

POWER EXPANSION PROGRAM II

(BH-0018)

EXECUTIVE SUMMARY

BORROWER: The Bahamas Electricity Corporation (BEC)

GUARANTOR: The Commonwealth of The Bahamas

EXECUTING AGENCY: The Bahamas Electricity Corporation

AMOUNT AND SOURCE:

IDB:	US\$56.0 million (OC)
Cofinancing:	US\$25.0 million (EIB)
Local counterpart funding:	US\$15.0 million (BEC)
Total:	US\$96.0 million

FINANCIAL TERMS AND CONDITIONS:

Amortization period:	20 years
Disbursement period:	3 years
Interest rate:	variable
Inspection and supervision:	1%
Credit fee:	0.75%
Currency:	US dollars from the Single Currency Facility

COFINANCING: European Investment Bank (EIB)

Amortization period:	15 years
Disbursement period:	3 years
Interest rate:	variable
Inspection and supervision:	
Credit fee:	%

OBJECTIVES: The objectives of The Investment Projects, are: (i) to provide more generation capacity in New Providence along with the corresponding transmission and distribution capacity to satisfy the projected electricity demand (ii) to improve the generation mix and lower production costs; and (iii) to optimize the operation of the transmission and distribution systems. In addition, the Program will improve the environmental standards of operation and provide support for studies and projects to promote a more efficient use of energy. Lastly, a Privatization Study for BEC has been prepared, as part of this Program. The objectives of this study were: (i) to define an institutional structure and a regulatory regime for a privately owned power sector; and (ii) to prepare a proposal of a privatization strategy for consideration by the Government.

DESCRIPTION:

The Program includes two investment projects, and a concurrent component consisting of an environmental protection program, an efficient use of energy study, and the privatization study.

The Generation Expansion Project consists of: (i) the installation of a single Low Speed Diesel, (LSD) generating unit with a capacity of approximately 30MW. This will conclude phase II of the Power Expansion at Clifton Pier Station, which was designed under a least-cost expansion plan; (ii) the associated transformation and transmission installations with about 25km of a 132kV transmission line from Clifton Pier Station to Big Pond substation; and (iii) expansion of substations at Big Pond and Clifton Pier by 80MVA each. Direct costs including engineering and supervision, are estimated at US\$66.0 million.

The Transmission and Distribution Optimization Project consists of: (i) installation of 33kV feeder line from Big Pond to Paradise Island and a new 33kV substation at Paradise Island; (ii) reconfiguration of the existing 33kV transmission and distribution system to accommodate the injection of additional capacity through Big Pond Substation including the expansion of the Blue Hills and Sea Breeze substations; (iii) loss reduction, protection and control and reliability improvement component. Direct costs, including engineering and supervision, are estimated at US\$14.4 million.

The Privatization of BEC. The investments are urgently required to bring generating and transmission capacity in line with rapidly growing demand. Accordingly, The Government has decided to develop the investment projects and the privatization study in parallel, and to carry out the actual privatization following the completion of these investments. Recent experience has shown that there could be complications leading to protracted delays when system expansion and privatization are attempted simultaneously. The privatization is being earnestly pursued as a high priority of the Government with BEC being one of the utilities earmarked for divestiture. The commitment of the Government to privatization of public corporations is evidenced in the successful conclusion of the privatizations of wholly-owned government properties in the tourism sector during 1995-1996. In line with this policy commitment, BEC's privatization study proposes restructuring and ownership options and a regulatory framework for

privatization of the electricity sector which should: (i) attract private capital and broaden local ownership; (ii) provide an efficient and reliable supply of electricity at least cost; (iii) promote environmentally acceptable operation of the power sector; and (iv) recommend a structure that is in the best interest of the consumers, the nation and the employees.

Other concurrent components are: (i) Environmental Protection and Mitigation component for the new investment projects including improvements of the existing BEC operations. The cost has been estimated at US\$2 million; and (ii) an Energy Efficiency Program study to define the most suitable demand-side customer driven program to optimize the efficient use of electricity. Estimated cost is US\$500,000. (Financial and unallocated costs for the whole program are estimated at US\$12.5 million).

**ENVIRONMENTAL
CLASSIFICATION:**

The Environmental Management Committee, in its session of January 18, 1995, classified this operation as Category III. The environmental summary was approved by the CMA on August 20, 1996.

BENEFITS:

The proposed operation follows the successful completion by the BEC in 1992 of an 85 MW generation project financed by the Bank. The BEC is a well-managed and profitable company, whose generation and distribution costs compare favorably with other electric utilities in the region. The new generation capacity, financed by the proposed Program, has been optimized within the BEC's long run expansion plan, and will provide urgently needed power for Bahamas' continued economic development, and increase the financial net worth of the company.

During the development of the project emphasis was placed on the need to improve the balance sheet of BEC by clearing up the situation with respect to monies owed to BEC by the central government and public corporations. A satisfactory resolution sought by this program, will bring the corresponding benefit since it will make the company more attractive to a private investor.

Accumulated environmental problems have also been addressed and brought into conformity with IDB/World Bank standards and guidelines which were accepted by the Department of Environmental Health and which a successor company will be required to follow.

In the meantime enabling legislation for privatization is being drafted, the technical and administrative staffing requirements of the Public Utilities Commission assessed as well as ground rules for its operations developed. The financing of the system expansion under the present company structure will serve the dual purposes of satisfying urgent demand for electrical energy while allowing new legal, technical, administrative and other institutional arrangements to be finalized with diligence.

The proposed operation is consistent with the Government's program to maintain macroeconomic stability. This program emphasizes: (i) reduction in public expenditure; (ii) encouragement of private sector investment and reduction in the role of the State in key sectors; (iii) improvement of public sector management; and (iv) reduction of public sector indebtedness.

RISKS:

The main issue affecting the project is that a US\$23 million of accounts receivable owed by government corporations is considerably past due. The Government has recently agreed to repay these debts over the next six years. This schedule, if met, is sufficient to provide BEC with resources to fund the counterpart requirements for the implementation of the Program.

**THE BANK'S
COUNTRY AND
SECTOR STRATEGY:**

The Bank's strategy in The Bahamas is to: (i) increase the competitiveness of the economy in tourism and in other productive sectors; (ii) encourage diversification of the tourism product and services through out the islands; (iii) stimulate productivity in the non-tourism sectors of the economy; (iv) encourage the authorities to develop a national environmental policy to protect the natural resources base that is vital to the sustainability of growth in the Bahamas; and (v) increase the efficiency of services provided by the public sector, and target some of these services to the low-income population. This operation will supply electricity to the economy at the lowest long-run marginal cost. As a result, it will allow existing enterprises to expand and new businesses to initiate productive activities with reliable and efficient power. It is thus consistent with the strategy to diversify the economy while improving competitiveness.

The Bank partially financed an expansion program with BEC for the period 1988-92 (loan 560/OC). All works, including 85MW of generation capacity and associated

transmission, were completed on schedule and at cost. In 1993, loans 659&660/OC-BH were approved to finance the Electrification Program for the Family Islands. This Program is also being well executed.

**POLICY CRITERIA
RELATING TO
POVERTY AND SOCIAL
ASPECTS:**

In reference to the Eighth Replenishment recommendations (AB-1704), the proposed Program does not meet the criteria of an operation that targets the poor, either geographically or in terms of beneficiaries, nor is it aimed specifically at women.

**EXCEPTIONS TO BANK
POLICY:**

Force account may be used to perform small works and certain environmental measures for a sum total of the equivalent of US\$1.8 million in direct costs chargeable to the local counterpart resources (see paragraphs 3.13 and 3.14).

**SPECIAL
CONTRACTUAL
CONDITIONS:**

The Borrower will be required to obtain approval of parallel financing from the European Investment Bank or other source for up to the equivalent of US\$25 million, as a condition to first disbursement.

Ratios and other financial conditions that the Bank utilizes for loans to electrical utility companies will be incorporated into the contract. These conditions are set out in paragraph 4.20.

The Borrower will implement the recommendations set forth in the EIA and the Bank's Environmental Summary Report.

PROCUREMENT:

International competitive bidding (ICB) will be used to award all procurement of goods in excess of US\$250,000; and for construction works valued at more than US\$3,000,000.

I. FRAME OF REFERENCE

A. General

- 1.1 The Commonwealth of The Bahamas is an archipelago of over 700 islands, of which 29 are inhabited. About 84% of the population of approximately 280,000 in 1996 are concentrated in New Providence/Paradise Island and Grand Bahama. These islands dominate tourism, are the main source of employment and output, and have benefitted from past investments, while most of the other islands are considerably less developed.
- 1.2 Output growth has picked-up in recent years, following a 6% decline during the recession of 1991-92. Restoration of macroeconomic stability through structural reforms in the 1990s have improved economic prospects, but these have not yet resulted in higher economic growth. The growth rate remains below 1% per annum compared with a population growth of 2%. The unemployment rate had fallen in 1995 because of increased renovation and construction-related activities in the latter half, but it remains over 10% of the labor force.
- 1.3 Generally prudent fiscal, debt and monetary policies have improved the country's external competitiveness. In particular, a fiscal current account surplus has been maintained at about 2% of GDP and the annual average inflation has been contained at below 2% for the past two years. At the same time, domestic and external debt have been reduced and the relevant ratios remain way below critical levels.
- 1.4 Overall, there is a renewed optimism in the country. Tourist arrivals and expenditure have increased, partly due to major renovation of hotels and favorable external conditions. Moreover, Government policy towards private sector has become more favorable in recent years which, since 1993, has involved accelerated structural adjustment efforts including liberalizing foreign investment regime and divesting state-owned hotels, a commercial bank and selected water and electricity operations in Family Islands.
- 1.5 Based on foreign investment approval up to end-1995, the country can expect annual foreign investment of about \$300 million or about 10% of GDP. Because of increased tourism-related activities and associated foreign investment, domestic private investment is also high in 1996 and GDP growth for 1996 is generally expected to be above 2%. While investment activities are now relatively more widespread among the islands, most of the investment is still directed towards New Providence and its neighboring Paradise Island.
- 1.6 Presently, the state-owned The Bahamas Electricity Corporation (BEC) serves about 90% of New Providence/Paradise Island households

and virtually all businesses. Electricity demand in this region is expected to grow at about 4% per annum, faster than in recent past because of the increased investment activities.

- 1.7 These developments necessitate an interim increase in electricity generation and distribution capacities by the BEC. The Government is considering divesting the BEC, the telecommunication utility, the air transportation company, and certain aspects of water supply and solid waste management. To this end, it has enacted a Public Utilities Commission (PUC) Act to depoliticize the process of setting utility tariffs. The PUC needs to be strengthened before any privatization is undertaken to ensure orderly operation of the utilities, and the authorities may need further Bank support in strengthening the economic and legal regulation to accelerate the program of possible privatization or private sector participation.
- 1.8 Local counterpart funding for this project will come from the BEC's operating profit, from partial payments of the \$23 million owed by other government corporations, and from loans from other sources. BEC's forecasts demonstrate the required profitability. The government has recently agreed (Annex I-1) to repay these past-due debts, and BEC is negotiating with the EIB and other banks to finance the remainder.

B. Power companies in The Bahamas

- 1.9 The Office of the Deputy Prime Minister is responsible for public electricity supplies throughout The Bahamas. At the end of 1995, electricity was supplied to about 90,000 consumers by the Bahamas Electricity Corporation, The Freeport Power Company and nine small private companies with a total installed capacity of approximately 400MW.

1. Bahamas electricity corporation

- 1.10 The Bahamas Electricity Corporation is a statutory corporation which is regulated under the provisions of the Electricity Act of 1956. During 1995, the Corporation supplied electricity to approximately 57,000 consumers in New Providence and Paradise Island. In the same year, maximum system demand of 137MW was met by an installed generating plant capacity of 209 MW.
- 1.11 The Corporation also supplied about 14,000 consumers on eleven (11) Family Islands with a total installed generating plant capacity of approximately 55 MW. The islands in which the Corporation operated electrical systems during 1995 were: Abaco, Andros, Bimini, the Berry Islands, Cat Island, Eleuthera, Exuma, Long Island, San Salvador, Ragged Island, Black Point, Exuma and Cherokee Sound.

2. Freeport Power Company

- 1.12 The Freeport Power Company was established under the provisions of the Hawksbill Creek, Grand Bahama (Deep Water Harbour and

Industrial Area) Act. During 1994, the company supplied about 16,000 consumers in the Freeport area of Grand Bahama and its maximum demand of 48 MW was met by an installed generating capacity of 108 MW.

3. Other private electricity companies

- 1.13 The activities of private electricity operations are regulated under the provisions of the Out Island Electricity Act. This Act permits the Minister to grant franchise agreements to approved companies to operate in specified areas in the Family Islands. At the end of 1994, there were nine small private electricity companies supplying about 3,000 consumers.
- 1.14 Six of these companies were associated with the tourist resorts at Spanish Cay, Treasure Cay and Walker's Cay, Abaco at Chub Cay, Berry Island, at Cat Cay, Bimini. Abaco Power & Light Co. is the only private company which only operates a distribution system. It purchases electricity from the Bahamas Electricity Corporation at Marsh Harbour, Abaco and distributes it to Man-O-War Cay.
- 1.15 Two other companies operated as community co-operative ventures, one at Crossing Rocks, Abaco and the other at St. George's Cay, Eleuthera. A further private undertaking was operated by the Morton Bahamas Company at Inagua to supply the residents of Matthew Town, the majority of whom are the Company's employees.

4. Private industrial and commercial installations

- 1.16 In addition to the private companies mentioned above, there are four private electricity generation and distribution systems associated with major industrial and commercial enterprises in The Bahamas. These companies are South Riding Point Holding, Marcona Ocean Industries, Morton Bahamas Ltd. and the Nassau Beach Hotel (Total Energy Plant). The generating plant capacity of these companies totaled 11 MW. In addition, US Government bases have 3.5 MW of autogeneration capacity installed at a group of islands.

C. Electrification of The Bahamas

1. The Family Islands

- 1.17 It is the Government's intention to develop the electric power supply of each Family Island taking each island in order of priority based on its stage of development. To achieve this goal BEC wishes to complete the electrification of the remaining major Family Islands by 1997. To this end the Corporation has secured financing from the IDB (loans 659 & 660/OC-BH). The project consisted of the design and construction of the extension of the power supply system on Abaco, Eleuthera and Bimini, and Long Island; and new systems on the islands of Rum Cay, Mayaguana, Black Point and Staniel Cay and Exuma Cays. The total cost of the phase

of the electrification program (Family Island Electrification Phase II) is of US\$47 million.

2. New Providence & Paradise Island (NP/PI)

a. Supply of electricity

1.18 The NP/PI service area of the BEC, with about 57,000 consumers in 1995, is the single system with the most generating capacity and the highest demand in The Bahamas. With the high concentration of tourists and tourist facilities in use over the whole year, it is by far the most important area in the Bahamian economy. Adequate and quality electricity supply is vital to the growth and development of the NP/PI area if it is to remain one of the prime tourist centers in the Caribbean. The focus of BEC's objectives is to maintain the capacity of its system in order to meet the increasing demand on time and without unscheduled interruptions in service.

1.19 BEC's New Providence physical plant includes 209 MW of installed generator capacity with a net generation of about 900 GWh, between two inter-connected stations: Blue Hills and Clifton Pier. BEC has two 132 kV transmission line in operation: i) a 13-mile single circuit overhead tie-line from the Blue Hills Station to the Clifton Pier Station and ii) a 15 mile single circuit overhead feeder line between Big Pond Substation and Clifton Pier. The two lines, built in 1984 and 1992, have been operating satisfactorily. In addition, BEC includes in the transmission category the 33 kV lines in the system, consisting of about 39 miles of overhead line and 25 miles of underground line. Distribution primary lines are designed to operate at 11 kV and 7.2 kV. Secondary lines are at 208/120 Volts three phase, and 240/120 Volts, single phase, at 60HZ. Forced outages are mainly on the distribution feeders due to the high level of thunderstorm activity, vehicular damage to poles and equipment, and the age of some of the distribution facilities.

b. Demand for electricity

1.20 During the 1981-1995 period, total electricity sales increased by 6.6% per year from 326,500 MWh in 1981 to 800,000 MWh in 1995. Gross generation rose from 366,000 MWh to 950,000 MWh at a rate of 7.0%. Peak demand also showed significant annual increases of 6.2% from 60 MW to 140 MW. Technical and non-technical losses amounted on average to 12.4% of gross generation. If energy use by station and the administrative building are included, the losses amount to 16.4%.

1.21 The total number of customer accounts grew from 31,706 in 1981 to 57,000 in 1995 for annual average rate of increase of 4.3%. There were 48,000 residential accounts (84%); 5,200 small commercial and industrial (9%); 1900 large industrial (3%) and 1200 temporary customers (3%). Residential customers accounted for 36% of energy demanded; the share of the small commercial and industrial class

was 11% and that of the large commercial/industrial customers was 53%. Approximately 90% of households were served with electricity in 1995.

- 1.22 Electricity use per residential customer was 4,200 kWh in 1981 and 6,000 kWh in 1995 for an average annual rate of increase of 2.6%. The per customer use in the large commercial class increased from 220,600 kWh in 1981 to 275,900 kWh in 1995 for an average annual growth rate of 1.6%. The annual growth rates for new connections in the different customer categories over the 1981-1995 period were: residential, 4.0%, small industrial/commercial, 4.3% and large industrial/commercial, 4.1%.

c. Pricing and tariffs

- 1.23 During 1987-1993, electricity tariffs for the New Providence system averaged 14.75 cents/kWh. The residential, the commercial and the industrial tariffs were approximately the same. The system average for 1994-1996 was 17.08 per kWh. The average tariffs for the two separate classes, residential and commercial/industrial, were 17.03 cents and 17.14 cents, respectively.

- 1.24 Prior to 1993, the structure and level of the tariffs were determined by financial revenue requirements. In order to incorporate economic costs in the derivation of the structure of tariffs, a marginal cost of electricity study for the New Providence system was completed in May 1994. Among the objectives of the study were:

- * to review the existing tariff structure, load forecast, and least-cost development program.

- * on the basis of long-run marginal costs, and financial and social considerations, make appropriate recommendations for restructuring electricity prices.

- 1.25 The study concluded that the weighted average Long Run Marginal Cost (LRMC) for New Providence was 11.8cts (US) kWh. LRMC ranged from a low of 9.1 cents/kWh for bulk customers to a high of 13.97 cents/kWh for the small commercial category. The LRMC for residential customers was 12.6 cents per kWh.

- 1.26 The share of capacity costs varied from 42% of LRMC for bulk customers to 59% of LRMC for the special category of churches and sports arenas etc. A comparison of the yield from BEC's current tariffs to the estimated strict LRMC shows that for all classes of customers, the current tariff is above the LRMC. When the strict LRMC tariffs are set against the level of tariffs needed for BEC to meet its financial targets, the comparison still shows strict LRMC below actual financial tariffs. However, modifications will be necessary to the existing tariff system to "equalize" the variance between strict LRMC and actual tariffs for the different customer classes. As a result, there will be small increases for

residential and small commercial customers and decreases for all other categories. Revised tariffs with a structure based on long run marginal costs and levels established by BEC financial requirements and with the outlined adjustments were submitted to Government for approval. The implementation of the revised tariffs, once approved, will be monitored during execution. The revised tariffs include provisions for fuel cost adjustments and an inflation measure designed to avoid erosion in the real price of electricity and will assist BEC in satisfying certain performance benchmarks and assuring long-term viability of the company.

D. Privatization prospects for BEC

- 1.27 In 1995, the government appointed a Committee to evaluate options relating to the eventual privatization of BEC. The Committee met several times during 1995 and 1996 and commissioned the privatization study. The report of the study focused on: (i) restructuring and ownership options; and (ii) the regulatory framework.
- 1.28 The privatization is being earnestly pursued as a high priority of the Government with BEC being one of the utilities earmarked for divestiture. The commitment of the Government to privatization of public corporations is evidenced in the successful conclusion of the privatizations of wholly-owned government properties in the tourism sector during 1995-1996. In line with this policy commitment, BEC's privatization study proposes restructuring and ownership options and a regulatory framework for privatization of the electricity sector which should: (i) attract private capital and broaden local ownership; (ii) provide an efficient and reliable supply of electricity at least cost; (iii) promote environmentally acceptable operation of the power sector; and (iv) recommend a structure that is in the best interest of the consumers, the nation and the employees.
- 1.29 The Bank has from the inception of the process in 1993, assisted BEC in drafting the terms-of-reference, selecting consultants and reviewing the study reports. The Bank will continue to assist this process in a similar manner and with MIF financial assistance if necessary.

E. Bank's strategy and rationale for participation

- 1.30 The Bank's strategy is designed to support The Bahamas to effectively address its principal development constraints. It is focused to support the Government's continuing efforts to restore sustained private sector-led growth by improving competitiveness, diversifying the economy, improving intersectoral linkages, and strengthening of environmental regulation and oversight of productive activities.
- 1.31 Bank strategy in The Bahamas is to: (i) increase the competitiveness of the economy in tourism and in other productive

services through out the islands; (iii) stimulate productivity in the non-tourism sectors of the economy; (iv) encourage the authorities to develop a national environmental policy to protect the natural resources base that is vital to the sustainability of growth in the Bahamas; and (v) increase the efficiency of services provided by the public sector, and target some of these services to the low-income population.

- 1.32 In addition to financing high priority investment projects and to supporting the addition of urgently needed generation capacity, the Program supports Government's overall public sector agenda for this and other utilities such as water and sewage and telecommunications. The optimization and consolidation of the existing BEC's electricity system and improvement of efficiency of the supply will contribute to the overall improvement of BEC's operations and provide the necessary conditions for a well structured and organized transition towards a more competitive environment and major private participation in the sector.

F. Bank and other donor experience in the sector

- 1.33 The Bank has financed two major investment projects in The Bahamas in the Energy Sector through loans 560/OC-BH, 659/OC-BH and 660/OC-BH, respectively. Loan 560/OC-BH, Electricity Power Expansion Program, was approved by the IDB in 1988 for US\$109 million. It supported the expansion in New Providence of the Clifton Pier Power Plant by 2 x 26.5 MW of LSD generators and one 12MW and one 20MW gas turbines at Blue Hills Power Station, with the associated transmission lines and substations. A technical cooperation for estimating BEC's long-run marginal costs of generation, transmission and distribution of electricity was also part of this operation. The implementation of this project was completed on time and on budget.
- 1.34 The loans 659/OC and 660/OC-BH for the Family Islands Electrification Program were approved at the end of 1991 but the loan agreements were not signed until March 31, 1993 for the amount of US\$28 and 3,83 million respectively. The delay of almost one year of signing of the contracts was mainly due to the change of the Government in 1992. In spite of this delay and the delay produced by Hurricane Andrew, that severely affected existing installations on the Family Islands, the general progress of the implementation is considered satisfactory. About 50% of the loans have been disbursed and practically all of the remaining resources from the loans have already been committed. The final disbursement is scheduled for September 1997, six months later than originally estimated. BEC has complied with the Bank's procedures for acquisition of goods and services and no contractual conditions are pending.

II. THE PROGRAM

A. Objectives

- 2.1 Consistent with Bank strategy and Government of The Bahamas's (GOBH) objectives to expand production and employment in the Bahamian diversified economy and to recover the competitiveness of tourism, the overall goal of the proposed Program is to satisfy efficiently the increasing demand for electric power. The increase in demand has been driven, to a large extent, by the success in attracting foreign investment in tourism. In addition, the program will improve the efficiency and optimize the existing electric system, improve the environmental standards of operation and provide support for studies and programs that will lead to the privatization of BEC and which will promote a more efficient use of energy.
- 2.2 The objectives of the Investment Projects, are: (i) to provide more generation, transmission and distribution capacity in New Providence to satisfy the projected electricity demand within the limits of reliability and system performance; (ii) to improve generation mix and lower production cost; and (iii) to optimize the operation of the transmission and distribution systems. The objectives of the Study to Evaluate Institutional Options towards the Privatization of the Power Sector, are: (i) to define an institutional structure and a regulatory regime for a privately owned power sector; and (ii) to propose a privatization strategy for GOBH consideration.
- 2.3 The expansion of the generation capacity to be achieved within this program will satisfy the accelerated increase in demand, expected to grow steadily until the end of the century. A postponement of the needed increase in capacity at this time, would risk the deterioration of quality and reliability of electricity service, the increase of system losses, curtailing extension of service to existing and new users, and the prospect of even more expensive future investment.

B. Program description

1. Scope

- 2.4 The program consists of an investment component, and an environmental protection program, including an efficient use of energy study, and the study to evaluate institutional options towards the privatization of the electric sector. Total Program cost is estimated at US\$96 million and the expansion is scheduled to be implemented in three years. The design of the Program components seeks to: (i) meet the growth of the projected demand including the demand of a major committed load of 15MW that will come on stream in 1997 and 1998, prevent energy deficits, improve

the generation mix and lower production cost (and increase the revenues); (ii) optimize the existing system by reducing losses, improving the protection and control and by increasing its reliability; (iii) define the most suitable and comprehensive demand side program to optimize the efficient use of electricity; and (iv) evaluate the institutional options towards the privatization of the power sector and during the transition to a more competitive environment.

2. Investment component

a. Generation expansion project

- 2.5 This project consists of: (i) the installation of a single generating unit of about 30MW of Low Speed Diesel (LSD) to conclude the Power Expansion at Clifton Pier Station, phase II, designed under the least cost expansion plan, that is programmed to be in operation in 1998; (ii) the associated transformation and transmission installations necessary to bring the new capacity to the distribution grid, with about 25 km of a 132kV transmission line from Clifton Pier Station to Big Pond substation; and (iii) expansion of the departing and receiving substations at Clifton Pier and Big Pond, respectively, by 80MVA each. (The selected North bound routing of the 132 kV line, will improve the security of supply from Clifton Pier).

b. Transmission and distribution optimization project

- 2.6 This project consists of: (i) transmission and transformation works, such as, installation of 33kV feeder from Big Pond to Paradise Island, and new 33kV substation, to satisfy the demand of the committed major load (15 MW) at Paradise Island, half of which will come on stream in 1997 and half in 1998; (ii) reconfiguration of the existing transmission and distribution system to accommodate the injection of additional capacity through Big Pond Substation, including the expansion of Blue Hills with transformer replacement and Sea Breeze Substations; (iii) loss reduction, protection and control and reliability improvement works include East Hill St. and Leisure Time Substations upgrade and works on the 33kV lines, at Clifton Pier to Windsor Field, Blue Hills to Ernest St. Blue H. to Sea Breeze, East Hill St. to Fort Charlotte, and Soldier Rd. to Winton.

3. Concurrent components and studies

a. Efficient use of energy study

- 2.7 An assessment was performed by a consultant to identify the potential for efficient use of energy program. Initial findings indicate that substantial opportunities exist in the areas of energy efficiency (EE) and renewable energy (RE) to meet the growing energy needs of The Bahamas. Benefits would include a reduction in import of traditional fuels, an increasing earnings

from domestically produced and controlled energy supplies, and additional social and environmental benefits.

- 2.8 BEC has decided, based on these findings, to define the most suitable demand side customer driven program to optimize the efficient use of electricity by commissioning a comprehensive study at a national level. This study consists of: (i) situational analysis; (ii) opportunity screening and demonstration project identification; (iii) recruiting and selecting customers to develop demonstration projects; (iv) designing and implementing of projects; (v) generalizing experiences from demonstration projects to create a market for energy efficiency and renewable energy transactions; and (vi) training, education and institutional capacity building.

b. Environmental protection program

- 2.9 An Environmental Impact Assessment Study and Environmental Audit of BEC's operations have defined the measures and environmental standards for this Program and for BEC system as a whole. This component consists of: (i) investment activities, such as, new multi-flue stack for units DA5,6,7 and 8; extending the height of stack 6 to 70m; bunding of all new and existing bulk, oil storage and day tanks; upgrading oily waste water management installations, laboratory facilities and hazardous materials stores; emergency standby equipment for control of major oil spillage; monitoring equipment; and (ii) institutional strengthening including monitoring, training and education.

c. Privatization options study

- 2.10 This study was completed during the preparation of this Program. The study examined the restructuring and ownership options and the regulatory framework for privatization of the electricity sector which would: (i) attract local and foreign private capital and broaden local ownership, thus reducing public sector borrowing; (ii) provide an efficient and reliable supply of electricity at least cost; (iii) promote environmentally acceptable operation of the power sector; and (iv) recommend a structure that is in the best interest of the consumers, the nation and the employees.

C. Performance objectives

- 2.11 The program will help to achieve the following performance objectives (See the Logical Framework Annex II-1):
- a. The additional generation capacity will increase the installed capacity in New Providence and Paradise Island from 209 MW in 1996 to approximately 240 MW in 1998, and add 242 GWh/year of base load energy to the system.
 - b. The total technical and non-technical losses, estimated at 16.4% in 1994 will be reduced to approximately 13% in 1998.

- c. The reliability of the transmission and distribution system will reach the level required by the industry and it will reduce loss of load expectation, or the frequency and duration of service interruption. As a result, in 1998 more than 1000 MWh will be available in the system.
- d. The level of generation reliability will also be increased. The loss of load probability (LOLP) over a one-year period will be 1%, or 87.6 hours per year, instead of 1.3%.

D. Results

2.12 The principal results of the program will be as follows:

- a. By the end of 1997 a new 33kV substation with 30 MVA capacity will be built on Paradise Island and a new feeder with a total length of 1 km from New Providence to Paradise Island will be installed.
- b. By the beginning of 1998, the transformation capacity at Big Pond Substation will be increased by the addition of 80 MVA capacity.
- c. By mid 1998, the new power plant with 30MW, of generating capacity denominated as unit No.11, will be in operation.
- d. By the end of 1998, the losses reduction program will be completed including works on: Clifton Pier/Windsor Field, Soldier Road/Winton circuits and works at Fort Charlotte and Winton Substations.
- e. By the end of 1997 the study on efficient use of electricity and renewable energy will be completed including demonstration projects.
- f. By the end of 1998, the protection and control component, including works on Clifton Pier/Windsor Field and Soldier Road/Winton circuits and at Sea Breeze, East Hill St., Leisure Time, Winton and Fort Charlotte substations will be finalized.

E. Program cost and financing

1. Total cost

2.13 The Program's total cost, including investment and concurrent component, engineering, administration and supervision, financial cost and unallocated cost, is estimated at US\$96 million. The Bank will finance US\$56 million and BEC's local counterpart will consist of proceeds of a loan from the European Investment Bank (EIB) in the amount of ECUs 20 million (US\$25 million equivalent) and US\$15 million will be generated internally. The Banks financing was dimensioned based on the total cost of the Program, foreign exchange requirements for the acquisition of major equipment,

availability of other sources particularly those locally generated and local counterpart requirements of the Bank's lending program.

- 2.14 The proposed distribution of Bank and other financing is presented in the following table:

PROGRAM COST ESTIMATE
(in US\$ thousands)

DESCRIPTION	TOTAL	SOURCE OF FINANCING		
		BEC	EIB	IDB
1. ENGINEERING & ADMINISTRATION	3700	3700	0	0
1.1 Engineering & Supervision	3100	3100	0	0
1.2 Administration	600	600	0	0
2. DIRECT CONSTRUCTION COST	76700	8000	19300	49400
2.1 Generation	55900	6500	0	49400
2.1.1 30 MW M&E Equipment	40000	900	0	39100
2.1.2 30 MW Civil Works	15900	5600	0	10300
2.2 Transmission	20800	1500	19300	0
2.2.1 Transmission line 132 kVA	4300	0	4300	0
2.2.2 Sub-Stations	2800	0	2800	0
2.2.3 Reinforce & optimization T&D	13700	1500	12200	0
3. CONCURRENT COSTS	3100	1100	2000	0
3.1 Efficient Use of Energy(DSM)	500	0	500	0
3.2 Environment mitigation	2000	500	1500	0
3.3 Privatization study	600	600	0	0
4. FINANCIAL COST	7700	2200	0	5500
4.1 Interest	6388	1448	0	4940
4.2 Credit fee	752	752	0	0
4.3 Inspection & supervision	560	0	0	560
5. UNALLOCATED <u>1/</u>	4800	0	3700	1100
5.1 Contingencies	2760	0	2266	494
5.2 Escalation	2040	0	1434	606
GRAND TOTAL	96000	15000	25000	56000
%		16%	26%	58%
^{1/} The proportion of unallocated costs is higher in the case of the financing to be provided by the EIB because these costs are estimates. In the case of IDB, the costs are real since the ICB has been completed.				

- 2.15 These costs reflect current market conditions confirmed by the recently completed international competitive bidding for mechanical and electrical equipment and civil works for the generation plant and works of similar characteristics that are under implementation on the Family Islands Electrification Program financed by IDB. They provide for cost escalation of 6%, based on projected inflation.
- 2.16 The above proposed distribution has been made in order to allow for an optimal and complementary use of financial resources from the different sources while reducing conflicts and delays due to bidding and awarding procedures and eligibility criteria established by IDB and EIB. It also takes into account that a minor portion of works will be contracted locally or will be implemented by force account (max.amount estimated at US\$1.5 million) by BEC's crews.

2. Cofinancing

- 2.17 Agreements between BEC and EIB have been finalized for an ECUs 20 million loan, equivalent to US\$25 million, that will be used for the transmission and distribution works. EIB has presented its non objection to BEC to use the proceedings from this loan as partial counterpart to the IDB financing.

3. Cost distribution

a. Engineering and administration (US\$3,700,000)

- 2.18 The cost in this category include the detailed engineering, supervision, inspection and administration by BEC as well as the costs of contracting an engineering firm that has assisted BEC in developing the feasibility study, detailed engineering study and tender documents. This firm will also assist BEC during the implementation of this program.

b. Direct construction costs (US\$76,700,000)

- 2.19 The cost in this category are composed of: (i) the cost of the generation plant project with (a) mechanical and electrical equipment and the corresponding civil works, estimated at US\$56 million, and (b) transmission works associated with the generation plant, estimated at US\$7 million; and (ii) the cost of transmission and distribution reinforcement and optimization project, estimated at US\$13.7 million.

c. Concurrent costs (US\$3,100,000)

- 2.20 The cost in this category include the DSM study, US\$ 500,000, the Privatization Study US\$ 600,000 and Environmental protection Program US\$ 2,000,000.

d. Other costs (US\$12,500,000)

- 2.21 Unallocated costs have been estimated at US\$4.8 million. Out of this amount contingencies have been estimated at US\$2.8 million, approximately 7% of pending bids. The escalation was calculated based on inflation rates projected for the country, and amounts to US\$2.0 million, approximately 6%.
- 2.22 Financing cost has been estimated at US\$7.7 million, based on the IDB's and EIB's current lending conditions for loans.

III. PROGRAM EXECUTION

A. Executing agency

- 3.1 BEC is the Executing Agency for the Program. It will be in charge of the technical, administrative, and financial aspects of the Program execution, as well as the enforcement of contractual conditions, and submission of scheduled reports and disbursement requests. Specifically the office of the Deputy General Manager - Planning and Engineering (DGM-PE), reporting directly to the General Manager of BEC, would be responsible for the construction activities of the Program.
- 3.2 BEC will provide through the DGM-PE and through its New Providence Projects Unit the staff of the core organization for the management of the Program. The DGM-PE office will have specialized support areas for contract negotiations, contract administration, engineering, scheduling, program cost accounting and reports, and will also be in charge of the relations between BEC and the Bank. Detailed work related to preparation of pre-qualification and tender documents, the evaluation of offers, and the supervision and inspection during manufacturing, construction and installation of the generation and transmission facilities, will be performed mainly by a consulting engineering firm.
- 3.3 BEC will participate in the supervision and inspection of construction and installation of equipment with its own personnel assisted by a resident engineer of the engineering consulting firm, and for specialized events, like installation, testing, and commissioning by specialists of the engineering consulting firm.

B. Status of program preparation

- 3.4 All required detailed engineering and design studies for the investment projects have been carried out satisfactorily by a consulting engineering firm contracted following the Bank's procedures. Technical advisory services have been provided for: (i) feasibility study, the detailed engineering designs, the preparation of tender documents and the evaluation of offers for the 30MW power plant; and (ii) feasibility, design, preparation of tender documents and evaluation of offers for the transmission expansion works, reconfiguration and optimization of the transmission system. BEC has retained the services of the same consulting firm for the supervision and project management.
- 3.5 The feasibility studies included surveys for demand studies, options for generation expansion and their cost, a study of alternatives, the definition of the least-cost solution, and cost-benefit economic analysis including the environmental considerations. They also included electric load flow analysis to

verify the compliance of the designs with the technical planning criteria.

- 3.6 As part of the project preparation, the borrower has prepared an Environmental Impact Assessment (EIA) Report for the new investments, according to the Bank's guidelines and the scope and standards recommended by the Bahamas authorities. An Environmental Management Audit (EMA) Report covering existing operations was also prepared in parallel with this EIA report.
- 3.7 These studies have been prepared through extensive field work, and included comprehensive consultations with local authorities and affected communities. The reports have been reviewed by BEC environmental unit and by the IDB, and have been made public. As a result, appropriate mitigation measures were selected to avoid potential impacts and provide guidance for environmentally sound management of BEC's operations.
- 3.8 BEC has already concluded the pre-qualification and bidding phase for the mechanical and electrical equipment and for the civil works of the generation plant, in accordance with Bank's procedures. Offers for the mechanical and electrical equipment are being evaluated by the engineering consultant and the contract is expected to be awarded by the end of September 1996. Offers for the civil works have been received on August 22 and the contract is expected to be awarded by the end of October 1996, in order to have this plant in service in May 1998.
- 3.9 The consultant has presented to BEC the feasibility study and the technical specifications for the transmission lines and substations involved in this Program, including the reconfiguration arrangements in the 33kV system. The optimization of the transmission and distribution system including protection and control and loss reduction component have also been studied in this feasibility report. The bidding documents have been prepared and presented to the EIB and IDB for consideration and approval in September, 1996.
- 3.10 BEC has produced detailed terms of reference for the Energy Efficiency Program and before the end of 1996 a preselection and shortlisting of interested companies will be performed, following EIB's procedures.

C. Execution and bidding procedures

1. Execution

- 3.11 The execution of the program will be managed by the DGM-PE through New Providence projects unit, which can request support from BEC's engineering department and the environmental unit that will deal fully with environmental aspects of the Program and in particular the implementation of the mitigation measures as recommended by the Environmental Impact Assessment study.

- 3.12 BEC has implemented works similar and with a higher degree of complexity than those which are part of this Program and has prepared engineering designs and bidding documents in the past with assistance from an engineering consulting firm. It has experience with the procurement of goods and services and supervision of construction of engineering and electrical works, and with the installation, testing and commissioning of generation plants and transmission systems.

2. Force account

- 3.13 BEC has been using its own personnel on construction of some 33 kV, 11 kV and 7.2 kV line extensions and substation works. Work done has been satisfactory. BEC's Distribution Division has some 100 construction personnel, of which approximately 40 can be used in smaller works of the nature described. It is recommended that these workers be utilized for such small works that are part of the transmission subcomponent not to exceed a total value of equivalent US\$1.5 million in direct costs, from local counterpart resources, of works over the implementation period of the Program.
- 3.14 BEC's Environmental Unit will also conduct works that are part of the Environmental Protection package, by engaging BEC's regular operations and maintenance personnel on smaller activities. The total value of these works that will be conducted over a period of three years will not exceed the equivalent of US\$300,000 in direct costs, from local counterpart resources.

3. Bidding procedures

- 3.15 BEC has followed Bank's Procurement Procedures for two major bids, one for the procurement of generation mechanical and electrical equipment and the other for civil works of the generation project. International competitive bidding shall be used as stipulated in IDB's procurement guidelines to award all contracts for consulting services valued at over US\$200,000; for procurement of goods in excess of US\$250,000; and for construction works valued at more than US\$3,000,000. The procurement of goods and services to be financed by EIB will be done using EIB's Procurement Procedures. All procurement charged to local counterpart funding will be done using local competitive bidding or by calls for bids from prequalified firms or international competitive bidding under the same thresholds as for the IDB financed purchases.

D. Recognition of expenses, advances, and schedule of expenses

1. Recognition of expenses

- 3.16 Since the date of the loan request from the Government of The Bahamas in March, 1995, and prior to the approval of the proposed loan, BEC will have incurred expenses related to Program preparation, engineering and administration (US\$1.5 million), for the preparation of the privatization study (US\$600,000) and for

contracting the 30 MW LSD unit (US\$4 million). It is recommended that retroactive recognition of the amounts of these expenditures be approved against the local counterpart funding. The project team and the Country Office in The Bahamas monitored and reviewed the procedures followed by BEC to commit these funds and found them consistent with Bank policy and procedures.

2. Advances of funds

- 3.17 The nature of the program and the anticipated pace of work make it useful to be able to have an advance of funds equal to 10% of the loan to cover the advance payments for the mechanical and electrical and civil works contract for the 30 MW LSD.

3. Schedule of expenses (for program execution)

- 3.18 The overall execution period of the Program is estimated to be 36 months calculated from the time the contracts are signed and including the lead time necessary for the fabrication of the mechanical and electrical equipment for the 30MW LSD. The schedule of expenses is shown in Table III-1:

Table III-1
Schedule of Expenses

SOURCE	1996	1997	1998	TOTAL	%
IDB	6,100	31,200	18,700	56,000	58%
EIB	200	9,300	15,500	25,000	26%
BEC	6,400	5,800	2,800	15,000	16%
TOTAL	12,700	46,300	37,000	96,000	100%
%	13%	48%	39%	100%	

- 3.19 Annex III-1 presents a breakdown of Program expenses by component and source of financing for the Program's three-year implementation period.

E. Land and rights-of-way

- 3.20 All the necessary land for the power plant and substations are owned by BEC. No problems are anticipated with the rights-of-way needed for projects works since the route of the new 132 kV line follows almost completely the existing 33 kV line.

F. Operation and maintenance

- 3.21 BEC has two units in charge of the operation and maintenance of the BEC's electricity system operations. One which is specifically

responsible for looking after the generation operations on New Providence and the other for transmission and distribution on New Providence and for operations on the Family Islands. To date the system has been operated and maintained in a satisfactory manner, so that there is no reason to expect difficulties in providing the same service to the new installations to be built under the Program. In addition, within the scope of the optimization of generation, transmission and distribution operations, BEC will update the maintenance management system to incorporate adequate real-time technology and equipment for a corporate integrated management system.

- 3.22 BEC has over 30 years of experience with the operation of LSD units and uses accepted practices for their maintenance and operation. Further, it is BEC's intention to include spare parts in addition to the purchasing order for the new units for the normal operation for 5 years and complementary (additional) training for the key operation personnel. Therefore, it is envisaged that the facilities included in the Program will be well operated and maintained. BEC will present to the Bank for a period of ten years a report discussing the operational results of the power plant, the maintenance performed and scheduled for the following year, and the results of the monitoring activities of environmental impact (as per EIA).

G. Environmental considerations (management)

- 3.23 In general, the main environmental effects of the expansion power station are related to the operational phase, particularly to air quality, while ecological and visual issues are the main concerns with regard to the transmission/substations sub-component.
- 3.24 Accordingly, specific mitigation measures have been selected, comprising design modifications, construction specifications, remedial actions and management procedures, to avoid a situation where deterioration in environmental quality prevents further development.
- 3.25 The implementation of the measures recommended in the EIA for the expanded power station will enable BEC to comply with both short-term and long-term air quality standards at all populated locations, and reduce plume visibility and smut formation. In addition, the recommended diversion for the first 3-4km of the proposed route for the transmission line will avoid significant impacts on the sensitive area known as the "Primeval Forest".
- 3.26 An Environmental Management and Monitoring Plan, as recommended in the EIA, will be used to ensure that Clifton Pier PS is operated with a minimum environmental impact. Hence, this plan and full implementation of the Environmental Management System initiated in 1994, will ensure that fuels are properly managed and all releases to the environment are determined and controlled. Likewise, the required Environmental Management and Monitoring Plan will be

expanded beyond the immediate needs of the power plant extension, so that when the Working Manuals which lay down the detailed methods for sampling, measurements, reporting and corrective actions, are subsequently prepared, they cover company-wide needs, particularly with regard to the forthcoming national environmental control regulations.

H. Ex-post evaluation

- 3.27 In accordance with the Bank's policy and in consultation with BEC, it was agreed not to include an ex-post evaluation as part of the program activities. However, it should be noted that an ex-post evaluation could be carried out easily because the necessary data for the ex-post evaluation will be readily available.

IV. BORROWER AND EXECUTING AGENCY

A. Entities involved

- 4.1 The Bahamas Electricity Corporation (BEC) will be the borrower and the executing agency for the Program. BEC is a wholly-owned Government Corporation established in 1965 under the Electricity Act of 1956, as amended. The corporation's activities are regulated under Chapter 182 of the Statute Law of the Bahamas. The Guarantor for the loan will be the Commonwealth of the Bahamas through its Ministry of Finance and Planning (MOF).

B. Institutional analysis

1. Administrative structure

- 4.2 BEC is supervised by a Board of Directors appointed by the Deputy Prime Minister. The Deputy Prime Minister provides guidance on the formulation of policy and the direction of the Corporation's activities. The General Manager is the chief executive officer of the Corporation and has the overall responsibility for planning and controlling its activities. The General Manager is appointed by the Board of Directors. The activities of the company are organized into eight divisions: Energy Supply, Field Operations, Customer Service and Marketing, Planning and Engineering, Administration, Controller, Internal Audit, and Legal. This structure is appropriate for a small-sized utility like BEC. BEC has 1025 employees, a number that has declined slowly over the last several years, a period during which the Corporation has experienced considerable growth. Even so, the consultants retained to study the privatization of BEC determined that the number of staff could be further reduced without affecting the Corporation's ability to deliver service.

2. Operating management

- 4.3 The generation, fuel supply and safety is the responsibility of the Assistant General Manager for Energy Supply. The transmission, distribution, system control and Family Islands operations is the responsibility of the Deputy General Manager for field Operations.

3. Financial management

- 4.4 The Controller has overall responsibility for finance, accounting and budgeting. The accounting procedures are adequate for the control of the operations of the BEC. Interim financial reports of acceptable quality are prepared monthly. The Assistant General Manager for Customer Service and Marketing has the responsibility for meter reading, billing, credit and collection and other customer service activities.

- 4.5 Data processing is the responsibility of the Deputy General Manager for Administration. A Data Processing Manager has been recruited who is expected to join the company on October 1, 1996. He will report to the Deputy General Manager, Administration. There are two Assistant Managers in the Data Processing Department. The Deputy General Manager, Administration is also responsible for the purchasing and stores, transportation, human resources and security department.
- 4.6 The internal auditing of the BEC is the responsibility of the Internal Audit Department, headed by the Chief Internal Auditor. This department reports functionally to the Chairman of the Audit and Finance Committee of the Board, and reports administratively to the General Manager. This Department has three full-time professionally qualified internal auditors. The activities of the Department are carried out in accordance with a program which is prepared on an independent basis and according to appropriate norms and standards. Satisfactory internal audit reports are issued regularly. Based on these reports, correct internal control weaknesses are taken by the departments concerned.
- 4.7 BEC's financial statements are audited by external auditors (a firm of chartered accountants) appointed by the Deputy Prime Minister. During the period of Program execution, the financial statements of the Program shall be submitted to the Bank with the opinion of an independent firm of chartered accountants acceptable to the Bank. Additionally, during the life of the loan contract, the Bank will receive the audited financial statements of the Borrower.
- 4.8 All fixed assets for the generation, transmission and distribution systems, including buildings, plant, vehicles, office furniture and equipment, have been comprehensively insured for damages, except for the physical loss of or damage to overhead lines and transmission equipment. The losses due to damage to lines and transmission equipment tend to be smaller than the potential losses to generating plants and for this reason BEC considers it more economical to self insure for these risks. The fixed assets are insured on the basis of replacement costs.

C. Historical financial analysis

- 4.9 An assessment of BEC's financial health was made by analyzing certain measures of the company's profitability, leverage and liquidity. Profitability was assessed in order to form a view of whether the company can generate sufficient resources to be sustainable. Leverage was analyzed in order to measure how big a cushion of equity the company has, in case future cash flow is not sufficient to service all of the debt. And liquidity was analyzed in order to form a view of the company's ability to meet its short-term obligations. The following analysis considers the measures or ratios that are commonly used to analyze industrial companies that require relatively large amounts of long-lived plant and equipment. To obtain an indication of BEC's financial performance compared to

a peer group, comparisons are made with the average ratios for Caribbean electrical utilities, as contained in the Utility Survey published by the Caribbean Electrical Utility Services Corporation (Carilec). The most recent issue of the survey uses data from 1994.

- 4.10 BEC's profitability has declined considerably over the last three years, from around US\$10m in the fiscal year ended September 30, 1993 to around US\$3m in 1995. This was in spite of the fact that total revenues rose from \$115m to \$141m during the three-year period. There were three main causes of this declining profitability. The most important cause was large foreign exchange losses on previously contracted IDB loans denominated in the Bank's unit of account. Large losses were recorded in 1994 - US\$6.6m and in 1995 - US\$5.6m. A large gain of about \$6m is expected for the current year, however. Secondly, effective July 1st, 1994, the Government imposed a duty for the first time on fuel used for the generation of electricity. Duty paid for fiscal year 1994 was \$2.9 million and for 1995 it amounted to \$7.9 million.
- 4.11 The final problem affecting profitability is that large amounts of accounts receivable have gone unpaid for extended periods. Both the central government and several government companies have not always paid their electricity bills. Although the central government has reduced its past due accounts considerably, there had been no progress over a number of years with respect to the government corporations until quite recently. The total amount that has been outstanding for more than one year as at the end of June 1996 was \$23m. The financial cost to BEC of carrying these non-performing receivables was approximately US\$1.5m in 1995. In August, 1996 the GBH reached an agreement with BEC, stipulated in the Arrears Action Plan (Annex I-1), to repay these debts over a six year period, beginning immediately. In addition, the Government has allocated funds to the Ministries for utilities expenditure. BEC also has been very persistent in the implementation of a non-technical loss reduction campaign that includes service cuts as one of the measures for timely collections.
- 4.12 The declining profitability affected the company's ability to meet its debt service. In 1993 profits were enough to cover debt service twice over, whereas in 1995 they were barely sufficient to keep BEC current on its debt service. In spite of these profitability problems, leverage was not excessive during the period. The debt/equity ratio changed only slightly from 1.78 times in 1993 to 1.72 times in 1995, as the company repaid old loans and contracted new ones in roughly equal amounts during the period.
- 4.13 BEC's profitability problems did affect the corporation's liquidity, however. The current ratio, which is current assets divided by current liabilities, declined from 1.50 at the end of fiscal year 1993 to 1.27 at the end of 1995. The Carilec Survey indicates that the average current ratio among Caribbean electrical

utilities is 1.56, which suggests that the BEC is operating with considerably less liquidity than is normal. Another measure of liquidity called the quick ratio, which measures only those assets that can be turned into cash quickly, shows a similar decline, and also under-performs the peer-group average.

D. Financial projections

- 4.14 The purpose of the analysis of the financial projections is to determine if the existing mix of assets plus those that result from the expansion plan which will be financed by the proposed loan and other sources, gives rise to an enterprise that is sustainable at tariff levels that are acceptable to the government and to the users of electricity. The analysis of the projections also provides the opportunity to check that the underlying assumptions are reasonable. If the projections show unsustainable results, or produce a financial structure that is not sufficiently robust, then the inputs can be changed, for instance, by contracting the financing for a longer maturity, while there is still time to make these adjustments.
- 4.15 The base year for the financial projections is fiscal 1995, the most recent period for which audited accounts are available. The projections are made for ten years. During this period, another 30MW expansion is expected to be required in 2002. The investment and the financing for this second-stage expansion are included in the projections.
- 4.16 The main assumptions used in the projections have been reviewed and are considered to be reasonable. These assumptions are:
1. That the interest rate on the IDB loan will be 7.00% p.a. during the life of the project.
 2. That standard IDB credit and inspection fees will apply.
 3. That the loan is denominated in US dollars.
 4. That electricity demand is in accordance with the forecast contained in the Electricity Tariff Study conducted by RCG/Hagler Bailly and revised by BEC to reflect the stronger demand that is now expected.
 5. That government corporations repay their debts of \$23m over an accelerated schedule described in the agreement between the Government and BEC (Annex I-1), and that they keep current on new billings.
 6. That the price of electricity grows slowly from 17.65 cents per kWh in 1995 to 20.80 cents per kWh in 2005.
 7. That system losses average 12% of electricity generated.

8. That fuel prices increase at an average of 4% p.a. and non-fuel and non-financial expenses increase at an average of 5% p.a.

BEC: FINANCIAL PROJECTIONS - SOURCES AND APPLICATIONS (in thousands)											
INTERNAL SOURCES	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
NET OPERATING INCOME	20884	22905	24961	32234	35188	36770	39888	44782	44105	46807	50358
DEPRE& AMORT.DEFER.CHG	16276	15529	15823	17104	19957	22350	23038	23664	25493	27349	28065
LONG TERM RECEIVABLES	0	6000	6000	6000	5000	1000	1000	1000	1000	0	0
TOTAL INTERNAL SOURCES	37.160	44.434	46.784	55.338	60.145	60.120	63.926	69.447	70.598	74.157	78.423
EXTERNAL SOURCES											
PROPOSED IDB LOAN(S)	5875	5850	51300	24805							
OTHER LOANS	12334		32747	14253	1000	987	13900	833	767	7700	633
CONTRIB.IN AID OF CONS.	204	1672	8846	1741	1828	1920	2016	2117	2222	2333	2449
TOTAL EXTERNAL SOURCES	18413	7522	92901	40799	2828	2886	15915	2949	2989	10033	3083
TOTAL SOURCES	55573	51956	139685	96137	62973	63006	79842	72396	73587	84190	81506
L/TERM IDB FINANC.CHGS.		9751	9042	8372	13801	12988	12087	11027	9960	8899	7819
L/TERM OTHER FIN. CHGS.	25261	4588	10153	13790	3462	2511	2832	2627	1909	2026	1860
AMORT.IDB LOAN(S)	7982	8289	8544	8544	10533	10533	14033	14033	14033	14033	
AMORT.OTHER LOANS	12322	9412	7753	15781	18631	3147	3184	16223	2195	2240	9290
TOTAL DEBT SERVICE	39828	31136	31443	41052	46428	29180	32136	43910	28097	27198	33002
PROPOSED IDB PROJECT		5373	56097	38447							
PRIOR IDB PROJECTS	12033	6962	17000	5784							
OTHER PROJECTS	5558	7107	29229	10840	17417	18852	60482	25997	21294	71438	30213
TOTAL CONSTRUC. COSTS	17591	19442	102326	55051	17417	18652	58482	25997	21294	71638	30213
OTHER APPLICATIONS											
DECLARED DIVIDENDS	633	633	633	633	633	633	633	633	633	633	633
INC.(DECREASE)WORK.CAPT	3109	-3454	12619	4721	-8322	7153	2357	-7115	1254	1824	1819
CONSTRUCT.FIN.CHGS.PAID		-904	-4048	-5435							
TOTAL OTHER APPLIC.	3742	-3725	9205	-81	-7689	7786	2990	-6482	1887	2457	2452
TOTAL APPLICATIONS	61161	46854	142974	96021	56156	55617	93608	63425	51277	101293	65667
ANNUAL SURPLUS (DEF)	-5588	5102	-3290	116	6817	7389	-13766	8971	22310	-17103	15839

- 4.17 Based on these assumptions, BEC's financial condition improves in the future. Sales are expected to increase each year, from 840 GWh in the year currently in progress to 1,200 GWh in the year 2005. In US dollar terms the increase is from US\$141 million to

US\$248 million at the end of the forecast period. Profits recover sharply from the US\$3m level of 1995 to US\$16.m for the year currently in progress. Profits grow from this level, ultimately reaching US\$40m in 2005. As a percentage of revenues, profits jump from 2.11% in 1995 to 10.50% in 1996, then increase from this level until reaching 16% at the end of the period. BEC's operating margin confirms this pattern. In 1996 it reaches 15.5% and grows to 20% in 2005. The Carilec average was 14.85%. The interest coverage ratio also confirmed this trend, improving to 1.94 in 1996 and to 4.20 in 2005.

- 4.18 This level of profitability enables the company to maintain adequate levels of liquidity during the forecast period. The liquidity, as measured by the current ratio, starts at 1.36 in 1996 and grows steadily as earnings are retained, reaching 1.82 at the end of 2005.
- 4.19 During the whole period BEC shows conservative use of leverage. The debt-to-equity ratio falls steadily throughout the period, reaching 0.49% at the end of 2005. Although this ratio is more important in the case of private-sector companies, which must rely entirely on their cash flow and their cushion of equity in order to meet obligations, than a wholly-owned public-sector company with government-guaranteed debt, it is important to observe that BEC's leverage is as low as most private-sector electrical utilities, a fact that will facilitate the company's privatization
- 4.20 In order to encourage prudent financial management, the following financial conditions are recommended to be reflected in the loan contract:
- (a) before first disbursement from the loan proceeds, the Borrower shall present evidence that it has obtained binding commitments sufficient to finance the entire Program;
 - (b) during the life of the loan the Borrower shall maintain a current ratio of not less than 1.2 times;
 - (c) during the life of the loan the Borrower shall maintain a debt service coverage ratio of at least 1.6 times;
 - (d) maintain a minimum ratio of collections during each fiscal year to accounts receivable at the beginning of the year of 85%.
 - (e) during the life of the loan the Borrower shall maintain a debt to equity ratio of not more than 1.4 times;
 - (f) during the life of the loan, the Borrower shall abstain from declaring dividends unless it can prove that: (i) compliance with the ratios in this section will not be impaired; and (ii) the declaration of dividends will not affect its ability to meet its financial obligations.

(Conditions (b) through (f) are similar to those contained in the Bank's existing loans to BEC).

E. Privatization plans

4.21 The Committee, composed of representatives of different government entities, commissioned a privatization study to:

- (i) recommend an institutional structure for a privately owned power sector and a regulatory regime, which would: (a) attract foreign and local capital and broaden local ownership; (b) provide an efficient and reliable supply of electricity at least cost; (c) promote an environmentally acceptable operation of the power sector; (d) ensure that the structure would be in the best interests of the consumers, the nation as a whole and the employees.
- (ii) define ownership of constituent utility(ies) as well as a regulatory framework consistent with the recommended ownership structure and required institutions to regulate the sector.
- (iii) prepare a privatization strategy for consideration by the authorities.

V. FEASIBILITY OF THE PROGRAM

A. Technical feasibility

- 5.1 The proposed Program is the result of studies and research conducted by BEC and its consultants, using criteria, and procedures widely recognized as acceptable and consistent with the practices of modern public and private electric power enterprises. The specifications of the Program components have been optimized and, in all cases are the least costly for each component.
- 5.2 The electric power generation and transmission components are similar to those of existing facilities in BEC's plant in operation. Furthermore, in the selection of the 30MW LSD unit technology for the new power plant, BEC considered the following main technical aspects of the decision, in comparison with other technologies:
- BEC's long experience with and knowledge of LSD technology
 - simplicity of design
 - fewer valves to maintain and reduced maintenance requirements
 - higher overall availability
 - longer combustion time
 - greater tolerance to low quality fuels
 - wide service experience
 - wide source of supply of alternative designs
 - more rugged
 - lower lubricating oil requirements
 - longer life
 - minimal technical risk to BEC
- 5.3 Studies reviewed by the Bank demonstrate the technical feasibility of the new LSD power plant and the related transmission, expansion and modifications. The consulting engineers will continue giving considerable advisory assistance during the final stages of the execution of the program.
- 5.4 The estimates used to cost the program are reasonable, calculated according to the specifications of equipment and works to be installed and existing designs, on the basis of foreign and domestic unit prices from the most recent bidding competitions held by BEC for the construction of similar works. In addition, in the case of the generation plant, the cost reflects the bid quotations received for mechanical and electric equipment, and civil works. Technical, economic, environmental and financial criteria acceptable to the Bank were used, and reasonable margins have been allowed for possible price escalation and contingencies.
- 5.5 No problems are anticipated with the rights-of-way needed for projects works since the route of the new 132 kV line follows almost completely the existing 33 kV line. BEC owns sufficient land on which the generating facilities will be built. There are

also no difficulties expected in securing the remaining timely provision of goods and services.

- 5.6 BEC has been executing works similar to those being proposed. It has always used engineering advisors and will continue to engage consultants during the period of execution for the engineering and supervision aspects. It will use a program executing unit, satisfactory to the Bank that will be responsible for daily activities of the program. The transmission and distribution department has the technical capability and human resources necessary to undertake the extensions of the 33 KV system.
- 5.7 The methods used in carrying out the works under the supervision of BEC, with assistance from the consultant, are deemed adequate since the company has had a great deal of experience with similar projects. There is every reason to assume, therefore, that the projects will be built on time within the program schedule, which is considered realistic.
- 5.8 With regard to the operation and maintenance of the facilities, BEC has qualified personnel and the necessary capacity and experience to exercise these functions. Thus, all components of the project are deemed technically feasible.
- 5.9 It is concluded that the proposed Power Expansion Program, Phase II, is technically sound, has been properly conceived, planned, sized and designed; that its costs are based on recent and reliable data; that the timetables and schedules for implementation are reasonable; and there are no major problems foreseen which might place the implementation and subsequent operation of the subprojects in doubt.

B. Institutional feasibility

- 5.10 BEC will be responsible for the implementation of the technical, administrative, and financial aspects of the program. It has operated as an efficient executing agency in the past for projects financed by the Bank and has the necessary experience and expertise to carry out the proposed project in a timely fashion and within the budget presented.
- 5.11 The DGM-PE will have the basic responsibility for the program, and will have specialized support areas for contract negotiations, administration, engineering, scheduling, program cost accounting and reports. The New Providence projects unit will be the core group of the project executing unit. It will carry out, with consultants support, all tasks required for implementation of the program, for which it has the necessary personnel and skills.

C. Financial feasibility

- 5.12 Provided that approximately \$23 million in past due accounts receivable owed by government corporations are cleared up according

to the Government's Arrears Action Plan and set forth in BEC's financial plan, the corporation will have sufficient resources to execute the program. The Action Plan has been approved by the Cabinet. Successful completion of the program also assumes that BEC concludes its negotiations with the EIB for an equivalent \$25m parallel loan facility. These negotiations are substantially advanced and are expected to be concluded by October, 1996, with the loan approval expected in November, 1996. There are no other unresolved issues. (The EIB loan is contingent to the IDB loan being approved and it is recommended that disbursements under the Bank's loan be made contingent on the approval of the EIB loan).

- 5.13 In spite of the relatively large size of the expansion program, the financial forecasts show that BEC expects to have adequate liquidity, profitability and capital during the execution of the Program. These forecasts were prepared using conservative assumptions and should therefore be robust enough to withstand somewhat lower demand or higher costs than has been forecasted.
- 5.14 BEC's ability to manage its financial affairs is adequate and no special measures to strengthen the financial administration are recommended. It will be necessary to closely supervise the compliance with the financial conditions of the proposed loan.

D. Economic feasibility

- 5.15 The need for incremental capacity in the electricity generation system in New Providence was determined through the formulation of a least-cost generation expansion study which evaluated technical and economic factors such as (i) projected growth of electricity demand, (ii) the accepted level of reliability, and (iii) the technical and economic characteristics of the existing and proposed generation resources.

1. Demand forecast

- 5.16 Two recent studies examined the historical demand for electricity and the main factors which influenced the level and growth of electricity consumption in New Providence. Both studies used forecasting techniques to capture the essential nature of the influence of these factors on the growth of demand for electricity and generated forecasts for the period 1995-2015. BEC's forecast indicates that a peak demand of 140 MW in 1996 will increase by 3.4% per year to 155 MW in 2000 and 3% per year from 2001 to 2010.
- 5.17 However, the addition of a committed major load with a peak demand of approximately 15 MW will eventually lead to higher peak demand for both forecasts. The new load originates from a large-scale tourism development, for which financing has already been assembled, and was not planned at the time of the earlier study done by the consultant Hagler Bailey Inc. (HBI). Approximately 50% of the new increment in peak demand is expected to be connected to the system in 1997 and the remainder in 1998.

- 5.18 The BEC forecast of peak load tracks better with the recent historical experience and is consistent with the most recent available data. It was therefore adopted as the base case for generation system planning and therefore the economic analysis of the project. For the purpose of sensitivity and risk analyses, the HBI results were used as the lower bound and the BEC high growth case as the upper bound.

2. Reliability

- 5.19 Different indices were evaluated for use as reference for system reliability. BEC considered the loss of load expectation (LOLE) to be a suitable index to measure the reliability of the system because the LOLE takes into account the entire load and the effect of diversity of supply as opposed to peak demand only, as is the case with deterministic measures such as capacity reserve margin.

- 5.20 The LOLE is complemented by a measure of the expected unserved energy (EUE), which estimates the amount of electricity demand that may not be served due to the occurrence of the loss of loads events. Because of the relatively flat load curve observed for BEC, the EUE is expected to be relatively high. No recent studies have been made to value the unserved energy. However, a consensus value of \$1.25 per kWh was adopted for the system expansion planning.

3. Energy-capacity balance

- 5.21 The existing system is unable to meet the projected demand without significant addition of base load capacity in the immediate future. Without the indicated additions, firm capacity and energy deficits will emerge by 1998 and would be exacerbated by the demand of the committed major load which will come on stream during 1997 and 1998. BEC will also be pressed into using peaking plants (gas turbines) as base load units. This will result in higher fuel costs for system operation and, because of the age and condition of some of the peaking plants, maintenance will also increase, and system reliability decrease with a higher frequency of black outs which may not be satisfactorily mitigated by private standby generating facilities.

4. Supply options

a. Alternatives to new generation equipment

- 5.22 Life extension of existing plants, demand management techniques and pricing policies were evaluated as possible options to supply the required capacity and energy demand. It was concluded that there was no scope of recovery of significant efficient capacity through rehabilitation of existing generating capacity.
- 5.23 An energy efficient use project is not likely to show positive results in the near term, but it may impact on the decision for

future capacity expansion. Since tariffs for the different categories of consumers are, in all cases, above the respective strict long-run marginal costs, the level of tariffs could be considered to contribute towards a rational use of electricity in the system. As part of this operation a comprehensive efficient use of energy program will be developed for The Bahamas.

b. Candidate generation resources

- 5.24 Gas turbines, combined cycle and low speed diesel units were the technologies selected as new plant candidates because of compatibility with BEC's all-thermal system and the constraints of environmental policies.

5. Least-cost expansion plan

- 5.25 The load forecast, the reliability targets, the technological and operational characteristics of existing and new generating units, with entry-into-service dates for the latter, were used as inputs into the production costs generation planning tools (GPT) model to simulate the operation of the New Providence electricity generation system over the period 1995-2010 and to identify the least-cost expansion plan.

- 5.26 The conclusions of the simulation exercises are: (i) additional generation capacity would be needed by 1998 and 2002, (ii) unit sizes of 30 MW offered the most economy, (iii) there were no advantages in installing peaking capacity as the next addition. Fuel price stability, site availability and shared facilities favor the continuation with low-speed diesel technology over the short-run and (iv) the addition of a low speed diesel unit of 30 MW with an entry-into-service date of 1998 was the least cost option.

6. Generation project benefit/cost analysis

a. Costs

- 5.27 The investment costs for the projects include resources allocated for generating machinery and equipment, dedicated transmission lines, substation and auxiliaries and civil works, and environmental protection measures. The base case cost including engineering and administration, physical contingencies and interest during construction account for \$74 million.

b. Benefits

- 5.28 The main benefit of the project is the value of the electricity it produces in the context of the operation of the entire system. The unit is estimated to produce an average of 221 GWh per year over its economic life of twenty-five (25) years.
- 5.29 According to the merit order of dispatch, the energy would be mostly baseload which would displace the output of less efficient

plants. Though there is some contribution to peak load, the project's energy is considered substitution energy which is valued at the opportunity cost of the resources released which are mainly fuel and non-fuel inputs for operating and maintenance. This admittedly is a conservative approach and has the effect of understating in this case, to a small degree, the benefits of the project. The average annual value of the electricity is US\$21.0 million. The internal economic rate of return of the project is 18%. The net present value is \$25 million.

c. Sensitivity analysis

- 5.30 The project remains viable with a 20% increase in investment and non-fuel operation and maintenance costs. The economic internal rate of return remains above the 12% bench mark when the value of benefits is reduced by 15%. When investments costs are increased by 20% in combination with a 10% reduction in the value of the benefits, the project's economic internal rate of return declines to 11.5%.

7. Transmission system improvement project benefit/cost analysis

a. Costs

- 5.31 The Program includes a project to reinforce the existing transmission system including substations. Project investment costs include capital expenditure for switchgear transformers and other reinforcement and security works - and amount to \$22 million.

b. Benefits

- 5.32 The major impact of the transmission system improvement project is the creation of new capacity to transmit and distribute incremental electricity. There will also be a reduction in the frequency of occurrence and duration of outages and the decreased instability by protecting against potential major faults.
- 5.33 The benefits of the project are the annual amounts of incremental energy supplied and the electricity "recovered" through the reduction in the frequency and duration of outages. The incremental energy was valued at the average tariff. Losses avoided were valued at their opportunity costs. For the purposes of this analysis, a value of \$1.25 per kWh was adopted as the opportunity cost of energy not served. Outage reduction was considered for a period of 10 years. The economic internal rate of return is 22% when all costs are evaluated against incremental energy benefits only. The net present value is \$11 million.

c. Sensitivity analysis

- 5.34 The project remains economically viable when costs are increased by 20% and benefits reduced by 10% simultaneously.

E. Conclusion

- 5.35 The generation expansion project has been designed to operate as a baseload unit. It will have the lowest variable costs of all of BEC's generation resources and will therefore displace the peaking units which are now used inefficiently as baseload servers. With the project BEC's entire generating system will meet demand growth in the new term at lower cost than without the project. The new unit and similar and existing low-speed diesel units will use low-sulphur diesel fuel which should lead, under proper operating conditions, to emissions of sulphur and other gases below the accepted limit.
- 5.36 There is a high likelihood that the demand forecasts will be attained especially as recent economic policy changes and economic performance have inspired relatively large investments in the tourism sector on New Providence. If the new demand is realized to the extent projected in the least cost plan, new capacity will be needed again in 2002.

**LOGICAL FRAMEWORK
POWER EXPANSION PROGRAM II
BH-0018**

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	INDICATORS	MEANS OF VERIFICATION	ASSUMPTIONS
GOAL To assist country's efforts to expand production and employment in a more diversified economy and to contribute to development of productive sectors including tourism that has been successful attracting foreign investment.	1. Consumption per capita rises from 2940kWh in 1995 to 3500 kWh in 2000.	-BEC's Corporate Business Plan	-It is assumed that the economic growth of the Bahamas will continue at a relatively slow recovery. -That there will be no additional government taxes
To prepare the electric sector for privatization.	2. Privatization study recommendations on utility regulatory entity sectoral structure and ownership options.	-Privatization Steering Committee decisions and government resolutions	
PURPOSE To satisfy efficiently the increasing demand for the least cost and environmentally safe electric power supply in New Providence and Paradise and by the first half of 1998.	1) The installed generation capacity on New Providence must increase from 209MW in 1996 to 240MW in 1998 2) Improvement of generation mix lower production costs to achieve heat rate of 11000btu/kWh and increase reliability to LOLP=1% 3) Transmission and transformation capacity must be adequate to handle the addition of 30 MW and 242 GWh/year that have to reach New Providence's centers of development 4) Optimization of the distribution system with reduction in losses from 16.4% to 13% 5) The level of reliability of the transmission & distribution system will be at industry's level. LOLE reduced by 1000MWh in 1998 6) Emissions are to comply with recommendations of the EIA study	1) Generation Operations Report Daily Operating Statistics 2) Generation Operations Report Daily Operating Statistics 3) BEC's corporate business plan 4) Distribution of operations report 5) Daily operating statistics 6) Department of Environmental Health (DEHS) monthly reports	1) Climatic conditions remain favorable and there are no serious infrastructure damage and or disruptions due to hurricanes

**LOGICAL FRAMEWORK
POWER EXPANSION PROGRAM II
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	INDICATORS	MEANS OF VERIFICATION	ASSUMPTIONS
OUTPUTS			
Installation of 1x30 MW, LS Diesel generator unit and building extension at Clifton Pier	By mid 1998, a new LSD power plant with 30MW of generating capacity will be completed and in operation	Project close out reports, final payments commissioning tests	
Construction of approximately 25km of 2kV Transmission line between Big Pond and Clifton Pier stations	1) Total system transportation capacity to increase by mid 1998 by at least 30MW	Project commissioning Report & system operations report	Climatic conditions remain favorable and there are no serious damage and/or disruptions due to hurricanes
Expansion of substations at Clifton Pier and Big Pond	2) & 3) By the beginning of 1998 the transformation capacity at Big Pond and Clifton Pier will be increased by the addition of 80 MVA each		
A new 33kV substation to be built on Paradise Island	4) & 5) By the end of 1997, the capacity of transformation at Paradise Island will be increased by 30MVA and a new feeder will be placed to connect this substation with New Providence distribution system	Availability of permanent supply to Paradise Island	
A new 33kV feeder will be installed to transport increased capacity to Paradise Island	Ability to deliver up to 15MW at 33kV	Project Commissioning Report	
Loss reduction works and transmission and distribution system optimization to improve protection and control	By the end of 1998, the loss reduction component will be completed and both technical and non-technical losses will be reduced from 16.4% in 1995 to 13% in 1998	Corporate business plan and operational statistics	idem
Install equipment and plant modifications to ensure adequate environmental mitigation at the Clifton Pier	Increased stack heights. Unification and height increase of joint stack on existing Sulzer diesel generating units	Measurements of local NOx & SOx ground level concentrations	idem
Install boiler grade water production facilities	By mid 1998, the plant will produce boiler grade quality water	Quantity of water sufficient to meet corporate needs of BEC	idem

**LOGICAL FRAMEWORK
POWER EXPANSION PROGRAM II
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Page 3

	INDICATORS	MEANS OF VERIFICATION	ASSUMPTIONS
Privatization study on restructuring ownership options and regulatory framework for the electricity sector	By the end of 1997 government will define institutional & regulatory parameters	Government/BEC Board directives	The government undertakes the institutional and regulatory reforms
Produce a study on efficient use of electricity and renewable energy	By the end of 1997 a report defining the most suitable DSM customer driven program and formation of a nucleus implementation unit at BEC will be completed	Demonstration project results	Customer interest for energy saving
PUTS Program schedule	See detailed budget for the project		Present operation is approved by IDB and EIB.

POWER EXPANSION PROGRAM (BH-0018)
SCHEDULE EXPENSES
(in thousands of US\$)

July 1996

DESCRIPTION	1996			1997			1998			TOTAL			TOTAL BEC + EIB + IDB
	BEC	EIB	IDB	BEC	EIB	IDB	BEC	EIB	IDB	BEC	EIB	IDB	
1. <u>ENGINEERING & ADM.</u>													
1.1 Engineering & superv.	1,400	0	0	900	0	0	1400	0	0	3700	0	0	3700
1.2 Administration	1,250	0	0	650	0	0	1200	0	0	3100	0	0	3100
	150	0	0	250	0	0	200	0	0	600	0	0	600
2. <u>DIRECT CONSTRUCTION COSTS</u>													
2.1 Generation	3900	200	5700	4100	6800	29000	0	12300	14700	8000	19300	49400	76700
2.1.1 30 MW M&E Equipment	3600	0	5700	2900	0	29000	0	0	14700	6500	0	49400	55900
2.1.2 30 MW Civil Works	900	0	4000	0	0	23000	0	0	12100	900	0	39100	40000
	2700	0	1700	2900	0	6000	0	0	2600	5600	0	10300	15900
2.2 Transmission	300	200	0	1200	6800	0	0	12300	0	1500	19300	0	20800
2.2.1 Transmission line 132 kVA	0	100	0	0	2000	0	0	2200	0	0	4300	0	4300
2.2.2 Sub-Stations	0	100	0	0	1000	0	0	1700	0	0	2800	0	2800
2.2.3 Reinforce & Optimization T&D	300	0	0	1200	3800	0	0	8400	0	1500	12200	0	13700
Total (1 + 2)	5300	200	5700	5000	6800	29000	1400	12300	14700	11700	19300	49400	80400
3. <u>CONCURRENT COSTS</u>													
3.1 Efficient use of energy (DSM)	700	0	0	200	1500	0	200	500	0	1100	2000	0	3100
3.2 Environment mitigation	0	0	0	0	500	0	0	0	0	0	500	0	500
3.3 Privatization Study	100	0	0	200	1000	0	200	500	0	500	1500	0	2000
	600	0	0	0	0	0	0	0	0	600	0	0	600
4. <u>FINANCIAL EXPENDITURES</u>													
4.1 Interest	400	0	400	600	0	1670	1200	0	3430	2200	0	5500	7700
4.2 Commission	10	0	213	333	0	1484	1104	0	3243	1448	0	4940	0
4.3 Inspection and supervision	390	0	0	267	0	0	96	0	0	752	0	0	0
	0	0	187	0	0	187	0	0	187	0	0	560	0
5. <u>UNALLOCATED</u>													
Contingencies	0	0	0	0	1000	530	0	2700	570	0	3700	1100	4800
Escalation	0	0	0	0	506	254	0	1760	240	0	2266	494	2760
	0	0	0	0	494	276	0	940	330	0	1434	606	2040
	0	0	0	0	0	0	0	0	0	0	0	0	0
GRAND TOTAL	6400	200	6100	5800	9300	31200	2800	15500	18700	15000	25000	56000	96000

SCHEDULE FOR PROCUREMENT

DESCRIPTION	DATE	PREQUALIFICATION	BID TYPE	AMOUNT US\$000	SOURCE OF FINANCING		
					IDB	EIB	BEC
A. GENERATION PLANT				55,900			
1. <u>Mechanical and Electrical Equipment</u> 30MW low speed diesel alternator with all associated mechanical and electrical plant and equipment to operate at base load	04/96	yes	ICB completed in July/96	40,000	39,100	0	900
2. <u>Civil Works Associated</u> -Power house extension including loading bay, mechanical annex, electrical annex and transformer compounds -Diesel generator foundation -Ground improvement works -Switchgear building -etc.	04/96	yes	ICB completed in August/96	15,900	5600	0	10300
B. TRANSMISSION CONTRACT							
There will be a single contract for equipment and works as itemized 1/	08/96	NO	ICB	20,800	0	19300	1500
1. <u>Transmission Works Associated with Generation Project</u> 1.1 Transmission line includes: 25km of 132 kV wood pole line							
Estimated cost of equipment and works				4,300			
1.2 Substation expansion at Clifton Pier and Big Pond includes: 2x80 MVA 132/33kV transformers							
Estimated cost of equipment and works				2,800			
2. <u>Reconfiguration of 33kV System</u> includes: Sea Breeze substation and Blue Hills substation, and lines connecting Blue Hills and Earnest St. and Blue Hills and Sea Breeze							
Estimated cost of equipment and works				5,000			
3. Loss Reduction and Reliability Improvement includes addition of circuits and upgrading to achieve industry acceptable reliability level. Works are located at Fort Charlotte SS, Clifton Pier/Windsor Field line, Winton Ss, Soldier Rd/Winton line and East Hill St./Fort Charlotte							

1/ This estimate includes \$1.5 m. for force accounts to be contributed by BEC.

DESCRIPTION	DATE	PREQUALIFICATION	BID TYPE	AMOUNT US\$000	SOURCE OF FINANCING		
					IDB	EIB	BEC
Estimated cost of equipment and works				3,000			
4. Replacement of underrated 33kV switch gear at East Hill and Leisure Time Substations							
Estimated cost of equipment and works				2,200			
5. Installation of new 3x10 MVA 33/7.2kV substation and feeder cables on Paradise Island				3,500			
Main transmission contract equipment list for items 1 to 5: *25km 132kV wood pole transmission line *33km 33kV Wood Pole Sub-transmission lines *16km 33kV underground cable circuits *2x80 MVA 132/33kV transformers *3x15 MVA 33/7.2 kV transformers 2x10 MVA 33/7.2 kV transformers *1x8 MVA 133/7.2 kV transformers *132 kV Outdoor line isolator and miscellaneous instrument transformers, lightning arresters and connections *Containerized 33 kV switchgear, indoor SF6, in 6 locations totaling 38 bays *Containerized 7.2 kV switchgear, indoor SF6, in 3 locations totaling 38 bays *Miscellaneous substation control, protection and metering equipment, fire protection and civil works, etc.							
C. ENVIRONMENTAL MANAGEMENT	12/96	no	ICB/LCB	1,500	0	1500	0
1. Construction of one common multi-flue stack of 60m (units DA 5,6,7 and 8)				850			
2. Extension of stack (units 9 & 10 and incinerator) from 60m to 70m				350			
3. Install three air quality monitoring stations				200			
4. Bunding for fuel and lubricating oil storage tanks and day tanks				100			
D. STUDIES							
1. Privatization study <u>Note: The study was completed in June 1996</u>	02/95	yes	ICB completed in May 1995	600	0	0	600
2. Efficient use of energy study	11/96	yes	ICB	500	0	500	0
TOTAL				79,300	44,700	21,300	13,300

PROPOSED RESOLUTION

THE COMMONWEALTH OF THE BAHAMAS. ____/OC-BH TO THE BAHAMAS ELECTRICITY
CORPORATION. Power Expansion Program II (BH-0018)

The Board of Executive Directors

RESOLVES:

That the President of the Bank, or such representative as he shall designate, is authorized, in the name and on behalf the Bank, to enter into such contract or contracts as may be necessary with the Bahamas Electricity Corporation, as Borrower, and The Commonwealth of The Bahamas, as Guarantor, for the purpose of granting the former a financing to cooperate in the execution of a Power Expansion Program II. Such financing will be for the amount of up to US\$56,000,000 from the Single Currency Facility of the Ordinary Capital resources of the Bank, and will be subject to the "Terms and Financial Conditions" and "Special Contractual Conditions" of the Executive Summary of the Loan Proposal.