

UNCLASSIFIED

**DEPARTMENT OF STATE  
AGENCY FOR INTERNATIONAL DEVELOPMENT  
Washington, D. C. 20523**

**CAPITAL ASSISTANCE PAPER**

**Proposal and Recommendations  
For the Review of the  
Development Loan Committee**

**TURKEY - CICEROZ HYDROELECTRIC AND TRANSMISSION LINES PROJECT**

AID-DLC/P-258

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DEPARTMENT OF STATE  
AGENCY FOR INTERNATIONAL DEVELOPMENT  
Washington, D.C. 20523

AID-DLC/P-258  
June 11, 1964

MEMORANDUM FOR THE DEVELOPMENT LOAN COMMITTEE

SUBJECT: Turkey - Ciceroz Hydroelectric and Transmission Lines Project

Attached for your review are the recommendations for authorization of a loan in an amount not to exceed \$20,400,000 to the Government of Turkey for relending to the Ministry of Energy and Natural Resources to be used by said Ministry in financing the foreign exchange costs of the materials, equipment and services required in connection with construction of the Ciceroz dam, 300 MW hydroelectric power plant on the Sakarya River, and approximately 97 miles of 154 kv transmission lines.

This loan proposal is scheduled for consideration by the Development Loan Staff Committee at its meeting on June 15, 1964 and a telephone poll of DLC members will be conducted to determine whether the DLC members approve without a DLC meeting or request a DLC meeting for the consideration of this proposal.

Rachel C. Rogers  
Assistant Secretary  
Development Loan Committee

Attachments:

Summary and Recommendations  
Project Analysis  
Annexes I--VIII  
Tables I and II

CICEROZ HYDROELECTRIC AND TRANSMISSION LINES PROJECT

INDEX

|  | page |
|--|------|
| SUMMARY AND RECOMMENDATIONS. . . . .   | i    |
| I. ELECTRIC POWER IN TURKEY . . . . .  | 1    |
| II. ORGANIZATION OF THE POWER SECTOR . . . . .   | 1    |
| A. Energy Department of Ministry of Energy. . . . .  | 2    |
| B. Elecktrik Isleri Etut Idaresi (Electric Power Resources<br>Survey and Development Administration) (ELE) . . . . . | 2    |
| C. Etibank. . . . .  | 2    |
| D. Devlet Su Isleri (State Hydraulic Works) (DSI) . . . . .  | 3    |
| E. Iller Bankasi (Iller Bank) . . . . .  | 3    |
| F. Municipalities . . . . .  | 3    |
| III. BACKGROUND OF PROJECT. . . . .  | 4    |
| IV. THE PROJECT. . . . .   | 4    |
| A. Dam and Hydroelectric Project. . . . .  | 4    |
| 1. Site . . . . .  | 4    |
| 2. General Layout . . . . .  | 5    |
| 3. Engineering. . . . .  | 5    |
| 4. Construction . . . . .  | 6    |
| 5. Training . . . . .  | 6    |
| B. Transmission Facilities. . . . .  | 6    |
| 1. Recommended Amount . . . . .  | 6    |
| 2. Construction and Operation . . . . .  | 8    |
| V. ECONOMIC ANALYSIS. . . . .  | 9    |
| A. Present Service. . . . .  | 9    |
| B. Load Forecasts . . . . .  | 9    |
| C. Generating Capacity. . . . .  | .10  |
| D. Comparison with Alternatives . . . . .  | .13  |
| E. Annual Cost. . . . .  | .13  |
| 1. Operation and Maintenance. . . . .  | .13  |
| 2. Taxes and Insurance. . . . .  | .14  |
| 3. Administrative and General . . . . .  | .14  |
| 4. Interest and Depreciation. . . . .  | .14  |
| F. Cost Per Kilowatt-Hour . . . . .  | .14  |
| G. Conclusion . . . . .  | .14  |

|       |                                    |            |
|-------|------------------------------------|------------|
| VI.   | FINANCIAL ANALYSIS . . . . .       | page<br>15 |
| VII.  | IMPLEMENTATION PLAN. . . . .       | 16         |
| VIII. | CONDITIONS AND COVENANTS . . . . . | 16         |
| IX.   | CONCLUSIONS. . . . .               | 16         |

ANNEX I - Statutory Criteria

ANNEX II - Responsibility of Organizations in the Power Sector -  
Present and Proposed

ANNEX III - Artist's Conception of Dam

ANNEX IV - Benefit-Cost Ratio

ANNEX V - Cost Estimates

ANNEX VI - EEIM Financial Statements

ANNEX VII - Construction Schedule

ANNEX VIII - Draft Authorization

TABLE I - Load Growth

TABLE II - Peak Demand

TURKEY

CICEROZ HYDROELECTRIC AND TRANSMISSION LINES PROJECT

SUMMARY AND RECOMMENDATIONS

1. BORROWER: The Government of Turkey, for relending to the Ministry of Energy and Natural Resources. The funds will be used by agencies of the Ministry.
2. DESCRIPTION OF THE PROJECT: Construction of the Ciceröz Dam and 300 MW hydroelectric power plant on the Sakarya River and approximately 97 miles of 154 kv transmission lines.
3. AMOUNT OF LOAN: \$20.4 million.
4. PURPOSE OF THE PROJECT: To assist the Government of Turkey to meet the peak power demands in the Northwest and West Anatolia regions from 1969 on.
5. ESTIMATED TOTAL COST OF THE PROJECT:

|                                | <u>FY</u><br>U.S.\$ | <u>LC*</u><br>U.S.\$ | <u>Total</u><br>U.S.\$ |
|--------------------------------|---------------------|----------------------|------------------------|
| Ciceröz HE project (millions)  | 18.7                | 40.6                 | 59.3                   |
| Transmission System (millions) | <u>1.7</u>          | <u>1.1</u>           | <u>2.8</u>             |
| Total Project (millions)       | 20.4                | 41.7                 | 62.1                   |

Only the foreign exchange portion of the project is to be provided under this loan. The local currency is to be provided by the Government of Turkey.

6. BACKGROUND OF THE PROJECT: A loan application was submitted in February, 1964 for the proposed Ciceröz Project and for the construction of two 380 kv transmission lines between Ankara and Istanbul. A.I.D. concluded that: (1) the 300 MW Ciceröz project would be needed to meet the forecasted loads on the applicant's main grid system; (2) construction of connecting

\* \$1.00 = TL 9

154 kv lines to the present grid is justified at this time. Information available to A.I.D. is insufficient to justify 380 kv transmission, but provision is made in this paper for further study of transmission needs.

7. EXIM BANK CLEARANCE: April 17, 1964.
8. MISSION VIEWS: The Mission supports this loan, with the exception of the difference of approach noted in Section IV.B.
9. STATUTORY CRITERIA: Met. See Annex I.
10. ISSUES: None.
11. RECOMMENDATIONS: The establishment of a loan of up to Twenty Million Four Hundred Thousand Dollars (\$20,400,000) upon the following terms:
  - a. The Government of Turkey shall repay the loan to A.I.D. in U. S. dollars within forty (40) years after first disbursement. including a grace period of not to exceed ten (10) years, with interest at the rate of three-fourths of one per cent ( $\frac{3}{4}$  of 1%) per annum during such grace period and of two per cent (2%) per annum thereafter on the outstanding balance of the loan. Repayment to A.I.D. will be in U. S. dollars.
  - b. Procurement: All goods and services financed with the loan shall have their source and origin in the United States of America.
  - c. Relending shall be at three and one-half per cent ( $3\frac{1}{2}\%$ ) for twenty-five (25) years with a five (5) year grace period.
  - d. Such other terms and conditions as A.I.D. may deem advisable.
12. PROJECT COMMITTEE:

|              |   |                         |
|--------------|---|-------------------------|
| Loan Officer | : | VDMcCutcheon, NESA/CDF  |
| Counsel      | : | JWestberg, NESA/GC      |
| Engineer     | : | ACywin, NESA/TECH       |
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Drafting Officers: ACywin, NESA/TECH - JEHall, USAID/Turkey -  
VDMcCutcheon, NESA/CDF:jj

TURKEY

CICEROZ HYDROELECTRIC AND TRANSMISSION LINES PROJECT

I. ELECTRIC POWER IN TURKEY

Turkish electric service was inaugurated in Tarsus in 1902. The first service to a large community was at Istanbul in 1913. Development of the power industry continued at a modest pace and, at the establishment of the Republic in 1923, consisted of a total operating capacity of 33 MW.

Development of electric power after 1923 followed the trend toward industrialization. During that period many new industries, unable to purchase reliable power, installed their own generating facilities and sold available surplus energy for local distribution.

Following World War II, when total generating capacity totaled 246 MW, expansion accelerated with the installation of larger Government-owned regional plants until by the end of 1962 generating capacity totaled 1,300 MW.

A.I.D. has assisted the development of the Turkish electric industry for many years. The Sariyar Dam and Hydroelectric project, completed in 1957, was partly financed through I.C.A. In 1959, D.L.F. made a loan of up to \$7,000,000 to assist in extension and improvement of the power distribution system. Ebasco Services, Inc. in 1961, with I.C.A. financing, prepared two reports entitled "Northwest Anatolia Market Survey and Forecast of Electric Power Consumption" and "Northwest Anatolia Power Supply Priority Study" which have served as a guide in the development of power projects in Turkey. In 1962, A.I.D. made a loan of up to \$31,300,000 to finance the foreign exchange costs of a 200 MW Thermal plant near Istanbul and installation of 80 MW additional capacity at the existing hydroelectric plant at Sariyar. A.I.D. also financed the feasibility study which supports the present loan application.

II. ORGANIZATION OF THE POWER SECTOR

Development of electric power facilities in Turkey has been hampered by division of responsibility and authority. More than 95% of the electric power industry is owned and operated by agencies or departments of the National Government or by municipalities. Prior to

February, 1964, the National agencies were under different ministries and subject to different regulations and controls.

In February, 1964, the Government established a new Ministry of Energy and Natural Resources and placed most of the power agencies within that Ministry. The agencies brought under the new Ministry are operating under present laws until legislation covering the organization, duties, responsibilities and authority of the Ministry is prepared and passed into law.

The principal organizations presently engaged in the electric power industry are indicated below:

A. Energy Department of Ministry of Energy

This department has responsibility for communications and cooperation among the government administrations, organizations, municipalities, and private companies concerning energy activities.

B. Elektrik Isleri Etut Idaresi (Electric Power Resources Survey and Development Administration) (EIE)

EIE is subject to special legislation under the Ministry of Energy and Natural Resources. It is responsible for the study, planning and engineering of power projects in Turkey. It is managed by a General Director with divisions of Survey, Planning and Design, Statistics, Accounting, and Administration. EIE employs about 750 people, mostly engineers and technicians.

C. Etibank

Etibank is a State Economic Enterprise within the Ministry of Energy and Natural Resources. It is engaged primarily in mining activities, except coal and iron mining which it once controlled but which have been established as separate enterprises. It also conducts commercial banking activities, constructs and operates electric plants and transmission facilities, and participates in development of commercial and industrial enterprises. It has participations in 25 different commercial and financial companies or enterprises and is subject to taxes.

Etibank is managed by a management committee of five people, including the General Director. It has divisions of Power, Mining, Banking and Administration and has established a separate organization, Elektrik Islemeleri Muessesesi (EEIM), to operate its power facilities, and distribute its output and that of the State Hydraulic Works (DSI).

Etibank would be responsible for construction and operation of the transmission facilities included in this loan.

E. D. Devlet Su Isleri (State Hydraulic Works) (DSI)

DSI is responsible for many water-related areas including flood control, irrigation, related hydro-electric facilities, water supply and sewerage systems for towns and villages, river basin development plans, etc.

It is a division of the Ministry of Energy and Natural Resources, exempt from taxes, with its own accounting and budget. It is run by a General Director and has divisions of Investigation and Planning, Design and Construction, Operations, Administrative Services, Mechanical, Accounting, Technical, Legal, Agricultural and Economic. There are 13 regional offices and a central office in Ankara. DSI employs about 13,000, of which about 1900 are qualified technical personnel.

*The power generated by DSI would be transmitted to the municipalities by the transmission lines.*  
DSI would be responsible for construction and operation of the dam and hydroelectric facilities of this project.

F. E. Iller Bankasi (Iller Bank)

The principal functions of Iller Bank are to assist provincial governments, municipalities, and village administration with planning and construction of local public services. It supplies funds to finance the construction of such installations, and it also conducts a general banking service. Iller Bank also owns and operates a construction firm, a design and engineering firm, and a foundation drilling firm. Iller Bank is under the Ministry of Reconstruction and Settlement.

G. F. Municipalities

There are some 600 separate municipalities which generate and/or distribute electric power. Some of them have extended service beyond their corporate limits but many others have been reluctant, or have not had the resources, to do so.

In 1959, the Turkish Parliament rejected a bill to consolidate the reorganize the power sector. There is presently pending before the Parliament a bill to establish the Turkish Electric Authority (TEK) to further consolidate the electric industry. TEK would assume, under the Ministry of Energy, responsibility for all phases of the power industry except planning and construction of hydro

plants which would remain with DSI. All rights previously given to the Municipalities would be transferred to TEK. ~~A breakdown of present and planned responsibilities of the major agencies is provided in Annex II.~~

It is believed that establishment of TEK would be a favorable step in the development of the Turkish electric industry on a more rational basis.

### III. BACKGROUND OF PROJECT

Following Ebasco's 1961 surveys which had indicated need for additional generating capacity to service the forecasted loads, A.I.D. authorized a loan of up to \$350,000 (AID Loan 277-H-036) to finance a feasibility study of two possible hydroelectric plants: Keban on the Euphrates river in Eastern Turkey and Ciceroz on the Sakarya river in northcentral Turkey. Ebasco prepared the feasibility studies of both projects. After receipt of the studies, the Government of Turkey in February, 1964 formally submitted a loan application to A.I.D. for \$35,760,000 to finance foreign exchange costs of the Ciceroz project and two 380 kv lines between Ankara and Istanbul. The Keban Project is also under A.I.D. review.

### IV. THE PROJECT

The Project consists of construction, and placing in initial operation, of the Ciceroz dam and 300 MW hydroelectric power plant on the Sakarya river and approximately 97 miles of transmission lines. The two 380 kv lines requested are not included in the project. The dam and power plant will be discussed separately from the transmission facilities.

#### A. Dam and Hydroelectric Project

##### 1. Site

The proposed Ciceroz project, on the Sakarya River in north-central Turkey, is about equi-distant from Ankara and Istanbul, which are 235 transmission line miles apart. It is located about 200 miles upstream from the mouth of the river and about 30 miles downstream from the Sariyar hydroelectric station. Like the Sariyar dam, the Ciceroz project would provide power to meet the peak load requirements of the Northwest and West Anatolia system. However, the proposed Ciceroz reservoir would only have sufficient water storage to permit operation of the power generators a few hours each day. Thus it would be almost completely dependent upon water releases from Sariyar.

The Sakarya River above the Ciceroz damsite drains an area which varies in character from rugged upland and broad swampy valleys in the upper reaches to mountainous uplands and steep narrow valleys in the lower portion. Total drainage area above Ciceroz damsite is 18,000 square miles of which 17,300 square miles are controlled by the existing Sariyar dam. Elevation in the basin varies from about 1300 feet at the damsite to 7500 feet at the peak of the divide.

## 2. General Layout

The Project will consist of a concrete arch dam with a center overfall spillway controlled by three gates, see artist's conception Annex III. The powerhouse will be on the left bank and will have an installation of three 100 MW units each served by an individual penstock. The maximum dam height will be 505 feet from the foundation and crest length between abutments will be about 1,066 feet. Total crest length including abutments will be 1,427 feet. The total volume of concrete to be placed is estimated at 820,000 cubic yards.

## 3. Engineering

Elektrik Isleri Etut Idaresi (EIE), the Turkish Government agency responsible for planning and engineering development of power resources, entered into a contract with Ebasco in December, 1963 under which Ebasco is preparing final designs for both Ciceroz and Keban. A.I.D. has been requested to finance costs incurred under this contract for work on Ciceroz from the date the contract was signed.

The contract for design was entered into by EIE with no indications from A.I.D. that costs incurred prior to authorization of a loan would be reimbursed by A.I.D. Both before and after signing the contract, A.I.D. warned that reimbursement was unlikely.

The GOT was anxious to proceed and did so. It is recommended that A.I.D. finance only those foreign exchange costs of this contract incurred after authorization of the loan.

A.I.D. would, however, insist that a broad engineering contract be entered into under which a U. S. consulting firm agrees to undertake complete design, purchasing, expediting, supervision of construction and start-up and limited operator training for this project. Such contract would be subject to A.I.D. approval.

#### 4. Construction

Construction would be performed by general contractors, using some new equipment and several major items presently available from the equipment used for construction of the Kemer dam. Most common construction materials are available in Turkey. Trained labor is limited, but a nucleus of competent workmen can be recruited from other construction projects. An access road of about forty miles is to be constructed to the Ciceroz site by the Turkish State Highway Department.

#### 5. Training

The powerhouse will be operated by DSI which has been operating other hydroelectric plants since 1953. At present DSI operates three major dams and hydroelectric plants and is supervising construction of two major hydroelectric projects.

The number of hydro plant operating personnel presently employed by DSI is more than necessary for the efficient operation of present DSI hydroelectric plants. This large number of operators has been maintained in order to train the personnel required for the hydroelectric power plants which are under construction. It is understood that this training program will continue, so that the Ciceroz project will have skilled operating personnel from the DSI staff.

The plant operating staff to be assigned to this power station will participate in the installation of the main generating and auxiliary station equipment in order to be thoroughly familiar with the plant. Limited operator training would also be undertaken by the consulting engineer.

### B. Transmission Facilities

#### 1. Recommended Amount

In addition to the dam and hydroelectric facilities, the loan application also requested \$18,260,000 for construction of two 380 kv transmission lines from Ankara to Istanbul, with one looping into Ciceroz.

While it is possible that additional transmission facilities between these two load centers will be required in the late 1960's or early 1970's, A.I.D. has not received sufficient information to make a positive finding that, and when, this will be the case, nor to determine the optimum voltage.

It is therefore recommended not to authorize a loan for these additional transmission facilities at this time. It is intended however to permit use of funds available under Loan 277-H-036 (Keban and Ciceroz Feasibility Studies) for a detailed study by a U. S. consulting engineering firm of transmission requirements between the two centers. If such study provides convincing evidence that additional facilities are needed, A.I.D. would be willing to consider on its merits an application for a loan to finance such facilities.

Included in this loan are only those funds required to connect the Ciceroz power plant to existing 154 kv circuits. This connection would consist of approximately 97 miles of line and include separate links to Eskesehir and Sariyar. These connections would provide the most economical means of transmitting Ciceroz power to the existing grid, which is adequate to absorb that power.

In the event that further study of transmission requirements indicates the need for the construction of additional circuits, it may become necessary to review the present plan of constructing 154 kv connections. In order not to delay final decision on this matter, and therefore construction of the Project, it is intended to advise the Turkish Government that a final decision must be reached prior to disbursement of A.I.D. funds under the present loan for other than engineering services.

In the interest of complete objectivity, it is further proposed that the firm performing the transmission study be disqualified from any additional engineering work on transmission facilities which might result from the study.

The A.I.D. mission to Turkey has recommended construction of the connecting lines included in the proposed loan. However, it has recommended that the question of transmission between Ankara and Istanbul be treated as a totally separate problem, the resolution of which would in no way affect the connecting lines included in the present loan.

Their wish to treat transmission as a separate issue is largely due to their concern that the transmission problem is intimately connected with the strong desire of Turkish authorities to proceed with the Keban Dam project as soon as possible. While construction of the Keban Hydro project would indeed require additional transmission facilities between Ankara and Istanbul, such facilities may be needed even if the Keban Dam is not built or before it is built. It appears therefore inadvisable to ignore the transmission problem.

Since the need for the peaking power to be provided by this Project has been clearly demonstrated, and since the connecting transmission lines included in the present loan would adequately supply the power to the grid in an economical manner, it appears desirable to proceed with the project at this time.

## 2. Construction and Operation

Etibank would be responsible for construction and operation of the transmission facilities, and would engage a U. S. consulting firm to provide services for the design and construction of the transmission facilities similar to the consulting services for the dam.

Etibank has a division to perform construction work and has built numerous transmission lines. With the above provided consulting services, it is believed to have the ability to build the contemplated facilities.

Etibank has been operating transmission systems since 1948 and believes that it has sufficient trained transmission line operators to efficiently handle the operation of the new lines when the extended transmission system goes into operation. At present total length of transmission lines operated by Etibank is 2,597 kms.

## V. ECONOMIC ANALYSIS

### A. Present Service

In preparing both the Keban & Ciceroz feasibility studies, Ebasco reviewed the power situation in the whole of Turkey with the exception of the sparsely settled eastern provinces near the USSR and Iran. The study area is essentially comprised of the Northwest, West and East Anatolia power systems; the first two of these were interconnected in 1962 and the latter is to be connected in 1970.

Electric service is available to about 1/3 of the population in the study area. Of this group, about 1/2 are served by the Northwest and West Anatolia interconnected system. The other half are supplied by isolated systems, industrial systems or municipal generating plants. Over 78% of the gross power production of Turkey is generated on the Northwest and West Anatolia interconnected systems.

Distribution of electricity in cities, towns and villages, with few exceptions, is by the Municipality or Village Council. The electric systems sell electricity to the Municipalities, villages and to industrial customers. Frequently the municipalities do not serve areas outside of their jurisdiction.

In many instances, restrictions are placed on the use of electricity because of lack of generating capacity. When communities are supplied by the local utility having its own isolated station, the hours of operation are often so restricted that many industries operate power plants to supply their own requirements. This applies in many areas regardless of what organization supplies the electricity.

Inadequate distribution systems are a problem in most places offering electric service at this time. Some effort is being made to correct this situation, but it continues to be a major deterrent to expansion of electricity service.

### B. Load Forecasts

The load forecasts included in the Keban and Ciceroz Feasibility Studies prepared by Ebasco were however based on the orderly expansion of all phases of power supply and distribution based upon the following assumptions:

- "(1) That the distribution systems in the present cities, towns and villages connected to the systems will be rebuilt and extended to provide adequate capacity to supply the needs of these communities.
- (2) That adequate distribution facilities will be built in other cities, towns, villages, and rural areas when they are connected to the system.

- (3) That provision will be made for Municipalities or some other organization to provide electric service to villages near the Municipality when electric service is supplied from the interconnected system.
- (4) That electric rates to the ultimate consumer will be reasonable and low enough to encourage large industrial customers to purchase rather than generate.
- (5) That service from the system will be reliable so that critical industries will be willing to take utility service.
- (6) That a sufficient supply of reasonably priced appliances, motors and other electric utilization will be available.
- (7) That the extension of electric service to all areas will be in accordance with the Development Plan, First Five Years, of the Republic of Turkey State Planning Organization and with the plan prepared by Elektrik Isleri Etut Idaresi for later years."

Table I indicates the actual load growth of the study area from 1950 through 1962 and the estimated load growth from 1963-1973 by classes of service, based upon the above assumptions.

It is interesting to note that actual load growth from 1950 through 1962 was approximately 14% per annum and the forecasts arrive at a similar rate. Passage of the TEK legislation and establishment of an efficient Electric Authority will be an important step in assuring that the load forecasts are met.

### C. Generating Capacity

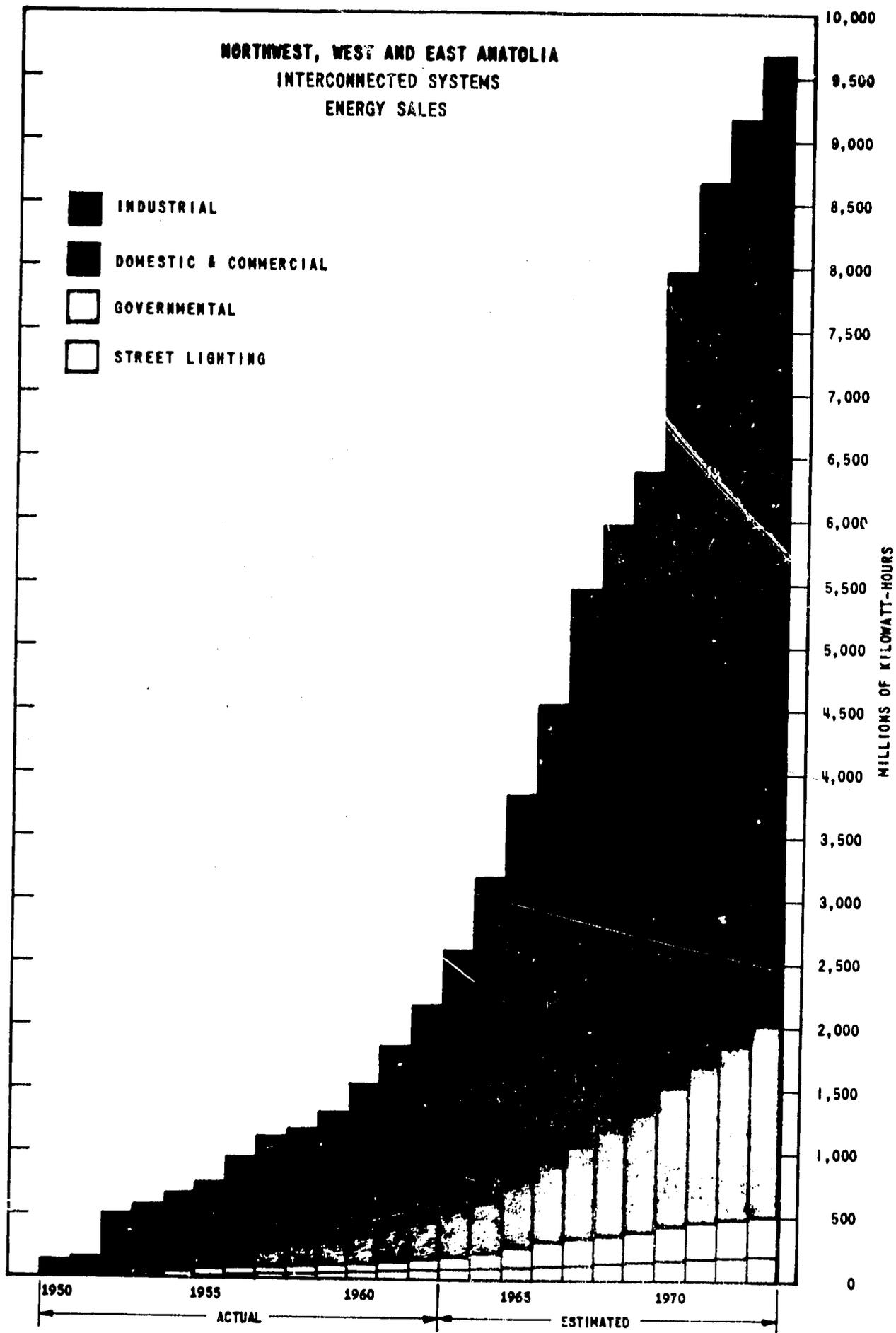
There are at the present time 285 MW of hydro and 371 MW of thermal plants connected to the N.W. and W. Anatolia system with 220 MW of thermal and 150 MW of hydro under construction. Table II shows the peak demand and firm capability of the system power generating resources both present and planned. The Ciceroz project is proposed to help meet the peaking needs from mid-1968 on for N.W. and W. Anatolia. Note that on Table II, the East Anatolia system will not be interconnected until about 1970.

The Ciceroz reservoir will have an active storage of 200,000 m<sup>3</sup> sufficient to provide daily regulation of water releases from the Sariyar reservoir upstream.

The primary capability, under coordinated operation of the Sariyar and Ciceroz projects will be equal to 92 continuous megawatts with a 300 MW (net head of 330 ft.) peaking capacity. This will most effectively meet the load requirements from 1969 on as shown in Table II.

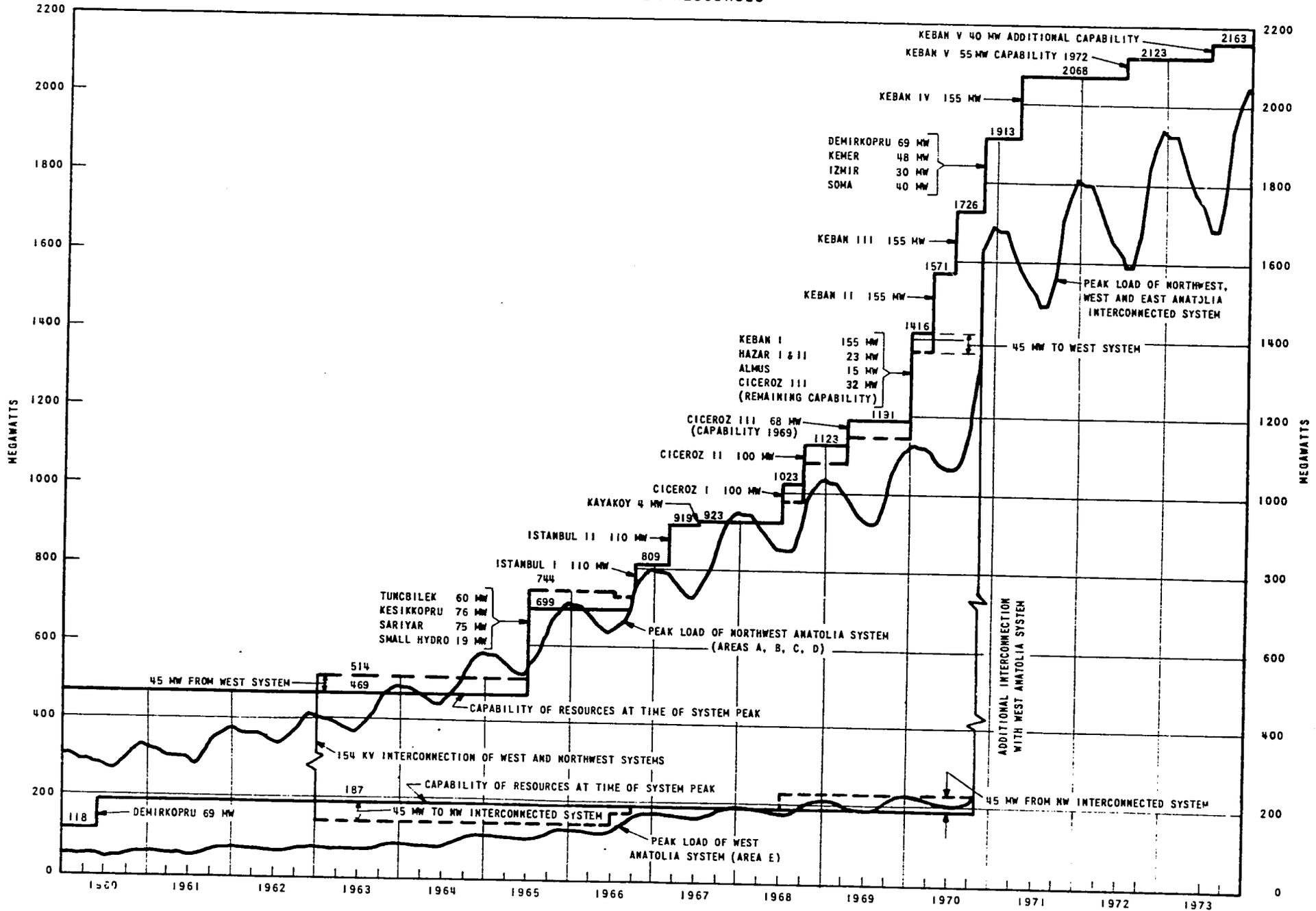
Selection of three turbine-generator units of 100 MW each was recommended in order to keep them of reasonable physical dimensions and to provide requisite operating flexibility. They will match the largest thermal units on the N.W. Anatolia system.

TABLE I



NORTHWEST, WEST AND EAST ANATOLIA INTERCONNECTED SYSTEM

PEAK DEMAND  
AND FIRM CAPABILITY  
OF SYSTEM RESOURCES



Based upon month-by-month calculations of stream flow over the past 25 years it is estimated that 562 million kwh per year will be available from this project for a plant capacity factor of 21.5 percent.

The addition of the Ciceroz hydroelectric project will place the interconnected systems in good position to handle peak load demands in the late 1960's and early 1970's. However, additional base load capacity will also have to be added from about 1970 on.

#### D. Comparison with Alternatives

EIE's earliest studies, confirmed by Ebasco, indicated that no river nearer to the Northwest Anatolia system load centers than the Sakarya had a single project with the peak power potential of the Ciceroz project. There also appears to be no combination of hydroelectric projects that would economically offer the same potential and thus no comparison is made of hydroelectric alternatives in the feasibility study.

The logical selection for a thermal alternative to Ciceroz would be 300 MW oil-burning thermal plant facilities located at Istanbul and Izmit. Annex IV shows the determination of the benefit-cost ratio for the Ciceroz project when compared to the thermal alternative. Annual charges have been equalized over the 50-year life of the hydro project and over a 35-year life of the thermal alternative. These costs were determined by developing annual load generation assignment schedules based upon the addition of Ciceroz, or alternative thermal. Because of the almost complete dependence on the Sariyar reservoir water releases, there are little if any benefits other than power which can be attributed to Ciceroz.

The benefit-cost ratio is 1.27-1 in favor of the Ciceroz project based upon power generation alone from the hydro plant.

#### E. Annual Cost

##### 1. Operation and Maintenance

The annual cost of operation and maintenance for the Ciceroz station is estimated to be TL 1,800,000 per year (\$200,000). Of this total, some TL 810,000 (\$90,000) represents the annual cost of labor and TL 990,000 (\$110,000) represents the annual cost of maintenance supplies and materials. Major spare parts expected to be utilized during the life of the Project will be purchased with the principal items of equipment and capitalized as part of the initial investment. In addition, the benefit-cost ratios included replacement factors as suggested in the A.I.D. supplement to the feasibility study booklet.

Operation and maintenance costs for the transmission line tap, as described below, is based on Etibank experience with its extensive transmission system. The annual operating and maintenance costs are calculated as 0.3 percent of capital investment.

## 2. Taxes and Insurance

The Ciceroz hydroelectric station will be owned and operated by DSI and will not be subject to taxes of any kind. The transmission system, however, will be operated by Etibank and will be subject to property and ad valorem taxes. These are calculated on a formula basis as 12 percent on 80 percent of net income from the facility. Assuming net income of 6 percent on invested capital, this represents an annual tax of 0.6 percent of the investment in transmission facilities.

Present Turkish practice requires that insurance coverage be obtained during the construction period but after the Project goes into operation no insurance is required. In any event, since a large part of Project investment is in noninsurable components, the annual cost of insurance on the total investment normally runs about 0.02 percent or less per year and may be eliminated from the calculations.

## 3. Administrative and General

Present accounting practice in Turkey does not allocate a portion of overall home office administrative and general expense to any specific project.

## 4. Interest and Depreciation

In accordance with A.I.D. instructions, Ebasco's economic analysis included interest on the foreign exchange (U.S. dollar) component at 3.5 percent per year, and on the domestic (Turkish lira) component at 6 percent per year. The amortization period has been assumed as 50 years, in accordance with current U.S. practice with regard to hydroelectric projects.

### F. Cost Per Kilowatt-Hour

The average cost per kilowatt-hour at the station bus has been calculated as 0.585 cents. This may be compared to costs at other DSI projects ranging from 0.67 to 0.34 cents per kilowatt-hour.

The cost of Ciceroz power at load center, using the capital costs of the project plus connections to the existing grid, is found to be 0.626 cents per kilowatt-hour. This may be compared with the 1962 wholesale price by Etibank of 0.99 cents per kilowatt-hour.

The revenue/cost ratio is therefore also found to be positive.

### G. Conclusion

The Ciceroz project is technically sound and economically feasible.

## VI. FINANCIAL ANALYSIS

Total costs of the project are estimated at \$62.1 million, of which \$20.4 million is in foreign exchange and \$41.7 million is in local currency. Detailed cost estimates are provided in Annex V.

This loan would finance the total foreign exchange costs of the project, with the exception of engineering costs incurred prior to its authorization. The Government of Turkey, acting through the Ministry of Energy and Natural Resources, will provide the local currency necessary. Appropriate assurances that the necessary local currency will be available as needed, will be required.

The revenue-cost ratio on a system wide basis was found to be positive in Section V(F). Within the system, however, there is no uniform accounting system and the various elements operate under different laws and regulations.

DSI is exempt from taxes; Etibank is subject to tax. DSI operates on budgetary allocations; Etibank operates as a commercial enterprise. There is no established economic standard for setting rates.

There is no contractual arrangement between DSI and Etibank covering the cost to Etibank of power received from DSI, and they have not come to an agreement on price. Etibank has never paid for power received from the three DSI plants supplying it. In the past, Etibank has also had difficulties in collecting its bills from various municipalities, including Istanbul, although current bills are being paid on time.

Cost of DSI's investment in hydroelectric dams, power plants and auxiliary facilities is approximately \$108 million in foreign exchange and \$96 million in local currency. Total expenditures of DSI in the fiscal year ended February 28, 1963 were \$71.2 million, of which \$69.4 was provided by budgetary allocations. Expenditures are budgeted at \$80.7 million for FY 1964.

Etibank has a paid-in capital of approximately \$45.2 million. Its consolidated balance sheet at December 31, 1963 indicated total assets of \$245.3 million, total liabilities of \$176.5 million and capital, surplus and reserves of \$68.8 million. Net profit for the year was indicated at \$10.7 million but a \$10.7 million credit was included as forgiveness by the State of "accumulated losses from the power plant establishment".

The financial statements of EEIM, which encompasses operation and distribution of Etibank's power facilities only for the period 1958-1962, are attached as Annex VI. They indicate that this phase of Etibank's operations has not been profitable.

## VII. IMPLEMENTATION PLAN

The proposed construction schedule for this project is attached as Annex VII, indicating completion by the end of 1968. Experience with other power projects in Turkey would indicate this schedule may be somewhat optimistic.

Design is already underway. AID will review all major specifications and contracts. Progress reports will be required and AID will stay in close contact with the borrower in following progress of the project. Periodic site visits will be made.

## VIII. CONDITIONS AND COVENANTS

The nature of the project is such that certain conditions are appropriate to assure its successful and timely completion. It is contemplated that these would include:

(A) A U.S. engineering firm or firms be employed by the borrower to provide a full range of consulting services for the Project;

(B) Construction of the access road to the site be completed prior to AID disbursement for other than engineering services;

(C) A Board of Consultants be convened by the Borrower to provide assistance as needed for the design and construction of the dam;

(D) The GOT provide appropriate assurances that the local currency required for the project will be provided in the amounts and at the times required.

## IX. CONCLUSIONS

The need for peaking power in the Northwest and West Anatolia areas beginning in the late 1960's has been clearly demonstrated. AID believes that the Ciceröz Project is the most economical method of meeting this need.

Transmission facilities required in the same area is a separate but related problem. AID has not received sufficient information to arrive at a conclusion on the need, timing and capacity of additional lines. Further study is provided for. If the studies are made and provide convincing evidence that additional transmission is required between Istanbul and Ankara, AID would be willing to consider on its merits a loan application for such transmission facilities.

AID recognizes the inefficient and uneconomic organization and operation of the power industry in Turkey. It also recognizes that the GOT is taking steps to improve the industry, evidenced by the recent establishment of the Ministry of Energy and Natural Resources and by introduction of the TEK legislation.

AID believes that the GOT needs technical assistance on a broad scale in reorganizing and improving management and operations of the industry. Turkey has informally requested the IBRD to provide assistance of the type required. The IBRD indicated interest and negotiations are being carried on.

Therefore, it is recommended that no funds be provided in this loan for this type of assistance. AID will continue to play a constructive role in the improvement of the industry. If the GOT should not continue its progress, AID will reexamine its position when considering subsequent loan applications.

## TURKEY CICEROZ HYDROELECTRIC AND TRANSMISSION LINES PROJECT

## CHECKLIST OF STATUTORY CRITERIA

1. FA Sec. 102. Precautions that have been or are being taken to assure loan proceeds are not diverted to short-term emergency purposes (such as budgetary, balance of payments, or military purposes) or any other purpose not essential to the country's long-range economic development. -- The Loan Agreement would provide that the loan funds be used only for the proposed project.
2. FA Sec. 201(b). Manner in which loan will promote country's economic development, emphasizing help for long-range plans and programs designed to develop economic resources and increase productive capacities. -- Considered in Sections IV and V.
3. FA Sec. 201(b)(1). Information and conclusion on availability of financing from other free-world sources, including private sources within the United States. -- Eximbank cleared the loan application for A.I.D. consideration on April 17, 1964. Private sources of financing in the U.S. would not be willing to provide the loan funds under the recommended terms and conditions.
4. FA Sec. 201(b)(2). Information and conclusion on activity's economic and technical soundness, including the capacity of the recipient country to repay the loan at a reasonable rate of interest. -- Considered in Sections III, IV, V, VIII and IX.
5. FA Sec. 201(b)(3). Information and conclusion on existence of reasonable promise activity will contribute to development of economic resources or increase of productive capacities. -- Considered in Sections IV and V.
6. FA Sec. 201(b)(4). Information and conclusion on activity's relationship to other development activities, and its contribution to realizable long-range objectives. -- Considered in Sections IV, V and IX.

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The following abbreviations are used:

FA Foreign Assistance Act of 1961, as amended by the Foreign Assistance Act of 1963.

App. Foreign Assistance and Related Agencies Appropriation Act, 1964.

7. FA Sec. 201(b)(5). Country's self-help measures, including institution of Foreign Assistance Act investment guaranty programs. -- Considered in Sections I, II, III and IX. The Investment Guaranty Program is in effect in Turkey.
8. FA Sec. (b)(6). Information and conclusion on possible effects on U.S. economy, with special reference to areas of substantial labor surplus. -- All purchases financed with the proposed loan would have their source and origin in the U.S.
9. FA Sec. 201(b). Information and conclusion on reasonable prospects of repayment. -- Present and prospective state of Turkish economy is such that there is a reasonable prospect of repayment of the loan.
10. FA Sec 201(d). Information and conclusion on legality (under laws of the country and the U.S.) and reasonableness of lending and relending terms. -- The funds will be loaned and reloaned in compliance with the laws of the U.S. and Turkey.
11. FA Sec. 201(e). Information and conclusion on availability of an application together with sufficient information and assurances to indicate reasonably that funds will be used in an economically and technically sound manner. -- Considered in Sections III, IV, V, VIII and IX.
12. FA Sec. 201(f). If a project, information and conclusion whether it will promote the economic development of the requesting country, taking into account the country's human and material resource requirements and the relationship between the ultimate objectives of the project and the country's overall economic development. -- Considered in Sections I, III, IV, V and IX.
13. FA Sec. 201(f). If a project, information and conclusion whether it specifically provides for appropriate participation by private enterprise. -- This is a public sector project. The goods and services financed with the loan would be purchased from private U.S. firms and U.S. shipping companies would participate in transporting the goods financed with the loan.
14. FA Sec 202(a). Extent (including amount of money so attributed) to which loan will encourage economic development through private enterprise and how. -- There being a shortage of electric power in

Turkey which has hampered the growth of private enterprise, the increase in available power represented by the project should be a stimulant to the growth of such enterprise.

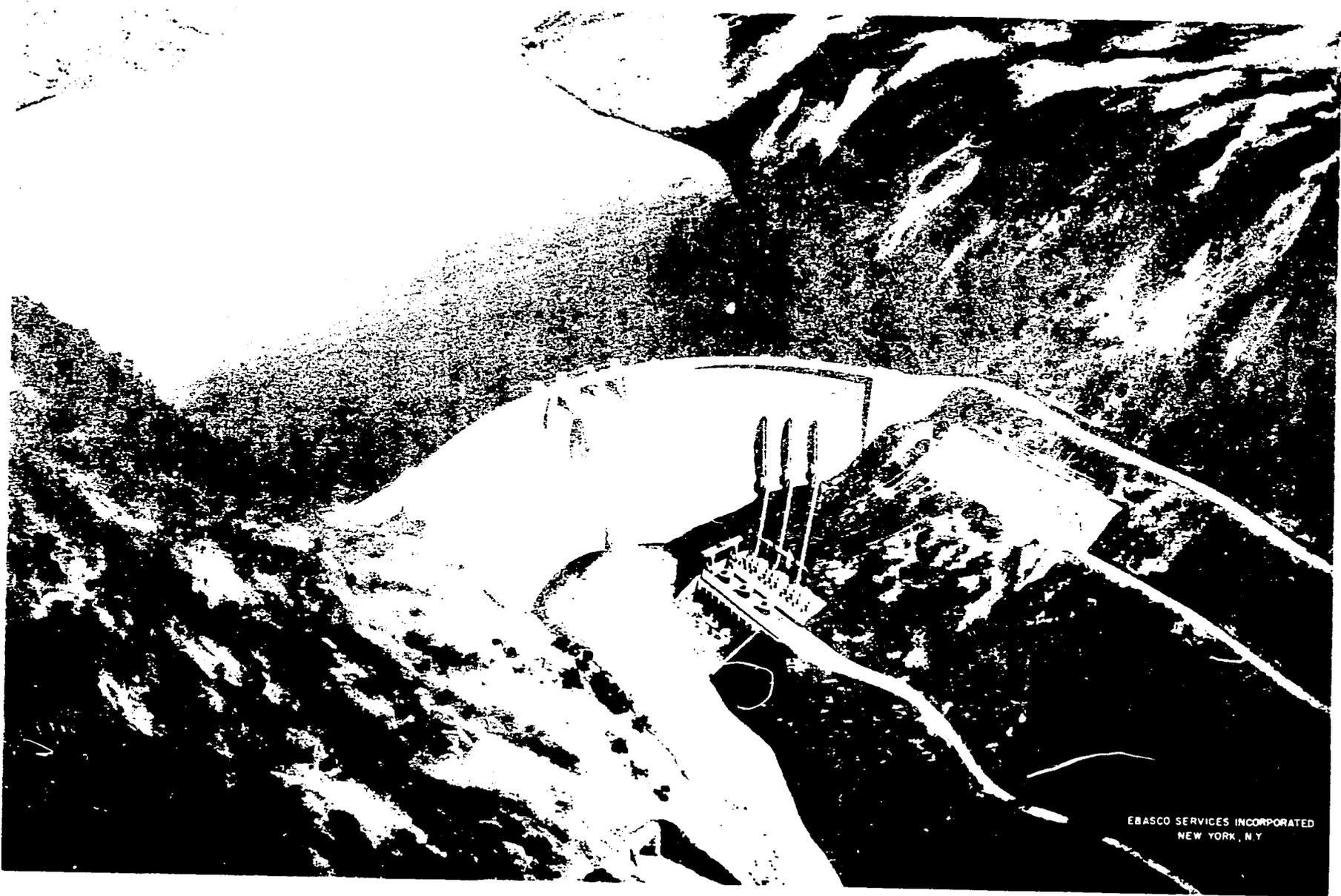
15. FA Sec. 601. Information and conclusions whether loan will encourage efforts of the country to: (a) increase the flow of international trade; (b) foster private initiative and competition; (c) encourage development and use of cooperatives, credit unions, and savings and loan associations; (d) discourage monopolistic practices; (e) improve technical efficiency of industry, agriculture, and commerce; (f) strengthen free labor unions. -- (a) Trade would take place between the U.S. and Turkey since all purchases financed with the loan would have their source and origin in the U.S.; (b) The goods and services purchased with the proceeds of the loan would be from private U.S. firms; (c) The loan would probably not have any direct effect on the development and use of cooperatives, credit unions, and savings and loan associations; (d) The loan is not likely to have any direct effect in discouraging monopolistic practices; (e) The additional power resulting from the project would be used in places and such ways that the technical efficiency of industry, agriculture and commerce should be improved; (f) The loan is not likely to have any effect in strengthening free labor unions.
  
16. FA Sec. 601, 602. Information and conclusions whether loan will (a) encourage U.S. private trade and investment abroad; (b) encourage private U.S. participation in foreign assistance programs (including use of private trade channels and the services of U.S. private enterprise); and (c) permit American small business to participate equitably in the furnishing of goods and services financed by it. -- (a) and (b) Goods and services purchased out of the proceeds of the loan would have their source and origin in the U.S.; (c) The Loan Agreement would provide for appropriate participation by small business.
  
17. FA Sec. 604(a). Compliance with restriction of commodity procurement to U.S. except as otherwise determined by the President and subject to statutory reporting requirements. -- It is a recommended condition of the loan that goods and services paid for out of the proceeds thereof have their source and origin in the U.S.
  
18. FA Sec. 604(b). Compliance with bulk commodity procurement restriction to prices no higher than the market price prevailing in the U.S. at time of purchase. -- The Loan Agreement or other implementing documentation would contain a provision covering this point.

19. FA Sec. 604(d). Compliance with requirement that marine insurance be purchased on commodities if the participating country discriminates, and that such insurance be placed in the U.S. -- The Loan Agreement or other implementing documentation would contain a provision covering this requirement.
20. FA Sec. 611(a)(1). Information and conclusion on availability of engineering, financial, and other plans necessary to carry out the assistance and of a reasonably firm estimate of the cost of the assistance to the United States. -- Consider in Sections III, IV, V, VI, VII and IX.
21. FA Sec. 611(a)(2). Necessary legislative action required within recipient country and basis for reasonable anticipation such action will be completed in time to permit orderly accomplishment of purposes of loan. -- No legislative action would be necessary to carry out the project.
22. FA Sec. 611(b); App. Sec. 101. If water or water related land resource construction project or program, information and conclusion on benefit-cost computation. -- Considered in Section VD. and Table \_\_\_\_\_
23. FA Sec 611(c). Compliance with requirement that contracts for construction be made on competitive basis to maximum extent practicable. -- The Loan Agreement would contain a provision on this point.
24. FA Sec. 619. Compliance with requirement that assistance to newly independent countries be furnished through multilateral organizations or plans to maximum extent appropriate. -- Turkey is not a newly independent country.
25. FA Sec 620(a); App. Sec. 107. Compliance with prohibitions against assistance to Cuba and any country (a) which furnishes assistance to Cuba or fails to take appropriate steps by February 14, 1964 to prevent ships or aircraft under its registry from carrying equipment, materials or supplies from or to Cuba; or (b) which sells, furnishes or permits any ships under its registry from carrying items on the Battle Act list, or other items of primary strategic significance, or items of economic assistance. -- Turkey is not currently in violation of this Section.

26. FA Sec. 620(b). If assistance to the government of a country, existence of determination it is not controlled by the international Communist movement. -- Turkey is not controlled by the international Communist movement.
27. FA Sec. 620(c). If assistance to the government of a country, existence of indebtedness to a U.S. citizen for goods or services furnished or ordered where such citizen has exhausted available legal remedies or where the debt is not denied or contested by such government or the indebtedness arises under an unconditional guaranty of payment given by such government. -- Turkey is not currently ineligible under this Section.
28. FA Sec. 620(d). If assistance for any productive enterprise which will compete with U.S. enterprise, existence of agreement by the recipient country to prevent export to the U.S. of more than 20% of the enterprise's annual production during the life of the loan. -- The electric power generated by the project would not compete with any U.S. enterprise.
29. FA Sec. 620(e). If assistance to the government of a country, extent to which it (including government agencies or subdivisions) has, after January 1, 1962, taken steps to repudiate or nullify contracts or taken any action which has the effect of nationalizing, expropriating, or otherwise seizing ownership or control of property of U.S. citizens or entities beneficially owned by them without taking appropriate steps to discharge its obligations. -- Turkey is not currently ineligible under this Section.
30. FA Sec. 620(f); App. Sec. 109. Compliance with prohibitions against assistance to any Communist country. -- Turkey is not a Communist country.
31. FA Sec. 620 (g). Compliance with prohibition against use of assistance to compensate owners for expropriated or nationalized property. -- Neither the Turkish Government nor any political subdivision or agency thereof is currently ineligible under this Section.
32. FA Sec. 620(h). Compliance with regulations and procedures adopted to insure against use of assistance in a manner which, contrary to the best interests of the U.S., promotes or assists the foreign aid projects or activities of the Communist-bloc countries. -- The Loan Agreement or other implementing documentation would contain an appropriate provision with respect to such regulations.

33. FA Sec. 620(i). Existence of determination that the country is engaging in or preparing for aggressive military efforts. -- Turkey is not currently ineligible under this Section.
34. FA Sec. 620(k). If construction of productive enterprise were aggregate value of assistance to be furnished by U.S. will exceed \$100 million, identification of statutory authority. -- U.S. assistance to this project would not exceed \$100,000,000 in U.S. dollars.
35. FA Sec. 620(l). Compliance with prohibition against assistance after 31 December 1965 for the government of a country which fails to institute investment guaranty program. -- The Investment Guaranty Program is in effect in Turkey.
36. FA Sec. 636 (h). Appropriate steps that have been taken to assure that, to maximum extent possible, country is contributing local currencies to meet the cost of contractual and other services and foreign currencies owned by the U.S. are utilized to meet the cost of contractual and other services. -- Turkey is contributing local currency to this project.
37. App. \_\_\_\_\_. Use of funds to carry out FA Sec. 205, which pertains to IDA. -- No contribution to IDA is involved in this project.
38. App. Sec. 102. Compliance with requirement that payments in excess of \$25,000 for architectural and engineering services on any one project be reported to Congress. -- Any such payments would be reported.
39. App. Sec. 104. Compliance with bar against funds to pay pensions, etc., for military personnel. -- Loan funds would not be provided for any of the prohibited purposes.
40. App. Sec. 111. Compliance with requirement for security clearance of personnel under contracts for services. -- Appropriate provision for compliance with this requirement would be included in the Loan Agreement or other implementing documentation.
41. App. Sec. 112. Compliance with requirement for approval of contractors and contract terms for capital projects. -- Appropriate provision for compliance with this requirement would be included in the Loan Agreement or other implementing documentation.

42. App. Sec. 114. Compliance with bar against use of funds to pay assessments, etc., of U.N. member. -- No such payment would be made from the loan funds.
43. App. Sec. 117. Availability of sufficient funds which have been appropriated or authorized for use by an appropriation Act. -- Funds are available.
44. App. Sec. 118. Compliance with regulations on employment of U.S. and local personnel for funds obligated after 30 April 1964. -- Appropriate provision for compliance with such regulations would be included in the implementing documentation.
45. App. Sec. 601. Compliance with bar against use of funds for publicity or propaganda purposes within U.S. not heretofore authorized by Congress. -- The loan funds would not be used for such purposes.



EBASCO SERVICES INCORPORATED  
NEW YORK, N.Y.

ÇİCEROZ DAM AND HYDRO-ELECTRIC POWER PLANT  
ON THE SAKARYA RIVER, TURKEY  
300,000 KW

AID-DIC/P-2538  
ANNEX III  
June 11, 1964

June 11, 1964

COMPARISON OF CICEROZ HYDROELECTRIC PROJECT  
WITH ALTERNATIVE THERMAL INSTALLATION

(Without Taxes)

|   | <u>Ciceroz HE</u>   | <u>Istanbul III - Thermal</u> | <u>Izmit I - Thermal</u> |
|---|---------------------|-------------------------------|--------------------------|
| Installed Capacity                                      | 3 - 100 Mw = 300 Mw | 2 - 150 Mw = 300 Mw           |                          |
| Incremental Thermal<br>Net Output - 10 <sup>6</sup> Kwh |                     | 562                           |                          |
| <u>Investment Cost (\$ - 000)</u>                       |                     |                               |                          |
| Hydro Plant   |                     |                               |                          |
| - Foreign   | \$20,400            |                               |                          |
| - Local   | 38,100              |                               |                          |
| Thermal Plant   |                     |                               |                          |
| - Foreign   |                     |                               | \$26,770                 |
| - Local   |                     |                               | 11,490                   |
| Transmission System (154 kv)                            |                     |                               |                          |
| - Foreign   | 1,700               | <del>615</del> 600            | 1,450                    |
| - Local   | 1,100               | <del>1,400</del> 1400         | 1,050                    |
|   | <u>\$64,900</u>     |                               | <u>\$40,760</u>          |
| <u>Comparative Annual Costs (\$ - 000)</u>              |                     |                               |                          |
| <u>Fixed Charges</u>                                    |                     |                               |                          |
| Hydro Plant -   |                     |                               |                          |
| Foreign 4.293%  | 876                 |                               |                          |
| Local 6.374%  | 2,428               |                               |                          |
| Interim Replacements                                    | 106                 |                               |                          |
| Thermal Plant -   |                     |                               |                          |
| Foreign 5.225%  | - 5.0               | A.C. 6.897                    | 1,399                    |
| Local 7.122%  | - 0.0               | 0.0                           | 818                      |
| Interim Replacements                                    | - 0.2               | 0.2                           | 63                       |
| Transmission System -                                   |                     |                               |                          |
| Foreign 4.293%  | 73                  |                               | 62                       |
| Local 6.374%  | 70                  |                               | 67                       |
| Interim Replacements                                    | 22                  |                               | 4                        |
| <u>Operating Costs (Differential Costs Only)</u>        |                     |                               |                          |
| Station, Excl. Fuel                                     | 200                 | 562 @ \$ 390                  | 220                      |
| Fuel  |                     | 562 @ \$3,450                 | 1,930                    |
| Transmission System                                     |                     |                               |                          |
| Lines 0.3%  | 8                   |                               | 7                        |
| Substations 1.25%                                       | 6                   |                               | 4                        |
| Total Annual Cost                                       | <u>\$3,589</u>      |                               | <u>\$4,574</u>           |
| Benefit Cost Ratio in Favor of Hydro                    |                     |                               | 1.27                     |

ESTIMATE OF COST

CICEROZ DAM & HYDROELECTRIC PROJECT AND RELATED TRANSMISSION

| Description                             | ALL SUMS IN - 000's |               |             |               |
|---|---------------------|---------------|-------------|---------------|
|   | Foreign<br>\$       | Local<br>T.L. | Total<br>\$ | Total<br>T.L. |
| LAND & LAND RIGHTS                      |                     | 20 500        | 2 278       | 20 500        |
| <u>POWERHOUSE &amp; IMPROVEMENTS</u>    | 167✓                | 15 500        | 1 900       | 17 000        |
| POWERHOUSE                              | 167                 | 8 800         | 1 156       | 10 300        |
| MISC POWER PLANT STRUCTURES             |                     | 2 700         | 300         | 2 700         |
| OPERATORS' VILLAGE                      |                     | 4 000         | 344         | 4 000         |
| <u>RESERVOIRS, DAMS &amp; WATERWAYS</u> | 4 965✓              | 129 820       | 19 382      | 174 500       |
| RESERVOIR                               | 22                  | 300           | 56          | 500           |
| ARCH DAM                                | 3 598               | 103 520       | 15 100      | 135 900       |
| FUSE PLUG DIKE                          | 133                 | 1 100         | 256         | 2 300         |
| DAM APPURTENANCES                       | 89                  | 3 700         | 500         | 4 500         |
| DIVERSION TUNNEL                        | 411                 | 4 500         | 910         | 8 200         |
| INTAKE APPURTENANCES                    | 100                 | 3 900         | 533         | 4 800         |
| SPELLWAY                                | 67                  | 4 500         | 567         | 5 100         |
| PENSTOCKS                               | 167                 | 4 500         | 667         | 6 000         |
| TAILRACE                                | 378                 | 3 800         | 800         | 7 200         |
| <u>TURBINES &amp; GENERATORS</u>        | 5 033✓              | 7 300         | 5 844       | 52 600        |
| TURBINES                                | 1 778               | 3 700         | 2 190       | 19 700        |
| GENERATORS                              | 3 255               | 3 300         | 3 622       | 32 600        |
| TESTS                                   |                     | 300           | 32          | 300           |
| ACCESSORY ELECTRIC EQUIPMENT            | 578✓                | 2 500         | 856         | 7 700         |
| MISC POWER PLANT EQUIPMENT              | 511✓                | 4 900         | 1 045       | 9 500         |
| PERMANENT ROADS                         |                     | 38 600        | 4 288       | 38 600        |
| SUBSTATION STRUCTURES                   | 56✓                 | 1 300         | 200         | 1 800         |
| SUBSTATION EQUIPMENT                    | 1 910✓              | 1 100         | 2 033       | 18 300        |
| Subtotal (Direct Cost)                  | 13 220✓             | 221 520       | 37 833      | 340 500       |
| INDIRECT CONSTRUCTION COST              | 985                 | 31 535        | 4 489       | 40 400        |
| Subtotal (Specific Constr Cost)         | 14 205              | 253 055       | 42 322      | 380 900       |
| OVERHEAD CONSTRUCTION COST              | 555                 | 200           | 578         | 5 200         |
| Subtotal (Before Escal, O&C & Int)      | 14 760              | 253 255       | 42 900      | 386 100       |
| ESCALATION                              | 590                 | 7 890         | 1 467       | 13 200        |
| OMISSIONS & CONTINGENCIES               | 2 150               | 28 955        | 5 366       | 48 300        |
| Subtotal                                | 17 500✓             | 290 100       | 49 733      | 447 600       |
| Transmission Facilities                 | 1 700               | 9 900         | 2 800       | 25 200        |
| Engineering Services                    | 1 200               | 7 200         | 2 000       | 18 000        |
| Total Project Cost                      | 20 400✓             | 307 200       | 54 533      | 490 800       |
| Interest During Construction            |                     | 38 940        | 4 327       | 38 940        |
| TAXES & DUTIES                          |                     | 29 500        | 3 278       | 29 500        |
| Total                                   | 20 400              | 375 640       | 62 138      | 559 240       |

ELEKTRIK ISLETMELERI MUESSESESI (EEIM)

(ETIBANK - ELECTRIC OPERATIONS)

COMPARATIVE BALANCE SHEET

At December 31, 1958-1962

(000)

|                                     | Turkish Lira |         |         |         |         | U. S. Dollars a/ |        |         |         |         |
|-------------------------------------|--------------|---------|---------|---------|---------|------------------|--------|---------|---------|---------|
|                                     | 1958         | 1959    | 1960    | 1961    | 1962    | 1958             | 1959   | 1960    | 1961    | 1962    |
| <b>ASSETS</b>                       |              |         |         |         |         |                  |        |         |         |         |
| Unpaid Capital                      | 40 000       | 40 000  | 40 000  | -       | -       | 4 432            | 4 432  | 4 432   | -       | -       |
| Current Assets                      |              |         |         |         |         |                  |        |         |         |         |
| Cash                                | 2 029        | 3 619   | 2 679   | 2 095   | 1 690   | 225              | 401    | 297     | 232     | 187     |
| Accounts Receivable - Customers     | 21 420       | 68 780  | 99 589  | 153 288 | 176 596 | 2 373            | 7 620  | 11 035  | 16 984  | 19 568  |
| Prepayments                         | 38 413       | 49 761  | 4 923   | 5 321   | 24 244  | 4 256            | 5 514  | 545     | 590     | 2 686   |
| Material and Supplies               | 14 839       | 22 591  | 31 133  | 28 799  | 30 472  | 1 645            | 2 503  | 3 450   | 3 191   | 3 376   |
| Fuel                                | 767          | 1 079   | 1 375   | 1 333   | 1 688   | 85               | 120    | 152     | 148     | 187     |
| Other                               | 5 814        | 7 008   | 7 274   | 8 230   | 7 972   | 644              | 776    | 806     | 912     | 883     |
| Total Current Assets                | 33 282       | 152 838 | 146 973 | 199 066 | 242 662 | 9 228            | 16 934 | 16 285  | 22 057  | 26 887  |
| Investments                         | -            | 1 050   | 1 050   | 1 045   | 1 050   | -                | 116    | 116     | 116     | 116     |
| Fixed Assets                        |              |         |         |         |         |                  |        |         |         |         |
| Power Plants                        | 363 899      | 380 329 | 418 085 | 430 974 | 435 305 | 40 320           | 42 140 | 46 324  | 47 752  | 48 232  |
| Transmission Lines and Transformers | 34 265       | 108 458 | 120 762 | 126 652 | 273 237 | 3 797            | 12 017 | 13 380  | 14 033  | 30 275  |
| Joint Facilities                    | 1 958        | 2 485   | 2 989   | 2 513   | 2 864   | 216              | 275    | 320     | 278     | 317     |
| Work in Progress b/                 | 205 378      | 139 527 | 174 632 | 190 189 | 67 784  | 22 756           | 15 460 | 19 349  | 21 073  | 7 510   |
| Total                               | 605 500      | 630 799 | 716 368 | 750 328 | 779 190 | 67 089           | 69 892 | 79 373  | 83 136  | 86 334  |
| Less: Depreciation Reserve          | 49 889       | 69 592  | 89 385  | 119 385 | 145 421 | 5 528            | 7 710  | 9 904   | 13 228  | 16 113  |
| Net Fixed Assets                    | 555 611      | 561 207 | 626 983 | 630 943 | 633 769 | 61 561           | 62 182 | 69 469  | 69 908  | 70 221  |
| Other Assets                        | 7 614        | 8 688   | 18 159  | 21 240  | 18 856  | 844              | 963    | 2 012   | 2 353   | 2 090   |
| Organization Costs                  | 3 565        | 2 362   | 1 324   | 398     | 333     | 395              | 262    | 147     | 44      | 37      |
| Losses - Prior Years                | 25 886       | 54 934  | 64 192  | 78 256  | 85 946  | 2 868            | 6 087  | 7 112   | 8 671   | 9 523   |
| Current Year                        | 29 048       | 9 258   | 14 064  | 7 690   | 10 933  | 3 219            | 1 025  | 1 559   | 852     | 1 211   |
| Total Losses                        | 54 934       | 64 192  | 78 256  | 85 946  | 96 879  | 6 087            | 7 112  | 8 671   | 9 523   | 10 734  |
| Total Assets                        | 745 006      | 830 337 | 912 745 | 938 638 | 993 549 | 82 547           | 92 001 | 101 132 | 104 001 | 110 085 |
| Regulating Accounts c/              | 202 834      | 42 212  | 34 576  | 32 448  | 9 318   | 22 474           | 4 677  | 3 831   | 3 595   | 1 032   |

a/ Conversion Rate - 9.0252 TL = \$ 1.00.

b/ Includes completed construction not transferred to applicable accounts.

c/ Every transaction involving an order or commitment is recorded in the Regulating Account, and on completion of the transaction it is recorded in the proper account.

ELEKTRIK ISLETMELERİ MÜESSESESİ (EEİM)  
 (ETIBANK - ELECTRIC OPERATIONS)  
 COMPARATIVE BALANCE SHEET  
 At December 31, 1958-1962  
 (000)

|                                       | Turkish Lira   |                |                |                |                | U. S. Dollars <sup>a/</sup> |               |                |                |                |
|---------------------------------------|----------------|----------------|----------------|----------------|----------------|-----------------------------|---------------|----------------|----------------|----------------|
|                                       | 1958           | 1959           | 1960           | 1961           | 1962           | 1958                        | 1959          | 1960           | 1961           | 1962           |
| <b><u>LIABILITIES AND CAPITAL</u></b> |                |                |                |                |                |                             |               |                |                |                |
| <b>Current Liabilities</b>            |                |                |                |                |                |                             |               |                |                |                |
| Borrowings From Etibank               | 102 790        | 163 043        | 524 266        | 498 238        | 355 952        | 11 389                      | 18 065        | 58 089         | 55 205         | 39 439         |
| Payments Due Etibank                  | 976            | 1 264          | 1 238          | 1 251          | 1 453          | 108                         | 140           | 137            | 139            | 161            |
| Accounts Payable - Purchases          | 753            | 5 327          | 11 620         | 23 433         | 35 074         | 83                          | 590           | 1 288          | 2 596          | 3 886          |
| Other                                 | 2 949          | 4 608          | 9 419          | 5 601          | 23 388         | 327                         | 511           | 1 043          | 620            | 2 591          |
| <b>Total Current Liabilities</b>      | <b>107 468</b> | <b>174 242</b> | <b>546 543</b> | <b>528 523</b> | <b>415 867</b> | <b>11 907</b>               | <b>19 306</b> | <b>60 557</b>  | <b>58 560</b>  | <b>46 077</b>  |
| Notes Payable                         | 33 825         | 33 825         | -              | -              | -              | 3 748                       | 3 748         | -              | -              | -              |
| Long-Term Debts Due Etibank           | 445 779        | 463 602        | 190 241        | 262 148        | 257 727        | 49 392                      | 51 367        | 21 079         | 29 046         | 28 556         |
| Other Liabilities                     | 56 279         | 56 171         | 71 818         | 16 541         | 11 575         | 6 237                       | 6 223         | 7 957          | 1 833          | 1 283          |
| Reserves                              | 1 655          | 2 497          | 4 143          | 31 426         | 58 380         | 183                         | 277           | 459            | 3 482          | 6 469          |
| Capital                               | 100 000        | 100 000        | 100 000        | 100 000        | 250 000        | 11 080                      | 11 080        | 11 080         | 11 080         | 27 700         |
| <b>Total Liabilities and Capital</b>  | <b>745 006</b> | <b>830 337</b> | <b>912 745</b> | <b>938 638</b> | <b>993 549</b> | <b>82 547</b>               | <b>92 001</b> | <b>101 132</b> | <b>104 001</b> | <b>110 085</b> |
| Regulating Accounts <sup>c/</sup>     | 202 834        | 42 212         | 34 576         | 32 448         | 9 318          | 22 474                      | 4 677         | 3 831          | 3 595          | 1 032          |

<sup>a/</sup> Conversion Rate - 9.0252 TL = \$ 1.00.

<sup>c/</sup> Every transaction involving an order or commitment is recorded in the Regulating Account, and on completion of the transaction it is recorded in the proper account.

ELEKTRIK ISLETMELERI MUESSESESI (EEIM)

(ETIBANK ELECTRIC OPERATIONS)

COMPARATIVE STATEMENT OF INCOME

For the Years Ended December 31, 1958-1962

(000 omitted)

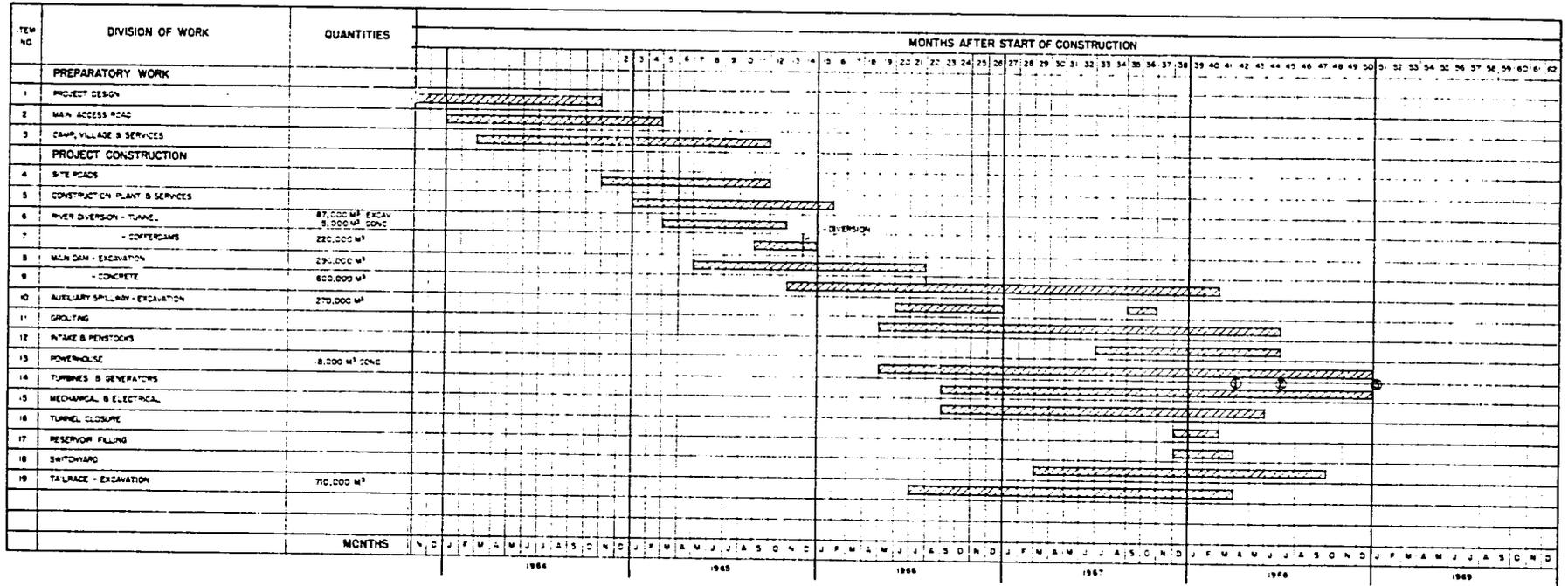
|                                 | Turkish Lira |         |          |         |          | U. S. Dollars * |         |         |        |         |
|---------------------------------|--------------|---------|----------|---------|----------|-----------------|---------|---------|--------|---------|
|                                 | 1958         | 1959    | 1960     | 1961    | 1962     | 1958            | 1959    | 1960    | 1961   | 1962    |
| <b>Income</b>                   |              |         |          |         |          |                 |         |         |        |         |
| Municipalities                  | 27 339       | 64 356  | 64 417   | 86 191  | 78 093   | 3 029           | 7 131   | 7 137   | 9 550  | 8 653   |
| Industrial                      | 32 140       | 50 516  | 56 741   | 65 622  | 80 453   | 3 561           | 5 597   | 6 287   | 7 271  | 8 914   |
| Small Customers                 | 371          | 361     | 749      | 409     | 464      | 41              | 40      | 83      | 45     | 51      |
| Total From Sales of Electricity | 59 850       | 115 233 | 121 907  | 152 222 | 159 010  | 6 631           | 12 763  | 13 507  | 16 866 | 17 618  |
| Other Income                    | -            | -       | 1 520    | 1 439   | 2 311    | -               | -       | 168     | 159    | 256     |
| Total Income                    | 59 850       | 115 233 | 123 427  | 153 661 | 161 321  | 6 631           | 12 768  | 13 675  | 17 025 | 17 874  |
| <b>Expenses</b>                 |              |         |          |         |          |                 |         |         |        |         |
| Operating Expenses              | 27 410       | 60 035  | 67 861   | 81 047  | 89 116   | 3 037           | 6 651   | 7 519   | 8 980  | 9 874   |
| Administrative                  | 10 080       | 10 214  | 11 814   | 13 212  | 14 796   | 1 117           | 1 132   | 1 309   | 1 464  | 1 639   |
| Amortization (Depreciation)     | 17 978       | 17 551  | 19 315   | 28 273  | 28 255   | 1 992           | 1 945   | 2 140   | 3 132  | 3 131   |
| Other Expenses                  | 2 816        | 5 543   | -        | 15 379  | -        | 312             | 614     | -       | 1 704  | -       |
| Total Expenses                  | 58 284       | 93 343  | 98 990   | 137 911 | 132 167  | 6 458           | 10 342  | 10 968  | 15 280 | 14 644  |
| Gross Income                    | 1 566        | 21 890  | 24 437   | 15 750  | 29 154   | 173             | 2 426   | 2 707   | 1 745  | 3 230   |
| Interest - Net                  | 30 614       | 31 148  | 38 501   | 23 440  | 40 087   | 3 391           | 3 451   | 4 266   | 2 597  | 4 441   |
| Profit                          | (29 048)     | (9 258) | (14 064) | (7 690) | (10 933) | (3 218)         | (1 025) | (1 559) | (852)  | (1 211) |

( ) Indicates red figure.

\* Conversion rate - 9.0252 T.L. = \$1.00.

AID-DLG/P-258  
ANNEX VII  
June 11, 1964

CICEROZ DAM AND HYDROELECTRIC PROJECT  
CONSTRUCTION SCHEDULE



CICEROZ DAM & H.E. PROJECT  
ARCH DAM  
CONSTRUCTION SCHEDULE

ERASC SERVICES INCORPORATED NEW YORK

SCALE: NONE  
APPROVED: \_\_\_\_\_ DATE: SEP 1963

NO. DATE REVISION BY (or) APPROVED

G-175825

DEPARTMENT OF STATE  
AGENCY FOR INTERNATIONAL DEVELOPMENT  
Washington, D. C., 20523

A.I.D. Loan No. 277-H-053

CAPITAL ASSISTANCE LOAN AUTHORIZATION  
Provided from Development Loan Funds  
(TURKEY: Ciceroz Hydroelectric and Transmission Lines)

Pursuant to the authority vested in the Administrator of the Agency for International Development (hereinafter called "A.I.D.") by the Foreign Assistance Act of 1961, as amended, and the Delegations of Authority issued thereunder, I hereby authorize the establishment of a loan pursuant to Part I, Chapter II, Title I, the Development Loan Fund, to the Government of Turkey in the amount of not to exceed Twenty Million Four Hundred Thousand Dollars (\$20,400,000) for relending to the Ministry of Energy and Natural Resources to be used by said Ministry to assist in financing the foreign exchange costs of materials, equipment and services required in connection with construction of a dam together with an hydroelectric power generating installation of 300 MW capacity at Ciceroz on the Sakarya River and approximately ninety-seven miles of 154 kv transmission lines running from such installation to Eskisehir and to Sariyar, this loan to be subject to the following terms and conditions:

1. Interest Rate and Terms of Repayment:

This loan shall be repaid within forty (40) years after the date of the first disbursement thereunder including a grace period of not to exceed ten (10) years. The interest on the loan shall be three-quarters of one percent ( $3/4$  of 1%) per annum during the ten (10) years grace period and two percent (2%) per annum thereafter on the disbursed balance of the loan.

2. Currency Repayment:

Provision shall be made for repayment of the loan and payment of interest in United States dollars.

3. Other Terms and Conditions:

(a) Equipment, materials and services financed under the loan shall be procured from the United States of America.

(b) Terms of the subloan by the Government of Turkey to the Ministry of Energy and Natural Resources shall be subject to approval by A.I.D.

(c) The loan shall be subject to such other terms and conditions as A.I.D. may deem advisable.

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Administrator

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Date