Electric and Pirelli are the largest local producers. ASEA, ITT, Siemens, Erickson, etc., are also manufacturing in Brazil. Some of these manufacturers are also competing in internationally financed projects with 15 per cent advantage over foreign suppliers.

The Brazilian industry is capable of producing:

- Power transformers — 70 MVA up to 500 kV
- Hydroelectric generators — no limit.
- P.T.'s and C.T.'s — 138 kV maximum
- Disconnect switches — 138 kV maximum
- Large AC and DC motors — no limit
- Circuit breakers — 66 kV low oil volume
- Steam turbines — 50 MW maximum
- Heavy switchgear and control panels are not produced in any substantial volume.

Foreign Suppliers — similar to local producers as most local manufacturing is done by subsidiary companies.

MARKET PROMOTION

Until and unless the situation changes, Canadian manufacturers can only compete on those projects which involve international loans or bilateral financing.

Canadian penetration of the future market in Brazil will not improve very much unless Canadian manufacturers become much more aggressive and competitive in price and can offer competitive financing for their equipment where international financing is not available.

REPORTING POST

Commercial Secretary
Canadian Embassy
Caixa Postal 2164-ZC-00
Edificio Metropol
Avenida Presidente Wilson 165
Rio de Janeiro, Brazil

CABLE: CANADIAN
PHONE: 242-4140
TELEX: 031430 (DOMINION RIO)

CHILE

MARKET DATA

Capital city	Santiago
Area	292,000 sq. mi.
Population (1967)	9,000,000

Language Spanish
 Currency The Escudo (= US \$0.94)
 Telephones (1968) 294,712
 Televisions (1968) 400,000
 Principal cities (Pop. 1967) — Santiago 2,414,000
 — Valpariso 284,000
 — Concepcion 185,000

UTILITY ORGANIZATION(S)

Empresa Nacional de Electricidad S.A. (ENDESA)
 Santa Rosa 76
 Santiago, Chile

ENDESA is a subsidiary (established in 1944) of Chile's Production Development Corporation CORFO. It is organized as a corporation in which CORFO holds most of the shares, and it generates, transmits and distributes electric energy throughout Chile. It is the only truly major power utility in the country, to the extent that it owns 82.5 per cent of the total hydroelectric installed capacity.

Compania Chilena de Electricidad Ltda. (CHILECTRA)
 Santo Domingo 789, Casilla 1557
 Santiago, Chile, S.A.

This privately owned (EBASCO of New York) company generates electricity and distributes it to some 550,000 customers in metropolitan Santiago. It buys about 50 per cent of its bulk power needs from ENDESA and generates the balance in thermal plants near Santiago.

OFFICIALS

ENDESA:

General Manager — Renato E. Salazar
 Construction Manager — Arturo Gantes A.
 Manager of Finance and Supply — Enrique Mardones R.
 Manager of Engineering (Planning) — Alberto Bennett L.
 Purchasing Department Manager — Pedro Beutler S.

CHILECTRA:

General Manager — Osvaldo Junemann W.
 Manager Finance — Sergio Molina C.
 Manager Development — Rafael Herrera P.

PRESENT FACILITIES — 50 HERTZ

Total installed capacity — ENDESA: (1968) 707 MW
 (hydro 645 MW; thermal 62 MW)
 CHILECTRA: (1967) 374 MW
 (all thermal)

Production — ENDESA: (1968) 2,529 GWH
 CHILECTRA: (1967) 1,239 GWH

Average cumulative annual production growth — 7 per cent

Number of customers — ENDESA: (1968) 213,899
 — CHILECTRA: (1968) 549,256

Transmission — Voltage (kV)	Length (KM)	
	1 Circuit	2 Circuit
ENDESA: 13.2 or 23	4,710	3
66	2,167	504
110	181	66
154	470	486
220	—	114
CHILECTRA: 44/66/110		356

Distribution — 6.9 and 12 kV, 220 and 380 V

Service voltages — 220/380, 1 and 3 phase

System control — limited modern facilities for load dispatching, remote control, signalling, telemetering, data logging, etc.

PROCUREMENT PROCEDURES

On fairly substantial purchases, particularly for imported materials and equipment, ENDESA calls for international public tenders. The Canadian Embassy reports the news to Ottawa with basic information. Tender documents for the foreign suppliers are usually available in English but bids are generally submitted by local agents in Spanish. While there may be situations where a foreign supplier could quote directly to ENDESA, this organization decidedly prefers dealing with a company that is represented in Chile because of the prompt response and assistance it can summon from the agent.

ENDESA does not normally favour turnkey or package contracts.

Materials and equipment imported into Chile by electric power utilities for their own use are exempt from all import duties and so are not affected by ANDEAN, LAFTA or protective tariff (local industry).

CONSULTING REQUIREMENTS

Due to the high level of expertise and experience of ENDESA's engineers, consultants are rarely employed. Only in very special situations, where foreign expertise is particularly outstanding, will foreign consultants be required. Feasibility studies on specific hydroelectric resource projects are one area in which outside help is more likely to be required.

FINANCING

The bulk of ENDESA's foreign exchange financing has come from IBRD on very long term and low interest arrangements. The last of these credits (US \$60 million) was approved on December 1, 1966, and purchases are currently being made with these funds. Dutch Delta Consult N.V. obtained a contract (US \$652,120) to study the Maule river basin, financed with a 20-year Dutch credit.

STANDARDS

North American electrical standards and guides are perfectly acceptable to ENDESA and are written into their specifications. The local standards agency is the Direccion General de Servicios Electricos y Gas.

ENERGY RESOURCES

In general, Chile has ample untapped water reserves for hydroelectric reserves and a reasonably adequate supply of fossil fuels.

DEVELOPMENT PROGRAM

Material and Equipment Requirements — Items usually imported by ENDESA, or in current demand, include:

- High tension pole line hardware
- Stringing equipment
- High voltage insulators
- Power cables
- Lighting arresters
- Metal clad switchgear
- Remote control equipment
- Current limiting reactors and line traps
- Automatic frequency control equipment
- Automatic load distribution equipment
- Substation connectors (high tension)
- Aeolian vibration dampers
- Disconnect switches
- Protective relays and automatic reclosing equipment
- Voltage and current transformers
- Panel boards and power meters
- High voltage fuses and fuse cutouts
- Circuit breakers

Current Capital Projects

- El Toro hydro plant : 4 x 100 MW units, nearing completion, Pelton type turbines.
- Bocamina thermal plant: 125 MW (coal), nearing completion.

Antuco hydro plant: 300 MW, preliminary feasibility studies completed, now in planning and design stage, start-up planned for 1976.

Colbun hydro plant: in prospecting stage by Dutch Delta Consult N.V., would require construction of 120 M high dam (reservoir of 1,300 million cubic meters), a 2,500 M tunnel and a 17 M canal.

Alto Polcura reservoir: prospecting and feasibility studies completed, construction underway, will contribute to water supply of El Toro plant.

Future Planning

ENDESA's overall plans call for an increase in installed capacity during the next 10 years of 1,300 MW. ENDESA's upcoming 10-year expansion plan by Merz and McLellan, a British consulting firm, will be used to establish foreign exchange financing requirements for future projects. High on the list of priorities for ENDESA's future expansion program are new power system control facilities, load dispatching equipment, communications systems for data and voice transmission, and remote control and protection signalling.

CHILECTRA will not construct new generating facilities; expansion and modernization of distribution facilities will be its chief concern in the future.

MARKET FACTORS

Local Industry —

Product	Manufacturers
Distribution transformers	1) Carry Compania 2) RHONA 3) SINDELEN
Power transformers (up to 25 MVA, 154 kV)	1) RHONA (G.E. Licence) 2) SINDELIN (AEI Licence)
Disconnect switches (15-16 kV)	1) Mario Gallardo 2) FAMAE
Disconnect fuses (15/23 kV)	1) REMA 2) Mario Gallardo
Metal structures	SOCOMETAL
Insulators (up to 23 kV)	FANALOZA
Control panels	1) Industrias Metalurgicas Bash 2) Fundicion Las Rosas

Control cables

- 1) Manufacturas de Cobre S.A.
- 2) Cobre Cerrillos S.A.

CORFU is interested in having HV insulators (over 23 kV), power capacitors, high voltage switchgear, electric motors (20 to 200 hp) and high voltage hardware produced locally. Foreign capital investments in this field would enjoy duty and tax incentives. Opportunities for licensing arrangements in this field appear to be quite limited.

Foreign Suppliers — The following companies have participated in ENDESA tenders: AESA (Sweden), G.E. (Spain), G.E. (U.S.A.), Brown Boveri (Switzerland), Mitsubishi (Japan), Siemens (Germany), ACEC (Belgium), AEG (Germany), AEI (England), Sola Basic (U.S.A.), McGraw Edison Power Systems (U.S.A.), Westinghouse (U.S.A.) Price is the basic consideration in determining the results of competition, provided that quality and technical specifications are equal and acceptable.

MARKET PROMOTION

As can be seen from the number and calibre of the suppliers competing for ENDESA's business, Canadian suppliers will have to strengthen local representation and contacts within the utilities through a steady program of visits with a minimum of two or three calls per year. A program whereby invitations could be extended to ENDESA for some of their engineers to visit Canadian industries or to work-study at Canadian utilities for short periods of time would be of great interest to ENDESA as well as to other government agencies and subsidiaries. Such programs would need to be available on a continuing basis, allowing two or three persons in each major field to visit Canada every year.

REPORTING POST

Commercial Secretary
Canadian Embassy
Casilla 771
Edificio Ahumada, 10th Floor
Santiago, Chile

CABLE: CANADIAN
PHONE: 64189
TELEX: 3520068 (3520068 DOMCAN)

COLOMBIA

MARKET DATA

Capital city	Bogota
Area	455,334 sq. mi.
Population	19,200,000

Language
Currency

Spanish
Colombian Peso (17.00 pesos = US \$1)

Telephones (1968)	515,000
Televisions (1968)	500,000
Principal cities (Pop. 1968)	— Bogota 1,849,000
	— Medellin 913,000
	— Cali 772,000
	— Barranquilla 590,000

UTILITY ORGANIZATION(S)

There are six main electric power authorities.

The Empresa de Energia Eléctrica de Bogota
The Empresas Publicas de Medellin
(Both of these are municipal utilities covering their respective cities.)

The Corporacion Autonoma Regional del Conca (CVC), which provides power for Cali and the rest of the valley of the Cauca River.

Central Hidroelectrica de Caldas (CHEC), which serves the Manizales area and Caldas province.

Corporation Eléctrica de la Costa Atlantica (Corelca), recently formed to serve the provinces of the Atlantic Coast, had delegated most of its functions (including the purchasing of equipment) to ICEL. It is now functioning more on its own.

The Instituto Colombiano de Energia Eléctrica (ICEL), reporting to the Ministry of Public Works, is responsible for electric power in the areas not served by the other authorities. It also functions as a "roof" organization for the other agencies, does some of their engineering and purchasing, and exercises some functions of coordination if not actual supervision over them.

Interconexion Eléctrica (ISA), which was originally founded to provide the interconnecting link between the Bogota, Medellin, CHEC and CVC systems. It has assumed a greater role including the construction of power stations to serve the network.

There is some overlapping between the roles and activities of ISA and ICEL. It is very difficult to forecast which agency will handle a particular project at any given stage of its development.

OFFICIALS

ICEL — Manager: Dr. Gerardo Silva Valderrana
ISA — Manager: Dr. José Maria Predrahita
Empresa de Energia Eléctrica de Bogota — Manager: Dr. Herman Borrero Urrutia
CVC — Manager: Dr. Henry Edir

CHEC — Manager: Dr. Elias Arango
Empresas Publicas de Medellin — Manager: Dr. Octavio
Aristizabal
Corelca — Director: Dr. Jacobo Bendsk

RELATED ORGANIZATIONS

All offers of foreign financing must be received by the Economic Affairs Division of the Colombian Foreign Ministry. Fonade (National Development Fund) is also involved in approving the acceptance of foreign loans, and in allocating foreign funds to various projects.

PRESENT FACILITIES — 60 HERTZ

Total installed capacity (1968)	— 1,688 MW
Production (1968)	— 6,521 GWH
Forecast annual production growth per annum	— 10 per cent
Distribution	— 13.2 kV — 50 per cent of lines — 11.4 kV — 30 per cent of lines — 6.6 or 4.2 kV — 20 per cent of lines
Transmission	— 230/380 kV, 11,602 KM
Service voltages	— 110/220, 120/208, 1,2 and 3 phase
System control	— no national frequency control or load dispatching system. No remote control of generation or load dispatching. Need for system of automatic control.
Underground	— beginning in larger cities.

PROCUREMENT PROCEDURES

All purchasing is done by calling tenders. In cases where international financing has been obtained, bidding may be limited to suppliers from the eligible countries. The final adjudication of international tenders depends usually on the financing terms offered — providing that prices are reasonable.

Spanish is the correct language of correspondence, although tender documents are usually available and may be submitted in English. Preferred are local firms and "consortia" formed by foreign firms with Colombian colleagues. Turnkey contracts are sometimes required although the general rule is that equipment only is imported, and the installation and civil works are carried out by a local firm.

Tariffs are relatively unimportant in this field — if the article is produced in Colombia or Latin America it

would not be imported and will face discrimination. On international financing, bids are assessed solely on price, quality, speed of delivery and installation.

CONSULTING REQUIREMENTS

ICEL regularly employs consultants. Canadian firms may be employed as consultants for a particular project: a) if they are associated with a good Colombian firm; b) if there are funds available to pay for their services.

FINANCING

In addition to Colombian funds, both from the national budget and from the electricity companies' own revenues, international financing had been received for electrification up to the end of 1968 from IBRD, Inter-American Development Bank, Export-Import Bank, US/AID, French Government and Bank Loan, National Development Fund and credits furnished by foreign manufacturers to the total amount of US \$293.65 million.

STANDARDS

NEMA, BSS or DIN standards are acceptable.

ENERGY RESOURCES

The country is mountainous and well-watered and possesses very large untapped resources of hydropower. While the country has substantial reserves of both oil and gas, neither is likely to become a main primary fuel for power generation. This leaves coal as the logical fuel for future thermal power developments. These developments will probably be on the Caribbean coast, an industrialized area situated far from sources of hydroelectric power.

DEVELOPMENT PROGRAM

Current Capital Projects

- Barranquilla (Thermonorte 1) — 2 x 66 MW oil fired thermal power project — commissioning date 1971
- Guatape II — 420 MW (6 units) — hydroelectric extension by 1975 up to 700 MW — first stage 4 x 70 MW commissioned in 1969
- Alto Anchicaya-Hydro — 340 MW (3 units) — to be commissioned in 1973

FUTURE PLANNING

Chivor I — 500 MW hydroelectric — total cost between \$140 and \$200 M — commissioning date 1976

Samana — 1000 MW (8 units) — in initial planning stages

	Capacity	Cost (Col. \$1,000s)	Starting Date	Commissioning Date
Cartagena — Termonorte 1	100 MW	240.0	1971	1973
Barranquilla — Termonorte 2	100 MW	218.9	1973	1975
Cartagena — Termonorte 2	100 MW	218.9	1975	1978
Termor Barranca 2 Vapor	125 MW	270.6	1972	1974
Future Transmission Lines				
Barranquilla — Sabanalarga	40 KM	230 kV		1971
Cartagena — Sabanalarga	75 KM	230 kV		1971
Cartagena — Sinceljo	150 KM	230 kV		1972
Sabanalarga — Fundacion	90 KM	230 kV		1975
Fundacion — Sta. Marta	80 KM	230 kV		1975
Fundacion — Valledupar	130 KM	115 kV		1975
Medellin — Sinceljo	350 KM	380 kV		1980
Barrancabermeja — Sabanalarga	500 KM	380 kV		1980
Western Region				
Paipa — Bucaramanga	160 KM	230 kV		1971
Bacuramanga — Cucuta	120 KM	230 kV		1971
Central Region				
Bogota — Esmeralda	180 KM	230 kV		1971
Guatapé — Esmeralda	160 KM	230 kV		1971
Cali — Esmeralda	195 KM	230 kV		1971
Bombolo — Quibdó	150 KM	115 kV		1971
Guatapé — Barrancaberme	200 KM	230 kV		1972
Flandes — Honda	104 MW	115 kV		1972

MARKET FACTORS

Local Industry — The following group of local companies in Colombia (mainly subsidiaries of foreign enterprises) manufactures some types of electrical equipment, in sizes that are the largest manufactured in the country:

General Electric de Colombia — (1955) subsidiary of G.E. (U.S.) — manufactures transformers 5 to 37 kVA; fractional hp motors (1/4 and 3/4).

Siemens Colombiana — subsidiary of Siemens, Germany — manufactures power and distribution transformers up to 1500 kVA; circuit breakers (Siemens U Type); motors, generators, up to 1500 kVA; substation switchgear (2.4 kV to 34.5 kV); power and distribution switchboards.

TYF — subsidiary of Sola Basic U.S. — manufactures power and distribution transformers 5 to 1,500 kVA, up to 15 kV.

Brown Boveri Colombiana and Oerlikan Colombiana — subsidiary of Brown Boveri and Oerlikan Switzerland respectively — manufactures motor control centers and switchboards (up to 5,000 kVA).

Codel — manufactures switchgear of any capacity (licensed by Square-D and Westinghouse).

Inelco del Pacifico — multi breakers (to 500 kVA).

Electrocentros Ltda. — manufactures low tension, porcelain tube, secondary rack (0 to 600 volts), pin type, suspension and post type insulators.

Lancor Industria Electrica — manufactures electric motors (up to 50 hp).

Electro — Industriales Ltda. — manufactures arresters, cut-outs; UT, N and K type fuses.

Siderurgica Corradine and ITO Cornacilla — manufactures Pelton type turbines (400 to 500 hp).

The wire and cable manufacturing industry is well-developed in Colombia, to the point that practically all types of wire and cables are made locally. Only sophisticated products are imported. CEAT General de Colombia (owned by CEAT, Italy, and General Cable Corp., N.Y.) and Fadaltic (49 per cent owned by Canada Wire and Cable) are the main manufacturers of wire and cable.

Foreign Suppliers — The major international suppliers of electrical equipment in Colombia are Siemens, G.E., Brown Boveri, Westinghouse, ASEA, AEG. The first three companies have their own subsidiary plants and, in addition, distribute and represent their head offices for the supply of major equipment not manufactured in the country. Well established in the country, they practically control the market, and usually offer financing facilities.

MARKET PROMOTION

Canadian firms seriously interested in obtaining business in Colombia in the electric power field must make regular visits to Colombia, not only to Bogota but also to agencies in Medellin, Cali and Manizales and to Corelca in Barranquilla.

The second important point to be considered is the appointment of a suitable local agent. The prime function of a local agent is to keep the Canadian firm aware of upcoming tenders before they are called and also to give it an idea of the financing terms which are being offered by competitors.

The third main reason for entering into an arrangement with a local firm is for technical cooperation. An agreement with a local firm enables the Canadian firm to submit an offer with a higher peso content, reducing the foreign exchange required. In view of the growing tendency toward turnkey projects, particularly for thermal plants (design, supply of equipment and installation), Canadian firms are finding that Colombian firms can take over much of the construction, civil works and installation, enabling the Canadian firm to submit a better offer in combination with the Colombian firm. Canadian firms should also look into the possibility of forming consortia among themselves to supply an integrated plant with Canadian equipment all the way through.

The key to sales in this market is making available financing on competitive terms.

REPORTING POST

Commercial Secretary
Canadian Embassy
Apartado Aereo 52531
Calle 58 No. 10-42
Bogota, Colombia

CABLE: CANADIAN
PHONE: 355211, 355477
TELEX: 044568 (DOMCAN BOG)

PERU

MARKET DATA

Capital city	Lima
Area	496,000 sq. mi.
Population (1967)	12,400,000
Language	Spanish
Currency	The Sol (38 soles = US \$1)

Telephones (1968)	152,136
Televisions (1968)	300,000
Principal cities (Pop. 1967)	— Lima 2,093,435
	— Cuzco 648,168
	— Arequipa 407,163
	— Callao 219,420

UTILITY ORGANIZATION(S)

Empresas Electricas Asociadas (EEA)
Conde de Superunda No. 261
Lima, Peru

The EEA (formerly Lima Light & Power Co.) is a private company that supplies electricity to greater Lima over an area of 726,000 acres.

Director-General Manager — Dr. Carlos Mariotti
Technical Manager — Ing. Jose Crosi
General Relations Manager — Dr. Alfredo Ghibellini

Corporacion Pruana Del Santa (CPDS)
Carabaya 831 — 5to piso
Lima, Peru

Serves the cities of Chimbote, Trujillo, Huarez, Carhuaz and Carez.

General Manager — Sr. Jorge de las Capas D.
Asst. Mgr. Public Relations — Dr. Luis E. Vidal Martinez.

RELATED ORGANIZATION(S)

All expansion project and financial commitments require the approval of the Ministry of Energy and Mines.

Through international entities, they require the Peruvian Government's guarantee which is obtained from the Ministry of Economy and Finance.

PRESENT FACILITIES — 60 HERTZ

EEA: Total installed capacity — (1969) 485.15 MW
(hydro 420.55 MW; steam thermal 11 MW;
gas turbine 53.6 MW)
Maximum system demand — (1969) 353 MW
Production — (1969) 1,842 GWH
Average annual production growth over past
five years — 9.4 per cent
Number of customers — (1969) 320,792
Transmission — 220 kV 63 miles (double circuit)
60 kV 164 miles (double circuit)
44 miles (single circuit)
20 miles (underground)
Distribution — Res. 220 V
Ind. 220 V
2.3/10/30 kV

Now trying to eliminate the 2.3 and 30 kV lines.
System control — mixed manual and automatic systems.

Company to install a micro-wave control and communication system during 1970.

CPDS: Total installed capacity — 100 MW (4 x 25 MW hydro)

Production — (1969) 278.8 GWH

Transmission — 138/66 kV

Distribution — 13.8 kV/220V

PROCUREMENT PROCEDURES

Depending on the volume of procurements or size of services, the purchase or contract is placed directly or through a call for tender, either locally or internationally.

Tariffs vary between 20 and 50 per cent ad valorem. However, in most cases imports by electric utilities are not subject to the full rate.

FINANCING

Financing purchases or construction are as follows:

- a) international development banks (World Bank, etc.) for approximately 30 per cent of requirements
- b) issues of bond and/or shares for 35 to 40 per cent of requirements
- c) 30 to 35 per cent of requirements financed from earnings.

STANDARDS

The standard used preferentially is IEC (International Electrotechnical Commission).

ENERGY RESOURCES

These are mostly hydraulic

DEVELOPMENT PROGRAM

Current Capital Projects

Hydroelectric plant — Rimac River — 1,000 M drop — two Pelton units.

Matucana plant — 120 MW — operational date in late 1971

Mantaro hydroelectric plant — 342 MW operational by 1972 — future expansion of an additional 300 MW.

Study of hydroelectric plant in Santa Eulalia valley — 400 — 800 MW — 1,300 M drop.

MARKET PROMOTION

Canadian manufacturers, consultants and construction firms should either on their own or with the assistance of the Commercial Secretary of the Canadian Embassy in Lima

contact potential agents and work through them. The agents will promote their goods in this market and be in close contact with all purchasers, thus increasing Canadian participation in this market. Canadian firms should also have a person responsible for exports who should travel through this territory and call on clients with his representative as often as possible.

REPORTING

Commercial Secretary

Canadian Embassy

Casilla 1212

Edificio El Pacifico

Corner Avenida Arequipa and Plaza

Washington

Lima, Peru

CABLE: CANADIAN

PHONE: 287420

TELEX: WLA 5323 (DOMCAN PX 5323)

VENEZUELA

MARKET DATA

Capital city	Caracas
Area	353,150 sq. mi.
Population (1967)	9,400,000
Language	Spanish (English used somewhat in business)
Currency	Bolivar (Cdn \$1 = 4.36 Bs)
Telephones (1968)	327,038
Televisions (1968)	700,000
Principal cities (Pop. 1967)	— Caracas 1,638,860 — Maracaibo 517,000 — Barquisimeto 245,476 — Valencia 201,105

UTILITY ORGANIZATION(S)

Government Sector

1. EDELCA, Electrification del Caroni
Apartado 62413 Este
Caracas, Venezuela, S.A.

Responsible for exploitation of hydroelectric potential of the Caroni river and transmission of power to consumption areas in Central Venezuela.

2. CADAPE, Compania Anonima de Administracion y Fomento Electrico
Edificio Fundaciones
Cota Mil, Caracas

Generation and distribution of power generated by its own plants, by ENDELCA and Venezuelan Petrochemical Institute.

Private Sector

3. C.A. La Electricidad de Caracas
Apartado 2299
Caracas, Venezuela

Electric public utility.

4. C.A. Energia Electrica de Venezuela
(Subsidiary of the C.I. Power, Montreal, Canada)
Apartado 146
Maracaibo, Venezuela

Production and distribution of electric energy.

There are also several small power companies generating and/or distributing power to isolated centres in Venezuela. Many industries such as oil companies generate electrical power for their own needs.

RELATED ORGANIZATIONS

Cordiplan: Central Planning Organization.

Corporacion Venezolana de Fomento — in charge of financing local industries.

Corporacion Venezolana de Guyana — plans and supervises industrialization and development of Venezuelan Guyana area.

Corporacion Venezolana de Los Andes — plans and supervises the development of the Venezuela Andean area.

Cambio de Frecuencia "Cafreca" — joint venture of government and private utilities for frequency conversion to 60 hertz.

OFFICIALS

EDELCA

Management: Ing. Rodolfo Telleria,
Planning and Engineering: Ing. Alberto Alazrachi
Purchasing: Oficina de Servicios Administrativos

CADAFE

Management: President — Dr. Ildemaro Leon Morales
Purchasing: Supply Division — Dr. Cesar Sierra,
Dr. Odazu Rivero J.

C.A. LA ELECTRICIDAD DE CARACAS

Management: General Manager — Dr. Oscar Machado
Zuloaga
Purchasing — Sr. José Guerva Sucre

C.A. ENERGIA ELECTRICA DE VENEZUELA

Management: Alexander E. Wilcox
Purchasing and Engineering: Paul J. Smith

PRESENT FACILITIES — 50 and 60 HERTZ

La Electricidad de Caracas operates at 50 hertz while the rest of the country operates at 60 hertz.

Total installed capacity — (1969) 2,432.55 MW
(hydro 909.55 MW; steam thermal 1001 MW; diesel 149 MW; gas turbine 373 MW)

Maximum system peak — (1969) 1,654 MW

Production — (1969) 8,587 GWH

Forecast annual production — 10 percent growth over next five years

Number of Customers — (1969) 1,043,000

Transmission — 400 kV — 570 KM
230 kV — 860 KM
220 kV — 100 KM
115 kV — 734 KM
138 kV — 225 KM
69 kV — 400 KM
34.5 kV — 550 KM
30 kV — 160 KM
24 kV — 1,000 KM

Distribution — 13.8 kV, 8.32 kV, 4.16 kV

Service voltages — 120/240, 120/208, 240/416, 1 and 3 phase

System control —

EDELCA: load/ frequency control equipment, data logging equipment, power line carrier and microwave equipment.

CADAFE: load/frequency control, telemetering and data logging — no remote control of plants, stations or substations.

La Electricidad de Caracas: now implementing a computer system which will take over supervisory and monitoring functions.

Energia Electrica de Venezuela: system load-frequency control, remote control of generating stations and substations, telemetering, pilot wire and power line carrier.

Underground —

La Electricidad de Caracas: 60 per cent of its system underground on a load basis with a growth of 8 per cent a year.

CADAFE: significant underground services.

PROCUREMENT PROCEDURES

EDELCA: Purchases of up to Bs 200,000 are made by Oficina de Servicios Administrativos. Beyond that, purchases are through public tender. For consulting and construction services, offers are sent to registered consultants and contractors. Public tenders are called in local and foreign newspapers in Spanish and/or English. Suppliers or consultants must be represented in Venezuela. Turnkey or package contracts are not favoured.

CADAFE: For normal requirements, semi-private quotations are received from three to six registered suppliers. Other alternatives are to issue tenders or to purchase from exclusive agents or distributors. Consulting and construction services are invited either by free choice by Gerencia de Desarrollo and Gerencia de Planificacion or by tenders. Tenders are advertised in major newspapers in Spanish. Turnkey or package contracts are not favoured. Tender bids must be guaranteed by local representatives.

C.A. La Electricidad de Caracas: Standard equipment is purchased by E de C through agents or representatives of either local or foreign companies. Tenders are called directly after selection of a group of suppliers from the E de C suppliers' kardex which is kept up to date in relation to material, activities, etc. English is used for tender documents sent to foreign suppliers. Turnkey or package contracts can be accepted if the firm is well known in the country and if its reputation and previous works satisfy the company.

When an item is locally produced, duty rates are raised to reach a prohibitive level or item is made subject to compulsory import licensing.

CONSULTING REQUIREMENTS

Consultants are normally retained for feasibility studies, power resources surveys, market analysis, power system studies and planning, project design, supervision of construction, procurement and inspection services. Harza Engineering is now a consultant to EDELCA. Electrowatt (Santa Domingo) is now consultant to CADAFE. EDELCA will require consultant services for system operation (next two years).

FINANCING

The large utility companies of the private sector are, as a rule, well financed and credit worthy. While they will insist on the usual commercial credits for their routine purchases of material and spares, they seem rather reluctant to make use of foreign financing facilities and often prefer to obtain credits from local government credit agencies or local banks or by issuing bonds.

The large projects in the government sector are partly financed by the government (often for local purchases), and international financing is sought for services, equipment or machinery which must be imported from abroad. The IADB, the World Bank and other sources have financed some Venezuelan projects in the past.

The C.A. La Electricidad de Caracas of the private sector has sought external financing by issuing 6 per cent and 7 per cent debenture bonds in the local market and foreign bank loans. Some expansion was effected through Export-Import Bank loans.

STANDARDS

North American standards and guides such as published by NEMA, ASA, IEEE, and CSA are acceptable to the electric power utilities. National standards organizations in Venezuela are CODELECTRA and COVENIN.

ENERGY RESOURCES

Total gross undeveloped hydroelectric power is stated at 45,353 MW. Reserves of coal are set at 152 million metric tons. Total reserves of gas are estimated at 752,781 million cubic meters. Total reserves of oil are estimated at 15,676 million barrels.

DEVELOPMENT PROGRAM

Current Capital Projects

EDELCA

Guri Dam — 6x220 MW units addition, timing 1970 to 1974, contract not yet awarded, US \$106 million, IBRD financing.

Second 400 kV transmission line (Guri to Santa Teresa) — timing 1972 to 1975, contract not yet awarded, US \$22 million, financing by IBRD, Venezuelan government and internal capital.

CADAFE

Santo Domingo (hydro) — 240 MW, in construction stage, scheduled completion 1973, cost Bs 191 million, Venezuelan government and IADB financing.

El Tablazo (thermal) — 110 MW, planning stage, contracts not awarded yet, scheduled completion 1973.

Transmission line (Santa Teresa — Cagua — Valencia) — 230 kV and substations, now in construction stage, scheduled completion 1970/71, cost Bs 13 million, Venezuela government financing.

Interconnection 115 kV/230 kV, now being studied, scheduled completion 1973, cost Bs 36 million approximately, contracts not awarded yet.

FUTURE PLANNING

EDELCA's expansion program of future power projects will be decided when new contracts and agreements are negotiated after 1975.

CADAFE's expansion program of future power projects will be the Uribante River system for 1983 and the Caparo River system. CADAFE is considering constructing 400 kV transmission lines (interconnecting Eastern-Central with Western-Central generation networks).

La Electricidad de Caracas plans no future expansion in power projects until 1976 and this could possibly be a 200 MW gas turbine.

Energia Electrica de Venezuela has plans for a 30 MW gas turbine per year.

CADAFE will spend approximately US \$40 million in conversion from 50 hertz to 60 hertz — expected to be finished by 1972.

MARKET FACTORS

Local Industry — Wire and cable of all types (PVC, PLT, CU-AL up to 34 kV), transformers (aerial type up to 267 kVA, subway type up to 167 kVA, both oil cooled), pole line hardware (all types), and transmission towers are extensively produced locally. There is also some manufacturing of control and metering equipment. Most local manufacturers base their production on licensing agreements with foreign firms to acquire the necessary know-how or to give their product the benefit of a well-introduced brand. There should be reasonable opportunities for control and measuring equipment and insulators. Usually the local product enjoys protection by increased customs tariffs or import controls.

Foreign Suppliers — General Electric, Westinghouse and Brown-Boveri have branch offices in Venezuela. Some of them provide technical advice to their customers and can supply components and smaller equipment from stock. Allis-Chalmers, Federal Pacific Electric and others have been selling to this market throughout the years and their products are well known. Although price consideration may be paramount, having local offices or a good representative or distributor with adequate service facilities can be very helpful in the long run. Technical assistance and advice to customers, particularly to those who have no previous experience or no engineering staff, is often the secret of the success of such large firms as GE or Westinghouse.

MARKET PROMOTION

Quality considerations (as long as quality is reasonable) are secondary and orders go to the lowest offer. Manufacturers

should therefore concentrate their sales efforts on the few power companies of the private sector which are known to appreciate higher quality — Electricidad de Caracas C.A. or Energia Electrica de Maracaibo C.A. Manufacturers might also consider producing export batches of products of slightly lower quality and much lower cost to compete in this price-conscious market.

It is impossible to do business in this market without good representatives. In order to make an adequate selection, it may be necessary that the Canadian consultant or manufacturer send to Venezuela a qualified officer to interview the power companies, establish the market demand of the services or products and select a representative familiar with the specialty and qualified to represent the Canadian firm. At least a week should be allowed for this task and it should not be attempted within the framework of a trade mission.

Canadian consultants and manufacturers should make sure that their enterprises are displayed in a prominent part of the international directories of their specialty and that their performance record is clearly stated. Local government agencies and power companies often consult such directories when looking for technical assistance or equipment. Catalogues and printed matter should be regularly distributed to government agencies, power companies and local representatives.

Joint ventures of consultants may be useful, not only with Venezuelan engineering firms but also with United States or other large foreign consultants, as a possible means of access to industrial (self-generating) jobs in the private sector, since many of the large local industries are branches of U.S. industrial groups.

REPORTING POST

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AFRICA

The continent of Africa consists of several young developing countries, and power system expansions are of prime importance to the modernization of these countries. Ambitious rural electrification programs are opening opportunities for foreign manufacturers of electrical power equipment.

Most of Africa's heavy electrical equipment will be manufactured abroad. This is especially true of highly engineered equipment such as turbines, generators, power transformers, etc.

The ability to provide long-term credit at low interest rates is probably the most important single factor in winning a bid. Manufacturers should also pay attention to international institutions such as CIDA and IBRD when approaching this market.

Consulting engineering studies will most certainly be required in all African countries with the exception of South Africa.

ALGERIA

MARKET DATA

Capital city	Algiers
Area	2,381,743 sq. km.
Population (1966)	12,101,994
Language	Arabic (French is widely used)
Currency	Algerian dinar (Cdn \$1 = 5.15 dinar)
Televisions (1968)	83,000
Principal cities (Pop. 1966)	— Algiers 942,769 — Oran 324,480 — Constantine 254,744

UTILITY ORGANIZATION(S)

Société Nationale d'Electricité et Gaz d'Algérie (Sonelgaz)
2 Boulevard Salah — Bouakouir
Alger, Algérie

Sonelgaz is a Government agency which has been given two objectives:

- 1) extending electrical power production facilities
- 2) bringing electrical power to every home.

RELATED ORGANIZATIONS

Ministère de l'Industrie et de l'Energie

Sonelgaz is directly responsible to this Government organization.

OFFICIALS

M. Allahoum, Président Directeur Général, Sonelgaz

M.A. Keramane, Directeur Général, Sonelgaz

PRESENT FACILITIES — 50 HERTZ

Total installed capacity — (1969) 626 MW (hydro 284 MW; gas turbine 268 MW; fuel 54 MW; diesel 20 MW)

Maximum system peak — (1968) 1,133 GWH

Production — (1968) 1,300 GWH

Forecast average annual production growth over next five years — 10 to 15 per cent

Transmission — 150 kV — 1,250 KM
60-90 kV — 1,580 KM

Service voltages — 230/380, 127/220, 1 and 3 phase

Underground — 1,700 KM

PROCUREMENT PROCEDURES

All Algerian requirements, either for equipment or services, which cannot be satisfied by local firms are published in the "Journal Officiel" in the form of a "call for tenders." The "call for tenders" is then usually printed in local daily newspapers and sometimes in "Financial Times". In some instances the "call for tenders" is sent directly to known firms or selected countries.

Few of the "calls for tenders" have been for turnkey projects, but there have been some, and no dislike of such projects has been openly manifested.

It would be preferable to correspond with the various officials in French.

There is no particular legislation or provisions which could hinder access of Canadian products or services in Algeria. Algeria does benefit from the European Common Market structure under special provisions of the "Yaounde Convention," and thus lower tariffs for E.E.C. countries are guaranteed.

CONSULTING REQUIREMENTS

Where Algerian engineers do not possess the resources necessary to carry out requested studies, a "call for tenders" is published and/or sent to firms already known to the Algerians.

FINANCING

Most financial agreements are concluded on a bilateral basis. French aid to Algeria has been decreasing very substantially since independence in 1962. It should be underlined that

Algeria is no longer solely dependent on aid, for revenues derived from its oil reserves have provided the Government with a certain ability to negotiate more freely.

STANDARDS

Standards are basically French. New equipment must, therefore, be of standards compatible with French ones.

ENERGY RESOURCES

Petroleum and gas are the two most important natural resources. Hydroelectric potential will not be developed since water is needed mainly for Irrigation.

DEVELOPMENT PROGRAM

Current Capital Projects

In Annababa: (1) — 55 MW station by Technoprom. Export (a Russian firm) operational end of 1970

(2) — 75 MW station by Ansaldo Mecanico Nucleare (of Italy) operational end of 1970

In Skikda: — four stations, total 120-150 MW capacity — first phase completion by 1972.

In Oran: — 75 MW station by Ansaldo Mecanico Nucleare (Italy)

Transmission Projects: for end 1972, cost 700 million dinars

1. Modernization of older stations
2. Three new stations of 150 kV
3. Five new stations of 60 kV
4. 500 KM of 150 kV lines
5. 500 KM of 60 kV lines.

Future Planning — Sonelgaz has not yet made known its longer term plans.

MARKET FACTORS

Local Industry in Algeria is relatively small. Manufacturers of any importance are subsidiaries of French firms.

Foreign Suppliers — The Algerian electrical equipment requirements are essentially satisfied by France, Italy, Germany and the Soviet Union. Canada benefits from goodwill in Algeria to the extent that many important people would like to see trade develop on a much larger scale.

MARKET PROMOTION

Market promotion of power equipment in Algeria should be based on personal contact. The various countries which

have been successful to date have spent considerable time in this country in order to meet decision makers and acquire a more intimate knowledge of the fine points related to selling in Algeria. They have taken the time necessary to get to know people of influence and convince them of the high quality of services or equipment they are capable of supplying.

REPORTING POST

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CONGO-KINSHASA

MARKET DATA

Capital city	Kinshasa (Leopoldville)
Area	905,567 sq. mi.
Population — (1966)	16,500,000
Language	French and Congolese
Currency	Zaire (Cdn \$1 = 0.46 Zaire)
Principal cities (Pop. 1966)	— Kinshasa 507,900
	— Lubumbashi (Elizabethville) 233,100
	— Kisangani (Stanleyville) 149,900.

UTILITY ORGANIZATION(S)

Société Générale des Forces Hydro-Electriques du Katanga (SOGEFOR)

Supplies the bulk of the power required in Katanga for mining and metallurgical industries from four hydroelectric installations. It is a private company. Most of the Congo's present generating capacity is located in Katanga.

Société des Forces Hydro-Electriques du Bas Congo

A government enterprise providing considerable power for the manufacturing and industrial enterprises of Kinshasa at Congo.

Compagnie Congolaise d'Electricité (Colectric)

Smaller private power company at Sanga. Most consulting provided by Belgian companies. It is a part of the Cominière (Société Commerciale et Minière du Congo) and purchases are made through Cominière, 5 rue de la Science, Bruxelles.

Also:

Société des Forces Hydro-Electriques de l'Est at Kisangani (Tshopo)

Bukavu (Muhuru on the Ruzizi River)

Kalemi (Bendera on the Kiymbi River)

PRESENT FACILITIES — 50 HERTZ

These major hydroelectric installations accounted for 92 per cent of the 2,840 million kilowatt-hours of electricity produced in the Congo in 1966. Smaller stations in the country's network of 31 hydroelectric installations provided another 6 per cent of the total, while the remainder was produced by thermal stations.

Almost 2,300 million of these kilowatt-hours were domestically consumed and the rest were exported to neighbouring countries.

Total installed capacity — (1966) 675.33 MW

Annual consumption growth per year — 7 per cent

Electricity production of the Congo's major hydroelectric installation for 65/66 was as follows:

	(GWH)	
	1965	1966
Bas Congo and Kinshasa (Zongo and Sanga)	252	291
Katango (SOGEFOR)	2,075	2,233
Kisangani (TAHOPO)	19	16
Albertville and Bukavu (Kiymbi and Ruzipi)		
TOTAL	2,403	2,604

ENERGY RESOURCES

Hydroelectric potential of the Congo estimated at 100 million kilowatts or 13 per cent of potential world electricity production (1965 Survey). Petroleum resources around Moanda are under exploration. A new 600,000 ton capacity refinery at Moanda was to commence operation in 1968 refining imported crude petroleum. Coal is mined at an annual rate of about 100,000 tons.

DEVELOPMENT PROGRAM

The largest single hydroelectric resource in the Congo is located at the Inga plateau on the Congo River. The total installed power capacity of the river at this point is estimated at 30 million kilowatts. The Congo Government is considering development of this resource. By 1968 the first phase of the project had been completed with first phase financing as follows:

39 per cent by Congolese Government;

32 per cent by

Italian credit (four years grace, eight years repayment at six per cent interest);

29 per cent

FED of which half credit and half loan (ten years grace, 28 years repayment at two per cent interest).

Given this financing it is apparent that the majority of equipment will be from Italian or other European countries.

REPORTING POST

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Canadian Embassy

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ETHIOPIA

MARKET DATA

Capital city	Addis Ababa
Area	400,000 sq. mi.
Population (1968)	23,000,000
Language	Amharic, English and Italian
Currency	Ethiopian Dollar (US \$1 = ET \$2.50)
Principal cities (Pop. 1968)	— Addis Ababa 644,100

UTILITY ORGANIZATION(S)

Ethiopian Electric Light & Power Authority (EELPA)

P.O. Box 1233

Addis Ababa, Ethiopia

An agency of the Ethiopian Government and fully responsible for the generation, transmission and distribution of electric power in Ethiopia.

OFFICIALS

General Director — Ato (Mr) Assesa Telakum

Production Manager — Ato Tamene Woldeyohannes

Manager, Transmission and Distribution — Ato Tenfalidet

PRESENT FACILITIES — 50 HERTZ

Total installed capacity — (1968) 225 MW (hydro 180 MW; diesel 45 MW — including 100 MW Fincha Dam)

Maximum system peak — N/A

Production — (1968) 400 GWH (not including 100 MW output of Fincha Dam)

Forecast annual production growth — 17 per cent

Number of customers — N/A

Transmission — 132 kV, 35 kV

Distribution — 15 kV

Service voltages — 127/220, 220/380, 1 and 3 phase

System control — N/A

PROCUREMENT PROCEDURES

Purchase of products is based on internationally advertised tenders and the need to meet the Authority's specifications.

The Canadian Embassy in Kenya will be given notice of EELPA's requirements which in turn will be sent to Ottawa for distribution to suitable manufacturers. Canadian manufacturers of equipment competitive under world bidding conditions would be put on the EELPA's bidding list automatically.

In Ethiopia, agents are not mandatory and in some cases of no benefit whatsoever.

Most transmission lines and sub-stations are constructed on a turnkey basis. For example, EELPA prepares specifications on a complete station and requests bids on a supply and erect basis. Normally, however, they may exclude the power transformers from the bid and call tenders for these only.

CONSULTING REQUIREMENTS

Engineering feasibility studies will be required for the next major power development — the Ono River. The EELPA to date has a need for a chief engineer.

FINANCING

The EELPA is reasonably well organized and, although small, has excellent fiscal responsibility and has managed all of its expansion entirely with its own resources, and this includes foreign exchange requirements. The Authority is now seriously considering having its government apply for foreign aid to assist electric power development.

STANDARDS

The EELPA follows any well established international standards such as IEC, BSS, ASA.

ENERGY RESOURCES

Crude oil and natural gas have not as yet been found in economically exploitable quantities. No coal deposits of economic significance are known in the country. Large potential of undeveloped hydroelectric power exists in Ethiopia (0.3 per cent has been developed).

DEVELOPMENT PROGRAM

Equipment and Material Requirement — ET \$15 million worth of equipment is purchased annually from foreign manufacturers by the EELPA (does not include major projects). There is considerable need for power transformers particularly in the 15 MVA range of the three winding rated 132/45 kV, but most would be in the range of 45/15 kV. Manufacturers quoting low loss transformers usually win the contract.

Current Capital Projects — Utilization of geothermal energy — UNDP conducting studies — prospects not encouraging.

Rural electrification — interconnecting system (electrify five or six towns a year) — expect to spend ET \$120 million during next five years for distribution purposes alone.

Future Planning

Ono River — next major power development involving some irrigation — engineering feasibility studies will be required.

Rural electrification — diesel generator sets.

MARKET FACTORS

Local Industry — small.

Foreign Suppliers — There is no marked preference for a particular supplier other than for price reasons. Alcan has supplied ACSR cable to Ethiopia.

REPORTING POST

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GHANA

MARKET DATA

Capital city	Accra
Area	92,000 sq. mi.
Population (1966)	7,945,000
Language	English
Currency	New Cedi (Cdn \$1 = 0.99 NC)
Telephones	30,000
Televisions	4,000 (Accra alone)
Principal cities (Pop. 1966)	— Accra 338,000 — Kumasi 190,000

UTILITY ORGANIZATIONS

Volta River Authority (VRA)
P.O. Box M77
Accra, Ghana

The VRA is a corporate body established in 1961 under the Volta River Development Act and has the following functions: generation of hydroelectric power, construction of a transmission system to carry power to industrial (Volta Aluminum Co.) and domestic (ECG) users and also to foreign purchasers (Ghana — Togo — Dahomey agreement).

Electricity Corporation of Ghana (ECG)
P.O. Box 521
Accra, Ghana

ECG is an autonomous government agency responsible for generation, transmission and distribution of electricity throughout Ghana. It is a major customer of the VRA.

RELATED ORGANIZATION

Ghanian Ministry of Finance and Economic Development — VRA's and ECG's development programs are under its supervision.

OFFICIALS

Chief Executive (VRA) — E.L. Quartey
Director of Engineering (VRA) — Mr. McLeod
Director of Services (VRA) — A.B. Futa
Managing Director (ECG) — E.Q.H. Acquah
Chief Engineer (ECG) — O.S. Abaka-Wood

PRESENT FACILITIES — 50 HERTZ

VRA: Total installed capacity — (1968) 588 MW Hydro
Maximum system peak — (1968) 329 MW
Production — (1968) 2,523 GWH
Forecast annual production growth over next five years — N/A

Transmission — 600 miles of 161 kV stepped down to 3.5, 11.5 and 6.6 kV

ECG: Total installed capacity — (1969) 85.2 MW (diesel)

Maximum System Peak — N/A

Production — (1969) 503 GWH (purchased from VRA)

Forecast annual production growth over next five years — 15 per cent

Number of customers (1969) — 90,000

Transmission — 33 and 11 kV — 55 miles

Service Voltages — 230/400, 1 and 3 phase

Underground — general overhead services

PROCUREMENT PROCEDURES

VRA: For capital projects attached to outside financial aid, the aid agency's procurement procedures are employed. For routine material and equipment purchases, competitive tenders are normally solicited except where the purchase cost is below a stipulated figure, where there is only one supplier, or when the time element is crucial.

ECG: All normal purchases are done through the official government purchasing agency (Ghana Supply Commission). Special purchases under IDA loans are made through international tendering under supervision of Lahmeyer & Co., West German consultants. Canadian firms are advised to register with the Ghana Supply Commission.

The VRA is not obligated to purchase through this Commission.

Equipment purchases under international or bilateral financing are not subject to tariffs. The VRA will shortly be officially exempt from tariffs for all routine purchases, provided they are essential. Tariffs are: 5 per cent for machinery, 10 per cent for accumulators, 25 per cent for iron and steel products.

CONSULTING REQUIREMENTS

VRA: Kaiser Engineering — Akosombo Expansion.
Ingledow & Associates — Ghana-Togo-Dahomey transmission line. The VRA may seek consulting services to review their accounting procedures.

ECG: Preece, Cardew & Rider, Brighton, England.
Cooper Bros., Britain.
E.A.G. Lahmeyer, Frankfurt, W. Germany.

FINANCING

VRA: World Bank and Canada for capital projects. Internal resources for routine equipment and material purchases.

ECG: Large engineering projects financed by foreign sources (West Germany and IDA).

STANDARDS

VRA: British standards normally but U.S. standards in some cases.

ECG: IEC or British standards.

ENERGY RESOURCES

As yet, no gas, petroleum, or coal has been discovered or commercialized in Ghana.

DEVELOPMENT PROGRAM

Current Capital Projects

VRA: Akosombo Dam expansion — 2 x 150 MW units — IBRD and CIDA financing — commissioning by end of 1971.

Ghana — Togo — Dahomey transmission line — 161 kV — CIDA financing.

ECG: Phase II of a power distribution project will soon be undertaken.

There is a special Ghanaian interdepartmental and agency committee studying the requirements for a rural electrification program.

Future Planning — IBRD is financing a study of alternatives for future long-term power generation. Presently, consideration is being given by VRA to a dam at Kpong on the Akosombo River.

IBRD will finance about \$1.5 million for equipment necessary to expand system due to load growth.

MARKET FACTORS

Local Industry: Very limited capacity for local industry to meet requirements. A cable factory is planned at Tema.

Foreign Suppliers: British and German firms have a somewhat privileged access to the ECG through the provisions of British Technical Assistance of the ECG and British and German consulting contacts with the ECG. The VRA is subject to international bid, so that no particular foreign suppliers have an advantage.

MARKET PROMOTION

VRA: CIDA is interested in future power developments in Ghana which now appear centered around the Kpong site. Those firms not already aware of developments are advised to write to the reporting Canadian trade commissioner.

ECG: Promotion is best undertaken by personal visits, and the appointment of Ghanaian representatives assisted by the Trade Commissioner's Office in Lagos.

REPORTING POST

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IVORY COAST

MARKET DATA

Capital city	Abidjan
Area	123,483 sq. mi.
Population (1966)	3,920,000
Language	French
Currency	Franc (Cdn \$1 = 257.4 Francs)
Principal cities	Abidjan, Bouaké, Daloa

UTILITY ORGANIZATIONS

Energie Electrique de la Côte d'Ivoire,
Abidjan, Côte d'Ivoire

EECI is a government agency jointly administrated with Energie de France (EDF) and responsible for generation, transmission and distribution of electric energy throughout the Ivory Coast.

RELATED ORGANIZATION

The EECI reports to the Ministère du Plan.

OFFICIALS

Directeur Général — Konan Lambert
Etudes (Study) Générales — M. Duffout
Etudes Techniques — M. Sibillat
Etudes Financières — M. Lamarque

PRESENT FACILITIES — 50 HERTZ

Total installed capacity — (1968) 136 MW (hydro 50 MW; thermal 63 MW; diesel 23 MW)

Maximum system demand — (1968) 56.7 MW

Production — (1968) 371.7 GWH

Forecast annual production growth over next five years — 35 per cent

Number of customers — (1968) 67,000

Transmission — 30 kV — 75.5 KM, 15 kV — 1278 KM, Low Tension — 1005.86 KM

Distribution — 115/200 V

System control — three administrative centers

PROCUREMENT PROCEDURES

For routine equipment and material purchases EEIC asks only for quotations from local representatives of foreign companies (95 per cent French).

For procurement of equipment, consulting and construction services for capital projects the EEIC together with EDF prepares the tender documents in French only. EDF advertises and calls for tenders at its office in France — 77 Point Carré, Paris 16me arrondissement.

For generators, transformers and electrical parts the tariff applicable to Canada would be 15.6 per cent ad valorem.

CONSULTING REQUIREMENTS

All the consultants employed are from EDF and there is no opportunity for Canadian consultant services unless aid projects are involved.

FINANCING

All major electrical projects in the past have been financed with the help of France plus self-financing.

The new Kossou project is financed by U.S.A. and Italy for 33 1/3 per cent each at 7-7 1/2 per cent interest, and the Ivory Coast Government for 33 1/3 per cent at 6 per cent interest.

The Vridi project financed by FAC (33 1/3 per cent) at 4-5 per cent interest and the Government (33 1/3 per cent) at 6 per cent.

STANDARDS

UTE standards are employed.

ENERGY RESOURCES

No coal, gas or petroleum has been found as yet in the country. There is a local refinery of 700,000 tons of annual capacity.

DEVELOPMENT PROGRAM

Material and Equipment Requirement — EEIC spends about \$1.6 million for expansion and replacement purposes.

Current Capital Projects

1. Kossou Hydro project — 150 MW; financed by EXIM. Impregilo and Ivorian Government; Kaiser is engineering consultant
2. Vridi III = 60 MW (1976) Thermal
3. Vridi IV = 60 MW (1978) Thermal

Future Planning — Kossou is probably the last hydroelectric project in Ivory Coast and future expansion projects will be most likely thermal and diesel.

MARKET FACTORS

Local Industry — No electrical equipment manufacturer.

Foreign suppliers — It is essential for a company which wants to supply the equipment for maintenance and small projects to have a local office or a representative because of EEIC purchasing policy.

MARKET PROMOTION

EDF supplies most of the engineers, technical advisers and the administrators of EEIC. EDF, being an organization of the government of France, naturally gives its information on local projects and equipment requirements for Ivory Coast to French manufacturers and suppliers. More than 95 per cent of the electrical equipment actually used in Ivory Coast was brought from France and it is only natural that the maintenance equipment comes from the same source.

The only way to approach the market is with the help of international organizations or CIDA on aid projects. It is also very important that Canadian manufacturers be represented by local agents.

REPORTING POST

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KENYA

MARKET DATA

Capital city Nairobi

Area 224,960 sq. mi.
 Population (1966) 9,370,000
 Language Swahili, Bantu, English
 Currency Shilling (Cdn \$1 = S 6.55)
 Principal cities (pop. 1962) — Nairobi 266,744
 — Mombasa 179,575
 — Nakuru 38,181

UTILITY ORGANIZATIONS

East Africa Power and Lighting Co. Ltd.
 P.O. Box 30099
 Nairobi, Kenya

A public limited liability company.

Kenya Power Company Limited

A company whose issued capital is partly owned by government. All the assets of KPC revert to government on the expiration of its bulk supply licence.

Tana River Development Company Limited

Company is similar to KPC in that part of its share capital is owned by the government. All the assets of the company revert to government when the bulk supply licence expires, or when the loan capital has been paid.

Both EAPL and KPC own transmission lines, but EAPL is the sole public distributor of electric power in Kenya.

OFFICIALS

EAPL staff manage all three companies.

General Manager — I. Lugonzo
 Chief Engineer (Planning) — B. D. Power
 Chief Engineer (Generation) — P. W. Fielder
 Chief Engineer (Distribution) — J. M. Payne

PRESENT FACILITIES — 50 HERTZ

Total installed capacity — (1969) 180 MW (hydro about 60 MW; steam 40 MW; diesel about 40 MW; gas turbines 4 MW; bulk supply from Uganda 30 MW)

Maximum system demand — (1968) 101 MW

Generated or purchased — (1968) 598 GWH

Forecast annual production growth over next five years — 9 per cent

Number of customers — (1969) 81,000

Transmission — 132 kV — 325 circuit miles
 66 kV — 136 miles
 40 kV — 93 miles
 33 kV — 348 miles

Distribution — 11 kV

Service voltages — 240/415; 1 and 3 phase

System control — centralized system control at Nairobi which controls switching and load dispatching on the interconnected system

PROCUREMENT PROCEDURES

Purchases are made through local agents or direct from manufacturers. There is no set procedure for calling for tenders, etc. Consideration is given to certain projects that lend themselves to turnkey contracts. There is a declared preference for local representatives.

Tariffs are not a factor as far as Canadian manufacturers are concerned.

CONSULTING REQUIREMENTS

Consultants have been employed for feasibility studies, power resource surveys, market analysis, power system studies and planning project design, construction supervision, project management and inspection services. The present consultants are:

Engineering and Power Development
 Consultants of Sidcup
 Marlowe House
 109 Station Road
 Sidcup, Kent

Consultants are not employed for a fixed number of years.

FINANCING

Loans have been raised for major projects while self-financing has been employed for minor works.

STANDARDS

All engineering standards in Kenya are governed by BSS.

ENERGY RESOURCES

These are hydro and uproven geothermal resources. For steam generation imported crude oil is used.

DEVELOPMENT PROGRAM

Material and Equipment Requirement — Power companies imported in 1969 about £200,000 (Kenya £) of equipment.

Current Capital Projects — Transmission Line — Mombasa to Nairobi — 300 miles
 — Kipevu Gas Turbine (aircraft) — 30 MW

Financing for these is by loans from the Commonwealth Development Corporation (CDC); and from British banks

(loan in excess of £6 million guaranteed by Export Credit Guarantee Dept.).

Future Planning

1. Kipevu Steam Unit 6 — 30 MW, operational 1971
2. Nairobi Gas Turbine (Industrial) — 12 MW, operational 1973
3. Kamburu Hydro Unit 1 and 2 — 2 x 50 MW — operational 1974, third unit 25 MW for 1976.
4. High Voltage Transmission Line — Tana-Nairobi — to deliver Kamburu power

Expansion will take place in steam and hydro plants and on geothermal sites if this is found practical.

MARKET FACTORS

Local Industry — The only products being produced locally of major importance to the power companies are aluminum conductor and copper and aluminum cables.

Foreign Suppliers — Most suppliers are British but the power companies are looking to the U.S. and Europe for certain products.

REPORTING POST

Commercial Counsellor
Office of the High Commissioner for Canada
P.O. Box 3778
Industrial Promotion Services Building
Kimathi Street
Nairobi, Kenya.

CABLE: DOMCAN NAIROBI
PHONE: 27426
TELEX: 22198 (DOMCAN NRB)

LIBYA

MARKET DATA

Capital	Tripoli
Area	1,759,500 sq. km.
Population (1964)	1,564,369
Language	Arabic
Currency	Libyan pound (100 piastres — 35.7 piastres = US \$1)
Principal cities (Pop. 1964)	— Tripoli 379,925 — Benghazi 278,826

UTILITY ORGANIZATIONS

There are two government agencies, each responsible territorially for half the country. These are soon to be

unified. At present, each is responsible to the Minister of Public Works.

- Eastern Electricity Corp., Benghazi, Libya
- Western Electricity Corp., Tripoli, Libya
- E.E.C. Chairman, Syd. Sami Gubi
- W.E.C. Chairman, Syd. Mohamed Yazid.

PRESENT FACILITIES — 50 HERTZ

Total installed capacity — (1970) 274 MW (steam thermal 140 MW; diesel 70 MW; gas turbine 64 MW)

Maximum system demand — (1970) — Tripoli 70 MW
— Benghazi 34 MW

Forecast average annual growth installed capacity over next five years — 20 per cent

Transmission — 30 kV, 10 kV — 200 KM, 1,600 KM respectively

Service voltages — 110/220, 230/400, 1 and 3 phase

System control — a need; study stage

PROCUREMENT PROCEDURES

For capital projects, the Minister or the Council of Ministers or most likely the RCC (Revolutionary Command Council) must decide.

For routine procurement, the corporations have regulations which define the power of each official and delegate specific authority to each official.

Tenders are published but since the time between publication and submission is short, it is necessary to know of forthcoming projects before publication.

The Government will likely require turnkey projects from now on.

It is required to have a local agent.

The same tariff for all nations with a few bilateral trade agreements exists in Libya. Tariff on electrical equipment is 10 per cent ad valorem.

CONSULTING REQUIREMENTS

Consulting engineers will no longer be employed. The Government will issue its own specifications.

FINANCING

Contracts require payment by sight draft for the merchandise, and payment of specified percentages at specified stages of completion. However, Government procedure is slow to release payments and foreign engineers or contractors may have to wait several months to receive their money.

STANDARDS

The Electricity Corporations prefer IEC standards, but also accept BSS, VDE, UTE, etc.

ENERGY RESOURCES

Libya has no hydro capacity or coal but large amounts of oil (third largest exporter in the world). At present and for the immediate future, the generating stations are oil fired but it is foreseen that the gas now wasted will feed the generating units.

DEVELOPMENT PROGRAM

Current Capital Projects — Over the next three years, plans call for:

- a) Tripoli area: — three 60 MW steam power generating stations, oil fired, capable of using gas in the future
— three 12 MW gas turbine power generating units
- b) Benghazi: — two 60 MW steam power generating stations; one is presently being completed
- c) Fazzan: — two 6 MW gas turbine or diesel power generating units

Transmission project plans are 350/40023000 KM of 220/30/10 kV

Future Planning — Over the next five years, a total of 110 million Libyan pounds (Cdn \$330 million) should be spent on electrical power generation and distribution. All stations will be thermal, oil-fired, eventually natural gas operated. Desalination combined with generation is being studied and actually space is reserved to use one of the turbines for desalination. There is no HVDC, and all future transmission will be 220 kV.

MARKET FACTORS

Local Industry — None in this field

Foreign Suppliers — Germany, Switzerland, Britain, Italy, U.S.A. Proximity, interest, and possibly lower costs are reasons for their success.

MARKET PROMOTION

It is essential that Canadian expertise in this field be known at the highest level — the RCC and the ministerial level. Interested Canadian companies, capable of turnkey projects, should visit Libya, meet responsible officials, appoint an agent, and prepare for the forthcoming tenders. Much of the success of this method would depend on the local agent who is very difficult to find, especially in recent months.

REPORTING POST

Minister-Counsellor (Commercial)
Canadian Embassy
Via G.B. De Rossi 27
00161 Rome, Italy

CABLE: CANADIAN
PHONE: 864-327
TELEX: 61056 (DOMCAN ROME)

NIGERIA

MARKET DATA

Capital city	Lagos
Area	357,000 sq. mi.
Population (1963)	55,670,052
Language	English, language of business
Currency	Nigerian pound (Cdn \$1 = 0.33 N. Pound)
Principal cities (Pop. 1963)	— Lagos 950,000 — Port Harcourt, 179,563 — Ibadan 627,379

UTILITY ORGANIZATIONS

Niger Dam Authority (NDA)
Cabinet Office
P.M.B. 12605
Lagos, Nigeria

NDA was formed to construct the Kainji Dam and has since been responsible for the operation of the dam. NDA puts its power output into the ECN network.

Electricity Corporation of Nigeria (ECN)
P.M.B. 2030

The ECN is a Crown Corporation which is responsible for generation, transmission and distribution of electricity throughout Nigeria.

RELATED ORGANIZATIONS

Dept. of Economic Development
Dept. of Mines and Power — ECN reports to this department
Dept. of Finance
Committee for the Co-ordination of Activities — between ECN and NDA

OFFICIALS

NDA: Acting Chief Executive — Philip Wolstenholme (Canadian)
Purchasing Officer — Mr. Mogaji

ECN: General Manager — C.F. Hsu
Chief Purchasing Engineer — M. Tata, Askira

PRESENT FACILITIES — 50 HERTZ

Total installed capacity (1969) — 400 MW (hydro 320 MW; steam thermal and diesel 80 MW) estimated.

Maximum system peak — N/A

Production — N/A — extremely small for the installed capacity

Forecast annual production growth over next five years — N/A

Number of customers — N/A

Transmission — 330, 132, 66, 33 kV

Service voltages — 230/400, 1 and 3 phase

System control — dispatch centre (radio) is elementary but effective for system.

PROCUREMENT PROCEDURES

Capital developments have, except for local costs, been financed by the World Bank Group and by bilateral loans, and consequently purchases have been subject to procedures of the lending agency or country. For routine operational requirements NDA has a small purchasing department. Both Crown Corporations usually go to competitive tender unless the amount involved is not considerable.

Suppliers are advised to work through local representatives who are familiar with local customs and regulations and have good government contacts.

Routine imports are subject to 66 2/3 per cent duty plus 7 1/2 per cent surcharge. Capital goods such as construction equipment for Kainji Dam are not subject to duty.

CONSULTING REQUIREMENTS

Both NDA and ECN rely on consultants. Merz-McLellan, Newcastle, were the consultants on the first stage of Kainji and they are consultants for the hydro grid project and are also involved in rural electrification studies. J.H. Nichol, Toronto, is undertaking IBRD financed work for ECN. The merger study between NDA and ECN will be undertaken by a Canadian consultant under CIDA financing. The rural electrification study will be undertaken by a Canadian firm.

FINANCING

Capital developments have been financed by World Bank loans and foreign bilateral loans (or grants); local costs have been covered from own resources. Certain small

projects have been financed with Nigeria's foreign exchange reserves.

STANDARDS

British standards have usually been used but there is no objection to Canadian standards.

DEVELOPMENT PROGRAM

Current Capital Projects

NDA: Kainji Hydro Project — 12 units x 80 MW — 4 units now installed — dam and power station for ultimate capacity of 960 MW — also a major training program.

ECN: Main project is \$30 million transmission line financed by World Bank.

Gondola Project — pre-feasibility reconnaissance by Nedeco (Dutch) — anticipate at least eight years before any construction work would be started.

Future Planning — Planning developments will depend on results of merger of ECN and NDA. ECN is now responsible for all transmission under 330 kV, distribution and the operation of thermal generating stations. The NDA is responsible for the operation of the Kainji Dam and all transmission of 330 kV.

Stage II Kainji Hydro Project — fifth and sixth units and additional transmission work is scheduled for completion in 1974.

The generation available at the moment is adequate and the transmission and distribution systems are being studied.

MARKET FACTORS

Local Industry — small

Foreign Suppliers — Britain, U.S.A., Italy, Netherlands and Canada

MARKET PROMOTION

CIDA is directing considerable aid to the electrical generating industry in Nigeria which should provide Canadian suppliers access to the market. Canadian firms should also pay close attention to IBRD financed projects.

REPORTING POST

Commercial Secretary
Office of the High Commissioner for Canada
P.O. Box 851
Odunlami Street
Lagos, Nigeria

CABLE: CANADIAN
PHONE: 53630
TELEX: 21275 (DOMCAN LAGOS)

SOUTH AFRICA

MARKET DATA

Capital city	Pretoria (administrative) Cape Town (legislative)
Area	472,685 sq. mi.
Population (1960)	16,000,000
Language	— English and Afrikaans
Currency	Rand (Cdn \$1 = 0.69 Rand)
Telephones (1965)	1,058,702
Principal cities (Pop. 1960)	— Johannesburg 2,075,000 — Pretoria 422,590 — Cape Town 807,211

UTILITY ORGANIZATION

Electricity Supply Commission (ESCOM)
Escon Centre
Box 1091
Johannesburg, S.A.

ESCOM is an autonomous government agency responsible for generation, transmission, and distribution of electric energy throughout South Africa. ESCOM generates about 80 per cent of the Republic's total electricity. The remainder is provided by private and municipal organizations but these are rapidly losing their position to ESCOM.

OFFICIALS

General Manager — H. J. de Villers
Chief Engineer (Mechanical) — N. T. Van der Walt
Chief Engineer (Operations and Maintenance) — F. W. Sutterheim
Chief Engineer (Electrical) — Dr. N. Troost

PRESENT FACILITIES — 50 HERTZ

Total installed capacity — (1969) 6,344.65 MW (hydro 1.35 MW; steam thermal 6,341.3 MW; diesel 2.00 MW)

Maximum system peak — (1968) 30,843 GWH

Production — (1968) 33,061 GWH

Forecast annual production growth over next five years — 13.4 per cent

Number of customers — N/A

Transmission — 400 kV and 275 kV — 1,869.67 miles
165 kV and 33 kV — 11,882.87 miles
22 kV and lower — 18,593.62 miles

Service voltages — 200, 220, 220/380, 230/400, 1 and 3 phase

Underground — universal for central urban purposes — tendency towards high tension underground distribution

System control — load dispatching by direct verbal contact from central control — system load/frequency control is effected by governors on the individual generators for short time period and by verbal contact for a long time period. Operations are still conducted on a manual basis.

PROCUREMENT PROCEDURES

Tender documents incorporating specifications, conditions of tendering, conditions of contract, etc., are prepared by the Buying Control Engineer and issued only to those firms whose names appear on the lists of approved tenderers. Generally, only local firms are invited to quote, either as local manufacturers or suppliers or acting as agents for overseas suppliers. When a new firm submits an application, its name is placed on the relevant list, provided that ESCOM's engineers have approved the particular commodity or equipment which they can offer. Any foreign company bidding on a tender must have a local agent if it is to be successful. A joint venture with a local construction company when bidding for a construction contract is virtually essential to success.

A number of package contracts is awarded covering all phases except, in most instances, engineering.

A preference is granted to local suppliers over foreign competition in the following manner: if a local company can incorporate between 60 to 100 per cent local content into his equipment he receives a preference of up to 10 per cent depending on the exact percentage of local content.

In the tariff field, Canada is an MFN country. Britain often enjoys preferences on its electrical equipment.

CONSULTING REQUIREMENTS

ESCOM does not employ consultants for studies and surveys. It undertakes its own analysis, design, supervision, management and procurement, etc. Opportunities for Canadian consultants are virtually nil.

FINANCING

The Commission generates much of its own capital and obtains most of its capital requirements by public loan issues. Capital is also acquired from overseas by direct loans from foreign banks or banking consortia (EXIM Bank, Commonwealth Development Finance Company, IBRD, Swiss banks, Barclay's Bank).

STANDARDS

All ESCOM specifications are based on the BSS. On occasion, and providing of course that the supplier can prove the adequacy of its standards, ESCOM has also accepted NEMA, ASA and CSA. The South African Bureau of Standards is the national standards organization (Director General, SABS, Private Bag, Pretoria).

ENERGY RESOURCES

Abundant and relatively cheap reserves of bituminous coal provide approximately 85 per cent of the country's total energy needs. The total reserves of coal in South Africa are 80,000 million short tons.

DEVELOPMENT PROGRAM

Material and Equipment Requirements (Annual)

Wire and Cable — approximately Cdn \$14,350,000 to Cdn \$21,500,000.

Wooden Poles — approximately Cdn \$1,435,000 to Cdn \$2,150,000

Distribution

Transformers

up to 100 kVA — approximately Cdn \$12,800,000 to Cdn \$11,500,000

Large Power

and Distribution

Transformers 100

to 150,000 kVA — approximately Cdn \$12,800,000 to Cdn \$11,500,000

Switchgear — medium voltage switchgear up to 11 kV — approximately Cdn \$8,550,000 — 80 per cent of market in bulk oil or medium oil switchgear and remaining 20 per cent is airbreak switchgear

low voltage switchgear — approximately Cdn \$21,500,000 — fuse switch units, air circuit breakers, molded case circuit breakers, and isolators

CURRENT CAPITAL PROJECTS

- Grootvlei Power Station — 6 x 200 MW units, thermal, two units in operation, two units to be commissioned in 1971
- Hendrina Power Station (Transvaal) — 10 x 200 MW units, thermal, two units operative in 1970
- Hendrik Verwoerd Power Station (Hydro — Orange River) — 2 x 80 MW turbo-generators — operative in 1971
- Arnot Power Station (Transvaal) — 6 x 350 MW reheat turbo-generators — two units operative by 1971 — remaining four units to follow at yearly intervals

FUTURE PLANNING

- Planning is underway for two large thermal stations known as "XX" near Bethal and "YY". Their estimated cost will be R 250 million each
- In 1975, planned importation of power from the Cabora-Bassa scheme in Mozambique — 680 MW in 1975, 1070 MW in 1979 and 1479 MW from 1979 on
- A 700 kV DC transmission line from Cabora-Bassa to a terminal near Pretoria will have to be constructed
- Orange River Project — 300 MW
- Kunene River Project in Angola will also contribute power to ESCOM's system
- Atomic Power Station — Western Cape area — tender calls to be issued in late 1970, work to start in 1971, and operations to begin before 1978
- Oxbow Scheme in Lesotho is a potential source of hydro-electric power — ESCOM has agreed in principle to purchase power from the scheme if it is completed

MARKET FACTORS

Local Industry

The large local electrical equipment manufacturers are all affiliates of foreign companies. These companies are:

- a) English Electric — GEC-AEI Group
- b) South Wales together with the Brush Group of companies
- c) The continental suppliers — Siemens, AEG, Brown Boveri and ASEA
- d) GE (U.S.A.), together with certain of the French and Italian manufacturers, are fairly active

The English Electric — GEC-AEI Group, together with ASEA, are the biggest local electrical equipment

manufacturers. The companies which manufacture on a smaller scale are Siemens, Brown Boveri, Long-Brush and South Wales, etc.

Any company which wishes to compete with equipment already available (most power equipment) in South Africa from local manufacturers must be willing to either manufacture locally, enter in a joint venture, or produce under licence.

MARKET PROMOTION

Construction firms wishing to enter the power systems market will find extremely tough competition. In order to succeed they must work with a South African company. Consultants in power systems have very little opportunity in this market because most of the consulting work is done by ESCOM for ESCOM, the only major purchaser for electrical equipment and technology for the establishment of power systems in South Africa.

The most effective promotional technique for electrical equipment is to write to the Canadian Trade Commissioner in South Africa who can try to interest local manufacturers in the equipment offered. If local companies prove to be interested, correspondence can be exchanged between the Canadian company and its South African counterpart, followed eventually by mutual visits.

REPORTING POST

Canadian Government Trade Commissioner
P.O. Box 61619 Marshalltown
78 Fox Street
Johannesburg, S.A.

CABLE: CANADIAN
PHONE: 834-6521
TELEX: 7189 (43-7189 JH)

TANZANIA

MARKET DATA

Capital city	Dar es Salaam
Area	363,508 sq. mi.
Population (1967)	12,231,000
Language	Swahili (English is the language of business)
Currency	East African Shilling (20 Shs. = US \$2.80)
Principal cities (Pop. 1967)	— Dar es Salaam 272,000 — Zanzibar 60,000

UTILITY ORGANIZATIONS

Tanzania Electric Supply Company Limited — TANESCO
P.O. Box 9024
Dar es Salaam, Tanzania

TANESCO is a limited liability company wholly owned by the Government. It is the only licensed public electrical generating and distributing authority on the mainland of Tanzania. There is a separate system on the island of Zanzibar.

RELATED ORGANIZATIONS

Government Ministry of Commerce and Industries

OFFICIALS

General Manager — F. S. Batty

PRESENT FACILITIES — 50 HERTZ

Total installed capacity — (1968) 95.5 MW
(hydro 41.2 MW; internal combustion 51.3 MW)

Maximum system peak — (1968) 307 GWH

Production — (1969) 358 GWH

Forecast annual production growth over next five years — N/A

Number of customers — 42,141

Transmission — 132 kV — 365 KM
66 kV — 118 KM
33 kV — 940 KM
11 kV — 1,440 KM

Service voltages — 230, 230/400, 1 and 3 phase

PROCUREMENT PROCEDURES

Tender notices are announced in the Government Gazette, local and leading international newspapers.

CONSULTING REQUIREMENTS

- SWE of Sweden is the consultant for Great Ruaha Project.
- Shawinigan Engineering is consultant for Gonja Project.

FINANCING

Financing of capital projects has been obtained from IBRD and the Swedish International Development Authority. The Tanzanian Government has supplied capital for local costs.

STANDARDS

BSS are mostly employed for the low voltage system and international standards are accepted for the high voltage system.

ENERGY RESOURCES

Tanzania has large reserves of bituminous coal and its economical reserves are estimated at 180 million tons. There is large hydro potential on the Ruaha River.

DEVELOPMENT PROGRAM

Current Capital Projects

- Extension to Ubungo Power Station — 3 x 6.2 MW units, completion expected mid 1970.

Future Planning

- Great Ruaha Power Project ultimate capacity of 200 MW, planning phase now in progress, first stage consists of 30 MW diesel power plant, a hydroelectric plant of 2 x 50 MW and a 220 kV transmission line of 310 KM, Swedish Government and IBRD financing, final phase completion expected by 1983
- 33 kV transmission line, Lindi to Mtwara, Canadian aid financing
- Extension to power station in Mwanza, 3 MW thermal

MARKET FACTORS

Local Industry — None

Foreign Suppliers — No particular preference for foreign suppliers. Supplies in the past have been furnished mainly by British manufacturers.

REPORTING POST

Commercial Counsellor
Office of the High Commissioner for Canada
P.O. Box 3778
Industrial Promotion Services Building
Kimathi Street
Nairobi, Kenya

Cable: DOMCAN NAIROBI
Phone: 27426
Telex: 22198 (DOMCAN NRB)

UGANDA

MARKET DATA

Capital city	Kampala
Area	91,000 sq. mi.
Population (1966)	7,739,700
Language	Bantu
Currency	East African shilling (17.15 shillings = £ 1 Sterling)

Telephones (1965 including Tanzania)	39,000
Televisions	7,700
Principal cities (Pop. 1959)	— Kampala 46,735
	— Jinja 29,741

UTILITY ORGANIZATIONS

Uganda Electricity Board (UEB)
P.O. Box 7059
Kampala, Uganda

A Government agency, which operates a partially integrated system extending into Kenya.

OFFICIALS

Chief Engineer — A. P. N. Waligo
Secretary — J. L. Mukasa

PRESENT FACILITIES — 50 HERTZ

Total installed capacity — (1968) 132.6 MW (hydro 131.96 MW; diesel 0.64 MW)

Maximum system peak — (1968) 131.9 MW

Production — (1968) 658.5 GWH (one third sold to Kenya)

Number of customers — (1968) 55,368

Transmission — 132 and 66 kV — 614 route miles
33 and 11 kV — 3,163 route miles

Distribution — LV lines — 893 route miles

Service voltages — 240/415 V and 3 phase

Underground — 33 and 11 kV — 39 route miles
LV lines — 63 route miles

PROCUREMENT PROCEDURES

The Canadian Commercial Counsellor usually has receipt of tenders from the UEB's consulting engineers and these are then passed on to the Department of Industry, Trade and Commerce in Ottawa for subsequent transmission to industry. Language of correspondence is English.

Tenders are sent out by the UEB's consulting engineers: Sir Alexander Gibb & Partners and Kenendy & Donkin to interested firms, and to local embassies.

CONSULTING ENGINEERING

Consulting engineers are employed on all major generation and transmission projects, and the consultant's local representative and staff are accommodated in the Board's head office. The UEB's consultants are Messrs. Kennedy & Donkin, Sir Alexander Gibb & Partners.

FINANCING

IBRD loans have been sought and successfully obtained by Uganda in financing its future projects. Loans have also been obtained from the British Government. The UEB intends to self-finance portions of future projects.

STANDARDS

BSS standards are followed.

ENERGY RESOURCES

No known coal reserves or petroleum reserves. Hydro is at present the only source of primary energy and the total hydro potential is estimated to lie within a range of 3000 to 15,000 MW.

DEVELOPMENT PROGRAM

Current Capital Projects — Reinforcement of 132 kV line (Soroti to Lira). Commissioning in 1971.

Future Planning — Murchison Falls Hydroelectric Project:
Stage 1 — temporary dam, intake, underground powerhouse tunnel and initial 150 MW plant, to be completed in 1976 at cost of 21 million pounds.

Stage II — construction of dam to replace temporary one.

Six subsequent stages — further installation of units will give a total of 600 MW.

Outside financing has been sought for Stages I and II and the UEB's own resources will be employed for subsequent stages. Project to be completed over 18 years.

MARKET FACTORS

Local Industry — very little

Foreign Suppliers — primarily Britain

REPORTING POST

Commercial Counsellor
Office of the High Commissioner for Canada
P.O. Box 3778
Industrial Promotion Services Building
Kimathi Street
Nairobi, Kenya

CABLE: DOMCAN Nairobi
PHONE: 27426
TELEX: 22198 (DOMCAN NRB)

CARIBBEAN

The Caribbean countries and the Bahama Islands are expanding their economies at a surprising rate. One major cause is the large influx of tourists which has placed a great demand on offered services and facilities such as hotels, airports, harbors and utility services. Thus the electric power utilities of the various countries must keep ahead of the growing load demand on their individual systems.

Generating plants are mostly diesel, or steam with fuel oil fired boilers for which fuel has to be imported.

Canadian firms will have little difficulty in meeting technical standards and specifications since they are based on British and North American standards.

In view of the trend towards North American equipment, Canada should be able to step up its exports in the field of power generating equipment.

BAHAMAS

MARKET DATA

Capital city	Nassau
Area	5,386 sq. mi. (approx.)
Population (1967)	145,896
Language	English
Currency	Sterling (the unit is the Bahamian dollar)
Telephones (1968)	— 31,520

UTILITY ORGANIZATIONS

Freeport Power Company (FPC)
P.O. Box 888
Freeport, Grand Bahama Island

FPC owned by the Grand Bahama Port Authority Ltd. It supplies electricity to the Freeport area and to other distributors who serve western section of Grand Bahama Island

Bahamas Electricity Corporation (BEC)
P.O. Box PMB 10
Nassau, New Providence Island

BEC is a Crown Corporation responsible to the Ministry of Works. The General Manager and the Permanent Secretary usually concur on the steps to be taken for the proper management and expansion of the Corporation. The Board of Directors (political appointees) have final say and can exert pressure on the Permanent Secretary.

RELATED ORGANIZATION

A. K. Wright
Permanent Secretary
Ministry of Works
P.O. Box 156
Nassau, Bahamas

OFFICIALS

FPC: President — Robert Ball
Purchasing Agent — John D. Byrd

BEC: General Manager — R. G. Broomfield
Chairman of the Board — Jim Shepherd

PRESENT FACILITIES — 60 HERTZ

FPC:

Total installed capacity — (1969) 59.5 MW (diesel and steam)

Maximum system peak — (1968) 41.1 MW

Production — (1969) 122 GWH

Forecast annual production growth over next five years — 35 per cent

Number of customers — (1969) 6,829

Transmission — 69 kV

Distribution — 12.5 kV (all underground)

Service voltages — 120/240, 115/200, 1 and 3 phase

System control — station is provided with automatic frequency control equipment

BEC:

Total installed capacity — (1969) 54.7 MW (diesel 40 MW; steam turbine 14.7 MW)

Maximum system peak — (1969) 48.9 MW

Production — (1968) 214.99 GWH

Forecast annual production growth over next five years — 19 per cent

Number of Customers — (1968) 22,389

Transmission — 33 kV

Distribution — 11, 7.2 and 2.4 kV

Service voltages — 120/240, 115/200, 1 and 3 phase

Underground — considering underground 66 kV transmission line

System control — very unsophisticated — much unplanned switching takes place

PROCUREMENT PROCEDURES

FPC management and staff are very experienced in the field of power. They rely on their background and a short list of companies, such as International General Electric and Mitsubishi, to bid on their projects. No preference is expressed for purchases of equipment from locally represented firms.

No set procurement procedures have been enforced by BEC but the selection and purchasing of units take place as a result of solicitation by individual firms, never through international tendering. The appointment of a local agent is often requested. There seems to be a general preference for turnkey projects.

All equipment comes in duty-free.

CONSULTING REQUIREMENTS

FPC have "an excellent U.S. consultant."

BEC always employs foreign consultants to undertake feasibility studies, power surveys, power system studies, project designs and the supervision in the implementation of projects. Consultants working with BEC are:

E.M. Warburg Inc. — New York, financial consultants

Acres International — Bahamas — technical consultants (hired by Warburg)

Frederick R. Harris — New York — planning consultants

FINANCING

FPC has been self-financing its expansion program. There would appear to be an interest in studying proposals for turnkey projects with EDC financing.

BEC capital projects have been financed by EXIM or by the Export Credit Guarantee Dept. (Britain). The Bahamas are not eligible for any form of Canadian aid.

STANDARDS

Both North American and British standards are written and accepted by FPC and BEC.

ENERGY RESOURCES

FPC and BEC are totally dependent on imported fuel, and oil is the only fuel used.

DEVELOPMENT PROGRAM

Material and Equipment Requirement — FPC uses catalogues for material purchase. They are not bound to any source and will buy the material needed from the source which seems to offer the best terms (price, delivery) for a standard quality.

Current Capital Projects

- FPC:
1. 20 MW turbine generator from International G.E. for commissioning by July 1970, FPC financing
 2. 40 MW steam generating plant, Mitsubishi (Japan), operational mid 1971, turnkey project of US \$6 million, Mitsubishi provides financing.
- BEC:
1. 2 x 4.3 MW generators, Fairbanks Morse International, operational early 1970, financing by EXIM.
 2. 13.5 MW gas turbine unit, Brown Boveri (Switzerland), operational summer 1970, option for a second unit within twelve months, financing by Corporation from Government loan.
 3. 2 x 14.4 MW gas turbine generators, John Brown Eng. (Scotland).

Future Planning

- FPC:
1. 40 MW gas turbine generator, commissioning mid 1973.
 2. 40 MW steam turbine generator, similar to Mitsubishi's, planned for 1973, outside financing (EXIM, EDC) contemplated.
- BEC:
1. Immediate requirement for consultants to design and build steam power station, 2 x 20 or 2 x 30 MW, outside financing required, "turnkey" projects will be well considered, also long term planning for Corporation.
 2. Two 33 kV submarine cables to Paradise Island augmented by a third 33 kV.
 3. Two 66 kV overhead lines should be installed between Clifton Pier switching site and the Big Pond/Soldier area.
 4. Re-inforcing power transmission system estimated US \$22 million over the next 10 years.

MARKET FACTORS

Local Industry

Phillips Cable Ltd. — subsidiary of British Insulated Cable

Celco Ltd.

Univex (Bermuda) Ltd. — subsidiary of Federal Pacific of Toronto, manufacturers of switching equipment

Foreign Suppliers — The main advantage of the U.S. firm is the proximity of the market. U.S. companies are also more persistent generally than their Canadian counterparts in soliciting business. As the Bahamas is still a colony of Britain, English suppliers benefit from direct access to top Bahamian civil servants who are also British. The situation however is changing: the BEC and the country as a whole are becoming more oriented toward North America.

MARKET PROMOTION

FPC — To compete successfully with firms of the size of Mitsubishi or IGE, it is necessary to provide financing arrangements. Decisions at the FPC are not dictated by political considerations — delivery, availability of servicing, price, sales terms in general are of prime importance. It is also important to bear in mind that the approach should not be made one year or so before the contract is awarded; the company likes to know two or three years in advance where they are heading and what the next step will be.

BEC — The quality of the product or service sold to BEC is important, but the first impact is made by personal contact. The Chairman, Minister, or Board must first be impressed with the seller as well as the product. The appointment of a local agent "acceptable" to the Corporation is also vital. Continued representation as a reminder of the first approach will be necessary. (It is worth noting that both the Chairman and the Minister have to sign a contract otherwise it can be challenged under Bahamian legislation.)

REPORTING POST:

Commercial Secretary
Office of the High Commissioner for Canada
P.O. Box 1500
Tobago Road
Corner Trafalgar Road and Knutsford Boulevard,
Kingston 10, Jamaica

CABLE: CANADIAN
PHONE: 65726
TELEX: KGN 30 (BEAVER KINGSTON)

BARBADOS

MARKET DATA

Capital city	Bridgetown
Area	166 sq. mi.
Population (1966)	245,000
Language	English
Currency	West Indies Dollar (US \$1 = WI \$1.71)
Telephones (1968)	22,159
Televisions (1968)	15,000
Principal city	Bridgetown (Pop. 94,000)

UTILITY ORGANIZATIONS

The Barbados Light and Power Company Ltd. (BL & P)
Garrison Hill, St. Michael
Barbados, West Indies

BL & P is a business managed, investor owned public utility company responsible for the generation and distribution of electricity throughout the Island of Barbados.

OFFICIALS

General Manager — J. H. Nelson

Major engineering and purchasing is usually done by C.I. Power Company (Montreal).

PRESENT FACILITIES — 50 HERTZ

Total installed capacity — (1970) 40 MW (steam thermal 5 MW; diesel 35 MW)

Maximum system peak — (1969) 24.4 MW

Production — (1969) 132 GWH

Forecast average annual production growth over the next five years — 15 per cent

Number of customers (1969) — 40,249

Transmission — 24.9 kV — 12 miles

Distribution — 11 kV, 3.3 kV

Service voltages — 115/230, 115/200, 1 and 3 phase

Underground — little use as yet

System control — supervisory control room operator — manual control

PROCUREMENT PROCEDURES

Tenders are called by C.I. Power Company in English.

Most electrical apparatus imported from Canada is subject to 12 per cent duty. Barbados also lies within the Commonwealth structure.

CONSULTING REQUIREMENTS

Consulting engineering is normally done by C.I. Power Services.

FINANCING

Reinvestment of retained earnings, bank loans and sale of stock.

STANDARDS

North American technical standards are acceptable. There are no material electrical standards and IEE regulations are used.

ENERGY RESOURCES

There are only small deposits of natural gas and petroleum. There is a local refinery which is dependent on imported crude.

DEVELOPMENT PROGRAM

Material and Equipment Requirements — Annual requirements are approximately 7,000 poles imported from Guyana; approximately 7,000 kVA of distribution transformers from Japan, Canada or U.S.A. with Japanese preferred for quality and price; single phase meters, 2,000 from Japan and 2,000 from U.S.A., and all other types from Canada; hardware and switchgear mainly from Canada and U.S.A.; wire mainly from Venezuela; and cable from Britain.

Current Capital Projects — For the Spring Gardens station, two 4,600 KW Minless Diesel Generators are on order from Hawker Siddeley in Britain. Completion scheduled for July 1, 1971. Tenders have been invited for one 20-30 MW steam turbine generator for completion July 1, 1973, with similar additional unit for July 1, 1974. Approximately \$800,000 E.C. has been allocated for line extensions and reconstruction throughout the Island.

Future Planning — Generation and line construction has been planned to cater for anticipated load increase of approximately 15 per cent per annum with load increases concentrated on South and West Coasts and in Bridgetown.

MARKET FACTORS

Local Industry — No local electrical manufacturers

Foreign Suppliers — No predominant foreign supplier.

MARKET PROMOTION

Canadian firms should keep C.I. Power Services informed of their products.

REPORTING POST:

Commercial Counsellor
Office of the High Commissioner for Canada
P.O. Box 1246
Colonial Building
72 South Quay
Port-of-Spain, Trinidad

CABLE: CANADIAN
PHONE: 34787
TELEX: 226 (DOMCAN POS226)

JAMAICA

MARKET DATA

Capital city	Kingston
Area	4,411 sq. mi.
Population (1969)	1,609,814
Language	English
Currency	Pound (0.4 = US \$1)
Telephones (1968)	56,709
Televisions (1969)	46,000
Principal city	Kingston (Pop. 419,416)

UTILITY ORGANIZATION

Jamaica Public Service Co. Ltd. (JPS)
151 Orange Street
Kingston, Jamaica

JPS is a private company controlled by American interests. Two Jamaican families also have "significant" participation in the firm. It is the sole supplier of public electricity in Jamaica.

RELATED ORGANIZATION

Public Utility Commission (PUC)
2 Ardenne Road
Kingston 10, Jamaica

PUC answers to the Ministry of Public Utilities and has the authority to require observance and performance by the company of its obligation under the licence, particularly as regards rates, maintenance, safety, adequacy, efficiency, extensions of facilities and accounting methods.

OFFICIALS

President (JPS) — R. F. Carney
Purchasing Agent — J. P. Cooper, Stone & Webster Engineering Corp., Boston
Chairman (PUC) — O. Cox.

PRESENT FACILITIES — 50 HERTZ

Total installed capacity — (1969) 176.85 MW (steam turbine 111.5 MW; hydro 21.95 MW; diesel 11.4 MW; gas turbine 32.0 MW)

Maximum system peak — (1969) 117.6 MW

Production — (1968) 589 GWH

Forecast annual production growth over next five years — 14.1 per cent

Number of customers — (1968) 105,200

Transmission — 69 kV — 275 miles

Distribution — 4/6.9/11.9 kV

Service voltages — 110/220, 1 phase

System control — manual load dispatching, stations interlinked by VHF radio.

PROCUREMENT PROCEDURES

All major procurements are sent to international tenderers. Tender forms are drafted and issued by the company consultant (and part owner), Stone & Webster Engineering of Boston. Some procurements are also delegated to Stone & Webster's local associates, Warren Anderson, mainly in the field of transmission.

There is a marked trend towards turnkey projects. The awarding of a turnkey project to a foreign company usually implies this company will subcontract whatever it can to local firms.

Association with foreign firms is also usually requested when a local firm is awarded a sizeable contract for a JPS project.

JPS purchases come into the country duty free.

CONSULTING REQUIREMENTS

Corporately linked to a U.S. consulting firm:

Stone & Webster Engineering Corp.
255 Franklin Street
Boston, Mass, 02107
Attention: J. P. Cooper

The local associate of the U.S. firm is:

Warren Anderson & Associates
P.O. Box 186
Kingston 5, Jamaica
Attention: Kenneth R. Warren

The Public Utility Commission is advised by Martin & Bennett (Washington).

There is a possibility that a much needed study of electrical requirements in 10-15 years will be undertaken by the PUC.

FINANCING

IBRD loans are made available for the purchase of major equipment. EXIM (U.S.) and Export Credit Guarantee Dept. (Britain) also offer financing. The Royal Bank of Canada jointly with the Commonwealth Development Corporation financed the Cdn \$6.5 million conversion of the system to 50 hertz.

STANDARDS

ASA and CSA standards are accepted (and written) by the U.S. consultant.

ENERGY RESOURCES

The country relies entirely on imported fuel, coal, oil and natural gas. So far as is known, natural gas has not been decided upon as an economic fuel for Jamaica. Hydro-electric resources on the island are reported to be almost exhausted.

DEVELOPMENT PROGRAM

Current Capital Projects

A 60 MW steam turbine generator financed by IBRD for Old Harbour Power Station. Hitachi (Japan) was awarded tender for main units. Mitsubishi also had part of the contract (transformers). Commissioning date — 1970.

US \$16 million steam turbine unit (68.5 MW) awarded to G.E. as a turnkey project, financed by EXIM. Should be commissioned early in 1972.

Future Planning — No future plans have been published. Proposed study has been in the thinking stage by the PUC for the last two years.

MARKET FACTORS

Local Industry

UNIVEX (Jamaica) Ltd. — a subsidiary of Federal Pacific
Toronto — switchgear equipment

BICC (Caribbean) Ltd. — a subsidiary of BICC Britain —
produces wire and cable

Licensing and joint manufacturing is the trend in Jamaica, mainly since new opportunities for exports to other Caribbean countries have come about with the establishment of the Caribbean Free Trade Area (necessitates 50 per cent area content in finished product).

Foreign Suppliers — Major suppliers of power generating equipment are the following (decreasing order of importance, 1967): U.S., Britain, Canada, Italy, West Germany, Japan. The trend being more towards North American equipment, Canada should be able to step up its exports in this field.

MARKET PROMOTION

For engineering and construction projects local contacts are as important as a local agency. In every field Jamaican content or input is always scrutinized and can be an extremely decisive factor. This is why all firms, and JPS is no exception, try to maximize local participation in all their undertakings.

REPORTING POST:

Commercial Secretary
Office of the High Commissioner for Canada
P.O. Box 1500
Tobago Road
Corner Trafalgar Road and Knutsford Boulevard
Kingston 10, Jamaica

CABLE: CANADIAN

PHONE: 65726

TELEX: KGN 30 (BEAVER KINGSTON)

PUERTO RICO

MARKET DATA

Capital city	San Juan
Area	3,435 sq. mi.
Population	2,749,544
Language	Spanish (English is language of correspondence)
Currency	US Dollar
Telephones (1969)	282,000
Televisions (1968)	470,000

UTILITY ORGANIZATION(S)

Puerto Rico Water Resources Authority
G.P.O. Box 4267
San Juan, Puerto Rico 00936

PRWRA is an autonomous government agency responsible for generation, transmission and distribution of electric energy throughout the Island of Puerto Rico.

RELATED ORGANIZATION(S)

Government Development Bank for Puerto Rico

OFFICIALS

Executive Director — Felix Cordova Diaz
Chief Engineer — Renan Colon
General Manager — Javier Cuevas Benitex
(Services and Supply)
Head, Purchasing Division — Julio C. Muniz

PRESENT FACILITIES — 60 HERTZ

Total installed capacity — (1969) 1,261.8 MW (hydro 104.8 MW; steam thermal 1,157 MW)

Maximum system demand — (1969) 1,246 MW

Production — (1969) 6,115.4 GWH

Forecast annual installed capacity growth over next five years — 35% (exceeding normal growth of system)

Number of customers — 678,000

Transmission — 230 kV and 115 kV

Distribution — 13.2 kV

Service voltages — 120/240, 120/208, 480, 3 phase

Underground — submarine cable (11 miles — 38 kV)

System control — modern — 10 of 15 hydro plants are non-attended and fully automatic.

PROCUREMENT PROCEDURES

Since the Authority does not have access to neighbouring power sources, it maintains a firm policy of purchasing only from reliable suppliers who have proven service and product quality. Low bidders on tenders do not receive orders unless the quality of their products has already been approved by the Authority. It is strongly recommended that a firm take steps to be listed as an approved supplier with the Authority. Once approval is obtained, the Authority will automatically mail invitations to the firm to bid direct.

An agent is not essential but helpful.

Imports in Puerto Rico are subject to U.S. Customs regulations and U.S. exports to Puerto Rico enter on a duty-free basis.

CONSULTING REQUIREMENTS

Jackson and Moreland Division of United Engineers and Contractors Inc.

FINANCING

For many years, the Authority has followed a policy of initially financing the construction of facilities under its

Capital Improvement Program with short-term bank loans. From time to time, issues of revenue bonds are sold for the repayment of such loans and for the continuance of construction.

STANDARDS

The Authority uses ASA and NEMA standards. CSA standards are acceptable.

ENERGY RESOURCES

Crude oil is imported mainly from Venezuela and is processed at the Corco and the Caribbean Gulf Refineries.

DEVELOPMENT PROGRAM

Annual Material and Equipment Requirements

- Pole line hardware
- Utility poles and cross ties — \$50,000 annually

Current Capital Projects

South Coast Steam Plant (Ponce) — addition of 2 x 410 MW units — in service August 71 and April 72 respectively

Future Planning

Steam plant (Acquire) design stage — 2 x 450 MW units — in service January 73 and January 74 respectively

Five additional 40 MW gas turbine generators will be installed throughout the system as follows: two in 1971, two in 1972, and one in 1973.

MARKET FACTORS

Local Industry — electrical power equipment to date is small.

Foreign Suppliers — the major suppliers of electrical equipment are U.S.A., Britain and Japan.

MARKET PROMOTION

Canadian firms interested in doing business with the Authority should take steps to be listed as approved suppliers with the Authority. It is recommended that interested firms contact Julio C. Muniz, Head of Purchasing Division, PRWRA, GPO Box 4267, San Juan, P.R. 00936, enclosing the following information:

- 1) brief history or background information of firm and data on projects with which previously involved
- 2) An indication of specifications used by the firm
- 3) Descriptive literature with specifications
- 4) A request that interested firm be included in future bid invitations issued by PRWRA.

REPORTING POST:

Consul and Trade Commissioner
Canadian Consulate
1606 Pan Am Building,
Hato Rey, Puerto Rico 00917

PHONE 764-2011 (Area Code 809)
TELEX 3450297 (Canada 3450297)

TRINIDAD AND TOBAGO

MARKET DATA

Capital city	Port of Spain
Area	1,980 sq. mi.
Population	994,850 (1966)
Language	English
Currency	T & T Dollar (1.85 = Cdn \$1)
Telephones	47,949 (1968)
Televisions	43,000 (1969)
Principal city	Port of Spain (Pop. 94,954)

UTILITY ORGANIZATION(S)

Trinidad & Tobago Electricity Commission
63 Frederick Street
Port of Spain
Trinidad, W. I.

A statutory board appointed by government; responsible for the generation, transmission and distribution of electrical energy in an economical, reliable and safe manner, throughout Trinidad and Tobago.

General Manager — Ing. Karl F. Seheult
Engineering Controller — Ing. George D.A. Ford
Chief Engineer — Ing. E.J. Guevara
Purchasing Officer — A.V. Pereira

PRESENT FACILITIES — 60 HERTZ

Total installed capacity — (1970) 279 MW; (steam 255 MW; diesel 4 MW; gas turbine 20 MW)

Maximum system peak — (1969) 146 MW

Production — (1969) 892 GWH

Forecast annual production growth over next five years — 5.8%

Number of customers — (1969) 150,000 (growth 6,000 per year)

Transmission — 132/66/33 kV — 45/185/245 miles

Distribution — 11/4/2.3 kV

Service voltages — 115/230, 230/400, 1 and 3 phase

Underground — 33 kV 3 miles, growth tendency in street lighting and residential underground service

System control — complete supervisory control system controls the generation and load dispatching of the entire system

PROCUREMENT PROCEDURES

Contracts under TT \$180,000 locally advertised and contracts awarded by Commission's Board (up to TT \$15,000) or Tender's Committee. More than TT \$180,000 tenders advertised locally and/or internationally and contracts awarded by the Tender's Board. Up to 15 per cent local supply preference.

T & TEC is exempt from import duty — however, it is subject to import licensing like any other importer. Canadian products are not discriminated against (or preferred) relative to other supplying countries.

The Commission uses package contracts where feasible as was the case in the recent 80 MW extension to the "B" Power Station, Port of Spain.

It is not necessary to have a local agent.

CONSULTING REQUIREMENTS

The Commission's staff undertakes feasibility, market analysis, power system and planning studies in addition to routine project design, supervision and construction and project management. Local consultants are retained for major civil engineering works. If a new power station is to be built, as is quite likely in the near future, the services of a consulting engineering firm would probably be required. Affiliation with a local firm of consultants is preferred to a local branch office, and could be now considered a must.

FINANCING

In the past it has been possible to finance consulting and construction services from the Commission's funds. The current rural electrification program is being assisted by a CIDA loan for Canadian equipment and materials.

The continuing electricity development program is being partially financed by a World Bank loan. For large generating equipment suppliers' credit has been received. While it will not be requested, this plays a major role in the award of important contracts.

STANDARDS

British Standards Specifications (BSS) are employed in writing specifications for equipment and construction

contracts. Standards of major industrialized countries such as NEMA, ASA, IEEE, CSA and DIN are acceptable provided they are equivalent to or better than the BSS specifications. In cases where the tenderer quotes on a basis other than BSS, he is to state the standard, as well as supply a copy of the relevant specification.

ENERGY RESOURCES

With adequate proven reserves of petroleum and natural gas, T & TEC will continue to depend on fossil fuels for the operation of its generating plants.

DEVELOPMENT PROGRAM

Current Capital Projects — With financial assistance from an existing World Bank loan, contracts were to be awarded in 1970 to a local contractor for the construction of a 30 mile double circuit 66 kV transmission line (total estimated cost TT \$1.5 million).

Future Planning — Studies are being carried out by Commission staff on generation expansion to 1980. Tenders were expected to be called late 1970 for a new steam plant (capacity and location to be determined) for operation late 1973. Cost has been estimated at TT \$15 million, to be largely financed by suppliers' credit. The recent 80 MW steam plant supplied from the U.S.A. was partly financed by an EXIM Bank loan with terms of 15 years including three years grace.

MARKET FACTORS

Local Industry — At present there is virtually no local manufacturing of industrial or utility electrical equipment. A new firm, Electrical Industries Ltd., is expected to come into operation this year and it will have pioneer status for the manufacture of insulated wire and cables (up to 1100 V), switchgear (up to 12 kV) and other electrical equipment. Two local companies and their principals, GEC/AEI Ltd. (Britain) and A. Reyrolle & Co. Ltd. (Britain), are behind this venture. Import quotas on products are to be established soon.

The availability of a galvanizing plant to be established this year in conjunction with a steel mill will provide a source for greater local content in the panel-board and switchgear manufacturing operations of Electrical Industries Ltd. It will also make possible the fabrication of steel towers and pole-line hardware.

Foreign Suppliers — The U.S.A. and England are the two major competitors for generation equipment. Other electrical and related equipment suppliers are from the U.K., Japan, India, West Germany, Switzerland, France and the U.S.A. The major factors contributing to success are

price and credit terms — the latter particularly with regard to generation equipment. Quality is understood to be in accordance with specifications stipulated by T & TEC.

MARKET PROMOTION

The fact that BSS are traditional and the accepted norm poses a basic problem for Canadian manufacturers seeking greater penetration of the Trinidad power systems market. Recently, however, Canadian standards have become recognized and accepted where equivalent to or better than the BSS called for on tender documents. Nevertheless, there are some items — for example, guy-wires and other pole-line hardware — that are acceptable only when made to BSS. This is because of inventory and maintenance problems which could be created by the stocking of products and materials made to other standards.

Securing a greater share of this market for standard electrical equipment is purely a matter of economics, and unless Canadian industry can quote competitively, any promotional measure or technique undertaken at this time would not be worthwhile. With regard to equipment for generation extension and supervisory control, the T & TEC recognizes its value, and procures such equipment as and when needed by an expanding system and availability of funds. It is in this field that supplier credit facilities are most important and promotional techniques or measures helpful.

Exposing T & TEC's engineers and technicians to Canadian equipment in Canadian surroundings and giving them training in instrument controls and electrical and mechanical maintenance could be one way of securing a greater share of this business. Such training and exposure could be for a period of two or three months for key engineers and technicians and could be stretched over a period of, say, two or even three years.

REPORTING POST:

Commercial Counsellor
Office of the High Commissioner for Canada
P.O. Box 1246, Colonial Building
72 South Quay
Port of Spain, Trinidad

CABLE: CANADIAN
PHONE: 34787
TELEX: 226 (DOMCAN POS 226)

EUROPE

One of the major constraints on Canadian manufacturers seeking to penetrate the European power systems market is standards — BSS, VDE and UTE being the accepted norms. While price considerations are important, most European countries stress quality. The existence of the European Common Market and the proximity of leading international manufacturers are other factors with which Canadian manufacturers must contend.

Local offices, representations, personal visits, service facilities and technical assistance are all useful aids to obtaining business in Europe but are definitely supplementary to competitive prices and attractive financing terms.

GREECE

MARKET DATA

Capital city	Athens
Area	50,944 sq. mi.
Population (1961)	8,388,550
Language	Greek (English and French spoken by business community)
Currency	Drachma (Cdn \$1 = 29.07 drs)
Telephones	500,000
Principal cities (Pop. 1961)	— Athens 1,852,709 — Salonika 378,444

UTILITY ORGANIZATION(S)

Greek Public Power Corporation (PPC)
30 Halkokondyli Street
Athens

The PPC is an autonomous state agency responsible for the generation, transmission and distribution of electric power throughout the mainland and islands of Greece.

RELATED ORGANIZATIONS

The PPC is responsible to the Ministry of Industry which exercises direct control over PPC activities. The Ministry of Co-ordination, the most influential and important Ministry in the Government, has the final say in the approval of PPC investment projects.

PPC OFFICIALS

Governor — V.N. Kardamakis
Director, Directorate of Programming (Technical — Financial) —
Chr. Andreadis
Director, Directorate of Procurements — N. Kadaris

PRESENT FACILITIES — 50 HERTZ

Total installed capacity — (1968) 1,714 MW (hydro 1,011 MW; steam thermal 703 MW; capacity of independent stations 99 MW)

Maximum system peak — (1968) 1,530 MW

Production — (1968) 7,340 GWH

Forecast annual production over next five years — 15 per cent

Number of customers — (1968) 2,443,705

Transmission — 150 kV and 66 kV — 178.7 KM
15 kV — 25,268 KM
low voltage — 28,698 KM

Service voltages — 110/220, 127/220, 220/380, 1 and 3 phase

Underground — trend in urban centres towards complete underground facilities

System control — telephone and power line carrier communication — studying installation of a national load despatch centre.

PROCUREMENT PROCEDURES

All purchases in excess of US \$166 must be made through public call for tenders, although exceptions are made occasionally and orders placed directly with suppliers who have been successful in previous transactions. Tender specifications are drawn up by the appropriate technical divisions of the PPC, the payment terms by the Finance Directorate, and the commercial terms by the Procurement Directorate which publishes calls for tenders in both the Greek Government Gazette and the daily trade and financial papers. Tender documents are made available to interested suppliers and their agents in either Greek or English. Successful bidders are usually required to exchange the Participation Guarantee (2 per cent) for a 10 per cent Good Performance Bond or Bank Letter of Guarantee.

Certain items of machinery and supplies are restricted to domestic suppliers, while on all tenders put out to international bidding Greek industry enjoys a 30-35 per cent tolerance.

The appointment of a local agent is not obligatory but an agent's familiarity with local conditions can be extremely useful.

Greece is an associate member of the European Economic Community and accords a more favourable rate to imports from member countries. The Soviet Union enjoys a 50 per cent reduced customs duty on a range of imports. However, imports of equipment and material destined for state

agencies are exempt from all customs duties and other miscellaneous taxes and charges.

CONSULTING REQUIREMENTS

Notwithstanding PPC's growing capabilities, foreign consultants in addition to EBASCO (PPC's former consultants), have been, are being, and undoubtedly will continue to be engaged for specific projects considered to be beyond the competence of PPC's own engineers. Foreign expertise is required for feasibility studies, preliminary reports, design engineering and construction supervision.

FINANCING

The trend in recent years has been for the PPC to award contracts for consulting engineering and construction services and equipment procurement to those foreign firms who have been able to offer attractive means of financing, in the form of government grants in aid or long term loans or government guaranteed commercial bank credits. Bilateral clearing and barter arrangements are other mediums used to assist Greece in obtaining capital equipment.

Credit financing terms negotiated with the French government, the Banque Nationale de Paris and the Banque Française de Commerce were as follows: Ff 200 million bank loan for 10 years at 5.74 per cent annual interest with a grace period of three to five years, and a French government Ff 25 million loan for 15 years at 3.5 per cent annual interest. Credit negotiated with a consortium of German Banks came to US \$18 million for 12 years at 7 per cent annual interest. EDC has given the PPC credit of up to Cdn \$3.1 million for 15 years at 6.5 per cent to cover hydro power resources study to be carried out by Canadian consultants from Montreal.

STANDARDS

All North American standards and guides including those published by NEMA, ASA, IEEE and CSA are known and used. German and British specifications are also used.

ENERGY RESOURCES

The economical exploitable hydraulic energy potential has been estimated at 21 billion KWH annually, of which only 3 billion KWH are being utilized at present. There exist 4 billion cubic meters of proven peat reserves and 1,950 million tons of proven reserves of lignite.

DEVELOPMENT PROGRAM

Material and Equipment Requirements: The following major items may be acquired through international calls for bids this year by state agencies:

	Value in thousand drachmas
Copper transmission cables	62,880
Copper steel alloy wire	72,000
Steel cable	4,615
Metal distribution panels	
30 kV and above	22,000
Tension modulators	4,000
Rectifying devices	836,500
Fuses	8,870
Safety contact breakers	10,830
Accumulators	76,530

Control equipment, distribution transformers and lightning arresters are obtained from abroad. Some oil filled copper cable is imported, as well as some copper conductors. Most requirements for 150 kV transmission line equipment are supplied by domestic industry, while relays and connectors are obtained from abroad.

Current Capital Projects

- Ptolemais No. IV Unit (Macedonia) — 300 MW lignite fired, contracts awarded, French Government Bank financing, cost US \$35 million, completion December 1972.
- Polyphyton (Aliakmon River, Macedonia) — 3x120 MW units, hydro, contracts awarded on first unit, French Government/banks/supplier credit financing, cost US \$17.5 million, completion early 1973, feasibility report done on next two units, one scheduled for late 1973 and the other for 1975.
- Kardia I (near Ptolemais) — 300 MW lignite fired unit, commissioning date late 1976, three year job, contract should be awarded 1972/73.
- Pournari Hydro Project — 3x75 MW units, commissioning date early 1976, four year job, contract should be awarded 1972.
- Pallalona Hydro Project — 100 MW unit, contract for studies (geological and preliminary design) awarded, projected commissioning date 1977.
- Lavrion II — 2x150 MW oil fired units, contracts awarded, French Government/banks/supplier credit financing, cost US \$25.5 million, scheduled completion 1973.
- St. George IX — 200 MW oil fired unit, contracts awarded to TECHNOPROM (Moscow), financing by

barter deal, cost US \$15.5 million, completion December 1970.

- Lavrion I — 150 MW thermal plant, contracts awarded, scheduled completion middle 1971.
- Lavrion Nuclear Reactor 400-450 MW — Britain possibly will supply heavy water enriched uranium reactor but there are uncertainties.
- Mikri Santi and Asomata H.E. Project — geological studies and preliminary design of 180 MW and 50 MW units, projected commissioning 1977, part of hydro studies awarded to Portuguese/Spanish group COBA-CONSULPREJA.
- Megalopolis — 2x125 MW lignite fired plant, operational in late 1970.
- Transmission projects:
 - Ptolemais — Salonika — 380 kV — 212 KM
 - Lavrion — Pallini — 380 kV — 37 KMContracts awarded to SAE of Italy. Total cost of projects will be \$9 million (\$4 million for material from Greek industries).
- Industrial complex by Aristotle Onassis, aluminum plant, oil refinery and thermal power station, 3 x 360 MW units. The PPC will prepare specifications and call tenders for electric power plant.

MARKET FACTORS

Local Industry — There are no Greek manufacturers of power plant equipment — generators, turbines, penstock gates and valves, boilers, etc. However, certain items of distribution (cable, fittings, distribution transformers, contacts, fuses) and transmission equipment and hardware, including steel towers and 150 kV cable, are manufactured by domestic industry. Conduit, copper and aluminum conductor cables of all types, power transformers, distribution panels and circuit breakers are also manufactured locally.

Foreign Suppliers — The engineering and equipment for all major power projects in Greece since the formation of PPC in 1951 has been supplied from West Germany, France, Italy, Austria, U.S.A, Soviet Union and other Eastern bloc countries. These countries have been successful due mainly to competitive prices and attractive financing terms.

MARKET PROMOTION

Although not obligatory or absolutely essential, it is definitely useful and advisable for Canadian equipment manufacturers to appoint Greek agents to represent their interests and keep them fully advised of upcoming requirements.

As far as Canadian consulting engineers and construction firms are concerned, it is definitely to their advantage to establish branch offices in Athens or form associations with Greek engineering and construction firms in order to obtain worthwhile contracts under the electric power development program of the PPC.

Local offices, representations, service facilities and technical assistance are all useful aids to obtaining business but are definitely supplementary to competitive prices and attractive financing terms.

REPORTING POST

Commercial Secretary
Canadian Embassy
31 Vassilissis Sophias Avenue
Athens 138, Greece

CABLE: CANADIAN ATHENS 5584

PHONE: 714-041

TELEX: 5584 (215584 DOM GR)

ICELAND

MARKET DATA

Capital city	Reykjavik
Area	39,702 sq. mi.
Population (1968)	202,200
Language	Icelandic
Currency	Krona (Cdn \$1 = 81.96 Kronas)
Principal city (Pop. 1968)	Reykjavik 105,000

UTILITY ORGANIZATION(S)

- (1) Orkustofun
(National Energy Authority)
Lougaveg 116
Reykjavik, Iceland

A Government organization whose main task is to study in general the hydro power and geothermal power resources of Iceland and to advise the Government in the power field.

- (2) Landsvirkjun
(The National Power Company)
Sudurlandsbraut 14
Reykjavik, Iceland

Owned 50 per cent by the state and 50 per cent by the city of Reykjavik. Main task to produce and transport electric power in southwestern Iceland where 70 per cent of the population lives.

(3) Laxarvirkjun
Akureyri, Iceland

Operates in northern Iceland with same function as Landsvirkjun. Owned 50 per cent by state and 50 per cent by town of Akureyri.

(4) Rafmagnsveita Reykjavíkur
Hofnarhusid
Reykjavik, Iceland

Owned by city of Reykjavik — distributes electricity to city.

(5) Rafmagnsveitur ríkisins
(State Electric Power Works)
Laugaveg 116
Reykjavik, Iceland.

Owned by the state. Distributes (and partly produces) electric power in rural and coastal areas.

OFFICIALS

President, Orkustofun, — Jakob Gíslason

General Manager, Landsvirkjun, — Eiríkur Briem

General Manager, Laxarvirkjun, — Knutur Otterstedt

General Manager, Rafmagnsveita Reykjavíkur, —
Adalsteinn Guðjohnsen

General Manager, Rafmagnsveitur ríkisins, — Valgard
Thoroddsen

RELATED ORGANIZATION(S)

Numerous small distribution companies, all municipally owned.

PRESENT FACILITIES — 50 HERTZ

Total installed capacity — (1969) 356 MW (hydro 248 MW; steam — stand by — 19 MW; geothermal steam 3 MW; diesel 51 MW; gas turbines — stand by — 35 MW)

Maximum system peak — (1968) 143 MW

Production — (1969) 910 GWH

Forecast annual production growth over next five years — 25 per cent

Transmission — 230 kV — 115 km
138 kV — 50 km
69 kV — 185 km
34.5 kV — 810 km

Distribution — 11 kV
6.6 kV (being phased out)

Service voltages — 220, 220/380, 1 and 3 phase

Underground — rapidly increasing

System control — various parts of country not yet inter-connected — system control is simple. Communication by telephone lines and power line carrier.

PROCUREMENT PROCEDURES

On routine equipment, the power and distribution works usually send simple specifications to local agents for foreign firms (mostly in Scandinavia, Britain, Germany, Belgium, Italy, Switzerland and France and, as regards cables and conductors, also some eastern countries).

Goods for capital projects are more carefully specified, often with the help of consultants, and the tenders are often sent, not only to local agents but also to firms (especially in Canada and the U.S.A.) without agents. However, Canadian and United States firms tend to charge prices that are too high.

As regards civil engineering works on bigger projects, joint ventures between local and foreign firms are common.

Turnkey projects are not common.

Power stations and main transmission equipment are mostly duty-free. All countries pay the same duty but, as Iceland is now a member of EFTA, this might change after two or three years.

CONSULTING REQUIREMENTS

There are several local consultants (civil engineering) in Iceland. At present two foreign firms operate in Iceland: Harza, Chicago, and Electrowatt, Zurich. Most of the work is concerned with hydro-power stations and transmission, and relates to design, specification, and supervision.

FINANCING

Power and transmission works are to a large extent financed by long-term bank and bond loans and in some cases suppliers' credits of up to 10 years. Distribution works, on the other hand, are practically all self-financed.

STANDARDS

In most cases, the standards of the delivery country. Specifications are often called for German, British and other standards with the words "or equal" added.

ENERGY RESOURCES

The total technically harnessable water power in Iceland is estimated at 35,000 GWH a year. Only 2 to 3 per cent

of this power has been developed as yet. Iceland has a high geothermal energy potential which is used for heating, power generation and industrial processes.

DEVELOPMENT PROGRAM

Current Capital Projects

(1) Burfell Project (SW Iceland) — 240 MW project is finished except for installation of 3 x 35 MW units (Toshiba, Japan). It included 230 kV transmission. Cost: US \$45.4 million. About two thirds of financing is foreign (World Bank and bonds).

(2) Laxa Project (Northern Iceland) — 50 MW project — built in stages. Tenders on civil works are opened and tenders on machines and equipment opened the middle of February 1970. No news on financing.

Future Planning — In the hope that more industries can be attracted, "Landsvirkjun" is now studying two 135 MW hydro sites and one 280 MW site. If and when built, heavy borrowing will be required. Twenty years and 7 per cent will be sought on at least 50 — 60 per cent of the financing.

MARKET FACTORS

Local Industry — There is practically no electrical manufacturing in Iceland.

Foreign Suppliers — The power and distribution works always seek offers in many European countries and lately also in Japan (U.S.A. and Canada are generally considered too expensive). Acceptance of a bid is based on price and quality only.

Technical assistance and service facilities are not too important.

MARKET PROMOTION

According to responsible people in the power and distribution works, the likelihood for purchases of goods and services from Canada is not great at the moment because Canadian prices are alleged to be too high. This allegation has not been substantiated, however, and it is felt that the first step should be for Canadian firms to seek agents in Iceland. Canadian long-term loans for capital projects would be a distinct asset in opening up this market.

REPORTING POST

Commercial Secretary
Canadian Embassy
Postuttak
Oslo 1, Norway

CABLE: CANADIAN

PHONE: 46.69.55

TELEX: Oslo 11880 (11880 DOMCAN)

IRELAND

MARKET DATA

Capital city	— Dublin
Area	27,136 sq. mi.
Population (1966)	2,884,002
Language	English
Currency	Irish Pound (= Pound Sterling)
Principal cities (Pop. 1966)	— Dublin, 760,000 — Cork 125,283 — Limerick 55,912

UTILITY ORGANIZATION(S)

Electricity Supply Board (ESB)
Lower Fitzwilliam Street
Dublin 2, Ireland

A national electricity supply organization, with members of the board and chairman appointed by a Minister of Government. It handles its own planning, construction, operation and maintenance of generation, transmission and distribution.

OFFICIALS

Chairman — T. Murray
Secretary — J.G. Gargan
Chief Engineer — A. Harkin
Chief Financial Officer — L.J. Barry

PRESENT FACILITIES — 50 HERTZ

Total installed capacity — (1968/9) 1,260 MW (hydro 219 MW; steam thermal 1041 MW)

Maximum system demand — (1968/9) 1050 MW

Production — (1968/9) 4749 GWH

Forecast annual production growth over next five years — 10 per cent

Number of customers — (1968/9) 765,000

Transmission — — 110 kV — 3060 KM
220 kV — 277 KM
110 kV — 120 KM growth/annum
220 kV — 460 KM construction and design

Distribution — 38 kV or 10 kV industrial
220/380, 1 and 3 phase

Underground — rapid changeover from overhead distribution to underground systems in residential estates

System control — from a load despatch office — information transmitted includes telemetering of generating station summated outputs, individual line loads and voltages, summated local loads, switch positions

		Value (£1,000s)	Source
O/H Conductor, etc.	9,000 KM	972	Ireland, Britain, Europe
Poles/masts	33,000	383	Ireland, Britain, Europe
Switchgear	5,000	142	U.S.A., Britain, Europe
Transformers	3,600	906	Ireland, Britain, Europe
U.G. Cable	450 KM	440	Britain, Europe
Meters	45,000	258	Ireland

PROCUREMENT PROCEDURES

Open inquiry to known suppliers (generally from three to 12 in number) depending on the equipment to be purchased. Joint ventures with local firms are encouraged when necessary. Local agents are not considered necessary. Packaged projects are not highly regarded — primarily on account of high cost.

No tariffs effectively protect the small number of local firms manufacturing electrical equipment, but preference is given to local manufacturers whose goods fully comply with specifications.

CONSULTING REQUIREMENTS

On capital projects, the Board's own staff carries out design; rarely are consultants employed, and then only in an advisory capacity or an inspection service. There would appear to be little opportunity for Canadian consultants on future work for the Board.

FINANCING

Originally capital came from repayable loans from the Government; subsequently ESB was permitted to raise capital by long-term loans from the public. In recent times ESB received a repayable loan from the World Bank. The Board has also raised capital from short-term loans from U.S.A., Switzerland and Germany. Some suppliers have given middle-term credits.

STANDARDS

BSS, VDE and IEC are the followed standards.

ENERGY RESOURCES

Hydro and peat resources have been fully developed. Balance ESB generating plant runs on oil. Part of this is imported.

DEVELOPMENT PROGRAM

Annual Material and Equipment Requirements

Current Capital Projects

Great Island Station — Unit 3 (120 MW) — contracts (oil fired) awarded — 1971/72 is completion date

Pigeon House "B" Station — 2 x 120 MW units, also 2 x 14 MW gas turbine contracts awarded — completion dates: Unit 1 and both gas turbines 1970-71; Unit 2 — 1971/72

Turlough Hill Pumped — Four 73 MW reversible pump-turbine/motor generator sets — completion date: 1973-74

Future Planning — The program for 1975 to 1978, which has been planned, has not yet been approved by the Board and cannot, at the moment, be made public.

MARKET FACTORS

Local Industry

Local	Foreign Associate	Product	Capacity
Unidare Ltd.	Diverse	Transformers, conductor cables, appliances	5 kVA-10 MVA
ACEC Ltd.	ACEC Belgium	Transformers,	Up to 30 MVA
EIE Ltd.	GEC England	Domestic appliances	
Siemens	Siemens Germany	Meters	
Ferranti	Ferranti England	Meters	
Ward & Goldstone (Ireland)	Ward & Goldstone (England)	Insulated cable wide range, Bakelite electrical accessories	
Driver Harris (Ireland)	Driver Harris (England)	Insulated cable	

Foreign Suppliers — Technical standards and cost are the only criteria used by the ESB in placing its business. A record of excellent service must be counted as a major contributory factor in the success of some of the suppliers. No special advantage is enjoyed by any international supplier.

MARKET PROMOTION

Canadian manufacturers, consultants and construction firms should make their services known, supported by all possible data, to the Commercial Counsellor for Canada in Ireland. Such information would then be placed in the hands of appropriate local sources for their further consideration.

REPORTING POST

Commercial Counsellor for Canada
66 Upper O'Connell Street
Dublin, Ireland

CABLE: CANADIAN
PHONE: 41577
TELEX: 5488 (DMCN EI)

PORTUGAL

MARKET DATA

Capital city	Lisbon
Area	35,340 sq. mi.
Population (1966)	9,490,000
Language	Portuguese
Currency	Escudo (Cdn \$1 = 26.7 escudos)
Televisions	two stations (reaching 98 per cent of pop.)
Principal city (Pop. 1966)	Lisbon 1,450,000

UTILITY ORGANIZATION(S)

The production and distribution of electric power is mainly in the hands of private companies. Local distribution in cities and towns is carried out by the municipalities in many cases.

The following are the more important producing companies:

Administração
Companhia Portuguesa de Electricidade, S.A.R.L.
Avenida Infante Santo 15
Lisbon.

This company is the outcome of the amalgamation of several companies with some 15 dams, two thermal support

stations and high voltage transmission lines covering more than three-quarters of the country.

Administração
Hidro-Eléctrica do Alto Alentejo, S.A.R.L.
Avenida Duque de Loulé 110
Lisbon

Producer and distributor

Administração
Empresa Hidro-Eléctrica de Serra de Estrela, S.A.R.L.
Avenida Sidonio Paris, 26-A
Lisbon 1

RELATED ORGANIZATION(S)

Direcção — Geral dos Serviços Eléctricos
(Direction — General of Electrical Services)

The Government co-ordinating and inspection organization for the production and distribution of hydraulic and thermal power.

Direcção — Geral dos Combustiveis
(Direction — General of Fuel)

Junta de Energia Nuclear
(Nuclear Energy Board)

Ministério da Economia
(Minister of Economy)

Secretaria de Estado da Industria
(Secretary of State for Industry)

OFFICIALS

It is not the custom in this country to address correspondence to individuals in companies.

PRESENT FACILITIES — 50 HERTZ

Total installed capacity — (1968) total 2,159.9 MW
(hydro 1,554.6 MW; thermal 605.3 MW)

Production — (1968) 6,215 GWH

Forecast annual production growth over next five years — 10.5 per cent

Number of customers — (1968) high tension 5,344; low tension 1,656,804

Transmission — up to 25 kV — 14,000 KM
From 25 to 50 kV — 6,150 KM
From 50 to 100 kV — 2,650 KM
Over 200 kV — 2,850 KM

Distribution — 220/380 V, 1, 2 and 3 phase

Underground — 2,300 KM. Tendency is to change over to underground distribution

System control — Planned and assembled by local firms, with foreign suppliers furnishing 60 per cent of equipment.

PROCUREMENT PROCEDURES

It is estimated that from 85 to 90 per cent of studies, projects, and construction works are executed by Portuguese firms.

Equipment purchases are made through local firms acting as agents. Occasionally, contacts are established direct with known foreign firms.

In connection with World Bank and IBRD loans, copies of tender calls are distributed to embassies and legations in Portugal of member countries of those organizations, for transmission to companies in their respective countries.

The Portuguese language is used in correspondence but most power producing companies can correspond in French and English.

All equipment originating from MFN (including Canada) is subject to minimum tariff. Duties are lower on equipment from EFTA member countries.

CONSULTING REQUIREMENTS

The hydroelectric companies and their thermal associates have their own planning services and engineers. The following Portuguese consulting engineering firms are best known:

Hidrotécnica Portuguesa — Consultores para Estudos e Projectors Lda.
Avenida Estadors Unidos da America 97-12
Lisbon

This company drew up the plans for the Cabora—Bassa in Mozambique, including dam, power station, transmission line, navigational system, irrigation, etc.

COBA — Consultores de Barragens e A aproveitamentos Hidraulicos Lda.
Avenida Marques Tomar 9 — 6
Lisbon

COBA's technicians often provide consulting and planning services abroad in countries such as Greece, Brazil, Sudan, Venezuela and Costa Rica.

FINANCING

In most cases, financing for the construction of large dams, power stations and transmission lines has been obtained on the internal market by Government guaranteed bonds, by the issue of shares and by loans from local banks.

When tenders are open to foreign firms, it is preferable to indicate the best possible credit terms.

STANDARDS

The Portuguese authorities accept as suitable NEMA, ASA, IEEE, and CSA, considering each case separately.

ENERGY RESOURCES

The electric power system in Portugal is essentially a hydroelectric one, the thermal stations playing only a supporting role. Some 60 per cent of the existing hydraulic resources are not yet developed and an increase in thermal production is contemplated.

DEVELOPMENT PROGRAM

Material and Equipment Requirement — Local procurement

Current Capital Projects

	MW	Cdn \$m	Completion
Corregado Thermal (3rd)	125	20.9 contracts awarded	1971
Villarinho das Furnas Hydro	100	24.9 contracts awarded	1971
Regua Hydro	150	52.4 contracts awarded	1972
Carregado Thermal (4th)	125	18.4 contracts awarded	1973
Fratel Hydro	75	32.5 contracts awarded	1973
Rio Maior Thermal	125	24.8 contracts awarded	1972/3
Crestuma Hydro	75	34.2 contracts awarded	1973/4

Several transmission line projects are being undertaken by Companhia Portuguesa de Electricidade for 150, 200 and 60 kV lines.

Future Planning — In 1973, when current projects are completed, future plans and projects will be known. However, 16 more dams and several power stations are planned on the Douro River. The concession has been granted to Companhia Portuguesa de Electricidade (CPE).

Similarly, dams and stations are planned on the Mondego River and on the Guadiana River.

Plans are being drawn up by CPE and the Nuclear Energy Board to construct nuclear power stations of 300 to 350 MW, possibly as a complement to the thermal power stations of Carregado and Rio Maior.

MARKET FACTORS

Local Industry — A very sophisticated local industry of power equipment and related materials exists in Portugal. Equipment for power stations — turbines, gates, transformers, alternators, etc. — is manufactured in Portugal under licence from Swiss, French and German firms. With regard to transmission lines, insulators, steel towers, substations, etc., plans are drawn up by one of the firms incorporated in the Companhia Portuguesa de Electricidade. There would appear to be opportunities for licensing or joint manufacturing agreements which can be investigated directly with the following firms:

Companhia Nacional de Electricidade, S.A.R.L.
Avenida Infante Santo 15
Lisbon

for power distribution, lines, poles and sub-stations;

Sorefame, S.A.R.L.
Venda Nova — Amadora

for turbines, alternators, outlet valves, sluice gates, etc.;

Construcoes Mecanicas MAGUE, S.A.R.L.
Alverca Do Ribatejo

for turbines, boilers, gantry cranes, hoists, sluice gates and outlet valves.

Foreign Suppliers — European countries, such as France, Germany, Belgium, Sweden, Switzerland and Britain.

MARKET PROMOTION

Contact with either of the foregoing consulting companies regarding future projects in Portugal and its overseas provinces, as well as in other countries, could be profitable, since foreign consulting engineers are often contracted.

Canadian manufacturers and consultants should supply the Commercial Division of the Canadian Embassy with literature for distribution to concessionaire companies, Portuguese consultants, constructors of dams, power stations and equipment. From time to time personal visits should be made by specialists to the foregoing companies.

REPORTING POST

Commercial Counsellor
Canadian Embassy
Rua Rosa Araujo 2-70
Seventh Floor
Lisbon 2, Portugal

CABLE: Canadian
PHONE: 56-25-49
TELEX: 377 (DOMCAN P)

SPAIN

MARKET DATA

Capital city	Madrid
Area	194,885 sq. mi.
Population (1966)	32,273,000
Language	Spanish
Currency	Peseta (Cdn \$1 = 67.57 pesetas)
Principal cities (Pop. 1965)	— Madrid 2,500,000 — Barcelona 1,660,500 — Valencia 558,000

UTILITY ORGANIZATION(S)

With two exceptions all the electricity power generating and distributing concerns are privately owned. The two government-owned concerns are:

Empresa Nacional de Electricidad S.A.
Valequez, 132
Madrid

Empresa Nacional Hidroelectrica del
Ribergorzana S.A.
Juan de Mina, 6
Madrid

RELATED ORGANIZATION(S)

Instituto Nacional de Industria (INI)
Plaza de Salamanca, 8
Madrid

INI is a government organization which controls the two government power companies:

Unidad Electrica S.A. (UNESA)
Serrano, 16
Madrid

All Spanish electricity concerns are federated in UNESA to co-ordinate planning.

OFFICIALS

Correspondence is normally addressed to the Managing Director (Consejero Delegado) of the electricity companies.

PRESENT FACILITIES — 50 HERTZ

Total installed capacity — (1968) 13,974 MW (hydro 8,554 MW; thermal 5,267 MW; nuclear 153 MW)

Maximum system peak — (1968) 7,517 MW

Production — (1968) 45,790 GWH

Forecast annual production growth over next five years
— N/A

Number of customers — N/A

Transmission — 100 to 138 kV — 13,185 KM
220 kV — 10,186 KM
380 kV — 1,289 KM

Service voltages — 127/220, 220/380, 150/260,
1 and 3 phase

Underground — N/A

System control — Central load dispatcher of UNESA,
modern coordination

PROCUREMENT PROCEDURES

Spanish electricity companies usually call for tenders when they are in the market for new plants. Local and foreign manufacturers considered to be competitive are invited to submit bids. Government-owned concerns are obliged to call for tenders. All other factors being equal (price and quality), preference is given to local manufacturers, many of whom are associated with foreign firms or manufacture under foreign licenses.

Local Spanish agents are essential (though not mandatory) for success in the country. Manufacturers should ensure through local Spanish agents that their company names are on the electricity companies' mailing lists.

Language of correspondence is Spanish.

CONSULTING REQUIREMENTS

Some leading Spanish electricity companies are associated with a number of competent local consulting concerns. When foreign expertise is needed, international consultants are approached to obtain their collaboration. Consultants would be well advised to keep in touch with Spanish consultants and with major electricity companies.

FINANCING

Foreign suppliers of plant and equipment for large power generating undertakings are normally expected to provide medium and long-term payment facilities (at reasonable rates of interest), according to the value of the plant needed. Money to meet the local construction work is raised by capital increases or by issuing debentures. Application may be made to state bank, Banco de Credito Industrial, with government approval. The type of credit facilities needed is usually outlined when the companies call for tenders.

STANDARDS

International standards are acceptable.

DEVELOPMENT PROGRAM

Current Capital Projects — The undertakings for the period 1969-73 are as follows:

- Alcantara — 4x200 MW, hydro — Tojo River, under construction
- Villarino — 4x135 MW, hydro — Tormes River, under construction
- Guillena — 3x70 MW, hydro — Ribera de Huelva
- Azutan — 3x60 MW, hydro — Tojo River, first unit operational in late 1969
- Frieira — 2x75 MW, hydro — Mino River, nearing completion
- Castrelo — 2x56 MW, hydro — Mino River, nearing completion
- Tabescan Superior — 2x56 MW, hydro — Noguera de Cardon River
- Gabriel y Galan — 100 MW unit, hydro — Alagon River
- Castellon — 2x540 MW units, thermal — fuel oil, nearing completion
- Santurce — 2x460 MW units, thermal — fuel oil, nearing completion
- Aceca — 2x314 MW units, thermal — fuel oil, nearing completion
- San Andrian — 2x300 MW units, thermal — fuel oil
- Sabon — 2x210 MW units, thermal — fuel oil
- Abono — 340 MW unit, thermal — carbon
- Vandellos — 2x250 MW unit, nuclear — under construction, completion set for 1971
- Santa Maria de Garona — 460 MW unit, nuclear — under construction, completion set for 1970

MARKET FACTORS

Local Industry — There is a large local industry of electrical equipment manufacturers in Spain. They are normally able to meet local demand in such product fields as wire and cable, insulators, power transformers, electric generators and electrical machinery.

Foreign Suppliers — Leading international manufacturers of plant for electricity generating have long been established in the Spanish market. Most of them have their own offices but some work through agents. These firms are organized to offer technical collaboration when needed, and when preparing their bids they include a maximum of locally-made assemblies, importing only the equipment that cannot satisfactorily or economically be made in Spain.

Preference is given to bids including a maximum of locally-made assemblies of reliable quality. Some foreign manufacturers are associated with Spanish manufacturers. Most Spanish manufacturers manufacture under foreign patents.

Such international firms include GE and Westinghouse (U.S.A.), GE and AEI (Britain), AEG and Siemens (Germany).

MARKET PROMOTION

All firms wishing to do business in Spain should appoint competent agents or associate with existing Spanish firms. A personal visit to the market is desirable. In view of the wide range of facilities being offered by leading international manufacturers, Canadian manufacturers will have to work closely with their Spanish agents to find new incentives to offer potential Spanish buyers.

REPORTING POST

Commercial Counsellor
Canadian Embassy
Apartado 117
Edificio Espana
Avenida de Jose Antonio 88
Madrid, Spain

CABLE: CANADIAN
PHONE: 247-54-00
TELEX: 27347 (DOMCA E)

TURKEY

MARKET DATA

Capital city	Ankara
Area	300,000 sq. mi.
Population (1967)	33,823,000
Language	Turkish (English, French and German used by business community)
Currency	lira (= Cdn \$0.1198)
Telephones (1968)	273,380
Televisions (1968)	10,000
Principal cities (Pop. 1965)	— Istanbul 1,742,978 Ankara 905,660 Izmir 411,626

UTILITY ORGANIZATION(S)

Etibank Genel Mudurlugu
Yenisihir, Ankara
Turkey

Etibank is a profit making state-owned economic enterprise. One of its major functions is the building of power plants and the transmission and distribution of power from these plants to various parts of the country, particularly major industrial districts.

General Directorate of
State Hydraulic Works
(Devlet Su Isbri Genel
Mudurlugu) (DSI)
Ankara, Turkey

DSI is an agency of the Ministry of Energy and Natural Resources and builds hydroelectric power plants which are sold to Etibank. In other cases DSI retains control over its plants.

Cukurova Elektrik A.S.
P.K. 239
Adana, Turkey

Produces and sells energy within Cukurova region of southern Turkey. Etibank has 49 per cent equity in Cukurova.

E.I.E.I. (Electric Power Resources Survey Department)
Ankara, Turkey

Provides consulting services to Etibank, DSI and sometimes Cukurova.

OFFICIALS

Etibank
General Manager — Munir Tanyeloglu
Assistant General Manager (Power) — Mustafa Ongun
Purchasing Manager — Sabahattin Kotan

DSI

Director General — Hazim Tutuncuoglu
Chief of Machinery and Purchasing Division — Seref Sanal

Cukurova

General Manager — Vakif Acunsal

EIEI

General Manager — Semih Uzel
Planning Manager — Ferruh Anik

RELATED ORGANIZATIONS

Illerbank purchases and finances turbines and diesel generators and sells to municipalities who produce their own power.

Atomic Energy Commission works under the Ministry of Energy and Natural Resources and has a division in Etibank. Turkish authorities favour a natural uranium heavy water-moderated reactor.

State Planning Organization approves plans for new electric power generating stations and network expansion proposed by Etibank and DSI.

PRESENT FACILITIES — 50 HERTZ

Total installed capacity (excluding Cukurova) — 1968 — 1990 MW (hydro 725.0 MW; steam thermal 1265.0)

Maximum system demand — (1972) 10,100 GWH

Production — (1969) 7,517 GWH

Forecast annual production growth over next five years — 13.9 per cent

Number of customers — (1968) 2,424,000

Transmission — 154/66/30/ under 30 kV — 3063/1021/1083/ 240 KM

Service Voltages — 220/380, 110/190, 1, 2 and 3 phase

Underground — controlled and conducted by local municipalities and is in the early stage of implementation

System specifications — 220 V, 50 hertz, 3 phase with the exception of the European side of Istanbul — 110 V, 60 hertz, 3 phase

System control — the techniques in this field are inadequate according to Etibank and DSI

Improvements need to be implemented quickly.

PROCUREMENT PROCEDURES

On international tenders, when a company submits its offer in English a Turkish translation must also be provided. If foreign currency is not needed, tenders are issued to local firms only. International tenders are announced by:

- a) advertisements in the official gazette international newspapers
- b) sending tender documents directly to interested firms registered with Etibank

On Turkish projects, joint ventures with local firms are preferred by the government and Etibank, construction generally being supplied by Turkish firms with the foreign partner providing engineering services, equipment and financing.

Goods are dutiable on CIF prices ad valorem. As Turkey is a member of GATT, Canada receives MFN treatment.

Canadian goods do not face any form of discrimination relative to other Western competitors. Turkey, Iran and Pakistan have concluded a treaty for regional co-operation and development which provides for preferential tariff rate to apply to imports from either of the other two partners.

It is important to have a local agent.

CONSULTING REQUIREMENTS

The purchasing organization employs consultants to undertake power resources survey, feasibility studies, project design, supervision of construction, etc. Consulting engineering services will continue to be required for at least five to 10 years.

Foreign consultants are required by the government to share work with a Turkish consultant in order to improve the experience and technical competence of Turkish engineers. Consultants establishing an office in Turkey in conjunction with their Turkish partner for a project often take on future work in the electrical and other fields.

FINANCING

Turkey's biggest problems are shortage of foreign exchange and a lack of modern management and technological expertise. Foreign investment is protected by the Foreign Investment Encouragement law.

Equipment requirements are frequently obtained by international tender with the stipulation that bids be supported by long-term financing with concessional terms. Sources of financing are either individual government credits or loans from EIB, IBRD, OCED Consortium and US/AID. On big projects long-term financing credits are requested by the buyers, generally 15 to 30 years credit with three to five years grace and four to five per cent interest. Concessional financing has been offered by the U.S.S.R. on a number of projects.

STANDARDS

Turkish Standards Institute is responsible for the preparation of standards for the material and equipment used by the state agencies.

North American standards are used for hydroelectric power, and German standards for thermal power.

ENERGY RESOURCES

Crude oil production in January 1970 reached a record of 305,000 tons. Four refineries now exist in Turkey.

DEVELOPMENT PROGRAM

Material and Equipment Requirements — For rural electrification 50 to 100 thousand impregnated transmission poles will be imported in 1970.

Current Capital Projects. — Projected hydroelectric plants by DSI: two 920 MW and 380 8 MW

Future Planning — Nuclear power plant 322 MW at a cost of Cdn \$120.1 million. Foreign financing will have to be found for about \$70 million. The plant is scheduled to go into operation by 1976-77.

MARKET FACTORS

Local Industry — Joint ventures and foreign investment in production facilities in Turkey are generally welcomed by the Turkish Government as a means of producing locally what would otherwise have to be imported, thereby curtailing the outflow of severely limited foreign exchange.

Foreign Suppliers — The list of foreign suppliers is extensive and covers all competitive exporters of electrical equipment from all exporting nations of the world.

Successful foreign suppliers depend on:

- a) Competitive prices
- b) Where needed, financing at competitive rates
- c) Local representation
- d) Where needed, technical assistance and after-delivery service
- e) Personal contact through regular visits

MARKET PROMOTION

The future success of Canadian firms depends on making themselves known to the right people in the market and to government officials. The best ways are through personal visits, and by having active representatives who can keep them informed of tenders, impending projects, and who, at the same time, can promote company, products and services with government and other purchasing agencies.

In order to increase exports substantially and to secure a greater share of the Turkish market, long-term financing must be supplied at less than commercial rates of interest and with extended repayment periods.

Canadian firms wishing to export to Turkey must provide the Canadian Embassy with as much technical information as possible on their products or services as well as data on the capability of their companies and where possible FOB and CIF prices. With this information, the following can be established:

- a) If the equipment can be imported

b) If purchasing organizations are interested in the product or service

c) Who might be interested in acting as representative

The Embassy can then register the names of companies with purchasing organizations to ensure tenders are sent to the Canadian firms.

REPORTING POST

Commercial Secretary
Canadian Embassy
Vali Dr. Resit Caddesi 52
Cankaya, Ankara, Turkey

PHONE: 12-24-48

TELEX: 69 (DOMCAN ANKARA)

MIDDLE EAST

The largest single market in the Middle East is Iran. This country has a very large potential for sale of electrical apparatus of all types, with imports running at \$100 million a year.

Few generating station installations are likely in Iraq and Lebanon in the immediate future. Possibly, the situation will be different in Kuwait. Products imported in large quantities by these countries are, in order of magnitude: electrical wire and cable; switchgear; transformers (except in the case of Iraq).

For sales of electrical distribution apparatus in Iran, medium term credit is required. There is a possibility of credit being requested from Iraq in the future. In Israel, Canadian products are preferred, providing prices are competitive, in order to use the balance of outstanding Canadian credit.

CYPRUS

MARKET DATA

Capital city	Nicosia
Area	3,600 sq. mi.
Population (1967)	614,000 (80 per cent Greek, 18 per cent Turkish)
Language	Greek and Turkish (English widely understood)
Currency	Pound (= 1,000 mils; 416.6 mils = US \$1)
Televisions (1968)	30,000
Principal cities (Pop, 1967)	— Nicosia 109,000 — Limassol 49,000 — Famagusta 40,000

UTILITY ORGANIZATION(S)

Electricity Authority of Cyprus
P.O. Box 1466
Nicosia, Cyprus

Electricity generation is in the hands of the E.A.C., a public corporation established in 1952 under the Electricity Development Law.

RELATED ORGANIZATION(S)

Cyprus Development Corporation (CDC)
P.O. Box 1415
Nicosia, Cyprus

An organization that can definitely be involved in financing power projects.

OFFICIALS

Chairman, EAC — M.E. Glykys

Chief Engineer and General Manager, EAC — S. G. Anastassiades
Principal Consultants, EAC — Preece, Cardew & Rider, London
Operations and Maintenance, Assistant Chief Engineer, EAC — N. G. Klayas
General Manager, CDC — A. M. Pikis

PRESENT FACILITIES — 50 HERTZ

Total installed capacity — (1968) 174 MW (oil fired — standby diesel)

Maximum system peak — (1968) 97.2 MW

Production — (1968) 453 GWH

Forecast annual production growth next five years — 8.1 per cent

Number of customers — (1968) 139,000

Transmission — (1968) 66 kV, 132 kV — 424 miles, 80 miles respectively

Distribution — (1968) 11/3.3 kV

Service Voltage — 240, 1 phase

Underground — (1968) 11 kV 11 miles, 3.2 miles were underground in Nicosia

PROCUREMENT PROCEDURES

The EAC always issues tenders. The embassies represented in Cyprus receive all tenders from the Authority one week ahead of publication. The tenders are in English. The Cyprus industry is not developed enough to compete with foreign industries and it is often very difficult to give official or unofficial preference to local firms.

In the tariff field, Canada has an advantage vis-a-vis the U.S.A. since Cyprus is a Commonwealth country, but the British, owing to their presence on the Island for many years, enjoy advantages.

An agent on the Island is a necessity.

CONSULTING REQUIREMENTS

Principal consultants: Preece, Cardew & Rider, London
Civil engineering consultants: Scott, Wilson, Kirpatrick & Partners, London

FINANCING

The Five Year Plan (1967-71) projects an expenditure of US \$14.3 million. The program will be financed from internal and external sources: \$9.3 million financed by the Authority and a \$5 million loan from the World Bank (Dec.

24, 1969) to the EAC (20 years incl. 3 1/2 years grace, with 7 per cent interest) guaranteed by the Republic of Cyprus.

STANDARDS

All works have to be to the standards of the British Standards Institute or in accordance with other authoritative standards which, in the opinion of the engineer, ensure an equivalent or higher quality.

ENERGY RESOURCES

None — the fuel oil supply for the boilers is pumped from sea-going tankers through submarine pipeline into storage tanks.

DEVELOPMENT PROGRAM

Current Capital Projects — Moni Power Station project will expand the Moni generating station through the installation of a fourth 30 MW steam turbo-generator. Also included is the construction of 87 miles of high voltage transmission lines, the expansion of the sub-station at Moni and the construction of a new sub-station at Athalassa.

Future Planning — The expansion program is as follows:

- 1 — 60 MW in 1973
- 1 — 60 MW in 1976
- 1 — 60 MW in 1980

MARKET FACTORS

Local Industry — The local industry for electrical equipment is almost nil.

Foreign Suppliers — Britain is the main supplier of the Island.

MARKET PROMOTION

The first step is to present what Canada can offer. Canadian firms interested in this market should send to the Authority, on a regular basis, scientific literature on their products, activities and experience abroad. The Commercial Division of the Canadian Embassy should also be informed of developments because it is in close contact with the Authority. Through frequent visits, the Commercial Division staff may then have the opportunity to evaluate the possibilities for Canadian firms. Visits to Cyprus by representatives of Canadian firms always make a good impression and improve chances of penetrating this market. Good potential agents are available for those who are interested in following up future tenders by the EAC and in developments of power projects.

REPORTING POST

Commercial Secretary
Canadian Embassy
P.O. Box 20140
84 Hahashmonlam Street
Tel Aviv, Israel

CABLE: CANADIAN

PHONE: 267121

IRAN

MARKET DATA

Capital city	Tehran
Area	630,000 sq. mi.
Population (1967)	27,000,000
Language	Persian (English and French are also spoken)
Currency	Rial (Cdn \$1 = 70.42 rials)
Telephones (1967)	200,000
Televisions (1967)	120,000
Principal cities	— Tehran 2,700,000 — Tabriz 350,000 — Isfahan 250,000

UTILITY ORGANIZATION(S)

Electric power supply in Iran is now provided by public utilities whose ownership is either private, municipal, mixed or government, and by industrial establishments. There are ten such utilities of which six are interconnected.

RELATED ORGANIZATION(S)

Ministry of Water and Power
All electrical projects in Iran, including those undertaken by the provincial authorities, are under the overall direction and authority of this Ministry.

Satkhad and Tavanir

A state purchasing company set up and under the jurisdiction of the Ministry of Water and Power. Its function is to purchase electrical distribution equipment on behalf of the various regional power authorities, normally up to 33 kV. Satkhad's function is to centralize all the regional utilities' bulk purchases.

Tavanir is another organization, which is responsible for much of the higher voltage electrical equipment requirements.

Plan Organization

Provides overall control of the financing commitments for capital projects in Iran. Various ministries requiring funds

for projects must have Plan Organization authority before they can proceed.

It is believed that in future years Satkhad will become the purchasing agency for all electrical power equipment; Tavanir will become the operating organization of the power system; and the Ministry of Water and Power will be the overall supervisory body of the system.

OFFICIALS

Tavanir — Managing Director — Mr. Jelinous

Ministry of Water and Power — Under-Secretary — H. E. Hazrati

Satkhad — Managing Director — Mr. Madani

Plan Organization — Technical Adviser — F. R. Afrouz

PRESENT FACILITIES — 50 HERTZ

Total installed capacity — (1967) 864 MW (hydro 265 MW; thermal 599 MW)

Maximum system peak — (1967) 634 MW

Production — (1967) 2544.7 GWH

Forecast annual production growth for next five years — 20 per cent

Number of customers — 300,000 (approximately)

Transmission — 230 kV, 132 kV, 63 kV, 33 kV

Service voltages — 220, 220/380, 1 and 3 phase

System control — modern system in advanced planning stage

PROCUREMENT PROCEDURES

Satkhad rarely goes to open tender. It will select a short list of suppliers which are chosen by a Committee. As a general practice, Satkhad will not accept conditional clauses in any part of contracts. The only exception to this rule is when buying material involving copper, lead or similar materials.

Nearly all major contracts (under the Ministry of Water and Power) go out to tender.

When engineering is completed and the budget fixed, open tenders will be called. In the case of the 400 kV transmission line, the contract will be for the supply, erection and financing of the whole project.

Agents are absolutely essential in Iran and the agency should be selected for its knowledge of the inner workings of the various and somewhat inter-related government groups involved in the purchasing. This is particularly necessary for turnkey projects.

CONSULTING REQUIREMENTS

Harza Engineering is the consultant to the Ministry of Water and Power. Foreign consultants are selected for specific power projects.

FINANCING

Satkhad has the following purchasing policy: on purchases up to \$500,000, it requires a 5 per cent down payment, 10 per cent against shipments, 85 per cent on credit, half-yearly consecutive installments; from \$500,000 to \$1 million — five years credit; from \$1 million to \$1.5 million — seven years credit; \$2 million and over — 10 years credit. All the foregoing at 6 per cent with no insurance or other charges added.

Iran is a credit-worthy country and is finding it easy to obtain financing for capital projects.

The World Bank is giving consideration to financing the Tehran Ring Project.

The Ministry of Water and Power would require financing for local costs as well as foreign exchange costs for the EHV transmission line project; it would not be interested in any credit for less than 10 years. For example, the line running from Dez and Araq to Tehran was financed by 25 years credit at 5 per cent.

STANDARDS

Electrical power authorities follow British and French standards but North American standards are acceptable if their merit can be proved to the authorities. Price of copper is quoted on the London Metal Exchange.

ENERGY RESOURCES

The principal source of energy in Iran is petroleum. The reserves of petroleum in Iran are estimated at 45 billion barrels. At present, in the absence of markets, more than one billion cubic feet per day of natural gas is flared. Total Iranian gas reserves are estimated at 105 trillion cubic feet. The probable reserves of coal are estimated at 143 million tons.

DEVELOPMENT PROGRAM

Material and Equipment Requirements — Major market opportunities for equipment will be in electrical distribution (66 kV and under), i.e. switchgear, transformers, poles, hardware, ACSR and copper conductor, etc.

Current Capital Projects

Reza Shah Kabir Dam — Karun River, 4x167 MW, contract awarded to French firm SASCR, cost of

\$100 million, bilateral financing, Harza is consultant, expected to be operational in 1974 and 1976.

Future Planning

EHV Transmission Project — 400 kV (possible up-rating to 500 kV), possibly five routes, approximate cost of \$50 million, Harza is consultant, proposed completion 1974, duration of credit supplied is most important.

MARKET FACTORS

Local Industry — relatively small.

Foreign Suppliers — numerous. Iranians place importance on high quality as well as price and delivery items. USSR, Yugoslavia, France and Britain have been major suppliers to Iran in past years.

MARKET PROMOTION

One point that cannot be over-emphasized in dealing in Iran is the absolute requirement to be able to grant credit on any product purchased by a government organization. The central purchasing authority, SATKHAB, insists on, and is obtaining, credit at relatively low rates of interest for virtually 100 per cent of its procurement.

While there is a profitable field for turnkey projects of various types in this country, particularly in the power field, it is felt that this will only last for a limited period and that great potential after the next five to seven years will be in equipment supplies rather than turnkey projects.

Canadian manufacturers must be prepared to meet foreign specifications or bid alternate constructions or mount a determined campaign to have Canadian constructions and standards accepted. This applies particularly to electrical wire and cable products.

Canadian companies must be prepared to spend the time, money and energy necessary to develop such intensely competitive markets.

REPORTING POST

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Canadian Embassy
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Corner of Takht Jamshid Avenue
and Forsat Street
Tehran, Iran

CABLE: CANTRACOM
PHONE: 613560, 4-9291
TELEX: 2037 (DOMCAN TEHRAN)

IRAQ

MARKET DATA

Capital city	Baghdad
Area	170,000 sq. mi.
Population (1968)	8,547,149
Language	Arabic (English spoken to some extent)
Currency	Dinar (Cdn \$1 = 0.33 dinar)
Telephones (1967)	50,000
Televisions (1967)	160,000
Principal cities (Pop 1968)	— Baghdad 1,884,151 — Basra 420,145 — Mosul 343,121

UTILITY ORGANIZATION(S)

National Electricity Administration
Nafoura Square, Jomhouriya Street
Baghdad, Iraq

NEA is a Government agency (attached to the Ministry of Industry) responsible for generation, transmission and distribution of electric energy in major cities and towns.

Directorate General of Projects (DGP)
Ministry of Municipal and Rural Affairs
Battaween
Baghdad, Iraq

A government agency responsible for electrification of small towns, villages and rural areas. It buys power from NEA.

RELATED ORGANIZATION(S)

The Ministry of Planning is responsible for the drafting, production, co-ordination and follow-up of projects included in the Five Year plans.

The Ministry of Industry — proposes implementation of new power projects.

OFFICIALS

Director General, NEA — A. J. Al-Janabi
Director General of Design and Construction, Ministry of Industry — Najim Qoja Qassab
Director General of Projects, DGP — Dr. Ali Shubbar

PRESENT FACILITIES — 50 HERTZ

Total installed capacity — (1969) 663 MW (steam 517 MW; diesel 26 MW; gas turbine 120 MW)

Maximum system demand — (1975) 950 MW

Production — (1968) 1,491 GWH

Forecast annual production growth over next five years
— 7 per cent

Number of customers — (1968) 850,000.

Transmission — 132/66/33 kV

Distribution — 33/11 kV
— 415 V, 3 phase

PROCUREMENT PROCEDURES

All Government of Iraq departments, including NEA and DGP, purchase almost all of their requirements through bid invitations. Iraq tends to place great stress on price and generally the lowest bid must be accepted unless it does not match the specifications. Preference is usually given to foreign suppliers and contractors offering financing facilities.

An Iraqi agent with headquarters in Baghdad is required for dealing with DGP. Suppliers could deal directly with NEA, although it is best to have an agent. Tender documents for routine equipment, services, supply and construction are prepared in English.

Iraq's trade policy is designed to protect domestic industry and encourage imports from Arab countries but since power generation equipment and insulated wire and cable are produced neither locally nor in any other country in commercial quantity, Canadian suppliers should have no difficulty in finding their way in Iraq. Ad valorem duties predominate. Duty-free entry is accorded to generators, motors (for government power supply) and steam generating boilers. Relevant import duties are as follows: 5 per cent on transformers, 8 per cent on transmission cables and 10 per cent on all kinds of insulated cables except those fitted with connectors (15 per cent ad valorem).

All DGP projects and almost all projects of NEA are handled on a turnkey basis.

CONSULTING REQUIREMENTS

The Government of Iraq normally employs consultants to undertake feasibility studies and prepare specifications. Consultants are also used to supervise construction and installation. Foreign consultants, according to Iraqi laws, must collaborate with Iraqi consultants to obtain work in Iraq. The latter must register the firm with the appropriate Iraqi authorities in order to receive invitations when services of foreign consultants are required.

The consultants must be able to prepare feasibility studies and specifications, study offers, make recommendations and finally must supervise installation and issue certificates that the project fulfils requirements.

FINANCING

Materials

1. NEA — Payment is usually made to the suppliers by means of an irrevocable and confirmed letter of credit (generally, 75 per cent on presentation of shipping documents, 25 per cent after receipt and acceptance of goods).
2. DGP — Payment is made to the agent rather than the supplier only after the goods are received and accepted by their stores. Offers from suppliers presenting their own method of payment are ignored.

Consultants — They are usually paid a lump sum for undertaking feasibility studies and preparing the specifications in accordance with a contract to be signed by both parties. Monthly salaries are paid if the project calls for supervision.

Contractors — For a turnkey project, payment is made in accordance with the contract agreed upon. The final payment, usually 5 per cent of the contracted value, is paid one year after satisfactory operation of the project.

STANDARDS

There are no national electrical standards in Iraq and almost all specifications for equipment are made in accordance with British Standards.

ENERGY RESOURCES

Two high-flood control and irrigation dams have been built in the North at Doka (120 MW) and Derbendikham (112.5 MW) with provision for future hydroelectric installations. Only one gas turbine is installed in Iraq.

DEVELOPMENT PROGRAM

Material and Equipment Requirements — Iraq's annual requirements of electrical materials and equipment average \$20 million. The materials and equipment required, in order of importance, are as follows: wire and cable, distribution transformers, hardware, poles, switchgear and KWH meters.

Capital Projects

1. Samara Hydraulic Power Station designed by Norconsults is to consist of three units (each 45 MW). The contractors are Zublin of Germany and Tuclima of Italy.
2. Expansion of Baghdad South Power Station by adding a 30 MW gas turbine by Westinghouse (U.S.).
3. Extension of high and medium voltage lines by 200 KM and 400 KM respectively. Also, the construction of 22 stations for the transmission of electric power to various towns.

Future Planning — Iraq is planning to conduct a power study of projected developments over the next 20 years. However, it is not expected in the near future. The expansion of Basra Power Station (4x15 MW) by adding two units of 75 MW each, was to be advertised in 1970/71. Government of Iraq will most probably seek foreign financing on this and other power generation and transmission projects.

MARKET FACTORS

Local Industry — With Soviet aid, the Government of Iraq established General Electric Equipment Company (capitalized at \$9 million) for the production of transformers, fans, motors, hardware, etc. Its annual production capacity for transformers is:

Oil transformers — 63 kVA — 750 Units
 Oil transformers — 100 kVA — 750 Units
 Oil transformers — 250 kVA — 500 Units
 Dry transformers — 5000 Units

Foreign Suppliers — The major suppliers of electrical materials and equipment are British, U.S., and West German firms which also serve as the main contractors. Their success is due to favourable credit terms, aggressive agents and their continued presence in the area for many years.

MARKET PROMOTION

Canadian manufacturers, consultants and construction firms interested in doing business in Iraq must appoint agents in Iraq in order to be kept posted on new opportunities that may be developing and to maintain necessary contacts. They must also consider the question of granting credit facilities. Since most Government capital projects are package deals, Canadian firms may wish to consider the formation of a consortium as and when necessary in order to be able to present a complete offer. The Commercial Office of the Canadian Embassy, Beirut, Lebanon, will provide names of possible agents in Iraq for any Canadian supplier or consultant.

REPORTING POST

Commercial Counsellor
 Canadian Embassy
 Boite Postale 2300
 Alpha Building
 Rue Clemenceau
 Beirut, Lebanon

CABLE: CANADIAN
 PHONE: 250955
 TELEX: 652 (DOMCAN BERYT)

ISRAEL

MARKET DATA

Capital city	Jerusalem
Area	8,017 sq. mi.
Population (1968)	2,841,000
Language	Hebrew
Currency	Pound (=Cdn \$0.29)
Telephones (1967)	302,946
Televisions (1968)	45,000
Principal cities and pops.	— Tel-Aviv 388,000
	— Jerusalem 266,300
	— Haifa 209,900

UTILITY ORGANIZATION(S)

The Israel Electric Corporation Ltd.
 P.O. Box 10
 The Power House
 Haifa, Israel

IEC, incorporated in 1923 as The Palestine Electric Corporation Ltd., is a public utility concerned with the generation and supply of electricity throughout Israel under the electricity concession.

RELATED ORGANIZATION(S)

Auditor General, Ministry of Finance — Regulatory

OFFICIALS

Managing Director, IEC — Jacob Khoushy
 Chief Engineer, IEC — Narciss Zuckerman

PRESENT FACILITIES — 50 HERTZ

Total installed capacity — (1968/9) 1020 MW

Maximum system demand — (1968/9) 940 MW

Production — (1968/9) 5460 GWH

Forecast average annual production growth over next five years — 8.6 per cent a year

Number of customers — (1968/9) 857,000

Transmission — 150 kV, 110kV — 533 KM, 1,137 KM respectively

Distribution — 13/22/33 kV

Service Voltages — 230/400 V, 1 and 3 phase — tendency is for three phase (four core) cable

Underground — Small part of system, 22 kV underground distribution. Growing demand for indoor transformer stations supplied by underground LV network.

System Control — Load dispatched with extensive use of telemetering and analog type logging from a central dispatch office

— Remote control of a few HV circuit breakers

PROCUREMENT PROCEDURES

The IEC purchases main equipment through its Head Office Purchasing Division. Bids (English-abroad) are issued to "qualified suppliers" and advertised. The IEC makes maximum use of local manufacturing facilities and accepts imports only when price, quality or delivery dates of local suppliers are not satisfactory or when goods are not made in Israel. Civil works are generally taken locally; there is little opportunity for the sale of contractors' services.

Israel has applied for association with the ECM; if accepted, there will be changes in the tariffs.

CONSULTING REQUIREMENTS

IEC engages Sargent & Lundy, Chicago, as its consultants for large power station projects. Specialized services, for example sea and tide-flow studies, are contracted out to specialists. System planning, desalting, combined heat and electricity schemes are carried out by IEC.

FINANCING

Financing is generally by commercial agreement with the supplying company, but on special projects may be arranged at government level.

Eshkol C Power Station will be financed by Export Development Corporation through the Industrial Development Bank of Israel. The loan (\$15 million) is for a period of 15 years (incl. three years grace) at 6 per cent per annum.

STANDARDS

Equipment is specified, wherever possible, in accordance with recognized European or American standards. Local standards may be obtained from Israel Standards Institute, University Street, Ramat Aviv.

ENERGY RESOURCES

Small sources of oil have been found. Crude oil is imported and refined locally in Haifa.

DEVELOPMENT PROGRAM

Material and Equipment Requirements — Distribution equipment is manufactured either in Israel or Europe.

Capital Projects

- 1) 2 x 214 MW units being completed
- 2) 2 x 228 MW units being designed
- 3) nine new transformer stations in design and construction stages — total 500 MVA
- 4) extension to 23 transformer stations — total 500 MVA

Future Planning — Studies are in progress on gas turbines, desalting atomic plants, next level of transmission voltage, rights of way, and power sites for power and transformer stations.

MARKET FACTORS

Local Industry — There are several large (by Israel standards) and many small manufacturers of electrical and associated equipment.

Foreign Suppliers — Large transformers, high voltage switchgear, turbines, boilers, fans and other large prime equipment for the system are purchased by competitive tender from European or North American suppliers. Many of these suppliers have local representatives.

MARKET PROMOTION

The IEC's recent boiler purchases from Babcock-Wilcox Ltd., Canada, coupled with established long-term Canadian credit, have provided the Canadian electrical industry with its first opportunity for sales to Israel. Providing prices are competitive, there is currently a preference for Canadian products to use the balance of outstanding credit.

The IEC plans to retain the services of its present American consultants, thus continuing its ten-year-long preference for North American design standards. For this reason, the receptivity of officials to quality, well priced Canadian equipment shows promise of being maintained.

Canadian firms should improve their contacts with the consultants and engineering staff of IEC through a combination of personal visits and literature mailings. Represented firms should ensure that their agents maintain contacts but should not overlook the benefits of personal visits.

REPORTING POST

Commercial Secretary
Canadian Embassy
P.O. Box 20140
84 Hahashmoniam Street
Tel Aviv, Israel

CABLE: CANADIAN
PHONE: 267121

KUWAIT

MARKET DATA

Capital city	Kuwait
Area	6,000 sq. mi. (excluding neutral zones)
Population (1967)	516,000 (more than 50 per cent non-nationals)
Language	Arabic (English used to some extent)
Currency	Kuwait dinar (357 KD = US \$1)
Principal cities	— Kuwait (population 250,000) — Mina-Al-Ahmadi (headquarters of Kuwait Oil Company)

UTILITY ORGANIZATION(S)

Ministry of Electricity and Water (MEW)
Mubarak Al Kabir Street
Kuwait

MEW is responsible for distribution in addition to maintenance and operation of all power stations in Kuwait.

RELATED ORGANIZATION(S)

Central Tenders Committee

Government agency responsible for preparing conditions for tendering. It invites, receives and studies tenders and awards contracts.

Planning Board,
P.O. Box 15
Kuwait

An agency responsible for the preparation of five and 10 year plans as well as for the registration of foreign consultants.

OFFICIALS

H. E. Abdulla Ahmad, As-Sumeit, Minister of MEW
Dr. Zaki Abu Eid, Chief Electrical and Mechanical Engineer, MEW
Ahmed Ali Al-Du'a'ij, Director General, Planning Board
Sami Haddab, Secretary of Consultant Selection Committee

PRESENT FACILITIES — 50 HERTZ

Total installed capacity — (1970) 850 MW (steam 790 MW; diesel 10 MW; gas turbine 50 MW)

Maximum system peak — (1968) 1,946 MW

Production — (1968) 1,045 GWH

Forecast average annual production growth over the next five years — 15 per cent

Number of customers — (1968) 132,299

Transmission — 132/32/11 kV — 7,646 KM

Distribution — 33/11 kV

Service voltages — 240/415, 1 and 3 phase

System control — at present there is no system control unit but studies have recommended the installation of one by 1970.

PROCUREMENT PROCEDURES

MEW buys through bid invitations. Bidding time is normally 30 to 90 days and, on major projects, two to four months is allowed after pre-qualification of bidders.

Tender documents are prepared in English by the engineering staff of MEW for routine equipment and by the consultant for major projects.

Under Kuwaiti regulations, foreign suppliers must submit their bids through Kuwaiti nationals who should have direct relationship with the supplier. Tender documents for government work are obtainable only by accredited Kuwaiti agents or companies.

Import duty is at an overall rate of 4 per cent; imports for the state and oil companies are exempt. Canadian goods do not face any form of discrimination relative to other supplying countries.

All MEW projects are handled on a turnkey basis. In most cases, however, the local agent handles civil work himself or finds suitable local contractors for foreign suppliers.

CONSULTING REQUIREMENTS

Consultants interested in doing business in Kuwait must register with the Planning Board. This agency is solely responsible for selecting consultants for MEW's projects and all other government projects.

Consultants cannot have a local agent but can associate with Kuwaiti consulting engineers. They should restrict their activities in Kuwait to consulting only — i.e. turnkey projects do not include design. Consultants directly or indirectly connected with manufacturers, material suppliers, contractors or commercial institutions are disqualified as are those associated with local agents, sponsors or correspondents. Once a consultant is appointed, he works directly with the engineering staff of MEW.

FINANCING

Funds for most past projects were made available from the Kuwaiti Government's own foreign exchange reserves.

However, financing is now a consideration, particularly in tenders for large government projects. It is believed that the Government of Kuwait, which maintains large investments in Britain, the U.S.A. and Switzerland, is making use of the credit facilities offered by foreign contractors and suppliers and is borrowing at rates of 4.5 to 6.5 per cent.

STANDARDS

The Ministry of Electricity and Water normally uses British standards for electrical equipment. Power and telephone cable prices must be based on the London Metal Exchange (LME) price for copper. American standards, with which consultants are familiar, are also considered.

ENERGY RESOURCES

Gas and oil, both of which are locally produced in huge quantities, are the only energy resources in Kuwait. Gas is provided free to the power utility from the Kuwait Oil Company.

DEVELOPMENT PROGRAM

Material and Equipment Requirements

Kuwait's annual requirement of material and equipment averages \$12 million. The materials and equipment required, in order of importance, are as follows: wire and cable, transformers, switchgear, hardware, poles, and KWH meters.

CAPITAL PROJECTS

In the expansion of the Shuaiba Power Station (400 MW to 934 MW), it is planned to complete four turbine units by the end of 1977. The first (250 MW) is expected to go into operation during the second half of 1971.

FUTURE PLANNING

A new 10-year plan (1971 . . .) is under preparation by the Government of Kuwait. Although the plan has not been published as yet, it is expected that the following expansions might take place:

Project	Estimated Cost in Millions Cdn \$
Increase of the capacity of Shuaiba Power Station by 250 MW	30
Construction of a new 600 MW power station	78

Reinforcement of the 11/33/132 kV network	36/31/31
New low voltage distribution network	95
H.T. distribution network	32
Expansion of the present underground low voltage network	43
Street lighting	6

MARKET FACTORS

Foreign Suppliers

The major suppliers of electrical materials and equipment to Kuwait are Japanese, British and West German firms which, at the same time, are Kuwait's main contractors. These firms have been in the local market for many years, have appointed aggressive agents and are offering financing facilities.

MARKET PROMOTION

It is somewhat difficult to find agents in Kuwait with a technical staff capable of dealing with other than simple specifications. Thus, Canadian suppliers should consider the possibility of sending technicians to ensure that a good service organization is established.

Consultants should have no agents in Kuwait but could always keep silent contacts. Data on registering consultants should be kept up to date by forwarding details of any new work completed by the Canadian consultant in or outside Canada.

REPORTING POST

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Beirut, Lebanon

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TELEX: 652 (DOMCAN BERYT)

LEBANON

MARKET DATA

Capital city	Beirut
Area	4,000 sq. mi.

Population (1965) 2,400,000
 Language Arabic (French and English widely used)
 Currency Lebanese pound (L.L. 3.08 = US \$1)
 Televisions (1968) 175,000
 Principal cities (Pop. 1965) — Beirut 500,000
 — Tripoli 145,000

UTILITY ORGANIZATION(S)

Office de l'Electricité du Liban
 Boîte Postale 131
 Beyrouth, Liban

An autonomous government organization responsible for the generation, transmission and distribution of electricity in Lebanon.

Office du Litani established to exploit the Litani River for irrigation and electrical production purposes.

OFFICIALS

Directeur Général p. i. — Monsieur Badih Lahoud

Chef du Service de distribution p.i. — Monsieur Edmond Ibrahim

Chef du Service Etude (Study) p.i. — Monsieur Georges Hassoun

Chef du Service Dispatching — Monsieur Muhieddine Mehio, Eng.

These are the most important posts concerned with equipment purchases.

PRESENT FACILITIES — 50 HERTZ

Total installed capacity — (1968) 423.1 MW (hydro 245.6 MW; steam thermal 177.5 MW)

Maximum system demand — (1968) 187 MW

Production — (1968) 763.3 GWH

Forecast annual production growth over next five years — 8 per cent

Number of customers — (1968) 344,000

Transmission — 66/66/33 kV — 43.5/26.3 (underground)/N/A KM

Distribution — 15/11/5.5 kV

Service voltages — 110/190 V, 220/380, 1 and 3 phase

Underground — 26.3 KM of 66 kV in Beirut for residential and commercial needs

System control — to date, control of load and frequency is by visual and manual intervention

PROCUREMENT PROCEDURES

All purchases of OEL are made by tender. Purchases below L.L. 10,000 are submitted directly to three or four suppliers. For purchases below L.L. 20,000, adjudication is made by simple authorization of the chief of the service. For purchases above L.L. 20,000, an authorization from the Administrative Council is required.

The specifications are established by each of the services concerned. They are based on the equipment already in use or on the standards of delivery desired. For normal purchases, tenders are called by direct communication with the suppliers. For important purchases, the official announcement is published in newspapers. French is the language of business.

Canadian products are not discriminated against (or preferred) relative to those of other supplying countries. An industrial complex, Liban Cables, was recently established and it is therefore possible that a protective tariff will be created to protect this industry. No tariffs exist as yet on electrical materials.

It is necessary to have a local agent.

CONSULTING REQUIREMENTS

The majority of engineering studies are made within the OEL itself. When foreign consultants are required for the study and elaboration of certain electrical projects, the Office de l'Electricité de France provides them. Opportunities for Canadian experts in the field of construction and electrification are minimal, but some exist in the organization and administration of OEL.

An exchange between Hydro-Québec and the OEL could easily take place due to the common language employed.

FINANCING

The OEL must finance its own projects, which creates a need for aid or long-term financing. The current method of financing consists of 25 per cent on purchase, against guarantee, with balance payable on delivery or in following the standards established in the specifications.

STANDARDS

There is no national standards organizations. Since the majority of equipment is of French origin, UTE standards are employed most frequently but their equivalent is accepted when possible.

ENERGY RESOURCES

Since hydroelectric reserves are minimal and two pipelines terminate in Lebanon, it is much more economical to supply thermal stations from already existing refineries.

DEVELOPMENT PROGRAM

Current Capital Projects — The Thermal Power Station of Jieh has two 60 MW units under construction and the addition of two 125 MW units each is predicted. The Japanese company, Toshiba, is handling the first two turbines at a cost of \$100 per KW installed (including civil, mechanical and electrical construction). The electrical equipment is of French manufacture.

A 20-year rural electrification program is now in its final stages (1,500 villages electrified).

Future Planning — With normal expansion, two sub-stations of 66 and 11 kV will most likely be required each year. By 1980, once the power project on the Euphrates in Syria (capacity — 800 MW) is completed, an interconnection between the two countries will possibly be established.

MARKET FACTORS

Local Industry — "Liban Cables" — production of cables (since August, 1969).

— "Electra" — transformers, meters, insulators, boosters, circuit breakers.

Foreign Suppliers — France, West Germany, Switzerland, Belgium and Italy are the principal suppliers. The U.S. does supply some specialized equipment but at a more elevated price. Preference is given to European suppliers.

MARKET PROMOTION

Lebanese law requires a company to have a local representative. The agent will register the supplier with OEL and also obtain specifications of tenders. The OEL gives recognition to this representative only and submits its contracts to him. The French language is widely used in Lebanon, a fact of which suppliers should take note.

Evidently, once a company's business affairs become important, service facilities and a parts department would be necessary.

REPORTING POST

Commercial Secretary
Canadian Embassy
Boite Postale 2300
Alpha Building
Rue Clemenceau
Beirut, Lebanon

CABLE: CANADIAN
PHONE: 250955
TELEX: 652 (DOMCAN BERYT)

SAUDI ARABIA

MARKET DATA

Capital city	Jeddah
Area	850,000 sq. mi.
Population (1964)	6,000,000
Language	Arabic
Currency	Riyal (Cdn \$1 = 4.84 riyal)
Televisions	50,000
Principal cities and pops.	— Riyadh 169,000 — Mecca 159,999 — Jeddah 148,000

UTILITY ORGANIZATION(S)

- a) Saudi National Company Limited for Electric Power, Jeddah, Saudi Arabia
- b) Jeddah Electric Company, Jeddah, Saudi Arabia
- c) Riyadh Electric Power Company, P.O. Box 57, Riyadh, Saudi Arabia
- d) Saudi Electric Co., P.O. Box 1213, Jeddah, Saudi Arabia
- e) Medina Electric Co., P.O. Box 1049, Jeddah Saudi Arabia
- f) Al-Hasa Electric Co., P.O. Box 1049, Jeddah, Saudi Arabia
- g) Dhahran Electric Power Co., P.O. Box 74, Damman, Saudi Arabia

All these companies are private and are responsible for generation, transmission and distribution of electricity in the various urban regions of the Kingdom. They form the major power potential and are completely autonomous.

The rural areas are serviced by small stations (mostly mobile), which are owned and operated by the municipalities but built by the Ministry of Commerce and Industry and financed by the Ministry of the Interior.

The Ministry of Commerce and Industry is studying the possibility of establishing a Central Power Authority to regulate and administer a national electric power program.

PRESENT FACILITIES

Installed capacity — (private companies only) 176.4 MW
(diesel and gas turbine)

Production — (1967) 376.8 GWH

Number of customers — (1967) 144,324

Transmission and distribution — Jeddah and Riyadh: 13.8 —
11 kV, distribution at
4.16 kV

— Mecca and Medina: 11 kV
and 10 kV

— other areas: 3.3 kV

Supply and system frequency — 100 or 120 V, 60 Hertz
— 220 V, 50 Hertz

PROCUREMENT PROCEDURES

All purchases are by tender. Normally, tenders are published in Arabic in the local press, but sometimes are offered direct to interested firms who must first be registered with the power companies and, for the government tenders, with the Ministry of Commerce and Industry, and the Ministry of the Interior.

All main equipment purchased by the government or imported by private companies to increase production is exempt from tariff duty. Maintenance equipment and materials are subject to a 5 to 25 per cent tariff. No discrimination or preferential tariff is applied.

CONSULTING REQUIREMENTS

The private companies do not normally employ consultants. Instead, they use consulting engineers hired by the Ministry of Commerce and Industry to act as full-time electricity advisers.

FINANCING

Although purchases are paid for in cash, buyers favour credit financing, especially on large deals.

STANDARDS

European specifications are used: VDE, BSS.

ENERGY RESOURCES

Fuel oil. In Jeddah, Riyadh and Dhahran, turbines are on gas.

DEVELOPMENT PROGRAM

Capital Projects — Desalination plant in Jeddah will supply 50 MW. Jeddah Electric is expanding distribution system

to 10 kV. Dhahran Electric is studying generation at 33 kV and is commissioning two new turbines (15 MW each). Riyadh Electric will install two new turbines (15 MW each).

Future Planning — The systems are to be standardized in the next five to six years on 220 V, 50 Hertz.

MARKET FACTORS

Local Industry — none.

Foreign Suppliers — The chief suppliers are as follows: U.S.A., Britain, West Germany, Italy, Switzerland and Belgium. Companies have agents in Saudi Arabia and their representatives make frequent visits from the European or regional headquarters to provide technical assistance. Lower transportation costs from Europe give European suppliers a major competitive edge over Canadian suppliers.

MARKET PROMOTION

Canadian companies must have a Saudi agent in order to maintain contact with the government and private power companies, and to be kept informed of tenders and market demands. Canadian companies can be in a good competitive position if they grant credit financing on large deals.

REPORTING POST

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Beirut, Lebanon

CABLE: CANADIAN

PHONE: 250955

TELEX: 652 (DOMCAN BERYT)

ASIA

Since most power development projects in Asian countries are assisted by loan aid programs, Canadian firms are advised to keep in regular contact with financing institutions such as CIDA, EDC, IBRD, IDA, UNDP and ADB on upcoming financed projects.

Competition for equipment sales in Asian nations is extremely keen from such countries as Japan, U.S.A., Britain and West Germany.

Local representation as well as competitive prices and financing are essential for doing business in any Asian country.

CEYLON

MARKET DATA

Capital city	Colombo
Area	25,000 sq. mi.
Population (1963)	10,590,060
Language	Sinkalese and Tamil (English is common in business)
Currency	Rupee (Cdn \$1 = 5.52 rupees)
Principal cities (Pop. 1963)	— Colombo 800,000 — Trincomallee 34,900

UTILITY ORGANIZATION(S)

Ceylon Electricity Board (CEB)
P.O. Box 540
Colombo, Ceylon

A statutory corporation established by Act of Parliament, the CEB is the sole authority for the generation and transmission of electrical energy on the Island. The CEB reports to Parliament through the Ministry of Land, Power and Irrigation.

OFFICIALS

Chairman — M. I. Aziez
General Manager — T. W. Mendis
Chief Commercial Officer (purchasing) — V. R. Charavanapavan

PRESENT FACILITIES

Total installed capacity — (1969) 262 MW (hydro 192 MW; steam thermal 50 MW; diesel 20 MW)
Maximum system peak — (1969) 145.8 MW
Production — (1969) 696 GWH

Forecast annual production growth over next five years — 15 per cent

Number of customers — (1969) 61,905

Transmission — Voltage	Route Miles
132 kV	235
66 kV	195.19
33 kV	1,700 (overhead) 27 (underground)

Distribution — 11/6.4/3.3 kV

Service Voltages — 230/400, 1 and 3 phase

Underground — Colombo has underground system

System control — load dispatching unit has not been constituted, will be undertaken

PROCUREMENT PROCEDURES

Basic materials required are purchased as a result of competitive bids. Where supply and installation of equipment not manufactured in Ceylon is involved, joint venture with local firms is essential since the CEB would require the agent of the supplier to undertake the installation, as well as the maintenance, of the plant and equipment.

On major projects, consultants are selected following competitive bids. The consultants undertake the preparation of the tender documents and generally assist the valuation of bids and supervise the construction works. No undue preference is given to local firms. The main criterion is the ability to provide the service, the quality of the material or equipment and the cost.

The CEB has not so far shown any preference to turnkey or package contracts.

Canadian goods enjoy preferential tariffs along with goods from other Commonwealth countries and do not face any form of discrimination.

CONSULTING REQUIREMENTS

The CEB has employed foreign consultants for the following projects;

Undertakings Department—Preece, Cardew and Rider, Britain

Maskeliya Oya Project Stage I — T.I.A.L. Vancouver

Maskeliya Oya Project Stage II — Montreal Engineering

Mahaweli Ganga Project Stage I — ECI, Denver

Mahaweli Ganga Project Stage II — no consultant, was to be awarded by the end of 1970, possibly IBRD financing

FINANCING

Except for the first hydro project which was financed from the government's own foreign exchange reserve, the financing for six major projects has been as follows:

four projects — loans provided by IBRD
one project — loan provided by EDC of Canada
one project — manufacturers credit facilities (Mitsui Sumitomo, CGEE, and Brown Boveri)

Materials required for other works and services are purchased from the government's own foreign exchange reserve or from foreign aid.

STANDARDS

The Board follows the BSS but would accept equivalent standards.

ENERGY RESOURCES

No known reserve of fossil fuel. Estimated hydro potential of 1,400 MW.

DEVELOPMENT PROGRAM

Current Capital Projects — The major hydro project has been completed and work on the Maskeliya Oya Stage II is due to start shortly. The transmission facilities consisting of 205 miles of 132 kV line and 500 miles of 33 kV line are under construction. These works, to be completed by the end of 1970, would cost the Board Rs 116 million (Rs 54 million foreign cost — suppliers credit).

Future Planning

Stage II Maskeliya Oya Project — consists of a diversion dam, five miles of tunnel, penstocks and 2 x 45 MW hydro generating sets.

In addition a 25 MW gas turbine will be installed.

Material and Equipment Requirements — Approximate annual requirements:

Distribution transformers	
33 kV/LT and 11 kV/LT	200 to 250
Cable	
ACSR 7/102 and 7/144	100 tons
AAC 7/102 and 7/134	250 tons
Line hardware (insulators, etc.)	
33 kV and 11 kV	125 route miles
Line hardware (insulators, etc.)	
LT	300 route miles
Service connection materials	
(meters, cutouts, etc.)	8,000

Underground cables LT 30 route miles

Underground cables 33 and 11 kV 10 route miles

MARKET FACTORS

Local Industry — There are few local manufacturers of electrical machinery.

Foreign Suppliers — The major suppliers to this market are British. Well known British manufacturers have long-standing connections with the few large and well established engineering firms here.

MARKET PROMOTION

If Canadians are to sell in this market, they should be able to compete with other suppliers. This has not been possible in the past due to the high transportation costs between Canada and Ceylon. This being a small market, some Canadian manufacturers feel that efforts to sell here are a waste of time. The best competitive opportunity for Canadian firms lies with projects financed by international agencies such as the IBRD and ADB. If possible, local agents should be found to represent Canadian firms. Representatives of Canadian consultants and construction firms should visit Ceylon to familiarize themselves with local conditions and to establish contact with government departments.

REPORTING POST

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INDIA

MARKET DATA

Capital city	New Delhi
Area	1,261,411 sq. mi.
Population (1967)	511,000,000
Language	Hindi (English is language of business and government)
Currency	Rupees (Cdn \$1 = 7.3 rupees)
Televisions (1965)	506
Telephones (1965)	766,093

Principal cities (Pop. 1965) — Bombay 4,653,687
— Calcutta 4,641,817
— New Delhi 2,711,808
— Madras 1,864,813

UTILITY ORGANIZATIONS

Ministry of Irrigation and Power
Government of India
New Delhi

The Central Water and Power Commission (CWPC)
Bikaner House
Shahjahan Road
New Delhi

Department of Atomic Energy
Government of India
New Delhi

The Electricity Boards of the states (provinces)

The generation, transmission, and distribution of power in India is a government monopoly. The state (provincial) governments initiate proposals for setting up power projects, and the Central Government Ministry of Irrigation and Power co-ordinates them within the development targets laid down by the Central Government Planning Commission. The annual execution of the projects is the responsibility of the state Electricity Boards.

The CPWC is responsible for initiating and co-ordinating schemes for the exploitation of water resources for several purposes, including hydro power generation, thermal power development, and transmission and utilization of electric energy.

The Department of Atomic Energy is responsible for developing and administering India's atomic power stations. It plans and administers the projects through the Atomic Energy Commission. The AEC is the agency for all nuclear research and development programs in India.

OFFICIALS

Minister of Irrigation and Power — Dr. K.L. Rao
Chairman (CWPC) — G. A. Narasimha

Other responsible officials are the chairmen and chief engineers of the individual state Electricity Boards.

PRESENT FACILITIES — 50 HERTZ

Total installed capacity — (1967) 10,000 MW (hydro 4,700; steam 4,900; gas turbine and diesel 400 MW)

Maximum system peak — (1968) 40,770 GWH

Production — (1967) 36,375 GWH

Forecast annual production growth over next five years — 2.5 per cent

Number of customers — (1967) 9.7 million

Transmission — 500 V up to 11/15 kV — 291,000 circuit KM; over 11/15 kV — 194,200 circuit KM

Distribution — 22 kV; 33 kV; 3.3 kV; 6.6 kV; 11 kV

Service voltages — 230/400, 1 and 3 phase

PROCUREMENT PROCEDURES

The Electricity Boards handle purchasing for major power projects. The chief method used by these agencies is the public tender call. Tender notices are in English, and are advertised in leading newspapers. They are also mailed direct to those contractors registered with the purchasing agencies. Registration takes the form of simple letters indicating interest in bidding for tenders. Registration is not obligatory. There are three types of tender: (1) open tenders, (2) limited tenders, and (3) restricted tenders open for bidding in a country offering loans for a specific project.

Turnkey or package contracts are not considered.

With the availability of indigenous expertise and equipment, preference is always given to Indian equipment.

There is no law requiring local representatives, but the buying organizations always prefer this arrangement.

India does not extend any tariff preferences to any country on electrical equipment. It protects indigenous industry by imposition of import controls and custom duties (usually 60 per cent ad valorem).

CONSULTING REQUIREMENTS

Purchasing agents do employ consultants to undertake all studies connected with the projects. With a large group of unemployed and under-employed engineers in India, the use of foreign consultants is generally discouraged.

FINANCING

For open tenders, financing is with India's own foreign exchange funds. World Bank finances are used for purchases from the member countries. Tied loans are used when buying equipment from the donor countries. Canada has supplied both electrical equipment and engineering services under Canadian loans and grants.

STANDARDS

India has its own standards but these have mostly developed out of accepted world standards. North American standards are accepted with modifications.

Indian Standards Institution
Manak Bhavan
Bahadur Shah Zafar Marg
New Delhi

ENERGY RESOURCES

Estimated reserves:

- (1) Hydro potential: 40 million KW (at 60 per cent load factor)
- (2) Coal: 121 billion metric tons
- (3) Petroleum (crude): 46 million metric tons

DEVELOPMENT PROGRAM

Material and Equipment Requirements — There is adequate capacity in the country for manufacture of heavy electrical equipment and no import of such equipment is envisaged in future.

Current and Future Capital Projects

- Rana Pratap Sagar Nuclear Station — 200 MW to be commissioned in 1970-71
- Srisailem Hydroelectric Project — 4 x 110 MW units and provision for addition of three units — benefits expected early — Fifth Plan period — estimated cost Rs 74.70 Crores
- Kothagudem Thermal Power Station Stage III — 2 x 100 MW units proposed under Fourth Plan — estimated cost Rs 44 Crores
- Naharkatiya Thermal Project (Assam) — proposed extension by 30 MW steam turbo set under the Fourth Plan
- Pathratu Thermal Power Station (Bihar) Stage II — 3 x 50 MW units to be implemented during Fourth Plan — estimated cost Rs 33.02 Crores
- Dhuvaran (Cambay) Thermal Power Station (Gujarat) — extension by 2 x 125/140 MW units sanctioned for the Fourth Plan — estimated cost Rs 36.58 Crores
- Iddiki Hydroelectric Scheme (Kerala) — common storage reservoir — 3 x 130 units for 1971-72 — three similar units at a later date — project being executed with Canadian assistance — estimated cost Rs 68.2 Crores
- Nagpur (Goradi) Thermal Station (coal) — 4 x 120 MW units — two units to be commissioned in Fourth Plan period
- Sharavathy Hydroelectric Project Stage III 9th and 10th — 89.1 MW units for implementation during the Fourth Plan — cost Rs 8.18 Crores
- Balimela Dam and Hydroelectric Project — 6 x 60 MW units to be completed in the Fourth Plan — estimated cost: dam Rs 33.6 Crores, hydroelectric works Rs 27.92 Crores
- Ennore Thermal Power Station — 2 x 110 MW and 2 x 60 MW units to be completed in the Fourth Plan — estimated cost Rs 58.14 Crores
- Obra Thermal Power Station Stage II — 3 x 100 MW units to be executed under the Fourth Plan — estimated cost Rs 50 Crores
- Santaldih Thermal Station (coal) — 4 x 120 MW units to be completed during Fourth Plan
- Badarpur Thermal Power Station (steam) — 3 x 100 MW units to be completed during the Fourth Plan — estimated cost Rs 40 Crores

MARKET FACTORS

Local Industry — There is adequate capacity in the country for the manufacture of heavy electrical equipment. Most new projects and expansions are now based on the use of indigenous equipment.

Foreign Suppliers — U.S.A., Canada, Western and Eastern Europe and Japan. The success of these foreign suppliers is not necessarily always due to the competitiveness of their products but is often related to the extent of their bilateral aid or trade programs.

MARKET PROMOTION

For Canadian manufacturers interested in the Indian market, joint ventures or local manufacture under licence hold the best potential. An important competitive factor is the extent of Indian manufactured content, if any, in the equipment being offered. With India's growing indigenous capacity, imports are now forbidden except in very rare circumstances. The same situation is true of consulting engineering services in this field. Only those firms which have joint venture operations established in India are likely to have an opportunity to secure work here.

REPORTING POST

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13 Golf Links Road
New Delhi 1, India

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PHONE: 61-8254
TELEX: 346 (DOMCAN DLI)

INDONESIA

MARKET DATA

Capital city	Djakarta
Area	735,340 sq. mi.
Population (1968)	115,130,000
Language	Indonesian (business correspondence in English)
Currency	Rupiah (US \$1 = 378 rupiahs)
Televisions (1969)	80,000
Principal cities (Pop. 1968)	Djakarta 4,774,000 — Bandung 1,085,000

UTILITY ORGANIZATION(S)

Perusahaan Listrik Negara (PLN)
(National Power Authority)
Djalan Singamangaradja 13
Kebajoran, Djakarta

PLN is a non-departmental government agency responsible for the generation, transmission, and distribution of electrical energy in all Indonesia and for the execution of minor projects. PLN's activities are supervised by the Directorate General of Power and Electricity (within the Department of Public Works), which is responsible for major electrical power projects. The Directorate General in effect now determines all major policy and purchasing decisions for the electrical sector.

RELATED ORGANIZATION(S)

Widjaya Karya and Indra Karya — state-owned company which carries out construction, contracting, and installation work required by the PLN

Djatilukur Power Authority — state enterprise for Djatilukur hydro facility

BAPPENAS — state planning board — overall planning and co-ordination of all aid-financed projects

Technical Assistance Committee (within the State Secretariat)

OFFICIALS

Director General of Electrical Power — Ir. Achmad Mohamad Hoesni

Director of Planning and Survey — Ir. Sufrani Atmakusama

Telecommunication and Power Adviser — J. C. Lithgow,
IBRD Resident Mission Djakarta, Jalan Widjaya 1 No. 61,
Kebajoran, Djakarta

PRESENT FACILITIES — 50 HERTZ

Total installed capacity — (1967) 586 MW (335 MW of "firm capacity"; hydro 283 MW; steam thermal 125 MW; diesel 178 MW)

Maximum system demand — (1966) 1,200 GWH

Production — (1966) 1,560 GWH

Forecast annual production growth over next five years — 10-15 per cent

Transmission — 7, 15, 25, 30, 70 and 150 kV

Service voltages — 127/220, 110/190, 1 and 3 phase

Underground — very little

System control — very unsophisticated

PROCUREMENT PROCEDURES

Tendering for IDA projects follows the normal IDA procedures. A technical team of the Directorate General of Power and Electricity has the responsibility for the analysis and evaluation of bids, and makes its recommendations to the Foreign Purchase Committee (PAPELON) for its approval. The IBRD expert with the IBRD Resident Mission in Djakarta provides advice and assistance. IBRD exercises an overriding voice in contract awards.

For minor purchases and supplies (estimated under US\$ 1 million in 1968) on commercial L/C basis, a local agent is indispensable because of the personal contact required and the short lead time of tender notices (about 30 days).

Tariffs are generally 10 and 30 per cent (turbo and steam generators free). In some item areas tariffs are as high as 80 per cent.

CONSULTING REQUIREMENTS

The PLN and the D/G of Electric Power must employ outside consultants for any studies, surveys or design work, as they do not themselves have the technical competence to do this work. The tender for technical assistance to PLN organization (included in Djakarta transmission rehabilitation project) will be awarded shortly under IDA loan.

FINANCING

Due to chronic shortage of foreign exchange, the procurement of all goods and services for the public power sector for the 1969/74 Development Plan is expected to depend on aid funds, both bilateral and from international agencies (principally IDA).

STANDARDS

Both European and North American standards are acceptable.

ENERGY RESOURCES

Crude oil production for 1968 was 202 million barrels.

Coal reserves of South Sumatra consist of 600 million tons proven and 2,000 million tons unproven.

DEVELOPMENT PROGRAM

Current Capital Projects — Apart from minor extensions to LV distribution lines, the only significant construction now under way is the Batang Agam hydro project — 10 MW. The ADB plans a detailed review of this project suggesting improvements and modification if required.

Future Planning

Over the period of the Five Year Plan (1969/74), it is expected that U.S. and Japanese aid will finance the rehabilitation of transmission and distribution in Central Java, East Java respectively. IDA is expected to approve a second credit sometime in 1970/71 to cover West Java. PLN estimates a total investment of US \$265 million including foreign exchange cost of US \$135 million — about 50 per cent for distribution and 50 per cent for generation.

Asaham Project (Sumatra) — design survey being carried out by Japan — possibility of financing from IBRD — construction commencing in 1972 (estimated will take four years).

MARKET FACTORS

Local Industry — none.

Foreign Suppliers — Success of suppliers is directly related to availability of foreign aid.

MARKET PROMOTION

Business at present is aid related. No substantial commercial market is expected to develop before eight to 10 years. A local agent/representative is essential for selling any goods or services to PLN.

Under present conditions market promotion activity by Canadian firms is not justified. Canadian suppliers seriously interested in building a base in Indonesia in anticipation of the development of a commercial market in late 1970s should:

(a) after a thorough personal investigation, appoint a local representative

(b) follow closely IDA project supply tenders expected over the next five years.

Canadian consultants interested in Indonesia are advised to keep in close touch with IBRD for IDA projects and to call on Mr. Lithgow of the IBRD mission in Djakarta.

REPORTING POST

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Djakarta, Indonesia

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TELEX: 011-4345 (DOMCAN DKP)

MALAYSIA

MARKET DATA

Capital city	Kuala Lumpur
Area	127,672 sq. mi.
Population (1965)	9,392,040
Language	Malay (official), Chinese, Indian and English (most common business language)
Currency	Malaysian Dollar (M \$1 = Cdn \$0.3525)
Televisions (1965)	50,000
Principal cities (Pop. 1960)	— Kuala Lumpur 400,000 — Penang 325,000 — Ipoh 126,000

UTILITY ORGANIZATION(S)

National Electricity Board (NEB)
Jalan Bungsar
Kuala Lumpur, Malaysia

The NEB is an autonomous government agency responsible for generation, transmission, and distribution of electric energy throughout the States of Malaysia, except Penang Island and parts of Perak which are supplied under licence by Perak River Hydro Electric Co. Ltd.

OFFICIALS

General Manager — Y.M. Raja Zainal bin Jaja Sulaiman

Deputy General Manager (Engineering) — Chan Khee Pok

Purchasing and Contracts Officer — K. K. Sunduram

PRESENT FACILITIES — 50 HERTZ

Total installed capacity — (1969) 660 MW (hydro 264 MW; steam thermal 360 MW; diesel 30 MW; gas turbine 4 MW).

Maximum system demand — (1969) 370 MW

Production — (1968/69) 2,226 GWH

Forecast average annual production growth over next five years — 15 per cent

Number of customers — (1969) over 400,000

Transmission — 275 kV	46 miles double circuit
132 kV	512 miles
66 kV	303 miles
33 kV	480 miles
11 kV underground	1362 miles
11 kV overhead	232 miles
22 kV o/h u/g	71 miles
6.6 kV underground	168 miles

Distribution — 11 kV and 6.6 kV

Service voltages — 230/400, 440, 1 and 3 phase

System control — facilities are modern

PROCUREMENT PROCEDURES

All purchases are through international tenders issued through the prime consultants, Preece, Cardew & Rider, Crown Agents, Britain, or local advertisement.

All preferential duties for Commonwealth countries have been abolished. Duty on all electrical apparatus is the same, whatever its country of origin.

CONSULTING REQUIREMENTS

The NEB normally employs consultants to undertake feasibility studies. The prime consultant is Preece, Cardew & Rider, Britain. Shawinigan Engineering Co. has conducted a feasibility study on the Temengor Hydro-electric Scheme. They have recently tendered in conjunction with local firm on the design engineering for the extension to the Port Dickson Thermal Plant. Normal extension up to 132 kV is engineered by the NEB staff.

FINANCING

Small payments are made from NEB's own capital and large amounts by the World Bank or suppliers' credit (bilateral with the World Bank).

STANDARDS

The NEB always insists on BSS or equivalent.

ENERGY RESOURCES

All generators are powered by imported oil which is refined locally. The only project of a non-thermal nature is the Temengor Hydroelectric Scheme.

DEVELOPMENT PROGRAM

Material and Equipment Requirements

Annual Cables — 249,000 yards — Britain and Japan

Distribution transformers — 197 — Britain KWH meters — 35,000 — Britain and Japan

Switchgear — 1,730 pieces — Britain

Current Capital Projects (before 1974)

Port Dickson Ext. — thermal — 120 MW — US \$20 million — IBRD financed

Prai Ext. — thermal — 30 MW — US \$5 million — IBRD financed

Johore Bahru — thermal — 30 MW — US \$5 million — IBRD financed

Future Planning (After 1974)

Port Dickson Ext. — thermal — 360 MW — US \$55 million

Perak River (incl. Temengor) — hydro — 600 MW — US \$450 million.

MARKET FACTORS

Local Industry — There are three large manufacturers of electrical wires and cables: Malayan Cables Ltd.; Power and Telecommunications Industries Bhd.; and Far Eastern Cables (M) Sdn. Bhd.

Foreign Suppliers — For international tenders Japan and India have proved most successful with cables and meters, while the British supply most transformers. Most generation equipment is British or Japanese. Price is the most important factor.

MARKET PROMOTION

The market is tied in with low cost financing. Canadians might be successful with some combination of CIDA and EDC funds.

REPORTING POST

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Kuala Lumpur, Malaysia

CABLE: DOMCAN

PHONE: 89722/4

TELEX: KL/TX 279 (DOMCAN KL)

PAKISTAN

MARKET DATA

Capital city	Islamabad
Area	365,529 sq. mi.
Population (1961)	93,720,000
Language	Urdu — West Pakistan Bengali — East Pakistan English — correspondence
Currency	Rupee (Cdn \$1 = 4.62 rupees)
Principal cities (Pop. 1961)	— Karachi 1,912,598 — Lahore 1,296,477 — Islamabad 50,000

UTILITY ORGANIZATION(S)

West Pakistan Water & Power Development
WAPDA House
Lahore, West Pakistan

WP. WAPDA is an agency of provincial government of West Pakistan responsible for the generation, transmission and distribution of electrical energy throughout West Pakistan except Karachi.

East Pakistan Water & Power Development Authority
WAPDA Building
Dacca — 2, East Pakistan

EP. WAPDA is an autonomous government agency responsible for the generation, transmission, and distribution of electrical energy throughout the province of East Pakistan.

RELATED ORGANIZATION(S)

Ministry of Industries and National Resources
Planning and Development Department (West Pakistan)
Planning and Development Department (East Pakistan)
Pakistan Atomic Energy Commission.

OFFICIALS

WP. WAPDA

Managing Director — I. A. S. Bakhari
Chief Engineer, Designs and Standards — Aftab Saeed Khan

EP. WAPDA

General Manager (Power) — A. N. Mohammad
Director of Planning — A.S. M. Nurullah

PRESENT FACILITIES — 50 HERTZ

Total installed capacity — 1969 —	W. Pakistan: 1230.83 MW (hydro 601.1 MW; steam thermal 500.7 MW; turbine 129.05 MW)
	— E. Pakistan: 272.0 MW (hydro 80 MW; steam thermal 61 MW; gas turbine 145 MW; diesel 86 MW)
Maximum system peak — 1969 —	W. Pakistan: 1212 MW
	— 1969 — E. Pakistan: 195 MW
Production — 1968 —	W. Pakistan: 3647.9 GWH
	— E. Pakistan: not known
Forecast average annual production —	W. Pakistan: 46 per cent
growth over next five years	— E. Pakistan: 16 per cent
Number of customers — 1968 —	W. Pakistan: 994,680
	— 1969 — E. Pakistan: 200,000
Transmission —	W. Pakistan — 5081 miles total: 132 kV; 220 kV; 66 kV; 34.5 kV; 66 kV loop, Karachi and Dhabeji
	— E. Pakistan 132 kV 660 circuit miles 66 kV not available 33 kV not available
Distribution —	W. Pakistan: 11, 33 and 66 kV
	— E. Pakistan: 11 kV
Service voltages —	230/415, 3 phase
Underground —	little or none
System control —	W. Pakistan: modern — planned control systems for grid under the Telecommunication Master Project (1970-75)
	— E. Pakistan: voice communication (telephone)

PROCUREMENT PROCEDURES

For items available in Pakistan open tenders are called by advertisement in local papers. To date, all capital projects have been carried out under foreign aid loans and include consulting services and construction supervision from the

lending country. Contractors are selected from a pre-qualified list of contractors on basis of past experience, staff and financial resources. Selected contractors are required to take out comprehensive all-risk insurance covering works and construction risks and to furnish performance bonds.

No protective tariffs are applicable to heavy electrical goods. Canadian electrical goods are accorded the Commonwealth Preferential Treatment.

Local representation is considered necessary for liaison with the purchasing departments and for picking up tender calls under international financing.

CONSULTING REQUIREMENTS

Each WAPDA has general consultants for preliminary investigations of all new projects. Firms of independent consulting engineers from donor countries (aid) are normally employed for detailed project engineering, designs, specifications, contract documents and bid analysis, and for supervision of the project execution and of its operation for an initial period. To obtain assignments, foreign consultants must affiliate with local consulting firms. Such action also ensures a link with local government agencies for advance information on upcoming projects.

FINANCING

Aid comes from IBRD and IDA member countries, Belgium, Canada, France, West Germany, Italy, Japan, Netherlands, Britain, U.S.; EXIM Bank; East European countries including USSR under barter. Supplier credit financing is also obtained. Non-member countries are approached on individual basis.

STANDARDS

A Standards Directorate has been created to prepare detailed specifications of materials and standardization material mostly conforming to North American and European Standards.

ENERGY RESOURCES

West Pakistan: Hydro potential 10 GW (250 MW developed); gas reserves — 10 million million cu. ft.; coal reserves — 6,000 trillion Btu's; Oil reserves — 200 trillion Btu's

Two of the three refineries in W. Pakistan use imported crude

East Pakistan: Hydro potential — some at Kaptai; gas reserves — 5.45 million cu. ft.; gas — coal — uneconomical

DEVELOPMENT PROGRAM

Current Capital Projects

West Pakistan:

Mangla Hydro Electric Extension (Units 4, 5 and 6) — Total 300 MW — Unit 4 installed — Units 5 and 6 by Skoda Export, Czechoslovakia — expected installed in 1971.

Quetta Thermal Power Station Extension — 1 x 7.5 MW — financing not yet arranged.

Additional gas turbine at Kotri — 14 MW — no financing as yet.

Thermal Station (Guddu) — 2 x 100 MW units — to be commissioned by 1971 — estimated cost US \$112 million of which US \$67 million is foreign exchange — Czech financing and Skoda Export supplying — another 2 x 100 MW unit is being procured from USSR.

North Zone Transmission and its extension: (a) 220 kV, 218 miles (b) 132 kV, 30 miles — work in progress — no completion date set.

Southern Zone Transmission (EHV Karachi — Guddu — Lyallpur) — preliminary work begun — USSR financing, including equipment — estimated cost US \$120 million of which US \$54 million is foreign exchange.

System Renewals and Replacements — by end 1970 — 132 kV, 300 miles; 66 kV, 500 miles; 11 kV and LT, 16,000 miles

Nuclear Power Plant (Karachi) — 125 MW — Canadian GE supplied and installed — operation in 1971.

East Pakistan:

Karnaphuli Hydro Station addition — 50 MW unit commissioning May, 1972.

Khula Thermal Station — 60 MW thermal unit — commissioning in 1970 — Czech loan.

Ghorasal Thermal Station — 2 x 55 MW units — Russian loans — commissioning date uncertain.

Chittagong Thermal Station — 60 MW unit — Czech loan — commissioning date uncertain.

East West Interconnector — 110 miles of 230 kV, double circuit transmission line — Ishurdi to Ghorssal.

Ishurdi — Saidpur line — 168 miles of double circuit 132 kV transmission line — Yugoslavian loan — commissioning date — 1973.

Ashuganj — Mymensingh — Jamalpur line — 105 miles of double circuit 132 kV line — Yugoslavian loan — commissioning date 1973.

Goalpara — Mangla — Barisal line — 80 miles of single circuit 132 kV transmission line — Japanese loan — commissioning date 1973.

Future Planning

West Pakistan:

Tarbela (Units 1,2,3 and 4) 525 MW — total foreign exchange cost US \$34 million.

Additional generation at Quetta along with transmission facilities — 30 MW — expected foreign exchange cost US \$12 million.

Tarbela (Units 5,6,7 and 8) — foreign exchange cost of US \$45 million during 1970-75 and US \$30 million during 1975-80.

Mangla Hydro (Units 7 and 8) — 200 MW — foreign exchange cost US \$12 million.

Transmission facilities for Mangla Units 7 and 8 — foreign exchange cost US \$5.4 million.

EHV transmission for Tarbela Units 1,2,3 and 4 — single circuit 500 kV — Tarbela to Lyallpur — foreign exchange cost US \$18 million — \$3 million for 1975 — 80.

Three 220 kV circuits — Tarbela to Wah cantonment — US \$5 million foreign exchange cost.

220 kV Wah — Daudkel single circuit line and 220 kV Lyallpur Sahiwal line — US \$5 million.

EHV Transmission for Tarbela (5,6,7, and 8) — 2nd circuit of 500 kV line — US \$21 million of which \$14 million for 1975-80 period.

Secondary Transmission System — US \$42 million.

Distribution — US \$18 million.

Renewal and Replacements — US \$1.6 million.

Research and Test Lab. Extension — US \$1 million.

East Pakistan:

Proposed 200 MW Nuclear Plant — ACEC (Belgium) will manufacture the reactor.

No major capital projects — all present planning centres around the extension of sub-transmission and distribution systems (33 kV and below).

MARKET FACTORS

Local Industry is small and dependent upon imported materials.

Transformers — up to 500 kVA — four companies with installed average annual capacity of 268,000 kVA.

Switchgear — 500,000 small switchgears and 1300 units of HT and LT switchgear — five companies.

Electric motors — up to 40 hp.

Steel towers — limited capability.

Cables and wires — limited to PVC type (domestic wiring)

Watt/hour meters — 235,000 units per annum.

However, the industry on the whole is a growing one with scope for foreign investment.

Foreign Suppliers — The principal suppliers for power projects in Pakistan are practically all the major world suppliers including those in Eastern Europe and USSR under barter deals.

MARKET PROMOTION

The power development taking place in Pakistan holds good prospects for Canadian participation under Canada's loan aid program and multilateral financing. Canadian firms could increase their share of this market by visiting this country more frequently for closer examination of development plans in the light of Canadian capabilities and through submission of proposals on turnkey basis involving financing, installation and commissioning. Large manufacturers should invite appropriate power officials to Canada for plant visits, including visits to sites where the equipment is in use. Firms should keep in regular contact with financing institutions (CIDA, EDC, World Bank, IDA, UNDP, Asian Bank), as they maintain files concerning the capabilities and experience of firms considered suitable for assignments in the borrower country.

REPORTING POST

Commercial Secretary
Office of the High Commissioner for Canada
Hotel Shahrazad
Islamabad, Pakistan

CABLE: CANADIAN

PHONE: 21101-04

TELEX: 875 (DOMCAN IBA)

PHILIPPINES

MARKET DATA

Capital city	Manila
Area	115,708 sq. mi.
Population (1968)	35,883,000
Language	Business community uses English
Currency	Peso (Cdn \$1 = 5.39 peso)
Televisions (1967)	14

Telephones (1967) 174,732
Principal cities (Pop. 1967) — Manila 1,449,000
— Quezon City (Luzon) 522,800

UTILITY ORGANIZATION(S)

National Power Corporation (NPC)
Bonifacio Drive, Manila

A government agency organized for the purpose of undertaking the development of electric power and to undertake the development of industries that are heavy consumers of power. The NPC is mainly involved in power production which is wholesaled to a number of regional utilities.

Manila Electric Company (MERALCO)
Ortigas Avenue
Posig, Rizal

Meralco is the largest private power utility in the Philippines. Its power system now generates almost 90 per cent of the total KWH sold in the country. It also purchases 200 MW of power from NPC and owns 975 MW of capacity.

In addition, there are upwards of 50 provincial, municipal and private power utilities of various sizes operating in the country.

RELATED ORGANIZATIONS

Electrification Administration (EA)
Bookman Building
Quezon Blvd. Ext.
Quezon City

A government agency established primarily as a lending institution to grant soft loans to electric power companies.

Public Service Commission
5th Floor, Gutierrez — David Building
Cr. Scout Reyes Street & Pasay Avenue
Quezon City

Government regulatory office to control and supervise operators of public utilities.

OFFICIALS

NPC: General Manager — Ramon R. Ravanzo
Chief of Engineering Department — Crispin T. Ubaldo

MERALCO: President — Eugenio Lopez
Purchasing Department — C. R. Marquez

PRESENT FACILITIES — 60 HERTZ

Total installed capacity — (1969) 1,292.7 MW (hydro 542.1 MW; steam thermal 736.5 MW; diesel 14.1 MW)

Maximum system peak — (1968) 1,032.3 MW

Production — (1968) 4,324 GWH

Forecast average annual growth installed capacity over next five years — 7 per cent

Number of customers — (1968) 1,040,000

Transmission — NPC 230 kV — 481.0 KM
115 kV — 197.9 KM
59 kV — 759.1 KM
23 and 34.5 kV — 247.5 KM
13.8, 4.1 and 2.4 kV — 970.4 KM

MERALCO 115 kV — 94 circuit miles
34.5 kV — 293 circuit miles
13.8 kV — 113 circuit miles

Distribution — Meralco: 6.24 kV, 4.8 kV, 1.99 kV

Service voltages — 220, 110/220, 125/216, 1 and 3 phase

System control — NPC: load dispatching centre, no remote control, telemetering or data link in system

MERALCO: modern telemetering remote control and communications network

PROCUREMENT PROCEDURES

NPC: Contract for public service or for furnishing of supplies, materials, and equipment to the government or any of its branches or agencies must be made on the basis of public bidding. All public bids of P 100,000 or more involving the government must to be approved by the Office of the President.

Philippine Government procurement regulations permit a foreign firm to bid on government procurements only if it maintains a registered branch office or a registered resident agent in the Philippines. The principal procurement office is the Bureau of Supply Co-ordination of the Department of General Services. Normally, a 15 per cent preference is accorded to Philippine firms.

Government invitations to bid are reported in the Department of Commerce publication, "International Commerce," and advertised in four major newspapers of the country and in trade journals.

The first step in obtaining government business is to be placed on the bidder's mailing list of the agency with which the applicant wishes to do business. This is done by sworn application accompanied by certified copies of the company's Application for and Certificate of

Registration issued by the Philippine Bureau of Commerce, articles of incorporation, receipted franchise tax bill, an up-to-date financial statement, and other attachments.

MERALCO: Purchases are normally negotiated through public tenders. The Purchasing Department is responsible for canvassing prices from local and overseas suppliers and placing of orders, after consultations with the Engineering and Financial Departments.

American goods enjoy a tariff preference. U.S. suppliers pay 90 per cent of the normal duty rates but this preference may disappear on January 1, 1974. Customs duty is based on the Brussels Nomenclature. Import duty is 10 per cent ad valorem on electrical equipment and machinery.

CONSULTING REQUIREMENTS

Both NPC and MERALCO normally employ foreign consultants to undertake feasibility studies, power resources surveys, project design and power system studies.

FINANCING

MERALCO relies on long-term financing obtained by the sale of MERALCO common stocks and mortgage bonds in the U.S. and Europe. Suppliers' credits account for a substantial portion of the capital requirement.

NPC has depended on foreign loans mainly from IBRD and the Export-Import Bank in the U.S.A. However future prospects of additional financing from IBRD and EXIM would appear limited. NPC also benefits from Japanese reparations payment to the Philippines.

STANDARDS

Government agencies as well as private firms set their own specifications in accordance with American standards such as ASTM, NEMA, ASA, and AIEE.

ENERGY RESOURCES

The magnitude and quality of known fossil energy reserves is limited. About 61 per cent of current electric power production is based on bunker fuel which is imported from the Middle East, Indonesia and British Borneo. There are four major international oil companies refining in the Philippines. There is approximately 1305 MW of under-developed hydroelectric potential which has been studied by the NPC.

DEVELOPMENT PROGRAM

Material and Equipment Requirements — All domestic requirements for distribution transformers, switchgear and

aluminum transmission and distribution cable (ACSR, ACAR, and all aluminum) are met by imports.

Current Capital Projects

NPC: Bataan Thermal Unit No. 1 — 75 MW — US \$18.45 million — operation April 1971 — Ilocos electrification (transmission line) scheduled completion end 1970 — Central Luzon electrification (transmission line) scheduled completion end 1970.

Laguna — Batangas Phase II (transmission) scheduled completion end 1970.

MERALCO: Construction program calls for an investment of about US \$123.6 million for the period 1970-73 — contracts have been awarded for construction of the generating stations.

Snyder Station No. 1 — 220 MW — operational January 1971 — US \$21.2 million.

Snyder Station No. 2 — 330 MW — operational August 1972 — US \$29.5 million.

Montelibano Station No. 1 — 330 MW — operational July 1973 — US \$32.6 million.

Transmission and	1970	US \$ 8.6 million
Distribution	1971	US \$10.7 million
Facilities	1972	US \$ 9.4 million
	1973	US \$11.5 million

Montelibano — Taytay Transmission line — 230 kV.

Future Planning

NPC: Bataan Thermal Unit No. 2 — 150 MW — completion early 1974 — cost US \$13 million and Pesos 20.5 million.

Southern Luzon Electrification Stage 1 — transmission — initial operation 1972 — cost \$2.4 million and Pesos 15.3 million.

Zambales Electrification Phase A — Transmission operation 1973 — cost \$0.37 million and pesos 2.07 million.

Maria Cristina Unit No. 5 — 50 MW — completion 1974 — cost \$3.03 million and Pesos 14.3 million.

Agus River No. 1 — 74 MW — feasibility study by Middle West Services Co., Chicago — estimated cost of development Pesos 133.5 million — feasibility Agus No. 2 — Mindanao electrification and transmission facilities also being studied.

Projects under Consideration

- a) Upper Pampangu River Project — feasibility of hydro electric prospects.
- b) Caliraya Pump Storage Hydroelectric project — feasibility study.

c) Thermal Unit Nos. 3 & 4 (Luzon) — 200 MW each — on steam 1976 and 1978 respectively.

d) Visayan Islands Electrification.

MERALCO: Initial studies by Harza Engineering for a pump storage hydroelectric plant nuclear power plant — 300/500 MW for 1980 — Bechtel Corp., consultants.

MARKET FACTORS

Local Industry — There are two major cable manufacturers in the Philippines. Phelps Dodge Philippines Inc. and American Wire & Cable Co. These two firms are each producing about three million pounds of electric copper wire and cable annually.

Foreign Suppliers — The major suppliers are U.S.A., Japan West Germany, and Britain. Their success in penetrating this market is mainly due to attractive credit offers and strong representation in Manila.

MARKET PROMOTION

It is present policy of the two major power organizations in the Philippines to procure requirements through international competitive bidding. The best approach for Canadian manufacturers is to use the services of a local representative or agent who is regularly supplied with sufficient quantities of literature and catalogues (in English) and who is kept abreast of new techniques and developments.

International competition for this market is very strong and it is important that Canadian offers be fully competitive in price, delivery terms and quality.

Financing is the key to large equipment sales to the Philippines.

REPORTING POST

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Canadian Consulate General
P.O. Box 1825
1414 Roxas Boulevard
Manila, Philippines

CABLE: CANADIAN
PHONE: 50-20-76, 77, 78
TELEX: 3252 (DOMCAN PN 3252)

SINGAPORE

MARKET DATA

Capital city (Pop. 1966) City of Singapore 1,200,000

Area	209.6 sq. mi
Population (1966)	1,945,000
Language	Malay (English widely understood)
Currency	Singapore Dollar (2.85 = Cdn \$1)

UTILITY ORGANIZATION(S)

Public Utilities Board (PUB)
City Hall
St. Andrew's Road
Singapore 6, Singapore

The PUB is a statutory body responsible for the provision of all aspects of electricity, water and gas services for the whole island of Singapore. The operations of the Board are conducted by 12 members appointed by the Minister of Law and National Development.

OFFICIALS

General Manager — A. Z. Fluczek
Chief Planning and Design Engineer — Patrick Pang
Chief Electrical Engineer — Z. K. Fluczek

PRESENT FACILITIES — 50 HERTZ

Total installed capacity — (1969) 584 MW (steam thermal 562 MW; gas turbine 22 MW)

Maximum system demand — (1969) 325 MW

Production — (1969) 1,885 GWH

Forecast average annual production growth over next five years — 20 per cent

Number of customers — (1969) 280,000

Transmission — 66/22/6.6 kV — 210 miles

Service voltages — 220/440, 1 and 3 phase

Underground — all distribution service is underground

System control — supervisory control system using telephone, pilot wire for remote control and telemetering of major stations (66 kV) — plan extension to 22 kV stations

PROCUREMENT PROCEDURES

Equipment requirements are supplied through both local and international tenders. Only member countries of the IBRD are allowed to participate. Tenders are advertised in local and foreign newspapers as well as being announced in the Government Gazette. All tender documents are in English and all correspondence and quotations must also be in English.

Package and turnkey projects are not favoured because it is cheaper for each component to be individually tendered.

A local agent is helpful for liaison between foreign principals and PUB.

Canadian equipment enjoys Commonwealth Preferential treatment. At present there is no legislation enacted to protect local industry, other than tax-holiday benefits for approved "pioneer industries." Government gives unspecified and variable preference to local firms producing required equipment.

CONSULTING REQUIREMENTS

The PUB employs consultants to undertake feasibility studies (as required by IBRD), power systems studies and planning, and other projects that they feel their local staff is incapable of handling adequately.

Consulting services are solicited from companies which have a proven record of reliability and whose prices are reasonable. These companies must be registered with the IBRD.

The type of consultant services required is mainly in areas of feasibility studies and installation supervision. Demand for electric power in the 1970s will necessitate a study of the feasibility of using a higher voltage network.

FINANCING

Financing of power projects is done via a combination of IBRD loans, suppliers' credit (including aid) and some internal financing.

STANDARDS

BSS are traditional. Present tendency is towards standards proposed by the IEC.

ENERGY RESOURCES

Singapore has neither hydroelectric potential nor coal reserves. There are two oil installations and three oil refineries which are supplied oil from the Middle East.

DEVELOPMENT PROGRAM

Current Capital Projects

1967-69: Jurong Stage I Power Station, 4 x 60 MW,
US \$39.9 million

1970-72: Jurong Stage II Power Station, 2 x 120 MW,
US \$32 million, partly IBRD-financed.

Future Planning

1974-75 Requirement for new station, probably an oil-fired steam generation station.

The PUB at present plans to spend S \$262 million in the next five years for electrical transmission and distribution projects.

MARKET FACTORS

Local Industry

Far Eastern Cables and Switchgear Ltd. — manufacturing only cables of sizes 1/044 through 61/103 (PVC) — PVC insulated and sheathed cables — PVC insulated steel wire armoured cables — PVC insulated and sheathed aluminum conductor cables — PVC insulated control cables of any core.

Sigma Cables Co. Ltd. — all types of PE (polyethylene) cables: power cables, armoured cables, control cables — sizes 1/044 through 61/103 (PVC).

Foreign Suppliers

Power cables: Japan, India and Yugoslavia

Transformers: Japan, Belgium and Germany

Switchgear: Germany, Britain, France, Japan and Sweden.

Most of these suppliers are represented locally but manufacturers' engineers are normally required to be stationed in Singapore during the period of installation of equipment.

MARKET PROMOTION

Competition is extremely keen from Japan, European countries, Britain and U.S.A.

Purchasing up to and including 1971 is virtually completed. During 1970 — 71 some further tenders may be issued for equipment to supply extensions to existing power stations.

A greater share of this market is possible only if Canadian suppliers are able to compete with present leading suppliers from Japan and Germany.

Financing is required for major projects. The expansion of Singapore's electrical generation facilities and distribution system is being financed by World Bank loans.

REPORTING POST

Commercial Counsellor

Office of the High Commissioner for Canada

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360 Orchard Road

Singapore 1, Singapore.

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TELEX: 277 (DOMCAN SPORE)

TAIWAN

MARKET DATA

Capital city	Taipei
Area	13,886 sq. mi.
Population (1969)	13,650,000
Language	Chinese (Mandarin) and English
Currency	New Taiwan Dollar (NT \$37.04 = Cdn \$1)
Principal cities (Pop. 1966)	— Taipei 1,175,279 — Kaohsiung 639,996 — Taichung — Keelung

UTILITY ORGANIZATION(S)

Taiwan Power Company (Taipower)
39 East Heping Road, Section I
Taipei, Taiwan
Republic of China

Taipower, a government-owned enterprise, is responsible for generation, transmission and distribution of electric energy throughout the island of Taiwan.

RELATED ORGANIZATION(S)

Taiwan's economy is characterized by a great deal of centralized control and planning. Therefore, the Ministry of Economic Affairs, the government, the Executive Yuan and the President's Office all exercise a considerable amount of control over the operations of Taipower.

OFFICIALS

President — L. K. Chen
Vice President — D. S. L. Chu
Vice President and Chief Engineer — W. K. Ku.

PRESENT FACILITIES — 60 HERTZ

Total installed capacity — (1968) 1,940 MW (hydro 721 MW; steam thermal 997 MW; gas turbine 218.3 MW; diesel 3.7 MW)

Maximum system peak — (1968) 1,616 MW

Production — (1968) 9,902 GWH

Forecast annual production growth over next five years — 11 per cent

Number of customers — (1968) 1,908,000

Transmission — 154 kV
69 kV
34.5 kV and/or 12 kV
345 kV — 330 KM (planned 1972-3)

Distribution — 3.45 kV, 4.97 kV, 11.95 kV — 20,970 (circuit KM)

Service voltages — 110/220, 1 and 3 phase

System control — reliable system associated with telemetering, remote control equipment, supervisory facilities, line fault locators, protective relay equipment, dispatching computer, VHF channels for load dispatching

PROCUREMENT PROCEDURES

Taipower has a purchasing department set up to handle procurement. For the most part, foreign purchases procurement is channelled through the Central Trust of China (CTC), which is a wholly-owned government enterprise operating under supervision of the Ministry of Finance.

CTC purchasing methods:

- (1) Open tender
- (2) Restricted tender
- (3) Negotiated purchases

Purchasing operations conducted by CTC may be classified as follows: purchases with government foreign exchange; purchases with international loans; foreign purchases for private enterprises; and domestic purchases with government funds.

Although a good portion of Taipower's procurement is done on the basis of international competitive tender, a local agent is virtually a prerequisite since he can maintain the type of personal contact which characterizes dealings in Taiwan.

Tender documents are in English and correspondence in English is quite acceptable.

All imports into Taiwan must be licensed and the government exercises rigid import controls. Taiwan has a one-column tariff which is applied to all imports, regardless of country of origin. In addition, a harbour duty is levied at a fixed rate of 3.7 per cent of the customs evaluation.

CONSULTING REQUIREMENTS

Taipower appears to be a progressive company prepared to employ outside consultants where necessary (assuming that funds are available). It would seem necessary to have working arrangements with a local Taiwanese engineering firm.

FINANCING

Taipower must import major equipment, resulting in foreign debt. The major sources of foreign capital have been:

- a) US/AID — terminated in June 1965
- b) Export-Import Bank in the U.S.
- c) IBRD (World Bank)

The capital investment required for the 10 year plan (1969-78) is expected to amount to US \$1,364 million, of which US \$616 million will be financed by Taipower from revenues and US \$744 million would have to be borrowed. Financing, therefore, will play a significant role in the selection of foreign suppliers and contractors.

Asian Development Bank (ADB) is expected to play some role in future financing in Taiwan. (Canada is a member.)

STANDARDS

Electrical Standards in Taiwan are based on U.S. standards.

ENERGY RESOURCES

Local coal reserves and yearly production do not warrant additional coal-fired thermal units. Local petroleum reserve insignificant. Natural gas has a market other than power generation. Nuclear fuel deposits are not found in Taiwan. Hydro potential appears the most valuable natural resource on the island.

DEVELOPMENT PROGRAM

Current Capital Projects

- Linkou No. 2 Unit — 350 MW — rescheduled for completion early 1972
- Talin No. 3 Unit — 375 MW — completion late 1972
- Lower Tachien No. 3 and 4 — 180 MW — completion moved ahead from 1974 to 1972
- Tachien No. 1,2 and 3 — 234 MW — completion middle 1973 and early 1974 — IBRD financing
- Tsengwen Reservoir Project — 2 x 50 MW units — completion date middle 1974
- Talin No. 4 — 375 MW — completion moved ahead from 1975-1974
- Nuclear No. 1 — 604 MW — contract awarded to G.E. — completion early 1976 — EXIM financing

Several 154 kV lines related to projects are under construction

Future Planning

- Nuclear No. 2 — 600 MW — Bechtel Corp. engaged to study selection of reactor — completion date moved ahead from 1977 to 1976 — interested in CANDU reactor

- Liwu Hydro — two-step development scheme — Chipan and Tienhsiang 250 MW — completion date early 1977
- Pumped storage project to replace Chunkung project — scheduled operation 76 or 77
- EHV transmission — 345 kV double circuit for 320 KM
- Several 345 kV and 154 kV lines are proposed for construction and several are under revision due to Taipower's accelerated development plan

MARKET FACTORS

Local Industry — There are no major equipment manufacturers in Taiwan, and it would appear that hardware manufacturing is not particularly developed.

Foreign Suppliers — The Taiwan market is dominated by Japan and the U.S.A. A distant third supplier is the EEC (particularly Germany and France). Japan occupies a dominant role by virtue of its proximity to Taiwan, as well as its aggressive marketing policies. The U.S.A.'s impact in the Taiwan market is mainly due to its historical involvement in Taiwan with the natural result that business ties are extremely close.

MARKET PROMOTION

At the present time, Canada does not have a reasonable share of the market in the private sector.

It has been suggested that only a resident representative could do a full job of promotion to the private sector.

Taipower 10 year power development program could potentially provide excellent opportunities for Canadian equipment suppliers, material suppliers and consultants.

In approaching this market, Canadian firms should bear in mind the need for personal contact. A good starting point would be a visit to Taipei to meet with Taipower officials and to arrange for local representation. Following this initial contact, a firm must be prepared to make regular visits to develop, cultivate and cement business relationships. In short, doing business in Taiwan is a complex affair and although dollars and cents factors are extremely important, they are often not the determining factors.

REPORTING POST

Consul General and Trade Commissioner
 Canadian Consulate General
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 1414 Roxas Boulevard
 Manila, Philippines

CABLE: CANADIAN
 PHONE: 50-20-76 , 77, 78
 TELEX: 3252 (DOMCAN PN 3252)

THAILAND

MARKET DATA

Capital city	Krung Thep (Bangkok)
Area	198,500 sq. mi.
Population (1969)	33,200,000
Language	Thai and Chinese (Tiochew); English widely understood in business
Currency	Baht (Cdn \$1 = 20 Bahts)
Principal cities (Pop. 1966)	- Krung Thep 2,600,000 - Chiang Mai 76,200

UTILITY ORGANIZATION(S)

Electricity Generating Authority of Thailand (EGAT)
Rama VI Bridge
Bangkruay, Nondhbuli

EGAT is a government authority which came into existence on May 1, 1969, resulting from the merging of Yankee Electricity Authority, Northeast Electricity Authority and Lignite Authority. Its organization functions are as follows:

1. Generating and transmission of electric energy throughout Thailand
2. Atomic power
3. Production and sales of lignite

Metropolitan Electricity Authority (MEA)
Chakrath Road
Bangkok, Thailand

Responsible for retail electric distribution in Bangkok and surrounding areas.

Provincial Electricity Authority (PEA)
218/3 Rama VI Road
Bangkok, Thailand

Responsible for distribution throughout the rest of the Kingdom.

RELATED ORGANIZATION(S)

National Economic Development (NEDB) — Planning co-ordinator

National Energy Authority (NEA) — Power generating organizer

OFFICIALS

EGAT: General Manager — Kasem Chatikavanich
Chief Engineer — Pat Kessasamli
Director of Purchasing Department — Banjerd Buranasiri

MEA: General Manager — Lek Savanayon
Director of Purchasing Department — Savek Palawat

PEA: General Manager — Tawee Asavanond
Chief Engineer — Arun Kaewsonthi
Director of Purchasing Department — Voravee Nilodom

PRESENT FACILITIES — 50 HERTZ

Total installed capacity — (1970) 914 MW (hydro 451 MW; steam thermal 327 MW; diesel 46 MW; gas turbine 90 MW)

Maximum system peak — (1970) 800 MW

Production — (1969) 3,600 GWH

Forecast average annual production growth over next five years — 30 per cent

Number of customers — 900,000 (60 per cent industries)

Transmission — Double Circuit 230 kV — 935 KM
Circuit 115 kV — 1,500 KM
Circuit 69 kV — 1,000 KM

Service Voltages — 220/380, 220, 380, 1 and 3 phase

Underground — No use

System control — 63 load dispatching and controlling stations. System load control is done through remote automatic control. Manual voltage control via power line carrier and microwave to substations equipped with automatic controlling equipment. Data logging via telemetering.

PROCUREMENT PROCEDURES

Public tenders and/or qualifications are usually issued for all types of purchasing equipment, consulting and construction services.

Tender documents are prepared in English and are publicized in all local newspapers and sometimes sent to foreign embassies in Thailand. Foreign firms can buy the tender specifications direct from EGAT and often from the head office of consultants retained for the projects. A local agent is not essential although recommended for submitting the bids, advising on procedures, and handling of incidentals essential for commercializing in this market.

Turnkey projects are not preferred.

No discriminatory tariffs, laws or practices. One tariff structure rate applies to all countries. Import duties and taxes of about 22 per cent are paid on imported equipment for approved projects. It is intended that in the future duties will be abolished or reduced for major projects.

CONSULTING REQUIREMENTS

Since all major power projects in Thailand are under IBRD loan or tied to bilateral assistance, foreign consulting engineering firms are retained.

FINANCING

The IBRD has made four power loans to Thailand. The latest project is called "First Power Project," for which a loan of US \$46.6 million equivalent has recently been approved by the IBRD. The project (total cost US \$92.4 million including interest) would be financed approximately 30 per cent by internal cost generation and 70 per cent by borrowing. Feasibility studies are sometimes made available through bilateral technical assistance aid. The Japanese Economic and Technical Co-operation Fund announced a development loan (US \$3,875,865) to the Thai Government for the Lam Doam Noi construction project. Long-term German development loans from Kreditanstalt Fur Wiederaufbau were signed over to PEA.

STANDARDS

Accepted world electrical standards are used.

ENERGY RESOURCES

Undeveloped hydro resources — 1,986 MW

Hydro Mekong resources — 4,120 MW

There are three oil refinery plants utilizing imported crude oil.

DEVELOPMENT PROGRAM

Annual Material and Equipment Requirements

	Baht (M)	Source of Supply
Wire and cable	23	Taiwan, India, Japan
Poles	55	Local
Distribution Transformers	30	Japan, India, Sweden, Belgium
Hardware	8	Germany, U.S.A.
K.W.H. meters	11	Japan, Europe
Switchgear	9	Germany, Britain
Fuse and cutouts	2.5	N/A
Insulators	.8	Japan
Lightning arresters	1.5	N/A

Current Capital Projects

- South Bangkok Thermal Plant — 310 MW — US \$40.82 million
- Surat Thani Thermal Plant — 30 MW (under study)

- Mae Moh Project Thermal — 75 MW (under study)
- Nuclear Power Plant — 500 MW (under study) — complete prior 1980
- North Bangkok Gas Turbine — 2 x 15 MW — complete in 1970
- South Bangkok Gas Turbine — 2 x 15 MW — complete in 1971
- Haadyai Gas Turbine — 15 MW — complete in 1970
- Sirikit Dam Project — 2 x 125 MW — complete in 1973 — tenders not issued as yet — ultimate capacity 500 MW — cost US \$42.79 million
- Nam Phram Hydro Project — 40 MW — ultimate 60 MW — complete in 1972
- Quae Yai No. 1 Hydro — 3 x 120 MW — ultimate 720 MW — complete in 1975

Future Planning — Future projects such as the Pattani River, Nam Sam, Nam Pai, Mae Kok and Pak Moon, etc. The biggest is the Pa Mong Dam project which is in the Mekong River Development Scheme (United Nations). The finished dam will have an installed capacity of 3,000 to 4,000 MW, supplying power to Thailand and bordering countries. Engineering studies of the dam are nearly complete but planning and financing will take some time. The nuclear power plant is contemplated to fill the gap of power demand during the period 1975-85, after which Pa Mong will meet power requirements of the foreseeable future.

MARKET FACTORS

Local Industry — Only electrical wire and cable and small distribution transformers are manufactured in the country.

Foreign Suppliers — Although all the major projects are opened to international competition, most Japanese firms maintain strong marketing offices in Bangkok which give them a decided competitive advantage due to continuing close contact with key buying personnel.

MARKET PROMOTION

Personal visits to Thailand to meet key personnel are essential. Close contact with UNDP and Mekong committees should be maintained. Local representation should be established for follow-up between visits. Since most projects are World Bank financed, close liaison with the Bank's Washington office is essential.

REPORTING POST

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