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Appraisal of a Power Project Afghanistan

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Europe, Middle East and North Africa Regional Office

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CURRENCY EQUIVALENTS

Currency Unit	=	Afghani (Af)
Af 1	=	US\$0.01759
Afs 56.86	=	US\$1.00
Afs 1,000	=	US\$17.59
Afs 1,000,000	=	US\$17,587.06

WEIGHTS AND MEASURES

kW	=	kilowatt
MW	=	1,000 kW
kWh	=	kilowatt hour
GWh (Gigawatt hour)	=	1,000,000 kWh
kV (kilovolt)	=	1,000 volts
One meter (m)	=	3.28 feet
One kilometer (km)	=	0.624 mile
One kilogram (kg)	=	
(1,000 grams)	=	2.2 pounds
One ton (metric ton)	=	
(1,000 kg)	=	2,205 pounds

GLOSSARY OF ABBREVIATIONS

CIDA	=	Canadian International Development Agency
DABM	=	Da Afghanistan Breshna Moassessa
FAO	=	Food & Agriculture Organization
Harza	=	Harza Engineering Company International
UNDP	=	United Nations Development Programme
USSR	=	Union of Soviet Socialist Republics
WAPA	=	Water and Power Authority

The Afghan calendar and fiscal year is March 21 to March 20, e.g., 1973/74 refers to March 21, 1973 to March 20, 1974.

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AFGHANISTAN

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This report has been prepared by Messrs. I. Mathai, E. Moore and V. Antonescu. It is based on information obtained by a mission to Afghanistan in June 1975 consisting of Messrs. I. Mathai and V. Antonescu.

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APPRAISAL OF
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SUMMARY AND CONCLUSIONS

- i. Power supply in Kabul, the capital city of Afghanistan, is critical in dry years because the present generating facilities though adequate in normal years to meet demand through 1980 would produce only about half the requirements in a dry year. To help alleviate this problem of energy shortage a gas turbine station with two units of 20 MW is proposed for erection by October 1977. It is the only feasible option within the available time frame.
- ii. The estimated cost of the Project excluding interest during construction is US\$11.0 million comprising foreign exchange costs of US\$10.0 million and local costs of US\$1.0 million equivalent. An IDA credit of US\$10.0 million, the first Bank Group assistance for the Afghanistan power sector, is proposed towards the foreign exchange costs. The Project is based on a feasibility study conducted by Harza Engineering Company International (Harza) with UNDP financing and the Bank as executing agency. Engineering and supervision during construction and commissioning would be provided either by Harza or by another consultant. The Project includes training for Afghan staff in operation of the gas turbines.
- iii. The Project would be executed by Da Afghanistan Breshna Moassessa (DABM), the national power authority, operating as a separate entity within the Water and Power Authority (WAPA), a new department of Government created in April 1975 to merge the country's power and water resource development functions and having at its head a General President of ministerial rank working directly under the Deputy Prime Minister. The power functions were previously vested in DABM, a corporate body with separate legal status, and the water resources were administered by another Government ministry.
- iv. DABM's current charter, which sets no financial objectives and under which it has functioned more or less like a government department, is not suited to its role as the national power authority responsible for generation, transmission and distribution facilities in the country. Its staff is governed by civil service salary scales, and the minister, not the General President, used to discharge all important duties and responsibilities. Government has agreed to establish by end of June 1976 a revised charter on the basis of principles already agreed with IDA and providing for DABM's functioning as a semi-autonomous enterprise within WAPA with autonomy in personnel matters and in day-to-day operations.
- v. DABM is beset by a host of problems. Its staff is of low caliber, the bulk of whom do not have the needed educational qualifications. Its salary scales, which are the civil service salary scales, are very low, and only the absence of employment opportunities prevents any large exodus of

staff; this handicap in the matter of salaries will however be removed when under the new charter DABM will be permitted to frame its own personnel policies. It does not have the financial and accounting systems and procedures associated with a utility. Its accounts, such as they are, have been compiled only through 1968/69 so there is no financial information on which to base management decisions. Its energy losses, about one half of which are estimated to be due to thefts and unmetered and unbilled consumption, were 45% or more in the four years from 1970/71 but have decreased to 39.6% in 1974/75 as a result of corrective measures. It has suffered operating losses ever since its creation in 1966/67 (Af 95 million in 1968/69, when revenues failed to cover a third of operating expenses); an estimate of present annual operating loss would be around Af 75-85 million. Its tariffs, set about 20 years ago, need revision. How best to effect the needed institutional improvements in DABM has engaged the Bank Group's attention since 1971.

vi. In a technical assistance program (costing about US\$1.1 million) mounted by the Canadian International Development Agency in close coordination with the Bank Group, utility experts are being provided to help DABM improve its operations. DABM has agreed to develop and implement in consultation with IDA various systems, procedures and programs on the advice of these experts or other consultants. Specifically these would cover areas such as reorganization, salary administration, training, financial and accounting systems and long-range power development planning.

vii. DABM will adopt not later than July 31, 1976, and thereafter implement without delay, a five-year plan for limiting energy losses to not more than 20% of generation. Government and DABM will also take a combination of measures including an average tariff increase of at least 20% so as to enable DABM to obtain at least 20% more revenues in 1976/77. DABM has undertaken to achieve an annual return of 8% beginning with 1980/81 and will reach this objective through a phased program during 1977/78 through 1979/80.

viii. Except for minor civil works which will be accomplished by WAPA's forces, procurement of IDA-financed items will be under international competitive bidding according to IDA's procurement guidelines. There are no domestic suppliers who are likely to compete in the bidding.

ix. In view of the agreements reached as set forth in Section VIII, the Project is suitable for an IDA credit of US\$10.0 million to Government on the usual terms, IDA's agreements with DABM being incorporated in a Project Agreement. Execution of an on-lending agreement with DABM satisfactory to IDA (not more than 20 years with three years of grace and 8.5% p.a. rate of interest) and completion of action including implementation of an average tariff increase of at least 20% so as to obtain 20% more revenues in 1976/77 through such action would be conditions of effectiveness. The Credit could be effective within three months of signing of the Credit Agreement.

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I. INTRODUCTION

1.01 This report appraises a project of two 20-MW gas turbine units, to be installed in the Kabul area in order to meet a critical shortage of energy during dry years.

1.02 The estimated cost of the Project excluding interest during construction is Af 625.46 million (US\$11.0 million) comprising foreign costs of Af 568.60 million (US\$10.0 million) and local costs of Af 56.86 million (US\$ 1.0 million). An IDA credit of US\$10.0 million is proposed towards the foreign exchange costs. The project is based on a feasibility study, which was prepared at the request of the Afghan Government, by Harza Engineering Company International (Harza), with UNDP financing and the Bank acting as executing agency.

1.03 The Project presents an opportunity for Bank Group involvement in the Afghanistan power sector, to which no financial support has so far been given.

1.04 This report is based on the findings of a Bank mission consisting of Messrs. I. Mathai (financial analyst) and V. Antonescu (engineer) which visited Afghanistan in June 1975.

II. THE POWER AND ENERGY SECTOR

A. Power and Energy Resources

2.01 The Republic of Afghanistan is a landlocked country between Iran, Pakistan, and the USSR, with an area of about 630,000 km² (250,000 square miles). The population, estimated at between 15 and 18 million inhabitants, of which over 15% is nomadic, is mainly engaged in agriculture and small scale industry. Only 13% of the population lives in the cities. The climate is dry, with a mean annual precipitation of 326 mm, of which half may occur as snow. The main transport needs are met by trucks, since there are no railways in the country.

2.02 The economy is dominated by agriculture which contributes about 60% of GNP. Only 5% of GNP is provided by mining and large scale industry comprising sugar, cement, fertilizer, pulp and textile plants. The remainder of GNP is made up by transportation, services and small scale industry.

2.03 Kabul, the capital of Afghanistan and its largest city, is situated at the junction of the Kabul and Logar Rivers, at an altitude of 1,800 meters (5,500 feet). It is the main commercial and communication center in the country, and contains government institutions, a university, a polytechnic school, major hospitals, and important manufacturing facilities. Its population, estimated at over 600,000, is expected to rise to 750,000 by 1979; future expansion is predicted at a 4% growth rate. (see maps).

2.04 Afghanistan's main energy resources are hydropower, natural gas, oil and coal. No detailed survey of the hydroelectric potential has been carried out, but it is estimated to total about 100,000 GWh in an average year, of which less than 1% has been developed, mainly in the Kabul area and in the Helmand Valley. The remaining resources are largely represented by the potential of very large projects on the Amu Darya (Oxus river) which forms the northern border with the USSR.

2.05 Natural gas deposits are in the north, near Sheberghan and Mazar-i-Sharif, estimated reserves being 40-50 billion m³. The gas contains about 94% methane and has a calorific value of 7800 kcal/m³ (865 Btu/cu. ft.). The 1975/76 production is estimated at 2.8 billion m³ of which more than 2.5 billion m³ are exported by pipelines to the USSR. Only 0.25 billion m³ is used for internal consumption in a fertilizer plant and a thermal power station (36 MW), both located at Mazar-i-Sharif. Present plans are to increase the gas production and exports (all to the USSR) to 4 billion m³ by 1977/78.

2.06 Proven reserves of coal are estimated at about 50 million tons and probable reserves at several hundred million tons. The best quality deposits, with a reported calorific value of 9,400 kcal/kg (14,000 Btu/lb) are located near the town of Dara-i-Soof, northwest of Kabul, between Mazar-i-Sharif and the capital. Other deposits with a lower calorific value are located east and south of Pul-i-Khumri and a small amount east of Herat. The coal mines are state-owned and are operated by the Coal Exploitation Department of the Ministry of Mines and Industries. Yearly production has fluctuated in recent years between 125,000 and 195,000 tons. Coal is available in Kabul in briquette form at a price of Af 900/ton (\$1/10⁶ Btu) which is estimated to be less than one fourth of the production cost. Despite this low price, electricity is still widely used for domestic heating (para. 6.01).

2.07 Exploration for oil has been under way since 1930. To date two small fields have been discovered in the northern part of the country--the Koh-i-Angot field with 2.5 million tons of reserves discovered about 1967 and the Agh-Darya field with 9 million tons discovered in the fall of 1975. Continuing investigations in the southeastern part of the country by a French company also have prospects of being successful. Except for 6000 tons of crude oil from the Koh-i-Angot field used annually for general heating, all oil requirements are imported as oil products, since there is no local refinery. Demand has been growing by about 15%/year and 1974/75 imports were about 230,000 tons at a reported cost in foreign exchange of some US\$30 million. The USSR supplies about 85% and Iran the rest. Of the 1974/75 total, over 70% is used in transport, about 20% in industry and the rest in households. The State Oil

Monopoly, under the Ministry of Finance, imports and markets all oil products, except for lubricating oils, kerosene and some gasoline. The cost of gasoline and diesel oil is US\$133/ton at the Soviet border and US\$110/ton at the Iranian border. The selling price in Kabul, Af 8,000/ton (US\$141/ton), includes transport cost by trucks of Af 2/ton km.

B. Organization of the Electric Power Sector

2.08 Although electric power generation commenced in Afghanistan in 1893, the power sector remained fragmented, with separate private companies operating isolated systems throughout the country, until 1966/67 when Da Afghanistan Breshna Moassessa (DABM) was formed as a government enterprise under a special charter for construction and operation of generation, transmission and distribution facilities. Its staff was (and is) governed by civil service salaries, and the Minister of Mines and Industries discharged all important duties and responsibilities, such as approval of budgets and financial statements, framing of tariffs, appointment of staff in higher grades, etc. In April 1975, Government set up a new department called the Water & Power Authority (WAPA), merging the country's water-resource development and power functions, under a General President with the rank of a Minister and working directly under the Deputy Prime Minister.

2.09 Installed generating capacity in the public sector is 267 MW, of which 207 MW is operated by WAPA. The total is made up of 218 MW of hydroelectric stations, 39 MW in coal-fired steam plants and 10 MW in diesel stations. Privately-owned generating plants account for another 20 MW, including 6 MW in hydro stations, 3 MW in steam stations and 11 MW in diesel stations. Almost 70% of the installed capacity in the public sector is concentrated in the Kabul area, and forms a separate power system. The rest is dispersed in over 20 isolated centers, of which the largest are the northern system centered on the 36-MW gas-fired station at Mazar-i-Sharif and the Helmand Valley network supplied from the 33-MW USAID-financed Kajakai multi-purpose hydro project.

2.10 Power generation in the Kabul area is based on three hydroelectric stations, located on the Kabul River totaling 178 MW. Sarobi (22 MW), Naghlu (90 MW) and Mahipar (66 MW). These power stations are interconnected through 110-kV transmission lines. Their output is highly dependent on water conditions in the Kabul basin since there is no significant water storage capacity at any of the hydro plants and no upstream storage reservoir. The Kabul system also includes a small and obsolete hydro station (Jabul-us-Seraj, 1 MW), a diesel station (Breshna Kot, 1 MW) and a small coal-fired steam station (2.8 MW), which serves the Gulbahar textile mill. Their importance for the power balance is insignificant. The Kabul system is due to be interconnected in 1978 with the Nagarhar system, whose major power source is the Darunta hydropower station (11.5 MW).

C. The Development Program

2.11 Development planning at the national level has formally existed in Afghanistan since the mid-fifties. The Draft Fourth Plan (1972/73-1976/77) was prepared in 1972, but had not been approved when the change of government took place in July 1973. All these short range plans have been little more than a collection of projects and have not reflected a clearly perceived development strategy. The first Seven Year Plan (1976/77-1982/83), covering all sectors of the economy, is to be prepared by mid-1976.

2.12 Planning and development of the power sector has been haphazard in the past with numerous ministries and organizations involved in the task and no clear coordination between them. However, two studies related to the power development of the northern and central parts of Afghanistan are now under way: (i) FAO's study for developing a master plan for the Kabul River Basin, and (ii) a USSR study for electrification of northern and central Afghanistan (including Kabul) through 1985 under a credit agreement of February 1975. The most promising major project for the Kabul system, which would be evaluated by the FAO study, is upstream storage on the Panjsher River estimated by Harza to provide 1279 GWh. Based on these and other studies the Government has agreed to formulate not later than March 20, 1977 a power sector development plan based on a forecast of market growth and a survey of potential hydroelectric sites and thermal alternatives, and their likely costs and benefits. Government also intends to send to IDA a copy of the proposed plan to enable it to make its comments.

III. THE PROJECT

A. Objectives

3.01 The objectives of the facilities included in the Project are:

- (a) to improve, in the shortest possible time, the power balance of the Kabul electric system, which since 1971 has been inadequate to meet the demand, and
- (b) to meet the growing power needs of the Kabul area until other power projects can be studied and implemented. Annex 1 provides historic and forecast power requirements.

B. Description

3.02 The Project consists of a gas turbine power station of the package type, comprising two units of about 20 MW each. The gas turbines will be installed for dual oil/gas firing, but fitted initially for oil firing with crude oil as the normal fuel and diesel oil as the unit cleansing and standby fuel. Fuel facilities will provide for unloading, storage and treatment of the oil. The gas turbines will be equipped with intake air filters, lubricating oil cooling systems, and other usual components. The gas turbine units

will be installed at the East substation, one of the three 110/15-kV substations serving Kabul. Provision for later conversion to a combined cycle plant will be included. The conversion would require the addition of a heat recovery boiler to supply a steam turbine unit of about 20 MW capacity, without supplemental firing. However since various alternative development schemes may be available for exploitation in the northern region of Afghanistan, which will be known after completion of present on-going studies, DABM has agreed to demonstrate to the satisfaction of IDA the justification for the additional investment before exercising the option for the combined cycle in the contract for the proposed gas turbines.

C. Status of Engineering

3.03 Through an extension of the original UNDP project, arrangements have been made for the preparation of bidding documents and receipt and evaluation of bids for the gas turbine power station by Harza. The consultant also will provide assistance to Government in reviewing the evaluation and awarding supply contracts. Contracts are expected to be awarded by August 1976. Following approval of the IDA credit, appropriate arrangements would be made, either with Harza or with another consultant, to provide engineering and supervision during construction and commissioning of the gas turbine power station. DABM has agreed to make such arrangements.

D. Cost Estimate

3.04 The estimated cost of the Project (Annex 2) is US\$11.0 million, of which US\$10.0 million would be in foreign exchange. Cost estimates are summarized as follows:

	----Af million----			----US\$ million----			% Foreign to Total Cost
	<u>Local</u>	<u>Foreign</u>	<u>Total</u>	<u>Local</u>	<u>Foreign</u>	<u>Total</u>	
<u>Gas Turbines</u>							
Civil Works	14.21	17.06	31.27	0.25	0.30	0.55	55
Mechanical & Electrical Equipment	11.37	324.11	335.48	0.20	5.70	5.90	97
Diesel Oil Facilities	5.69	62.55	68.24	0.10	1.10	1.20	92
Crude Oil Facilities	5.68	47.18	52.86	0.10	0.83	0.93	89
Total Direct Cost	36.95	450.90	487.85	0.65	7.93	8.58	92
Engineering & Administration	11.37	17.06	28.43	0.20	0.30	0.50	60
<u>Contingencies</u>							
(i) Physical	2.27	22.74	25.01	0.04	0.40	0.44	91
(ii) Price	3.98	67.67	71.65	0.07	1.19	1.26	94
Total Contingencies	6.25	90.41	96.66	0.11	1.59	1.70	93
Total Gas Turbine Cost	54.57	558.37	612.94	0.96	9.82	10.78	91
<u>Personnel Training for Operation & Maintenance</u>							
	2.29	10.23	12.52	0.04	0.18	0.22	82
Total Project Cost	56.86	568.60	625.46	1.00	10.00	11.00	91

3.05 The cost estimates were based on Harza's feasibility report, in which costs were estimated on end-1974 price levels of similar equipment and were determined with consideration of the difficult transport and installation conditions in Afghanistan. Taking into account recent gas turbine projects, and after discussions with Harza, the estimate has been revised as shown above to an October 1975 base. Physical contingencies of 5% on local and foreign exchange costs have been added. To allow for future price rises both for local and foreign costs, compound increases were assumed, allowing 10% in 1976 and 8% thereafter for equipment, and 14% in 1976 and 12% thereafter for civil works. On the basis of these estimates, the gas turbine station would cost about US\$275/kW (including personnel training), with a foreign exchange component of US\$250/kW.

E. Financing

3.06 The proposed credit would cover the foreign exchange costs of the Project. The local costs of US\$1.0 million equivalent (Af 56.86 million) would be financed by DABM as part of its total investment program, about 25% of which would be financed from internally generated funds and about 57% funded by Government. No retroactive financing is proposed.

3.07 The IDA Credit of US\$10.00 million would be granted to Government but the entire amount would be on-lent to DABM. On-lending terms would be for not more than 20 years, including three years of grace, and providing for an average annual interest charge of not less than 8.5%. Interest would not be payable during the grace period but would be added to the principal amount of the loan when the first payment of principal falls due. An acceptable on-lending agreement would be a condition of effectiveness.

F. Implementation

3.08 The East substation, administered and operated by DABM, where the power station will be installed, has adequate space for the two 20-MW gas turbine units and for the possible addition of the 20-MW steam component. All equipment for the gas turbine power station would be procured by international competitive bidding, under procedures in compliance with the Bank/IDA Guidelines for Procurement. The contract for the generating units would include transport and installation and would provide training for local operation and maintenance personnel over a one-year period. The construction unit of WAPA, long established as part of the former Irrigation Department of the Ministry of Agriculture, would be responsible for the civil works. In view of the limited amount of work involved, the capability of the unit and the fact that the works will be executed in the vicinity of energized equipment, this use of force account services is appropriate. Delivery of equipment to Kabul is expected by the end of February 1977 provided no undue transportation delays are encountered, and start of commercial operation by October 31, 1977.

G. Disbursements

3.09 Disbursements from the proposed Credit would be made for 100% of the foreign exchange cost of civil works, equipment and materials, engineering and supervision during construction, and training. Disbursements for the cost of civil works, to be executed by WAPA under force account, would be made against progress certificates issued by the engineering consultant for amounts representing the foreign exchange cost of the works which is estimated to be 55% of the total. Disbursements for the cost of the crude oil handling, storage and treatment facilities would be made only after arrangements satisfactory to IDA have been made for the supply and delivery of crude oil to the Project site. Savings, if any, would be cancelled unless IDA specifically agrees to their use for purposes related to the Project. Disbursements by IDA are expected to be completed by FY1978. Estimated disbursements are given in Annex 3.

H. Environmental Impact

3.10 The environmental impact of the power station is negligible, since the gas turbine units will be located outside the residential area of Kabul, in a zone which has been assigned to future industrial expansion. The few houses in the area are temporary dwellings. Nevertheless, silencers, in the form of sound-absorbing baffles at compression inlet and turbine exhaust, will be installed to limit plant noise to acceptable levels. DABM has agreed to an undertaking to this effect in the Project Agreement.

IV. THE PROJECT ENTITY

A. Background

4.01 DABM, the Project entity that will execute the Project under a new charter to be established in accordance with principles agreed with IDA (para. 4.05), has been beset by a host of problems since its establishment in 1966/67. With most decision-making confined to the highest levels of government and no delegation of authority, DABM has not really functioned as a utility should. Low-caliber staff operating under a poor management on inadequate civil service **scales of pay in an atmosphere of uncertainty and excessive caution with elaborate checks and counterchecks but without manuals and regulations to guide them, have kept operating efficiency alarmingly low.** Without up-to-date financial data or tariff policies and having no long-range power development planning, the enterprise has been only muddling through during all its life. These areas of weakness are dealt with in detail in the appropriate sections of this report.

B. Charter of DABM

4.02 In the past, though enjoying separate corporate status under a charter (Annex 5), DABM functioned really like a government department with all decision-making confined to a committee of ministers and without any effective delegation of authority. The Minister of Mines and Industries,

the Chairman, was responsible under the charter for all important duties such as approval of budgets, ratification of income statements and balance sheets, opening of new branches in places not yet electrified, framing of electricity **tariffs and getting them approved** by the Committee of Ministries, appointment, or proposing (to Prime Minister) appointment, of staff in the grades 1-5 etc.

4.03 DABM has had only a limited area of responsibility. It could not set its personnel policies nor establish its salary scales. The General **President was responsible** for preparation and submission of financial statements and annual budgets to the Minister of Mines and Industries but not for setting of tariffs, not even preparation of tariffs. The General President could also appoint staff only in the lowest five grades of 6-10 (starting with annual salary of Af 25,200 or US\$37 per month or less).

4.04 The charter does not clearly distinguish between policy-making and management since many management functions are vested in the Minister. It does not also establish financial objectives as guidelines for financial management.

4.05 With the creation of WAPA, the new organizational arrangements and the status of DABM within WAPA have to be clearly defined. DABM's charter should be revised:

- (a) to reflect the administrative changes following the creation of WAPA;
- (b) to provide for its operation as a semi-autonomous enterprise with clear financial objectives (para. 5.14) under the administrative control of the General President of WAPA and under the direction of a Board of Directors which shall formulate its policies and supervise its management and operations; and
- (c) to provide that it shall have control of all its activities including the power to appoint all staff on salary and wage **levels which will ensure the appointment and retention of competent personnel**, only policy matters such as approval of investment plans and budget and of tariffs being subject to the approval of Government (as distinct from the General President of WAPA).

Government has agreed to establish such a revised charter by June 30, 1976 on the basis of principles agreed during negotiations. These agreed principles are given in Annex 6.

C. Technical Assistance Program

4.06 DABM has had a series of uncoordinated technical assistance programs which have had varying degrees of success. The latest are a USSR program in the field of power planning, an Indian program for developing micro-hydel schemes and a German program for setting up a pole factory and for improving

the Kabul distribution system and the accounting work. The long-term institutional improvements necessary in DABM have engaged the Bank Group's attention since 1971 following a Bank sector mission. As part of the feasibility study financed by the UNDP (para. 1.02) Harza identified specific areas in DABM requiring long-range technical assistance. On a request by the Government of Afghanistan at the Bank Group's suggestion, and based on Harza's findings and on its own on-the-spot studies, the Canadian International Development Agency (CIDA) signed a memorandum of understanding with Government in December 1975 agreeing to provide technical assistance to DABM costing about US\$1.1 million initially for a period of one year, which is likely to be extended by another four years, (i) to help reorganize DABM for operating it on a sound basis under the required legislative authority and with appropriate policies, (ii) to help secure urgently needed improvements in the financial area through experts working as advisors, and (iii) to help coordinate long-range planning and implementation of power projects through assistance of Canadian advisors to senior engineering staff. CIDA has identified these priority areas needing help after discussion with IDA and would carry out its technical assistance effort in close coordination with IDA. Whether the technical assistance program should be extended beyond one year will be decided by CIDA depending on the extent of implementation of the recommendations of CIDA's experts. DABM has agreed:

- (a) to furnish to IDA by September 30, 1976 a work program for continuing or initiating studies for improving DABM's management and operations, and
- (b) to implement in accordance with a schedule acceptable to IDA such recommendations of CIDA's experts (or of other consultants satisfactory to IDA) as are acceptable to IDA for improving DABM's management and operations, more specifically in fields of organization, personnel, training, accounting including customer accounting, and financial management.

Government has also agreed to engage consultants satisfactory to IDA in order to provide technical assistance at least until June 30, 1979 should the CIDA program terminate before that date. Specific areas being covered in the technical assistance program are described below (paras. 4.07-4.11, 5.05, 5.07, 5.10 and 5.15).

D. Organization and Management

4.07 DABM's organization structure before the creation of WAPA was as given in Annex 7. After the creation of WAPA no significant changes have been introduced in the organization of DABM. The present organization structure for WAPA is also given in Annex 7.

4.08 DABM's management structure needs reorganization. At present about 20 departmental heads report to the General President of WAPA in whose hands practically all authority in DABM is concentrated. Whatever the historical reasons for such concentration of authority, it is now necessary to have proper delegation of responsibility and authority. The lines of responsibility

and authority so far as the branch offices are concerned are also far from clear and these offices often tend to operate independently of DABM's headquarters office. A complete reorganization of DABM including the branch offices with clear delegation of responsibilities and authorities to staff at various levels and delineation of responsibilities and authorities between the headquarters and branch offices seems essential. A possible organization structure for DABM would have two Assistants to the Head of DABM, one for technical operations (generation & transmission, distribution operations, and engineering and construction) and the other for administration, finance and accounting. Directors in charge of these activities would be functionally responsible for all work in their sphere of operations both in the headquarters and in the branch offices. Initiation of reorganization by December 31, 1976 would be desirable.

E. Staff

4.09 The low caliber of staff is one of DABM's serious problems. There are only 29 qualified engineers (23 electrical, 4 mechanical, 2 civil) out of a total of about 3,700 staff. Many Directors have passed only the 9th or 10th Standard (12th is final year of High School); even some General Directors (occupying grade 3, the third highest grade in DABM and in the civil service) have passed only the 12th Standard. The quality of accounting staff is especially poor which is partly due to the absence of any formal accounting education in the country. In order to upgrade the quality of staff, incentive-induced voluntary retirement and large scale recruitment of university-educated young people at various levels may be necessary. If necessary, expatriate staff should be hired on contract terms from countries with comparable backgrounds but which are in more advanced stages of development, e.g., India, Sri Lanka, Malaysia, etc. It is expected that DABM will take suitable measures in consultation with CIDA's experts to improve the quality of DABM's staff.

4.10 There is also a serious morale problem in DABM because of the very low civil service salaries applicable to it as to almost all organizations in the public sector. Because of limited employment opportunities in the country, these low salary scales do not result in any large exodus of staff, but they do cause immense dissatisfaction and perhaps also act as a disincentive for high-caliber staff to join DABM. Annex 8 gives these salary levels, and to provide the right perspective, also the prices of certain common commodities. In addition to salaries, staff enjoy certain perquisites like free transport to and from the place of work, free lunch (costing about 3 Af), etc., but these benefits are trivial. The problem of low salaries is best illustrated by the case of a graduate General Director with 27 years' service and a large family drawing a salary of only Af 4,100 (\$72) per month. The proposed charter of DABM will empower it to set salary scales at such levels as will enable it to recruit and retain competent personnel.

F. Training Program

4.11 The development and implementation of a training program at the management, technical and administrative levels is of the highest priority. Apart from the training of counterparts during the technical assistance program and possible overseas training in specialized fields to be arranged by CIDA, the following facilities available locally will be made use of by DABM:

- (a) accounting courses run by the Industrial Development Bank designed to meet the needs for personnel trained in the modern system of accounting. Although primarily intended for persons employed in commercial and development banks, places are allocated to outside trainees; this would provide the background for subsequent training in utility accounting to be carried out by CIDA;
- (b) courses offered at the Afghan Institute of Management and Administration--a UNDP Project;
- (c) courses in the English language run by the British Council, and
- (d) a newly introduced option in the Faculty of Engineering at the University in Kabul in Electric Power Technology.

In addition, a training organization could be set up within DABM on the advice of CIDA's experts, which will deal with the problems of orientation and in-service training of engineering and operations staff. Review of and agreement on training programs by December 31, 1976 should be an objective of the technical assistance effort.

V. FINANCES

A. Highlights of Financial Position

5.01 The highlights of DABM's financial position are as follows:

- (a) DABM does not have even a barely satisfactory accounting system. Accounts, such as they are, have been compiled only for the first three years of its existence through 1968/69, so it is operating without financial data for management decisions (para. 5.04);
- (b) although losses have been declining, due no doubt in part to the prior technical assistance programs (para 4.06), energy losses were around 45% or more in the four years (53% in 1971/72) from 1970/71 and 39.6% in 1974/75. About one-half are estimated to be technical losses and the other half due to thefts and un-metered and unbilled consumption (paras 5.06 and 5.07);

- (c) having no financial objectives in its charter, DABM has not sought to achieve any and has incurred heavy losses since inception. In 1968/69 (loss: Af 95 million) revenues failed to cover a third of its operating expenses; its present losses would perhaps be around Af 75-85 million (para 5.09);
- (d) its tariffs (flat charge of Af 1 for all customers except the 20% served by non-hydro sources) set about 20 years ago, need revision. Government will take as a condition of credit effectiveness a combination of measures including an average tariff increase of at least 20% so as to enable DABM to obtain 20% more revenues in 1976/77 through such measures. This would enable DABM to just about break even in 1976/77, i.e., to earn enough revenues to cover operating expenses (including depreciation) and interest; over a twelve-month period DABM will achieve a performance level of something more than break-even (paras. 5.08 and 5.13), and
- (e) DABM has agreed to achieve, through a phased program, an annual rate of return of at least 8% beginning with 1980/81.

B. Accounting System

5.02 DABM does not have the accounting systems and procedures associated with a utility. Some of the numerous deficiencies are:

- (a) though required under the charter, principles of double entry bookkeeping are not applied in all areas;
- (b) although a chart of accounts has been developed, it is not being fully used;
- (c) without a centralized general ledger and adequate plant accounting, the total capital investment is not readily ascertainable;
- (d) unsatisfactory stores accounting procedure; and
- (e) absence of payroll accounting, budgetary control and financial reporting system.

5.03 Developing satisfactory systems and procedures (accounting including customer billing and stores accounting, budgetary control, reporting system, etc.) and implementing them is beyond the capability of DABM. Consultants' assistance under the technical assistance project offered by CIDA is essential. DABM has agreed to take measures acceptable to IDA to implement programs for installation of satisfactory financial and accounting systems and procedures based on the recommendations of consultants (para 4.06).

C. Absence of Financial Data

5.04 The latest compiled accounts of DABM are for 1968/69. DABM's annual budget, which is approved by Government, contains the only financial data about the enterprise now available, but this reflects only incomings and outgoing and does not indicate the operating results or the financial condition of the enterprise and is not a satisfactory basis for financial management.

5.05 Compilation of the accounts for the seven years beginning with 1969/70 (through the year 1975/76) at considerable expenditure of time and effort may not serve any useful purpose at this stage. Efforts to complete these will also distract staff from the essential task of keeping accounting work current in future. DABM should therefore examine why these accounts should be prepared at all in the light of legal and other requirements. This matter would be explored with DABM in due course with the work of CIDA's experts. As part of the technical assistance program it is expected that DABM will implement, in consultation with IDA and with the assistance of CIDA's experts, a program for keeping accounting work current in future.

D. Energy Losses

5.06 One of DABM's serious problems, and an important contributory cause of its continuing heavy operating losses, is its high level of energy losses which for four years from 1970/71 thru 1973/74 were around 45%, rising as high as 53% in 1971/72, and came down to 39.6% only in the year 1974/75. In Kabul Division the losses have been close to 50% (58% in 1971/72) and came down to 43% only in 1974/75. The high level of losses is mainly due to:

- (a) theft of energy through illegal and unauthorized connections;
- (b) despite a requirement for bi-monthly meter reading, meters are not being read for several months and in many cases not at all;
- (c) wrong reading of meters and wrong application of multiplier;
- (d) technical defects of the distribution system, e.g., wrong size of conductors; and
- (e) supply to preferred customers such as mosques which is mostly unmetered and always unbilled (loss of revenue: around Af 4 million per annum).

5.07 According to Harza who investigated this matter under the UNDP project, on a rough basis about half the losses would be technical and the other half would be due to other causes broadly classified under management problems (theft, wrong or no metering, etc.). With a view to reducing unmetered and unbilled consumption, an inventory of connected meters was taken over a period of two years in 1973-1975 with the assistance of a German accounting expert provided under the German aid program (para. 4.06); of

about 50,000 total meters, approximately 30,000 have been inventoried and work is under way to correct billing errors and to improve customer billing and accounting. In order to place DABM's operations on a satisfactory footing, its energy losses should be brought down to a reasonable level, say, around 20%, which would be reasonable considering that generation is mainly hydro and transmission in the existing isolated systems is not over very long distances. In other words, losses should be limited to technical losses only. DABM has agreed, to adopt no later than July 31, 1976, and thereafter implement without delay, with the assistance of consultants a program for progressively reducing over a five-year period its energy losses to not more than 20% of generation.

E. Tariffs

5.08 DABM's present tariffs are shown in Annex 9. The present flat charge of Af 1 for all customers (except for the 20% of customers served by supply from non-hydro sources), fixed about 20 years ago, is not related to the cost of supply, is inequitable to different classes of customers, and does not form a basis for operating DABM as a viable financial unit. Development of a suitable tariff structure and setting of tariffs based on marginal costing principles are a matter of great urgency. However this will require a cost-of-service study, which could proceed in parallel with developing financial data for DABM's operations (see para. 5.05). Until suitable tariffs are devised, Government has agreed:

- (a) as a condition of effectiveness of the Credit, to take such action including, but not limited to, levy of connection charges on new customers, reduction of energy losses, compensation for electricity supply to preferred customers and an average tariff increase of at least 20% as will enable DABM to earn at least 20% more revenues in 1976/77 through such action. If Government wishes that the impact on domestic consumers be less, then the tariffs of other consumers should be suitably raised to secure the same revenues. On a rough computation based on present inadequate data, this would enable DABM to achieve a performance level of something more than break-even over a full twelve-month period; for 1976/77, with the impact limited to about 8 months after credit effectiveness, DABM should about break even;
- (b) not later than April 1, 1977, to establish a tariff structure for DABM satisfactory to IDA based on the recommendations of consultants, with suitable customer classification and taking into account demand and energy characteristics of customers and principles of marginal costing; and
- (c) not later than January 1, 1978, compensate DABM semi-annually for non-billed consumption of preferred consumers.

DABM has agreed to meter all supply to preferred customers by not later than December 31, 1977.

F. Past Performance and Present Position

5.09 The latest available income statement for the year 1968/69 shows that with revenues of Af 182.1 million, DABM had suffered a loss of Af 95.4 million in that year (Annex 10). In the absence of subsequent financial statements, only a rough estimate of DABM's operating results is possible. Income statements prepared on this basis for the years 1970/71 thru 1974/75 (Annex 10), show DABM's operating losses during this period to be in the range of 75-85 million per annum. DABM's balance sheets as of March 20, 1968/1975 are given in Annex 11.

5.10 Apart from its continuing losses, DABM has also a bill collection problem. Though receivables for electricity supplies to domestic consumers are coming down, collection has been most difficult from government offices and entities (especially the defense establishment), the outstandings from whom in March 1975 were about Af 141 million in the Kabul area, or six months' total revenues. Water supply and street lighting accounted for Af 62 million, or about two months' total revenues. Receivables are also not analyzed regularly according to age and reported to management. DABM will develop on the basis of recommendations of consultants (para 4.06) and implement as acceptable to IDA a program including measures for reduction of receivables to appropriate levels, after due analysis by age.

G. Financing Plan

5.11 The following table gives the total funds requirements for DABM's investments for the four years 1975/76 thru 1978/79, the last three years of which comprise the project construction period. Since the future power development program is largely undefined, it has been assumed that the investment requirements in the four-year period will be only marginally higher than current investment levels, a tenable assumption since some power sector investment is already outside the purview of DABM, e.g., power station at Qalagai in northern Afghanistan to be constructed by the USSR under a separate credit agreement with Government. The table also assumes a 20% increase in revenues in 1976/77 through a combination of measures including an average tariff increase of at least 20% (para 5.08(a)). Details are in the statement of sources and applications of funds in Annex 12.

	-----1975/76 thru 1978/79-----		<u>% of Capital Expenditure</u>
	<u>Amount in Millions (Af)</u>	<u>(US\$)</u>	
<u>Capital Expenditure Requirements</u>			
Proposed Project	625.5	11.0	14
Others	<u>3,764.1</u>	<u>66.2</u>	<u>86</u>
	<u>4,389.6</u>	<u>77.2</u>	<u>100</u>
<u>Sources of Funds</u>			
Internal Cash Generation	1,327.0	23.3	
Less: Debt Service	<u>(169.6)</u>	<u>(3.0)</u>	
	1,157.4	20.3	26
Less: Working Capital Increase	<u>(58.9)</u>	<u>(1.0)</u>	<u>(1)</u>
Net Internal Cash Generation	<u>1,098.5</u>	<u>19.3</u>	<u>25</u>
Borrowings - German Credit	227.2	4.0	5
- Proposed IDA Credit	<u>568.6</u>	<u>10.0</u>	<u>13</u>
Total Borrowings	<u>795.8</u>	<u>14.0</u>	<u>18</u>
Government's Capital Contribution	<u>2,494.6</u>	<u>43.9</u>	<u>57</u>
Other Sources	<u>0.7</u>	<u>-</u>	<u>-</u>
Total Sources	<u>4,389.6</u>	<u>77.2</u>	<u>100</u>

5.12 Internal cash generation would cover 25% of the capital program, Government capital contribution 57%, the proposed IDA Credit 13% and a German credit 5%. The internal cash generation ratio is high because of the low level of debt service and because the construction requirements do not reflect power sector investments that will be made outside the purview of DABM. Substantial offers of credits for Afghanistan including some for power are reported from many donors including USSR and OPEC countries. It has been assumed that these credits will be given to Government which in turn will provide funds to DABM for its investment program as equity contributions, and not as loans, in view of DABM's emerging utility status.

H. Future Performance

5.13 The operating loss of DABM for the year 1975/76 is estimated to be above Af 60 million. DABM would roughly break even in 1976/77 at its present level of operating efficiency, with a combination of measures including an average tariff increase of 20% with effect from the expected date of credit effectiveness (para. 5.08(a)).

I. Proposed Financial Covenant

5.14 Government should establish financial objectives for DABM, both short-term and long-term, and set them out in the regulations to be issued under DABM's charter. A rate of return objective would be more appropriate than a requirement to generate internally a percentage of capital expansion requirements because DABM's construction activity is not uniform from year to year and because it is difficult to determine what should appropriately be DABM's level of self-financing of construction. Government and DABM have agreed to take all necessary steps so that beginning with 1980/81, DABM will earn a rate of return of at least 8% on average net fixed assets in service as valued from time to time in accordance with methods satisfactory to IDA. Since DABM's debt service in the near future would be small, the 8% return should generate a reasonable portion of capital expansion requirements. DABM will achieve the goal of a minimum 8% return in 1980/81 through a phased program during the period 1977/78 through 1979/80, and Government will take all action required for DABM to secure this objective. Intermediate rate of return objectives will be established for each of the three years soon after better financial data relating to DABM's operations are available as a basis for discussions.

J. Depreciation

5.15 For depreciating assets DABM follows the straight-line method and uses rates established by Government in 1974/75. While individual rates are specified for various types of office equipment and furniture, only composite rates (e.g., a composite rate for all machinery and electrical equipment) are applied for more significant assets. These rates are also substantially higher than those normally applied in utilities, e.g., all plant and equipment is depreciated at 6% as against the customary rate of 3-4%. DABM will develop and implement suitable depreciation policies and procedures acceptable to IDA based on the recommendations of consultants (para 4.06). Suggested rates are given in Annex 13; these may be adopted or modified following consultants' recommendations.

K. Audit

5.16 Under extant regulations, the accounts of DABM should be prepared within six months after the end of each year. They are then required to be reviewed and certified by an inspection team (not less than three persons and as many as six or seven) of the Ministry of Finance. The Ministry of Mines and Industries sends the certified accounts to DABM with suitable instructions. In addition, an inspection team from the Prime Minister's Secretariat conducts a post-audit of purchases of materials. The latest certified accounts are for 1968/69 and no judgment could be formed on the quality of the work of review and certification presently done by the Ministry of Finance's team. However certification by the Ministry of Finance would not be suitable for IDA's purpose, viz., attesting to the reliability of the financial statements because:

- (a) it is not an independent review;
- (b) there are no professional accountants on the team; and
- (c) review by the Ministry of Finance Inspectors is not geared to serve IDA's purpose.

5.17 It is therefore necessary to have the annual accounts of DABM audited by independent auditors acceptable to IDA. DABM has agreed to submit to IDA its financial statements, duly audited by independent auditors acceptable to IDA, within six months after the end of each fiscal year. IDA could accept a firm of chartered accountants operating in Kabul as independent auditors for this purpose. At least two such expatriate firms in Kabul are conducting the audit of a large number of government, semi-government and private organizations as the result of a requirement of the Investment Law according to which all companies registered under the Law should have accounts audited by an independent firm of chartered accountants who meet internationally accepted auditing standards.

L. Insurance

5.18 Materials for the project will be insured. Since DABM is state-owned, other risks would be covered through self-insurance by Government. This is satisfactory, and no specific agreements in this respect are considered necessary.

VI. BENEFITS AND JUSTIFICATION

A. Forecast of Power Requirements

6.01 A forecast of generation required for the Kabul system was prepared by the mission using the consultants' forecast and a combination of projection technique (considering the annual generation in the last twelve years) and correlation between the annual growth rate of electricity production with the growth of population and the usage of electricity per person. The following facts and assumptions have been considered:

- (a) Power generation in the Kabul area, which is almost exclusively hydro, did not increase in 1974/75 as compared with 1973/74 due to particularly low river flows. Consequently, limitations in consumption were introduced.
- (b) Domestic consumption, which is about 30% of total consumption, was not rationed during recent dry periods. Electric heating is estimated at 12-15% of the annual domestic consumption.

- (c) The Nangarhar power system (city of Jalalabad) is due to be interconnected with the Kabul system in 1978/79. This will add to the Kabul system a consumption of about 35 GWh and a capacity of 13.9 MW.

6.02 Electricity, sales, generation and power station capabilities, both for the Kabul system (total) and for the entire country (WAPA) are shown in Annex 1. The increase in sales in the Kabul area is summarized as follows:

	1967/68		1974/75		1981/82		Average Growth	
	GWh	%	GWh	%	GWh	%	1967-74	1974-81
Industry	46.2	33.9	54.5	23.6	266.8	45.7	2.4	25.
Domestic	40.8	30.0	70.8	30.6	157.0	26.9	8.1	12.0
Commercial	0.2	0.2	0.4	0.2	1.2	0.2	10.2	17.0
Government Services	38.1	28.0	85.5	37.0	130.0	22.2	12.1	6.2
Embassies	1.8	1.3	1.7	0.7	2.2	0.5	--	3.8
Street Lighting	0.5	0.4	0.8	0.6	1.2	0.2	7.0	6.0
Other	8.5	6.2	17.1	7.3	25.0	4.3	10.2	5.6
	136.1	100.0	230.8	100.0	583.4	100.0	7.8	14.1

Residential consumers account for the major part of electricity consumption. The low average growth of consumption in industry for 1967/68-1974/75 is partly due to its negative increase in the last year. For the same reason, the expected trend of its growth for the next seven years appears high, but corresponds to Government's intentions concerning industrial development in the Kabul area. With an unrestricted consumption in 1974/75 the average annual growth of electricity sales would have been 8.8% instead of 7.8% for 1967/68 - 1974/75 and would be 13.2% instead of 14.1% for 1974/75 - 1981/82. The difference between the past and future growth rates is due mainly to the increase in sales (billed consumption) reflecting the decrease of losses expected in the period 1974/75 - 1981/82. On these assumptions, the corresponding growth rates of generation for the same period would be 11.5% starting from the actual production in 1974/75 or 10.2% considering a production which would have covered the real demand in 1974/75.

B. Generating Plant Program

6.03 The principal existing power sources for the Kabul system are three hydro power stations, commissioned between 1956/57 and 1966/67: Sarobi (22 MW), Naghlu (90 MW) and Mahipar (66 MW). The Darunta power station serving Jalalabad

(11.5 MW) will be interconnected with the Kabul system in 1978/79. No new capacity has been added to the power system since 1966/67 except the recent extension of the Naghlu station with a fourth 22.5-MW unit.

6.04 In evaluating the need for additional plant, the consultants (para. 1.02) compared the capacity of existing plant with forecast energy demand and determined that an additional energy source would be required in the Kabul system by October 1977 if shortages were to be avoided in years with hydrological flows with a probability of 95% (i.e., a 5% probability of not meeting the demand) and by January 1978 for 85%-probability years (i.e., a 15% probability of not meeting the demand) (Annex 14).

6.05 Although initially the consultants had considered only hydro alternatives (extension of the Sarobi plant, or a new station downstream to be designated Sarobi II), the review of the energy situation ruled out any hydro alternative because of construction time and a comparison of other alternatives indicated that a gas-turbine installation of about 40 MW capacity would be the least-cost means of meeting system needs until 1980/81, by which time additional studies for storage hydro projects, or indigenous-fuel based thermal, could be completed and an optimum development program selected (para. 2.12). In view of the possibility that the gas turbine plant would be required to generate substantial amounts of energy after 1978/79 in dry periods, the consultants suggested that the gas turbines be equipped for future addition of a 20-MW combined-cycle steam turbine, which would reduce the average operating costs; the proposed Project includes provision for such future addition.

C. Return on Investment

6.06 The Project, by providing "firming" capacity for existing plant, will permit serving additional load with a reliability at least equal to that of the existing system. The return on investment for the Project has been calculated as 7.1% using incremental revenues as an approximation of benefits, and Project costs with an allowance for transmission, distribution and administration expenses (Annex 15). It is assumed that revenues understate economic benefits because it is considered that a tariff increase of reasonable magnitude would not reduce demand significantly. The return is relatively low; however there are operating advantages which, although not quantifiable, are important during maintenance outages of the existing hydro plants.

6.07 As an indication of the sensitivity of the return, if electricity tariffs are 10% higher than assumed, i.e., 10% higher than the 20% already agreed to by Government, the return on investment for the Project would be about 9.2%. In case of a 10% increase in capital costs with other assumptions unchanged, the return would decrease to about 5.7%. The return is expected to range from 6 to 9%.

6.08 While the above return calculation is of little significance as a measure of the economic worth of the Project, it does indicate that, on average, the prices charged for electricity are less than incremental costs. To the extent that there is any demand elasticity, such a pricing policy might tend to encourage wasteful consumption of electricity and over-investment in the sector. However a systematic analysis of both tariff levels and structure is necessary to reach a firm conclusion on this (see para. 5.08).

VII. MONITORING SYSTEM

7.01 Owing to insufficient historical data, it has not been possible to develop key indicators for monitoring DABM's performance. However DABM has agreed to develop in consultation with IDA such key indicators for the future. Suggested key indicators are in Annex 16.

VIII. AGREEMENTS REACHED AND RECOMMENDATIONS

8.01 Government will:

- (a) formulate a power sector development plan not later than March 20, 1977 (para. 2.12);
- (b) execute an on-lending agreement with DABM acceptable to IDA (para. 3.07);
- (c) establish a revised charter for DABM by June 30, 1976, on the basis of principles agreed during negotiations (para. 4.05);
- (d) engage consultants satisfactory to IDA for providing technical assistance at least until June 30, 1979 should the CIDA program terminate before that date (para. 4.06);
- (e) take various tariff actions (para. 5.08); and
- (f) take all action necessary to enable DABM to achieve the required rate of return objectives (para. 5.14).

8.02 DABM will:

- (a) demonstrate to IDA's satisfaction the justification for the combined cycle investment before exercising the option for it in the contract for the proposed gas turbines (para. 3.02);

- (b) make appropriate arrangements, either with Harza or with another consultant, to provide engineering and supervision during construction and commissioning of the Project (para. 3.03);
- (c) install silencers in the gas turbine to minimize environmental impact (para. 3.10);
- (d) implement in accordance with a schedule acceptable to IDA, such recommendations of CIDA's experts (or of other consultants satisfactory to IDA) as are acceptable to IDA for improving DABM's management and operations, more specifically in fields of organization, personnel, training, accounting including customer accounting, and financial management (para. 4.06);
- (e) adopt no later than July 31, 1976, and thereafter implement without delay, a five-year plan for limiting energy losses to not more than 20% of generation (para. 5.07);
- (f) meter all supply to preferred customers by not later than December 31, 1977 (para. 5.08);
- (g) prepare on the basis of recommendations of consultants and implement as acceptable to IDA a program including measures for reduction of receivables to appropriate levels, after due analysis by age (para. 5.10);
- (h) achieve an annual rate of return of 8% beginning with 1980/81 through a phased program during 1977/78 through 1979/80 (para. 5.14);
- (i) implement suitable depreciation policies and procedures acceptable to IDA (para. 5.15);
- (j) submit to IDA its financial statements, duly audited by independent auditors acceptable to IDA, within six months after the end of each fiscal year (para. 5.17); and
- (k) develop in consultation with IDA key indicators for monitoring performance (para. 7.01).

8.03 Subject to the foregoing, the Project is suitable for an IDA credit to Government of US\$10 million equivalent on the usual terms. A Project Agreement would be executed with DABM. Execution of the on-lending agreement with DABM, satisfactory to IDA, and implementation of measures including a tariff increase of an average 20% to secure for DABM at least 20% more revenues in 1976/77 through such measures would be conditions of effectiveness. The Credit could be effective within three months of signing of the Credit Agreement.

APPRAISAL OF
A POWER PROJECT
AFGHANISTAN

Historic and Forecast Sales, Generation and Plant Capacities

Year Ending March 20,	-----Historic-----							Trend		-----Forecast-----						
	1968 (1346)	1969 (1347)	1970 (1348)	1971 (1349)	1972 (1350)	1973 (1351)	1974 (1352)	1975 (1353)	1968-1975 (1346-1353) %	1976 (1354)	1977 (1355)	1978 (1356)	1979 (1357)	1980 (1358)	1981 (1359)	1982 (1360)
Kabul System																
<u>Sales (GWh)</u>																
Industry	46.2	40.3	42.1	45.4	50.5	64.5	67.1	54.5	2.4	55.3	92.5	121.6	169.4	203.3	236.8	266.8
Domestic	40.8	41.8	42.4	41.9	40.5	53.5	56.7	70.8	8.1	71.7	81.5	93.0	106.0	121.0	138.0	157.0
Commercial	0.2	0.3	0.3	0.3	0.3	0.4	0.4	0.4	10.2	0.4	0.5	0.5	0.8	0.9	1.1	1.2
Government Services	38.1	39.1	46.4	47.4	36.8	66.5	67.3	85.5	12.1	88.3	95.4	103.0	112.0	118.0	121.0	130.0
Embassies	1.8	1.7	1.7	1.7	1.7	1.7	1.7	1.7	--	1.7	1.8	1.8	1.9	2.0	2.1	2.2
Street Lighting	0.5	0.5	0.6	0.7	0.7	0.7	0.8	0.8	7.0	0.8	0.8	0.8	0.9	1.0	1.0	1.2
Other	8.5	12.4	6.3	6.0	5.1	11.2	12.1	17.1	10.2	17.3	18.5	18.5	22.0	23.0	24.0	25.0
Total	136.1	136.1	139.8	143.4	135.6	198.5	206.1	230.8	7.8	235.5	299.0	339.2	413.0	469.2	524.6	583.4
								(245.0)	(8.8)	(263.9)						
<u>Losses (GWh)</u>	83.3	98.7	113.2	141.2	185.7	186.1	198.6	176.6		177.2	211.0	224.1	222.4	220.8	203.7	194.6
(%)	38.0	42.0	44.7	49.6	57.8	48.4	49.1	(200.0)	43.3	(234.1)	41.4	40.0	35.0	32.0	28.0	25.0
								(45.0)	(47.0)							
<u>Generation (GWh)</u>	219.4	234.8	253.0	284.6	321.3	384.6	404.7	407.4	9.2	412.7	510.0	563.3	635.4	690.0	727.7	778.0
								(445.0)	(10.6)	(498.0)						
<u>Plant Capacities (MW)</u> (Effective, net)																
Hydro	155.0	155.0	155.0	155.0	155.0	155.0	155.0	179.0		179.0	179.0	179.0	190.5	190.5	190.5	190.5
Diesel	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0	1.0	1.0	1.0
Steam	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8		2.8	2.8	2.8	5.2	5.2	5.2	5.2
Gas Turbine	--	--	--	--	--	--	--	--		--	--	--	40.0	40.0	40.0	40.0
Total	158.8	158.8	158.8	158.8	158.8	158.8	158.8	182.8		182.8	182.8	182.8	236.7	236.7	236.7	236.7
<u>Maximum Demand (MW)</u>	51.0	54.0	63.8	67.8	72.5	84.0	89.2	90.3	8.5	93.5	108.0	127.2	155.0	165.0	182.0	190.0
								(99.0)		(108.3)						
<u>Load Factor (%)</u>	49.0	43.3	45.5	48.0	50.5	52.1	51.5	51.5		50.4	53.9	50.5	47.4	47.7	49.4	46.7
										(52.4)						
<u>Capacity Margin (Effective)</u>																
Effective Capacity Less Maximum Demand (MW)	107.8	104.8	95.0	91.0	86.3	74.8	69.6	92.5		89.3	74.8	95.6	81.7	71.7	54.7	46.7
								(83.8)		(74.5)						
In % of Effective Capacity	67.8	66.0	59.88	57.3	54.3	47.1	43.7	50.5		48.9	40.9	42.9	34.5	30.3	23.1	19.7
								(46.0)		(40.8)						
<u>WAPA Total</u>																
<u>Sales (GWh)</u>	156.2	157.1	172.1	178.4	174.3	243.4	263.8	292.5	9.4	298.0	367.0	414.7	451.0	513.5	570.0	638.0
								(306.7)	(10.1)	(326.4)						
<u>Losses (GWh)</u>	97.4	115.9	121.2	148.8	192.9	198.5	213.3	191.7		192.5	220.0	243.5	232.3	230.7	210.8	212.6
								(215.1)		(249.4)						
(%)	38.4	42.5	41.3	45.5	52.5	44.9	44.7	39.6		39.2	37.5	37.0	34.0	31.0	27.0	25.0
								(41.2)		(43.3)						
<u>Generation (GWh)</u>	253.6	273.0	293.3	327.2	367.2	441.9	477.1	484.2	9.7	490.5	587.0	658.2	683.3	744.2	780.8	850.6
								(521.8)	(10.8)	(575.8)						

- Notes:
1. Years in brackets correspond to the Afghan calendar (the Afghan year begins March 21).
 2. Data in brackets are assumed levels, supposing a non-restricted power supply in 1974-1975 thru 1975-1976.
 3. Sales, generation and plant capacities of the Kabul system after 1977-1978 include the Nangarhar system.

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Estimate of Project Costs

	-----Af Millions-----			-----US\$ Millions-----		
	<u>Local</u>	<u>Foreign</u>	<u>Total</u>	<u>Local</u>	<u>Foreign</u>	<u>Total</u>
A. <u>Gas Turbine Station</u>						
1. Civil Works	14.21	17.06	31.27	0.25	0.30	0.55
2. Mechanical and Electrical Equipment						
- Gas turbine units	5.69	284.30	289.99	0.10	5.00	5.10
- Transformers	2.84	25.59	28.43	0.05	0.45	0.50
- Switchgear and other electrical equipment	<u>2.84</u>	<u>14.22</u>	<u>17.06</u>	<u>0.05</u>	<u>0.25</u>	<u>0.30</u>
Subtotal	11.37	324.11	335.48	0.20	5.70	5.90
3. Diesel Oil Handling and Storage Facilities	5.69	62.55	68.24	0.10	1.10	1.20
4. Crude Oil Handling, Treatment and Storage Facilities	<u>5.68</u>	<u>47.18</u>	<u>52.86</u>	<u>0.10</u>	<u>0.83</u>	<u>0.93</u>
Total Direct Cost	36.95	450.90	487.85	0.65	7.93	8.58
5. Engineering and Administration	11.37	17.06	28.43	0.20	0.30	0.50
6. Contingencies						
- Physical 5% for local and foreign costs	2.27	22.74	25.01	0.04	0.40	0.44
- Price <u>1/</u>	<u>3.98</u>	<u>67.67</u>	<u>71.65</u>	<u>0.07</u>	<u>1.19</u>	<u>1.26</u>
Total Contingencies	<u>6.25</u>	<u>90.41</u>	<u>96.66</u>	<u>0.11</u>	<u>1.59</u>	<u>1.70</u>
Total Gas Turbine Station Cost	<u>54.57</u>	<u>558.37</u>	<u>612.94</u>	<u>0.96</u>	<u>9.82</u>	<u>10.78</u>
B. <u>Personnel Training for Operation and Maintenance of the Gas Turbines</u>						
	<u>2.29</u>	<u>10.23</u>	<u>12.52</u>	<u>0.04</u>	<u>0.18</u>	<u>0.22</u>
Total Estimated Project Cost	<u>56.86</u>	<u>568.60</u>	<u>625.46</u>	<u>1.00</u>	<u>10.00</u>	<u>11.00</u>

1/ Assumed annual escalation for local and foreign costs:

	<u>1976</u>	<u>1977</u>	<u>1978</u>
Equipment	10%	8%	8%
Civil works	14%	12%	12%

March 1976

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Schedule of Estimated Disbursements ^{1/}

<u>IDA Fiscal</u> <u>Year and Quarter</u>	<u>Cumulative</u> <u>Disbursements</u> <u>at End of Quarter</u> <u>(US\$ Million)</u>
<u>1977</u>	
September 30, 1976	0.70
December 31, 1976	1.35
March 31, 1977	3.50
June 30, 1977	5.50
<u>1978</u>	
September 30, 1977	7.50
December 31, 1977	9.50
March 31, 1978	9.75
June 30, 1978	10.00

1/ Assumed date of effectiveness: August 1, 1976

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Cabinet Approval of Establishment of WAPA

The Cabinet in its approval No. 828 dated 12-1-1354 approves the following after reviewing proposal No. 1 dated 4-1-1354 of the Prime Ministry relating to the formation of a new Authority of water and power:

"Establishment of a new Authority of water and power within the framework of the Prime Ministry as proposed is hereby approved. This newly formed authority will in view of its volume of work and distinguish the activities of the existing projects related to irrigation and agriculture and should present gradually its proposal to the cabinet regarding activities related to the water and power authority."

This approval of the Cabinet which has been endorsed and approved by the President and Prime Minister of the Republic of Afghanistan is hereby communicated to you in order to enable you to take appropriate steps in this direction.

Signed: Dr. Hohd. Hasan Sharq
Deputy Prime Minister

Text of proposal No. 1 dated 4-1-1354 of the Economic Board, Prime Minister's Office to the Cabinet:

On the basis of orders of the President and Prime Minister of the Republic, a committee consisting of Ministers of Finance, Education, Planning and the undersigned was appointed to study all aspects of the formation of a new water and power authority and to give views in this regard. This committee studied the subject thoroughly and gave the following views: All matters should be studied thoroughly by the Economic Board of Prime Ministry and the latter should submit their views to the Cabinet. In accordance with the government's order and with consideration of government's policy as water and power play a most important role in the lives of the people socially and economically therefore the formation of an independent authority of water and power in Afghanistan's administrative organization is of the utmost importance and needs the most urgent attention. At the present time matters relating to water and power are managed in a disorderly and scattered manner by different organizations such as the Ministry of Agriculture and Irrigation, Ministry of Public Works and the Ministry of Mines and Industries without any coordination and in an haphazard manner.

In order to coordinate all matters relating to water and power resources of the country in accordance with economic and social needs the Economic Board presents its final decision in the form of a proposal consisting of 25 pages including an organizational chart of the proposed water and power authority for presentation and approval of the cabinet. The most important points of this proposal are as follows:

- 1 - Amalgamation of the General Electricity Authority of the Mines and Industries Ministry, Irrigation and Water Resources Development Authority related to the Ministry of Agriculture and Irrigation and the General-Directorate of Dams and Canals related to the Public Works Ministry in a single authority at the framework of the Prime Minister's office.
- 2 - The Helmand Valley Development authority shall also be related to this newly established authority.
- 3 - All irrigation projects such as Nangarhar valley development project, Parwan, Sardeh, etc., and other future projects whose construction activities and land preparation matters are not completed will also be under command of this new water and power authority.
- 4 - After completion of the construction matters and readying of the lands for utilization under these projects and any future projects to be constructed, these projects will relate to the Ministry of Agriculture and Irrigation.

- 5 - Coordination and mangements of all matters relating to production and distribution of electric power and energy through the Afghan Breshna Moassessa (Afghan Electricity Company) will relate to the water and power authority and will be under its control and management.
- 6 - In order to fulfill these duties and responsibilities the water and power authority will organize in its organization the advisory boards of representatives of related government organizations.

Water and Power Authority is hereby presented for study to the Cabinet. Further steps will be taken in accordance with orders given in this matter.

Signed: Dr. Mohd. Hasan Sharq

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CHARTER OF DA AFGHANISTAN BRESHNA MOASSESSA

ARTICLE 1 TITLE:

- a) An authority called Da Afghanistan Breshna Moassessa has been established as an enterprise of the Government of the Republic of Afghanistan.
- b) The central office of the Authority is located in the city of Kabul, and if necessary, branch offices may be established throughout the Provinces of the country.

ARTICLE TWO

Clause 2

The tasks of the enterprise are as follows:

1. The operation and utilization of the entire electrical plants, are financed by Government funds.
2. The construction and establishment of all kinds of facilities for generation, transmission, and distribution of electrical energy (hydro, diesel, thermal power, etc.) according to the Government plans.
3. Awarding the concession for construction and distribution of electricity to individual and private firms under separate instructions and conditions.

Clause 3

- a) The Authority's capital belongs to the Ministry of Finance which should control the fund.
- b) The total capital of the Authority is 10 billion Afs and is to be provided as follows:
 1. The prices of the properties (movable or unmovable) owned by the Moassessa, based on prices of the entire plant and equipment and buildings will be counted towards its capital.
 2. The outstanding sum of the fund, in escalation, is to be paid by the Ministry of Finance after the assessment of all the properties.
 3. The authority's profits after deducting depreciation, taxes, etc., have to be transferred to the Government account.

4. Based on the recommendations of the Chairman, the capital can be increased or decreased, if necessary, by the Committee of Ministers.
5. Under this law, the entire electrical plants (distribution and transmission) are to be awarded as capital for Da Afghanistan Breshna Moassessa.

Clause 4

- a) Chairman (Amire Umaomi)
- b) Board of Directors

The Chairman of the Authority is the Minister of Mines and Industries, who may form the following committees, if necessary, in order to perform the awarded duties and to oversee implementation of the Authority's tasks:

- a) Consultancy Committee; and
- b) Inspection Committee.

Note: The above-mentioned committees' staff can be selected by the Chairman for not more than three years, beyond which approval of the higher authority is necessary.

Clause 5

The duties and responsibilities of the Chairman are as follows:

- a) approval of the annual and development programs of the enterprise;
- b) approval of the annual budget;
- c) study and ratification of the financial statements (income statements and balance sheets);
- d) opening of new branches in places not electrified;
- e) framing of electricity tariffs and obtaining approval thereof from the Committee of Ministers;
- f) appointment of the senior officials according to the Government's law;
- g) approval of the internal rules and regulations according to the general laws of the Government; and
- h) responsibility for the entire important duties of the enterprise.

Clause 6

Board of Directors

- a) The Board of Directors is the main organ for execution and shall consist of the General President, who shall be in the special grade, and Vice President in grade two.
- b) The members of the Board of Directors shall be appointed by Government for a period of three years on the recommendations of the Chairman and shall be eligible for reappointment on expiry of this period.

Clause 7

Duties of the Board of Directors

- a) Preparation of annual and development programs of the enterprise.
- b) Preparation of the annual budget and its submission to the Chairman.
- c) Preparation of the financial statements (income statement and balance sheet) and its submission to the Chairman.
- d) Appointment and dismissal of the officials and employees according to the Government rules and this charter and the disciplinary punishment of the staff according to Government rules and this charter.
- e) Framing of internal rules and regulations of the enterprise and obtaining approval thereof by the Chairman.
- f) Fulfillment of the enterprise's programs including all purchases.
- g) Purchase of urgently needed materials on the basis of separate rules.
- h) Settlement of rightful claims against the enterprise.
- i) Submission of the budget, financial statements and other necessary reports to the Ministry of Finance.
- j) Purchases of equipment for the enterprise as required for an industrial enterprise.

Clause 8

The entire staff of the enterprise shall enjoy rights and be responsible for duties in the same manner as other staff of the Government of the Republic of Afghanistan.

ARTICLE THREE

Clause 9

Liquidation and Settlement

The enterprise may be dissolved and liquidated if in the opinion of the Chairman it is impossible to carry out the tasks of the enterprise.

Note: The settlement can be authorized by the Chairman and the firm's properties after settlement of its debts and other obligations should be transferred to the Ministry of Finance.

ARTICLE FOUR - MISCELLANEOUS

Clause 10

The accounting system of the enterprise should be prepared by the Ministry of Finance according to the system of double entry as necessary for an industrial enterprise.

Clause 11

Any amendments to these rules, if necessary, should be submitted to the Chairman by the Board of Directors and after approval of the Committee of Ministers shall be included in the charter of the enterprise.

Clause 12

The enterprise shall be governed by all other Government enterprises' law, if the same item is mentioned here.

The charter of the enterprise consisting of four articles in twelve clauses can be validated after it has been published in Jarida-e-Rasmi.

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Proposed Principles for Charter of DABM

(1) Da Afghanistan Breshna Moassessa (DABM) will be a semi-autonomous entity under the overall administrative control of the General President of WAPA and under the direction of a Board of Directors which shall formulate its policies and supervise its management and operations. The Board of Directors shall comprise the General President of WAPA, as Chairman, the Head of DABM and such other members as are appointed by the Government.

(2) The Head of DABM as the chief executive of the entity will be responsible for the implementation of the decisions of the Board of Directors. He will be chosen from among candidates with proven administrative ability and experience.

(3) In order to ensure stability and continuity in management, the Chairman, the Head of DABM and other members of the Board of Directors will normally be appointed for a period of three years and will be eligible for reappointment at the end of such period.

(4) The Head of DABM will be assisted by at least two Assistants, each responsible for a specific sector of DABM's organization.

(5) DABM will have control of all activities inherent in the provision of adequate public supplies of electricity throughout Afghanistan, including particularly the following:

- (i) Planning, design, construction and operation of all power generating, transmission and distribution facilities which may be required for the provision of such supplies including opening of branch offices as required;
- (ii) determination, subject to approval by the Government, of the investment programs necessary for construction of the above-mentioned facilities;
- (iii) determination, subject to general guidelines approved by the Government, of the tariffs which will apply to the provision of electricity supplies in accordance with the provisions of the Charter, and
- (iv) appointment of all staff on salary and wage levels which will ensure the appointment and retention of competent personnel, and discharge of staff as found necessary.

(6) DABM will be empowered to borrow up to such limits as shall be specified from time to time by the Government.

(7) DABM will be responsible for maintaining detailed accounts of its activities. In particular it will prepare, immediately after the end of each fiscal year, a balance sheet and income statement to be audited by qualified independent auditors in accordance with generally accepted auditing standards, the results of such audit to become available not later than four months after the close of each fiscal year.

(8) DABM will depreciate its assets on the straight-line method in accordance with generally accepted public utility practices.

(9) DABM shall so fix its tariffs as to provide a reasonable rate of return on its assets as realistically valued which would assure self-financing of a significant portion of Afghanistan's investments in projects and facilities for electric power, as determined from time to time by the Government. All surpluses accruing from the operations of DABM will be retained in DABM for use in its business as long as they are required for working capital for its operations or for financing its capital expenditure program within the regulations of the Government.

(10) All power generation facilities constructed by or for the Government for public supply of electricity, including the power component of multipurpose projects, will be transferred to DABM on their being brought into service. The capital costs of such assets may be treated either as loan or as equity contribution by the Government depending on DABM's capitalization at that time.

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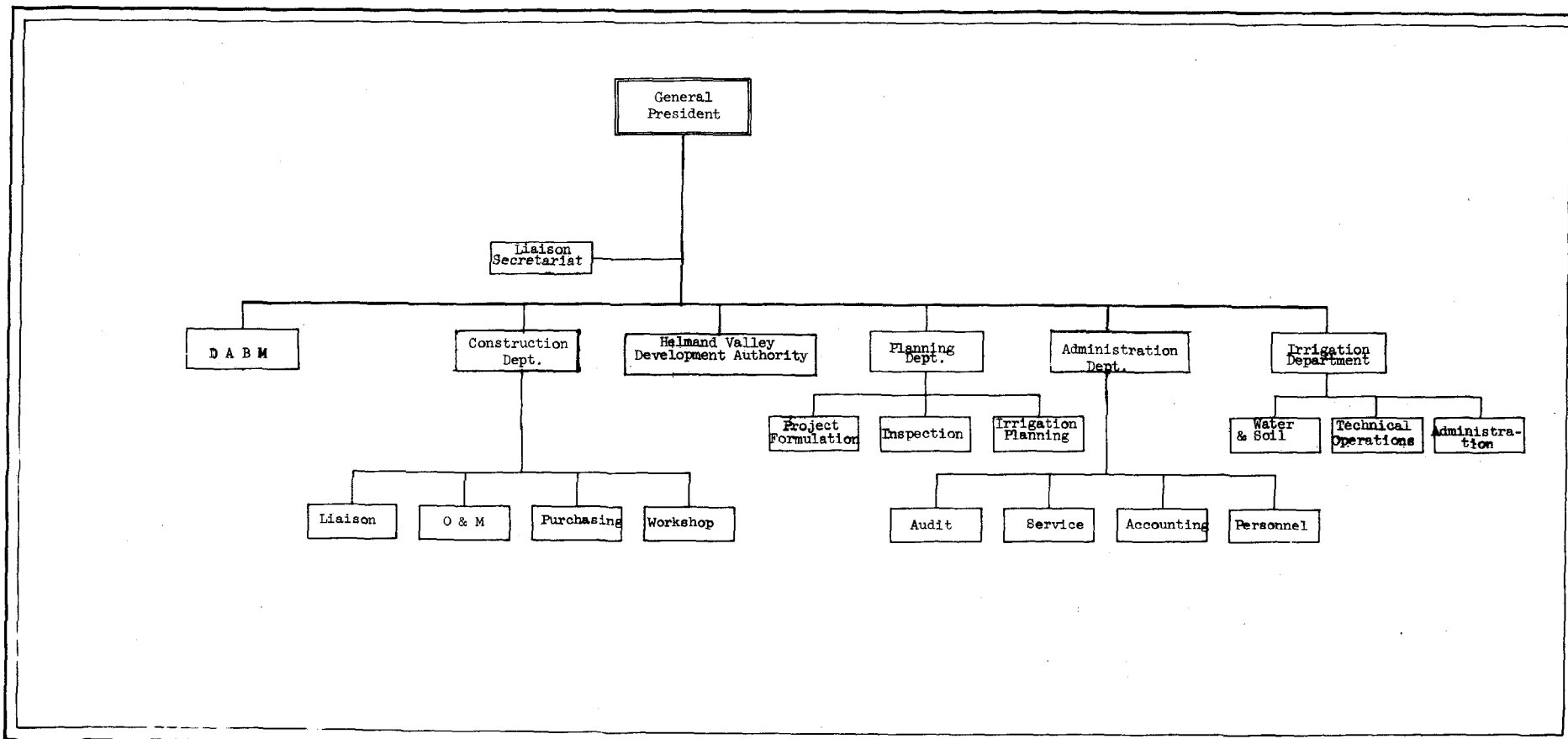
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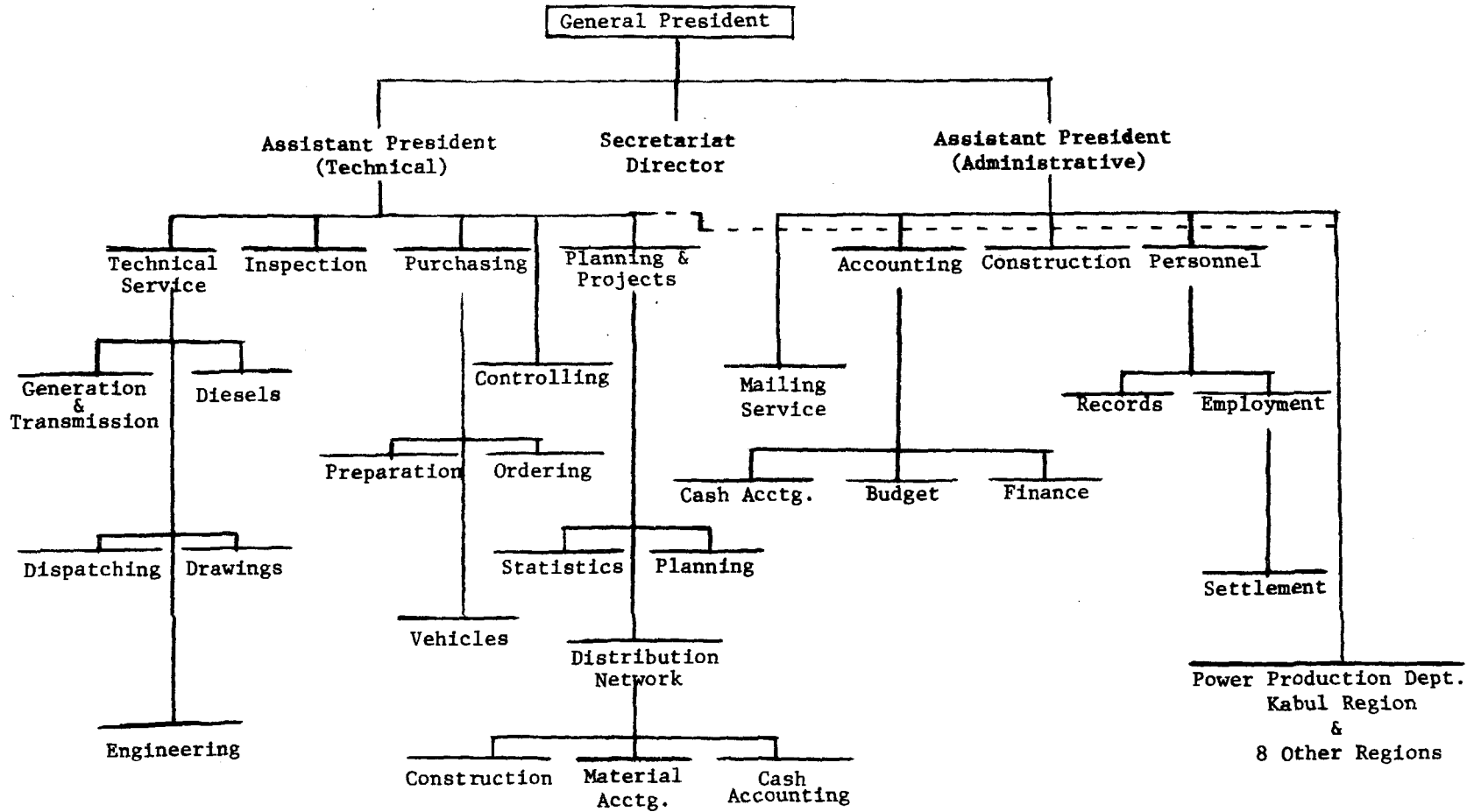
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Organization Chart of WAPA



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ORGANIZATION CHART OF DABM



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ANNEX 8
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A. Statement of Permanent Positions and Salaries in DABM

<u>Designation</u>	<u>Grade</u>	<u>Number of Positions</u>	<u>Salary (per annum)</u>	
			Af	US\$
General President	Special <u>1/</u>	1	122,400 <u>1/</u>	2,153
President	1	1	68,400	1,203
Vice President	2	3 <u>2/</u>	57,600	1,013
General Director	3	21	46,800	823
Director	4	40	32,400	570
Director	5	108	28,800	507
Deputy Director	6	213	25,200	443
Deputy Director	7	255	21,600	380
Head Clerk	8	282	18,000	317
Head Clerk	9	348	16,200	285
Clerk	10	<u>406</u> <u>3/</u>	14,400	253
		<u>1,678</u>		

1/ The General President is appointed on special terms. The salary shown is that of the previous incumbent.

2/ One vacant.

3/ Includes 1 clerk in Grade 11, a grade which continues in DABM but has generally been discontinued elsewhere.

B. In addition, 2,048 employees (technicians, doctors, nurses, all typists, motor mechanics, translators, cashiers, storekeepers, welders, peons, sweepers, watchmen, etc.) are engaged on contract generally renewable every year. The salaries range from Af 57,600 (US\$1,013) p.a. for special grade to Af 9,360 (US\$165) p.a. for grade 10 (the lowest).

Statement of Certain Commodity Prices in March 1975

<u>Commodity</u>	<u>Price per kg.</u> (Af)
Beef	50
Mutton	70
Chicken	100
Rice	18
Wheat	10 (Free Market - For government employees Af 6 for lower quality)
Oranges	8
Apples	20

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DABM's Tariffs

A. Hydro Power /1

1. Domestic - First 50 kWh in a month - 0.75 Af per kWh.
Above 50 kWh - 1 Af per kWh.
2. Industries, Shops, Hotels, Hospitals & Others - 1 Af per kWh.

B. Diesel Power

1. Domestic - First 50 kWh in a month - 2.5 Af per kWh.
Above 50 kWh - 5 Af per kWh.
2. Industries, Shops, Hotels, Hospitals & Others - 5 Af per kWh.

C. Mixed Power (Hydro & Diesel)

1. Domestic - First 50 kWh in a month - 1.5 Af per kWh.
Above 50 kWh - 3 Af per kWh.
2. Industries - 1.87 Af per kWh.
3. Shops, Hotels & Others - 3 Af per kWh.

D. Thermal Power (available at Mazar-i-Sharif)

1. Domestic - First 50 kWh in a month - 2 Af per kWh.
Above 50 kWh - 3 Af per kWh.
2. Industries - 1.5 Af per kWh.
3. Shops, Hotels & Others - 3 Af per kWh.

Load centers served by Hydro	:	Kabul, Pul-i-Khumri, Jalal-abad, Chari kar
" " " " Thermal	:	Mazar-i-Sharif
" " " " Mixed (diesel & hydro)	:	Kandahar
" " " " Diesel	:	Others

/1 Hydro power accounts for roughly 80% of total consumption.

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Income Statements for the Years Ended March 20, 1968-1979
(In millions of Af)

Year Ending March 20,	---Actual---		-----Estimated-----									
	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979
Installed Capacity - MW	227.0	227.0	263.0	263.1	266.2	266.2	266.2	266.2	299.2	299.2	339.2	241.6
Generation - GWh	253.6	273.0	293.3	327.2	367.2	441.9	477.1	484.2	490.5	587.0	658.2	683.3
Losses - GWh	97.4	115.9	121.2	148.8	192.9	198.5	213.3	191.7	192.5	220.0	243.5	232.3
- %	38.4	42.5	41.3	45.5	52.5	44.9	44.7	39.6	39.2	37.5/2	37.0	34.0
Sales - GWh	156.2	157.1	172.1	178.4	174.3	243.4	263.8	292.5	298.0	367.0/2	414.7	451.0
Average Revenue per kWh - Af	0.96	1.01	1.07	0.98	1.08	0.91	0.98	0.96	0.99	1.13/1	1.19	1.19
<u>Operating Revenues</u>												
Revenue from Sale of Power	150.5	159.4	183.6	175.4	187.4	222.3	258.5	280.8	295.0	416.5	493.5	536.7
Connection Charges	6.8	9.4	12.5	16.2	16.0	23.0	24.9	27.7	32.2	46.6/2	44.8	48.7
Other Operating Revenues	4.5	13.3	23.3	25.0	22.6	27.5	29.3	34.5	40.0	49.0/2	50.0	53.0
Total Operating Revenues	<u>161.8</u>	<u>182.1</u>	<u>219.4</u>	<u>216.6</u>	<u>226.0</u>	<u>272.8</u>	<u>312.7</u>	<u>343.0</u>	<u>367.2</u>	<u>512.1</u>	<u>588.3</u>	<u>638.4</u>
<u>Operating Expenses</u>												
Wages and Salaries	31.7	43.9	48.8	59.3	73.4	77.1	80.9	84.9	87.0	93.0	99.0	103.9
Other Operation & Maintenance Expenses	30.9	26.0	49.5	31.5	37.3	58.5	65.4	74.6	78.3	77.0	87.1	91.8
Depreciation	199.2	198.1	198.1	198.1	198.1	218.5	239.1	249.2	259.2	325.0	326.0	350.3
Electricity Duty	3.0	3.2	3.7	3.5	3.7	4.4	5.2	5.6	5.9	8.3	9.9	10.7
Income Taxes	--	--	--	--	--	--	--	--	--	0.2	11.8	15.1
Total Operating Expenses	<u>264.8</u>	<u>271.2</u>	<u>300.1</u>	<u>292.4</u>	<u>312.5</u>	<u>358.5</u>	<u>390.6</u>	<u>414.3</u>	<u>430.4</u>	<u>503.5</u>	<u>533.8</u>	<u>571.8</u>
Net Operating Income/(Loss)	(103.0)	(89.1)	(80.7)	(75.8)	(86.5)	(85.7)	(77.9)	(71.3)	(63.2)	8.6	54.5	66.6
Interest Charges	5.8	6.3	5.9	5.9	3.8	2.7	4.8	4.3	3.9	8.0	7.2	6.4
Net Income/(Loss)	(108.8)	(95.4)	(86.6)	(81.7)	(90.3)	(88.4)	(82.7)	(75.6)	(67.1)	0.6	47.3	60.2

/1 Assumes an average tariff increase of 20% effective August 1, 1976.

/2 Assumes impact of measures to increase revenues 20% in 1976/77.

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Balance Sheets as of March 20, 1968-1979
(Millions of Af)

As of March 20,	Actual		-----Estimated-----									
	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979
ASSETS												
Fixed Assets in Service - Land	5.0	5.4	5.4	5.4	5.4	7.4	7.4	7.4	7.4	7.4	7.4	7.4
- Buildings	153.0	201.4	201.4	201.4	201.4	249.7	258.6	258.6	263.6	264.5	310.0	310.0
- Electrical Plant	5,288.5	5,335.1	5,335.1	5,335.1	5,335.1	5,475.9	5,712.7	5,821.1	7,128.9	8,052.8	8,632.6	9,346.6
Total	5,446.5	5,541.9	5,541.9	5,541.9	5,541.9	5,733.0	5,978.7	6,087.1	7,399.9	8,324.7	8,950.0	9,664.0
Less: Accumulated Depreciation	507.8	705.9	904.0	1,102.1	1,300.2	1,518.7	1,757.8	2,007.0	2,266.2	2,591.2	2,917.2	3,267.5
Net Fixed Assets in Service	4,938.7	4,836.0	4,637.9	4,439.8	4,241.7	4,214.3	4,220.9	4,080.1	5,133.7	5,733.5	6,032.8	6,396.5
Work in Progress	--	--	70.8	150.0	196.7	399.0	892.2	1,504.0	1,244.9	1,240.0	1,811.7	2,316.7
Other Long-Term Assets												
Investments in Other Industries	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4
Miscellaneous Dues	15.2	21.9	23.5	24.0	21.8	24.5	23.6	22.5	23.0	23.5	24.0	24.5
Total Other Long-Term Assets	16.6	23.3	24.9	25.4	23.2	25.9	25.0	23.9	24.4	24.9	25.4	25.9
Current Assets												
Cash	73.5	74.4	41.2	61.3	174.8	8.5	9.2	146.1	108.2	102.0	95.8	118.3
Receivables - From Individuals	125.5	149.6	165.3	194.1	183.4	135.2	173.2	170.6	175.0	185.0	190.0	205.0
- From Offices	143.2	237.7	261.5	273.3	251.2	166.6	231.9	250.2	260.0	270.0	280.0	285.0
Inventories	130.8	294.2	348.1	259.3	219.2	278.0	202.3	157.5	175.0	179.7	190.1	190.0
Total Current Assets	473.0	755.9	816.1	788.0	828.6	588.3	616.6	724.4	718.2	736.7	755.9	783.3
Total Assets	5,428.3	5,615.2	5,549.7	5,403.2	5,290.2	5,227.5	5,754.7	6,332.4	7,121.2	7,735.1	8,625.8	9,537.4
CAPITAL AND LIABILITIES												
Capital and Reserves												
Capital	4,921.5	5,086.8	5,138.9	5,164.4	5,209.2	5,334.1	5,937.7	6,589.5	7,239.5	7,685.5	8,210.2	9,084.1
Reserves	69.1	69.1	69.1	69.1	69.1	69.1	69.1	69.1	69.1	69.1	69.1	69.1
Accumulated Losses - Prior Years	(3.1)	(111.9)	(207.3)	(293.9)	(375.6)	(465.9)	(554.3)	(637.0)	(712.6)	(779.7)	(779.1)	(731.8)
- Current Year	(108.8)	(95.4)	(86.6)	(81.7)	(90.3)	(88.4)	(82.7)	(75.6)	(67.1)	0.6	47.3	60.2
Total Capital and Reserves	4,878.7	4,948.6	4,914.1	4,857.9	4,812.4	4,848.9	5,369.8	5,946.0	6,528.9	6,975.5	7,547.5	8,481.6
Long-Term Debt	312.6	295.5	295.1	190.5	134.5	239.1	213.1	194.1	402.3	559.6	873.3	845.8
Accounts Payable	177.2	304.0	214.2	294.0	288.4	91.1	126.6	190.0	195.0	195.0	200.0	205.0
Customer Advances	59.8	67.1	126.3	60.8	54.9	48.4	45.2	2.3	5.0	5.0	5.0	5.0
Total Capital and Liabilities	5,428.3	5,615.2	5,549.7	5,403.2	5,290.2	5,227.5	5,754.7	6,332.4	7,121.2	7,735.1	8,625.8	9,537.4

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Estimated Sources and Applications of
Funds for the Years Ending March 20, 1976-1979
(In Millions of Af)

Year Ending March 20,	<u>1976</u>	<u>1977</u>	<u>1978</u>	<u>1979</u>
<u>SOURCES</u>				
<u>Internal Cash Generation</u>				
Gross Income	(63.2)	8.6	54.5	66.6
Depreciation	<u>259.2</u>	<u>325.0</u>	<u>326.0</u>	<u>350.3</u>
Total Internal Cash Generation	<u>196.0</u>	<u>333.6</u>	<u>380.5</u>	<u>416.9</u>
<u>Long-Term Borrowings</u>				
German Credit	227.2	-	-	-
Proposed IDA Credit	<u>-</u>	<u>199.0</u>	<u>355.4</u>	<u>14.2</u>
	<u>227.2</u>	<u>199.0</u>	<u>355.4</u>	<u>14.2</u>
Government Capital Contribution	<u>650.0</u>	<u>446.0</u>	<u>524.7</u>	<u>873.9</u>
Miscellaneous Sources	<u>2.2</u>	<u>(0.5)</u>	<u>(0.5)</u>	<u>(0.5)</u>
Total Sources	<u>1,075.4</u>	<u>978.1</u>	<u>1,260.1</u>	<u>1,304.5</u>
<u>APPLICATIONS OF FUNDS</u>				
Construction Requirements	<u>1,053.7</u>	<u>919.9</u>	<u>1,197.0</u>	<u>1,219.0</u>
<u>Debt Service</u>				
Amortization	19.0	41.7	41.7	41.7
Interest	<u>3.9</u>	<u>8.0</u>	<u>7.2</u>	<u>6.4</u>
Total Debt Service	<u>22.9</u>	<u>49.7</u>	<u>48.9</u>	<u>48.1</u>
Increase (Decrease) in Working Capital	<u>(1.2)</u>	<u>8.5</u>	<u>14.2</u>	<u>37.4</u>
Total Applications	<u>1,075.4</u>	<u>978.1</u>	<u>1,260.1</u>	<u>1,304.5</u>

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Suggested Depreciation Rates

<u>Type of Investment</u>	<u>Depreciation Rates (Composite) %</u>
<u>Thermal Plants</u>	
Land and Land Rights	1.0 <u>1/</u>
Buildings, Structures & Improvements	2.5
Boilers & Boiler Equipment	4.0
Engines & Engine Driven Generators	3.5
Turbogenerator Units	4.0
Auxiliary Electric Equipment	4.0
Miscellaneous Productions Equipment	4.0
Roads & Bridges	2.0
Transportation Equipment	20.0
Total Thermal	--
<u>Hydro Plants</u>	
Land & Land Rights	1.0 <u>1/</u>
Buildings, Structures & Improvements	2.0
Reservoirs, Dams & Water Intake	1.5
Water Wheels, Turbines & Generators	3.0
Auxiliary Electric Equipment	4.0
Miscellaneous Production Equipment	3.0
Roads, Bridges & Railroads	2.0
Total Hydro	--
<u>Internal Combustion</u>	7.0
<u>Transmission</u>	
Land & Land Rights	3.0 <u>1/</u>
Buildings, Structures & Improvements	2.5
Substation Equipment	4.0
Poles & Towers	3.0
Overhead Lines & Equipment	3.0
Underground Ducts & Tunnels	3.0
Underground Cables & Equipment	3.0
Miscellaneous Transmission Property	4.0
Roads & Bridges	2.0
Total Transmission	--
<u>Furniture & Fixtures</u>	5.0
<u>Office Equipment</u>	10.0

1/ On land rights only. Land owned should not be depreciated.

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Power Balance for the Kabul System

1. The existing generating capacity on the Kabul system totals 181.8 MW comprising 178.0 MW hydro, 1.0 MW diesel and 2.8 MW steam. The hydro capacity includes the 22-MW Sarobi, 66-MW Mahipar and 90-MW Naghlu stations. There is no storage capacity on the Kabul River or its tributaries except for seasonal storage provided by the Naghlu forebay so the energy capability of the hydro stations varies with the seasons.
2. The Kabul system is already deficient in energy in dry periods such as experienced in the fall of 1974/1975 when load reductions, mostly affecting industrial customers, were necessary. The Harza feasibility study determined that the hydro energy available from both river flow and the Naghlu storage in the driest months of August, September and October totals only 77 GWh based on "75% of time" flows, i.e. 25% probability of this or lower flows. Adding 4 GWh for the thermal sources, the total "dry season" system capability is only 81 GWh, compared to forecast energy requirements for the 3-month period of 106, 118, 131 and 145 GWh for 1977/78, 1978/79, 1979/80 and 1980/81 respectively. Thus the system needs an additional energy supply as soon as possible to minimize the possibility of power cuts under dry conditions in future years. Only gas turbines can be installed in the short lead time available.
3. Turning to the annual energy supply situation, Harza has analyzed the hydrologic records and determined that the annual energy availability from the existing hydro sources with different flow probabilities is as follows:

<u>Flow Probability</u>	<u>Annual Energy GWh</u>
Average water year	851.6
Exceeded 75% of time	751.3
Exceeded 85% of time	626.6
Exceeded 95% of time	506.1

4. The "95% of time" energy capability has been selected as the basis for planning the Kabul system, resulting in a "5% of time" risk of load cuts based on the annual energy supply. The following table shows the annual energy situation on the Kabul system for the period 1975/76 - 1980/81:

	<u>1975/76</u>	<u>1976/77</u>	<u>1977/78</u>	<u>1978/79</u>	<u>1979/80</u>	<u>1980/81</u>
	-----GWh-----					
<u>Required</u> <u>1/</u>						
Sales	230.8	235.5	291.0	339.2	413.0	469.2
Losses	<u>176.6</u>	<u>177.2</u>	<u>219.0</u>	<u>224.1</u>	<u>222.4</u>	<u>220.8</u>
Generation	407.4	412.7	510.0	563.3	635.4	690.0
<u>Available</u>						
Hydro <u>2/</u>	495.0	506.1	506.1	506.1	540.7 <u>4/</u>	540.7
Diesel <u>3/</u>	4.4	4.4	4.4	4.4	4.4	4.4
Steam Thermal <u>3/</u>	<u>12.3</u>	<u>12.3</u>	<u>12.3</u>	<u>12.3</u>	<u>12.3</u>	<u>12.3</u>
Total	511.7	522.8	522.8	522.8	557.4	557.4
Deficit	-	-	-	40.5	78.0	132.6 <u>5/</u>

-
- 1/ From Annex 1
2/ Based on 95% time flows
3/ Based on 50% annual plant factor
4/ Darunta hydro station will be interconnected
5/ For comparison, the energy capability of 40-MW of gas turbines at 50% plant factor is 175 GWh

5. The energy deficit starting in 1978/79 shown in the table indicates that the additional energy supply provided by the 40-MW gas turbines must be available by late 1977; therefore the Project gas turbines are scheduled for commissioning by October 1977. The table further shows that the gas turbines would be adequate to meet the energy deficit through 1980/81; however, capacity considerations require that an additional source be available before that date (see para. 8).

6. The capacity situation on the Kabul system with the existing supply for the period 1975/76 - 1980/81 is shown in the following table:

	<u>1975/76</u>	<u>1976/77</u>	<u>1977/78</u>	<u>1978/79</u>	<u>1979/80</u>	<u>1980/81</u>
	-----MW-----					
Demand <u>1/</u>	90.3	93.5	108.0	127.2	155.0	165.0
Hydro	178.0	178.0	178.0	178.0	189.5	189.5
Diesel	1.0	1.0	1.0	1.0	1.0	1.0
Steam Thermal	<u>2.8</u>	<u>2.8</u>	<u>2.8</u>	<u>2.8</u>	<u>2.8</u>	<u>2.8</u>
Available Supply	181.8	181.8	181.8	181.8	193.3	193.3
Less Largest Unit <u>2/</u>	159.3	159.3	159.3	159.3	170.8	170.8

-
- 1/ From Annex 1
2/ 22.5 MW unit at Naghlu

7. This table suggests that, based on a reserve of the largest unit, the existing capacity on the Kabul system will be adequate through 1980/81; however, this is a winter peak analysis. During the summer months the run-of-river, 66-MW Mahipar station has no firm capacity because of low flows in the Kabul River, so under dry conditions there are both capacity and energy shortages with the existing sources.

8. The 40-MW of gas turbines represent a potential energy supply of 175 GWh to firm up part of the 345 GWh of secondary hydro energy available on the system, based on the difference between energies available under average and "95% of time" flow conditions. The 40-MW additional capacity provided will also firm up the Mahipar station capacity in summer months.

9. Given the short time available gas turbines are the only practicable new source that can be installed by late 1977; however, Harza did consider a steam thermal station as an alternative and found it more costly, as well as requiring a construction time longer than the available time frame.

10. From the above analysis, it can be seen that the Project is required as an emergency measure to provide additional supply due to inadequate planning in the past. The ongoing FAO and USSR studies on the Kabul system, together with the CIDA technical assistance program, should provide improved planning in future and prevent the need for such emergency measures.

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Calculation of Return on Investment

Introduction

1. The return on investment for the Project is the discount rate which equalizes the present values of the associated cost and benefit streams over the economic life of the Project.
2. The 2 x 20 MW gas turbines will act as complementary thermal capacity, firming up the available hydro secondary energy, and thus permitting the sale of additional power. The Project cannot be credited, however, with the full sales increase, since it is partly due to corrective actions such as the billing of previously non-paying customers. These corrections are not directly attributable to the Project.

Benefits

3. The incremental load credited to the Project facilities is the increase in the actual consumption after 1977/78, the year of commissioning the Project facilities, as developed in the Attachment. The project capability will be fully absorbed by 1980/81, as shown, and this load level will be maintained through 1992/93 assuming an expected 15 year life for the gas turbines. The associated revenues are calculated at 1.19 AF/kWh which includes the 20% tariff increase the Government agreed to implement in 1977/78.

Costs

4. The details of the annual capital and operating costs associated with the Project for the lifetime period are also shown in the Attachment. The capital costs include those for the gas turbine station and for 40,000 KVA of additional distribution facilities required to carry the incremental load attributable to the Project. The operating costs include the gas turbine fuel, maintenance and staff costs, and the incremental administrative, operation and maintenance costs associated with the distribution facilities.
5. Although the gas turbines may operate at high load factor in dry periods, the average annual load factor will be relatively low reflecting average water year conditions, requirements for maintenance outages on hydro units, equipment testing and other operating situations. The requirement will gradually increase until a new generating source is added about 1980/81. Thereafter the gas turbines will continue operating as peaking and complementary generating capacity. The estimated operation is as follows:

	<u>Plant Factor</u>	<u>GWh</u>
1977/78	1%	3.5
1978/79	3%	10.5
1979/80	7%	24.5
1980/81	10%	35.0
1981/82-1992/93	5%	17.5

6. The Government has indicated it plans to use crude oil as the main fuel for the gas turbines and to use diesel oil for unit cleansing and standby purposes. It has further indicated the crude oil will be from Afghanistan sources -- the Koh-i-Angot field with reserves estimated at 2.5 million tons discovered about 1967 and Agh-Darya field with 9 million tons which the Government has reported was discovered in the fall of 1975 (after the appraisal). Both fields are in the northern region of the country and at present the only production is about 6000 tons annually used for general heating. The Government has indicated that the national petroleum agency will make arrangements for the supply and delivery of crude oil to the Project site.

7. The Government has stated that the commercial price to DABM of the crude oil delivered at Kabul will be 4.5 Af/litre or, assuming a specific gravity of 0.9, 500 Af/ton (\$12.00/barrel) which is near the average world price. At 10,000 kcal/kg (18000 BTU/lb), this is equivalent to 500 Af/10⁶ kcal (\$2.20/10⁶ BTU). At the expected average heat rate of 3500 kcal/kWh the unit fuel cost therefore will be 1.75 Af/kWh (3.1c/kWh).

Return on Investment

8. The return on investment calculated on the basis of the above assumptions is 7.1% as shown in the Attachment. If the capital costs are 10% higher than estimated the return would decrease to 5.7% and if the tariffs are increased 10%, i.e., a further 10% increase over the 20% increase assumed in the base case, the return would increase to 9.2%.

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Calculation of Return on Investment

Year	Revenue from Incremental Consumption Due to Project				Project Demand <u>4/</u> MW	Distribution Capital Cost <u>5/</u> Af x 10 ⁶	Average Tariff Af/kWh	Project Revenue Af x 10 ⁶
	Appraisal Sales <u>1/</u>	Appraisal Generation <u>1/</u>	Actual Consumption <u>2/</u> GWh	Project Sales <u>3/</u>				
1974/75	230.8	407.4	325.9	-	-	-	0.99	-
1975/76	235.5	412.7	330.2	-	-	-	0.99	-
1976/77	291.0	510.0	408.0	-	-	-	0.99	-
1977/78	339.2	563.3	450.6	-	-	-	1.19	-
1978/79	413.0	635.4	508.3	47.7	15.5	62.0	1.19	56.8
1979/80	469.2	690.0	552.0	91.4	29.8	57.2	1.19	108.7
1980/81	524.0	727.7	582.2	121.6	40.0	40.8	1.19	144.7
1981/82 to 1992/93	-	-	-	121.6	40.0	-	1.19	144.7

Calculation of Return on Investment
(Millions of Af)

	Capital Costs			Operating Costs				Total	Total Costs	Project Revenues <u>6/</u>	Net Benefits
	Gas Turbines	Distribution <u>5/</u>	Total	Fuel <u>7/</u>	Mtce. <u>8/</u>	Staff <u>9/</u>	Dist. O & M <u>10/</u>				
1976/77	91.9	-	91.9	-	-	-	-	-	91.9	-	-91.9
1977/78	475.4	-	475.4	6.1	0.6	0.3	-	7.0	482.4	-	-482.4
1978/79	45.6	62.0	107.6	18.4	1.8	0.3	4.8	25.3	132.9	56.8	-76.1
1979/80	-	57.2	57.2	42.9	4.3	0.3	9.1	56.6	113.8	108.7	-5.1
1980/81	-	40.8	40.8	61.2	6.1	0.3	12.2	79.8	120.6	144.7	24.1
1981/82 to 1992/93	-	-	-	30.6	3.1	0.3	12.2	46.2	46.2	144.7	98.5

- 1/ From Annex 1
2/ Assumes technical losses constant at 20%
3/ Incremental load relative to 1977/78
4/ Assuming 44% system load factor and 20% losses
5/ Cost of distribution facilities at 4000 Af/KVA (\$70/KVA) required to carry Project load
6/ Revenue from incremental load
7/ At 1.75 Af/kWh
8/ At 10% of fuel costs
9/ Assuming 12 operators at 25,000 Af annually each
10/ Administration, operation and maintenance costs related to Project load at 0.10 Af/kWh
11/ The 10% increase is in addition to the 20% tariff increase assumed in the base case, i.e., 1.19 Af/kWh starting in 1977/78.

Return for base case = 7.1%
Return assuming 10% increase in capital costs = 5.7%
Return assuming 10% increase in tariffs = 9.2%

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Suggested Key Indicators of Performance

- (a) System reserve margin for the Kabul system;
- (b) rate of growth of load (kW and kWh);
- (c) transmission and distribution losses;
- (d) average net plant investment per GWh sold;
- (e) operating revenue per unit of value of gross plant;
- (f) average revenue per kWh sold;
- (g) operating ratio;
- (h) debt service coverage;
- (i) number of average days bills outstanding;
- (j) debt-equity ratio;
- (k) internal cash generation ratio; and
- (l) rate of return.

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