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**Series:** Completion Reports and Audit Reports

**Dates:** 11/12/1975 – 02/26/1982

**Fonds:** Records of the Office of Operations Evaluation

**ISAD Reference Code:** WB IBRD/IDA OPE-06

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THE WORLD BANK  
Washington, D.C.

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**PUBLIC DISCLOSURE AUTHORIZED**

TURKEY (Loan 568 and 763-TU)  
Keban Transm. Lines & T

The World Bank Group  
**Archives**



1048097

R1985-081 Other # 6 Box #3317B

Turkey - Keban Power Project - Loan 568 / Power Transmission Project  
(TEK) - Loan 0763 - Report 3695

**DECLASSIFIED**  
WBG Archives

ROUTING SLIP		DATE: 12/23
NAME		ROOM NO.
<del>Mr Shiv Kumar</del>		
<del>Mr Bates</del>		File
Mr Kumar		3/1
APPROPRIATE DISPOSITION	NOTE AND RETURN	
APPROVAL	NOTE AND SEND ON	
CLEARANCE	PER OUR CONVERSATION	
COMMENT	PER YOUR REQUEST	
FOR ACTION	PREPARE REPLY	
INFORMATION	RECOMMENDATION	
INITIAL	SIGNATURE	
NOTE AND FILE	URGENT	
REMARKS:		
<p>Let me know on my return.</p> <p>Please see my notes attached R.G.</p> <p>12/24</p>		
FROM: Bai	ROOM NO.:	EXTENSION:

FIRST DRAFT

International Aspects

32. Given the fact that the Keban hydroelectric project would create a large reservoir on the Euphrates River in Turkey, the appraisal report for the Keban transmission project recognized that operation of the Keban dam and reservoir would affect downstream users of Euphrates waters in Iraq and Syria. Discussions between the three riparian countries on the sharing of the Euphrates waters had taken place since 1962. At the request of the Keban Syndicate, the Bank in 1965 undertook a study of international water problems on the Euphrates River, the aim of which was to reach an independent and objective determination of acceptable river flows during reservoir filling, to identify long-term problems and to suggest means of solving them. The study proposed the establishment of an international tripartite commission for the Euphrates River but this did not take place; neither was any international agreement reached on the use of the Euphrates waters, despite the Syndicate's efforts. However, the Turkish government undertook to use its best endeavours to reach future agreement with Iraq and Syria on water sharing. Meanwhile, in light of the study, the government agreed on a regime for filling the reservoir which would meet the needs of downstream users and the Bank was able to conclude that any further agreement on water releases would not affect the economics of the project, which had no irrigation uses and did not involve abstraction of water from the river except for the initial filling of the reservoir.

No copies,  
This is not the  
paras 32-33 on  
which I commented  
in my memo of 6/23/81  
to you.

*AmB*

Mr. Kapur

The para. which you sent to Mr. Bart (attached) is the one which appeared as para. 32 of the draft which was sent to the Region and CPS on June 3, 1981, for comments before sending the PPAR to Turkey; para. 33 covered developments on the riparian question subsequent to Keban, particularly with regard to the Karakaya project. On rereading Mr. Bart's Memo. of 6/23/81, I believe that he was indeed referring to the draft of June 3; otherwise, I assume that he could only have been referring to the version which was revised on or about June 21, at the written suggestion of Mr. Fish (CPS), by deleting from the June 3 version the reference to an "agreement" on the regime for filling the reservoir (see my Memo to file of October 22). I was given to understand that both the Programs and Projects Divisions agreed with Mr. Fish at the time and the June 21 version was accordingly sent to the country. In any event, as should be clear from your Memo. of July 2 to Mr. Bart, even the June 21 revision was only an interim measure, so that we could proceed with the processing of the audit and take up the riparian issue along with any other issues at a later stage, after receiving country comments and after my return from Home Leave. In the event, para. 32 was put back to something close to its original form (the June 3 version) and para. 33 was deleted. Perhaps the passage of several Memos over a long period of time (six months) caused the Region to lose sight of my original draft - such does seem to be implied in Mr. Bart's Memo. of October 6, where he states that the PPAR chose to leave out what was said in the President's and Appraisal Reports, despite the fact that my June 3 version essentially paraphrased those documents.

  
R.W. Bates

Feb. 26, 1982

February 8, 1982

Mr. Tunc Bilget  
Director General of the Treasury  
18, Mitatpasha Caddesi  
Ankara  
Turkey

Dear Mr. Bilget:

Re: Project Performance Audit Report  
Turkey: Keban Transmission Project  
TEK Power Transmission Project  
Loan 568-TU and Loan 763-TU)

Enclosed is the final version of the Project Performance Audit Report on Turkey Keban Transmission Project and TEK Power Transmission Project (Loan 568-TU and Loan 763-TU), a first draft of which was forwarded to you under covering letter dated June 22, 1981.

The report has been revised in the light of comments received from the Turkish authorities, and from Bank staff concerned with the project, and was subsequently distributed to the Executive Directors on December 28, 1981.

I am also sending a copy of this report to the Minister of Finance, the Minister of Energy and Natural Resources, the General Manager of TEK and the Under Secretary of Planning.

Sincerely yours,

Shiv S. Kapur  
Director  
Operations Evaluation Department

Enclosure  
RBates:dt

RB

**OFFICIAL FILE COPY**

February 8, 1982

His Excellency  
Kaya Erden  
Minister of Finance  
Ministry of Finance  
Maliye Bakanligi  
Ankara  
Turkey

Dear Mr. Minister:

Re: Project Performance Audit Report  
Turkey: Keban Transmission Project  
TEK Power Transmission Project  
Loan 568-TU and Loan 763-TU)

Enclosed is the final version of the Project Performance Audit Report on Turkey Keban Transmission Project and TEK Power Transmission Project (Loan 568-TU and Loan 763-TU), a first draft of which was forwarded to you under covering letter dated June 22, 1981.

The report has been revised in the light of comments received from the Turkish authorities, and from Bank staff concerned with the project, and was subsequently distributed to the Executive Directors on December 28, 1981.

I am also sending a copy of this report to the Under Secretary of Planning, the General Manager of TEK, the Director General of the Treasury and the Minister of Energy and Natural Resources.

Sincerely yours,

Shiv S. Kapur  
Director  
Operations Evaluation Department

Enclosure

cc: Mr. Jacques de Groote, Executive Director

RBates:dt

RJ

OFFICIAL FILE COPY

February 8, 1982

His Excellency  
Serbulent Bingol  
Minister of Energy and Natural Resources  
Ministry of Energy and Natural Resources  
Ankara  
Turkey

Dear Mr. Minister:

Re: Project Performance Audit Report  
Turkey: Keban Transmission Project  
TEK Power Transmission Project  
Loan 568-TU and Loan 763-TU)

Enclosed is the final version of the Project Performance Audit Report on Turkey Keban Transmission Project and TEK Power Transmission Project (Loan 568-TU and Loan 763-TU), a first draft of which was forwarded to you under covering letter dated June 22, 1981.

The report has been revised in the light of comments received from the Turkish authorities, and from Bank staff concerned with the project, and was subsequently distributed to the Executive Directors on December 28, 1981.

I am also sending a copy of this report to the Minister of Finance, the Under Secretary of Planning, the General Manager of TEK and the Director General of the Treasury.

Sincerely yours,

Shiv S. Kapur  
Director  
Operations Evaluation Department

Enclosure

R.S.

OFFICIAL FILE COPY

February 8, 1982

Mr. Kanul Toktas  
General Manager  
Turkiye Elektrik Kurumu  
Genel Mudurlugu  
Necatibey Caddesi 36  
Sihhiye-Ankara  
Turkey

Dear Mr. Toktas:

Re: Project Performance Audit Report  
Turkey: Keban Transmission Project  
TEK Power Transmission Project  
Loan 568-TU and Loan 763-TU)

Enclosed is the final version of the Project Performance Audit Report on Turkey Keban Transmission Project and TEK Power Transmission Project (Loan 568-TU and Loan 763-TU), a first draft of which was forwarded to you under covering letter dated June 22, 1981.

The report has been revised in the light of comments received from the Turkish authorities, and from Bank staff concerned with the project, and was subsequently distributed to the Executive Directors on December 28, 1981.

I am also sending a copy of this report to the Minister of Finance, Minister of Energy and Natural Resources, the Director General of the Treasury and the Under Secretary of Planning.

Sincerely yours,

Shiv S. Kapur  
Director  
Operations Evaluation Department

Enclosure

RBates:dt

*RS*

**OFFICIAL FILE COPY**

February 8, 1982

Mr. Yildirim Akturk  
Under Secretary  
Devlet Planlama Teskilati (SPO)  
Ankara  
Turkey

Dear Mr. Alturk:

Re: Project Performance Audit Report  
Turkey: Keban Transmission Project  
TEK Power Transmission Project  
Loan 568-TU and Loan 763-TU)

Enclosed is the final version of the Project Performance Audit Report on Turkey Keban Transmission Project and TEK Power Transmission Project (Loan 568-TU and Loan 763-TU), a first draft of which was forwarded to you under covering letter dated June 22, 1981.

The report has been revised in the light of comments received from the Turkish authorities, and from Bank staff concerned with the project, and was subsequently distributed to the Executive Directors on December 28, 1981.

I am also sending a copy of this report to the Minister of Finance, Minister of Energy and Natural Resources, the General Manager of TEK and the Director General of the Treasury.

Sincerely yours,

Shiv S. Kapur  
Director  
Operations Evaluation Department

Enclosure

RBates:dt

RJ

**OFFICIAL FILE COPY**

## OFFICE MEMORANDUM

TO: Mr. Maurice P. Bart, Director, EM2

FROM: Shiv S. Kapur, Director, OED

SUBJECT: TURKEY: PPAR on Keban and TEK Transmission Projects

DATE: December 14, 1981

1. As a rule, I do not like to resort to writing memos to the Regions and to CPS in the course of the normal give-and-take of our work. Your note of December 10 on the above subject, however, surprises me by its timing and content. You and I have personally been involved in working on this particular case, the PPAR has been issued in a form which satisfied both of us, and I did not think anything further needed to be said. Despite all this, your memorandum goes on to make some unwarranted comment of a generalized nature which I feel called upon to answer.

2. The best response lies in the attached two versions of the portion of the PPAM relating to the riparian issue. Apart from formulation, I can find no difference. The lack of respect for exactitude with which you charge OED staff is certainly not borne out by the two versions, the final version fully cleared by you.

3. The problem arose from the Region's initial insistence that the riparian issue was too "sensitive" and should either not be mentioned in the PPAM at all or that 20 pages be written on it to bring out all its complexities. We refused to suppress the issue of fact and invited the Region to contribute the 20 pages if it so desired. For the rest, the OED analyst consulted the project file and all other available documentation. It was only at a later stage that we were informed of an undertaking having been given by the Government of Turkey on the riparian issue in the form of a letter from the Minister. When we asked to see the letter, it could not be traced. We were finally told that it had been addressed to the U.S. Ambassador in Turkey in connection with a USAID operation and not in relation to the Bank project under review. In the circumstances, we decided it best merely to quote the President's Report in which the required assurances had been mentioned. This specific reference to the President's Report is the only change of any "substance" that I can find in the final version as against the initial draft.

4. There are two other things which I would like to stress. First, the PPAR process itself is designed to guard against errors and omissions of fact. When we send across a draft document it is intended in all seriousness to invite the Region's comments so as to make sure that no errors of fact take place. It is unfortunate if the draft at that stage is used by the Region to make and circulate all kinds of judgments or becomes the subject of an attack. Second, it is

known to you as well as to me that all documentation relating to a particular operation is usually not available in a central place. OED staff have instructions to seek the help of their counterparts to locate missing documents and/or to supply any other facts which might have been missed by the analyst and which, because of the Region's much longer association with the project concerned, may be documented outside the project file. Such help was repeatedly sought in this case and a good deal of time and effort spent before residual facts came to light.

5. Let me assure you that factual accuracy is our primary concern in all that we undertake. The system of triangular challenge between OED, the Regions/CPS and the Borrowers is intended precisely to ensure that facts relating to the operation at least are straightened out even if differences in judgment persist. We are greatly appreciative of the help given to us by the Regions and by CPS in making sure that this process works smoothly. In this particular case if it didn't do so in the initial stages I do not believe the fault lies with the OED analyst.

Attachments

cc: Messrs. Picciotto, EMP  
Bates, OED

## FIRST DRAFT

### International Aspects

32. Given the fact that the Keban hydroelectric project would create a large reservoir on the Euphrates River in Turkey, the appraisal report for the Keban transmission project recognized that operation of the Keban dam and reservoir would affect downstream users of Euphrates waters in Iraq and Syria. Discussions between the three riparian countries on the sharing of the Euphrates waters had taken place since 1962. At the request of the Keban Syndicate, the Bank in 1965 undertook a study of international water problems on the Euphrates River, the aim of which was to reach an independent and objective determination of acceptable river flows during reservoir filling, to identify long-term problems and to suggest means of solving them. The study proposed the establishment of an international tripartite commission for the Euphrates River but this did not take place; neither was any international agreement reached on the use of the Euphrates waters, despite the Syndicate's efforts. However, the Turkish government undertook to use its best endeavours to reach future agreement with Iraq and Syria on water sharing. Meanwhile, in light of the study, the government agreed on a regime for filling the reservoir which would meet the needs of downstream users and the Bank was able to conclude that any further agreement on water releases would not affect the economics of the project, which had no irrigation uses and did not involve abstraction of water from the river except for the initial filling of the reservoir.

## FINAL VERSION

### International Aspects

34. The Bank did not contribute to the financing of the Keban hydroelectric station itself (PPAM para. 13); nevertheless, given the fact that the Keban hydroelectric project would create a large reservoir on the Euphrates River in Turkey, the President's Report for the Keban transmission project recognized that operation of the Keban dam and reservoir would affect downstream users of Euphrates waters in Iraq and Syria (see map). Discussions between the three riparian countries on the sharing of the Euphrates waters had taken place since 1962. At the request of the Keban Syndicate, the Bank in 1965 undertook a study of international water problems on the Euphrates River, the aim of which was to reach an independent and objective determination of acceptable river flows during reservoir filling, to identify long-term problems and to suggest means of solving them. The study recommended a regime of minimum monthly releases during filling and proposed the establishment of an international tripartite commission for the Euphrates River. Such a commission was not established; neither was any international agreement reached on the use of the Euphrates waters, despite the Syndicate's efforts. However, the President's Report pointed out that the Turkish government had undertaken to use its best endeavours to reach future agreement with Iraq and Syria on water sharing and agreed on a regime of controlled flow in the initial filling period of the dam, in light of the study, which was intended to meet the needs of downstream users. The President's Report concluded that any future agreement on the regulation of water releases was unlikely to affect the economics of the project, since the purpose of the dam was to conserve water and the Turkish power system was large enough to be able to absorb all the power generated by the release of downstream users' water requirements, irrespective of the time of release. The Bank continued to pursue the matter of an international agreement thereafter, in the context of the Karakaya and other projects, to bring about negotiations between the riparians to solve the issue, without success so far.

*Project File  
Mr. Bates*

OFFICE MEMORANDUM

TO: Mr. Shiv Kapur, Director, OED  
 FROM: Maurice P. Bart, Director, EM2 *MB*  
 SUBJECT: TURKEY - PPAR on Keban and TEK Transmission Projects

DATE: December 10, 1981  
*I am inclined to agree with the position set forth. If you have a strong opinion concerning content from of best, please let me know.*

I have just sighted, after a long mission, Mr. Bates' memo of 11/13 to Ms. Ruggeri and wish to confirm my agreement to the revised wording of para 34 (replacing the initial para 32).

May I express my surprise at Mr. Bates' statement that his earlier request for the documentation on the riparian question had been unsuccessful.

This suggests that this whole issue had been discussed in the initial draft PPAR without access to the basic documents on the subject, and that the discussion had been pursued for some time since Mr. Fish's memo of 6/10/81 and my memo of 6/23/81 without the Region's attention being drawn to the fact that the authors of the report had not seen the documents referred to in these memos. *12/11*

I am sure you will agree that such a procedure, besides wasting the time of all concerned, casts serious doubts on the thoroughness of the evaluation process and may cause the Bank serious problems, as would have indeed been the case with the initial wording of para 32.

cc: Messrs. Picciotto, Davar, Fish, Mathai  
 /bp

Ms. S. M. Ruggeri, EM2

November 13, 1981

R. W. Bates, OED

TURKEY - PPAR on the Keban Transmission Project (Loan 568-TU) and  
the TEK Power Transmission Project (Loan 763-TU)

I should like to thank you for the special effort you make to locate successfully some documentation of the agreement on the riparian question which arose in the above audit; as you know, my earlier request for such documentation had been unsuccessful. After seeing the contents of the letter from the Minister of Finance which you showed me and in view of the comments of Mr. Mathai, I have modified para. 34 of the final version of the PPAR, which was sent to your Region through Mr. Weiner on October 26, as I described to you over the telephone yesterday; a copy of the revised paragraph is attached.

I understand that your Region has no further comments on the rest of the PPAR. As soon as I receive confirmation from your front office that this is the case, I shall arrange for the PPAR to be distributed to the Board

cc (with attachment): Messrs. Kapur  
Davar  
Mathai  
Kalim  
Fish

THE WORLD BANK  
Washington, D.C. 20433  
U.S.A.

Office of Director-General  
Operations Evaluation

DECLASSIFIED

JUN 29 2022

WBG ARCHIVES

*Ok to proceed  
WBS found  
11-17-1981*

November 23, 1981

MEMORANDUM TO THE EXECUTIVE DIRECTORS AND THE PRESIDENT

SUBJECT: Project Performance Audit Report - Turkey: Keban Transmission Project (Loan 568-TU) and Tek Power Transmission Project (Loan 763-TU)

Attached, for information, is a copy of a report entitled "Project Performance Audit Report - Turkey: Keban Transmission Project and Tek Power Transmission Project" prepared by the Operations Evaluation Department.

Ms. S. M. Ruggeri, EM2

November 13, 1981

R. W. Bates, OED

TURKEY - PPAR on the Keban Transmission Project (Loan 568-TU) and  
the TEK Power Transmission Project (Loan 763-TU)

I should like to thank you for the special effort you made to locate successfully some documentation of the agreement on the riparian question which arose in the above audit; as you know, my earlier request for such documentation had been unsuccessful. After seeing the contents of the letter from the Minister of Finance which you showed me and in view of the comments of Mr. Mathai, I have modified para. 34 of the final version of the PPAR, which was sent to your Region through Mr. Weiner on October 26, as I described to you over the telephone yesterday; a copy of the revised paragraph is attached.

I understand that your Region has no further comments on the rest of the PPAR. As soon as I receive confirmation from your front office that this is the case, I shall arrange for the PPAR to be distributed to the Board

cc (with attachment): Messrs. Kapur/  
Davar  
Mathai  
Kalim  
Fish

progressive expenditures on project works will be recorded. In fact, with effect from FY1982 Bank staff are required in all projects to confirm, at the time of appraisal, that an adequate accounting and internal control system exists for the recording and reporting of project-related financial transactions or will exist by the time that project expenditures commence.

#### International Aspects

34. The Bank did not contribute to the financing of the Keban hydroelectric station itself (PPAM para. 13); nevertheless, given the fact that the Keban hydroelectric project would create a large reservoir on the Euphrates River in Turkey, the President's Report for the Keban transmission project recognized that operation of the Keban dam and reservoir would affect downstream users of Euphrates waters in Iraq and Syria (see map). Discussions between the three riparian countries on the sharing of the Euphrates waters had taken place since 1962. At the request of the Keban Syndicate, the Bank in 1965 undertook a study of international water problems on the Euphrates River, the aim of which was to reach an independent and objective determination of acceptable river flows during reservoir filling, to identify long-term problems and to suggest means of solving them. The study recommended a regime of minimum monthly releases during filling and proposed the establishment of an international tripartite commission for the Euphrates River. Such a commission was not established, neither was any international agreement reached on the use of the Euphrates waters, despite the Syndicate's efforts. However, the President's Report pointed out that the Turkish government had undertaken to use its best endeavours to reach future agreement with Iraq and Syria on water sharing and agreed on a regime of controlled flow in the initial filling period of the dam, in light of the study, which was intended to meet the needs of downstream users. The President's Report concluded that any future agreement on the regulation of water releases was unlikely to affect the economics of the project, since the purpose of the dam was to conserve water and the Turkish power system was large enough to be able to absorb all the power generated by the release of downstream users' water requirements, irrespective of the time of release. The Bank continued to pursue the matter of an international agreement thereafter, in the context of the Karakaya and other projects, to bring about negotiations between the riparians to solve the issue, without success so far.

#### Supervision

35. Bank supervision of the two projects was satisfactory. From a technical point of view, neither project was particularly difficult, although some of the EHV construction for the Keban Transmission project was new to Turkey. Bank staff gave what assistance it could in dealing with the technical problems and in helping to overcome the delays caused by the financial problems of the Keban transmission line contractor (PCR para. 3.04). The institutional and financial problems related to TEK were much more intractable and considerable additional effort was devoted by Bank staff to tackling these problems through subsequent lending operations connected with the Elbistan and

FORM NO. 80  
(1-76)

THE WORLD BANK  
MESSAGES

DATE

11/16

TIME

5:00

TO

FROM

Margaret

DEPT./OFFICE

PHONE

EXTENSION

CALLED

CALL BACK

CAME TO SEE YOU

WILL CALL AGAIN

RETURNED YOUR CALL

REQUESTS APPOINTMENT

URGENT

REMARKS

Re: Turkey Power Transmission.

Mr. Richardson called from  
Emena to say that the Region  
is now satisfied with the  
PPAR.

RECEIVED BY

Onoria

<b>ROUTING SLIP</b>		DATE: 11/11/81	
NAME		ROOM NO.	
Mr. Robin Bates, OED		M814	
	APPROPRIATE DISPOSITION		NOTE AND RETURN
	APPROVAL		NOTE AND SEND ON
	CLEARANCE	X	PER OUR CONVERSATION
	COMMENT		PER YOUR REQUEST
	FOR ACTION		PREPARE REPLY
	INFORMATION		RECOMMENDATION
	INITIAL		SIGNATURE
	NOTE AND FILE		URGENT
REMARKS:			
<p>The Loan Agreement referred to in the first sentence of this letter is that between the US and Turkey - as you know, there were separate loan agreements with the Italians, French and others. There is no doubt, however, that this particular agreement is part of the "project" which is being audited. I would appreciate it if you could accomade our proposal accord-</p>			
FROM:	 SMKuggeri	ROOM NO.:	EXTENSION:
		F 718	72780

ingly.

T. C.  
MALIYE BAKANLIĞI  
Hazine Genel Müdürlüğü  
ve  
Milletlerarası İktisadi İşbirliği Teşkilatı

Republic of Turkey  
MINISTRY OF FINANCE  
Department of Treasury  
and  
Organization for International  
Economic Cooperation

Sayı : .....

Ankara, August 31, 1966

*The USAID Loan Agreement  
not 1620*

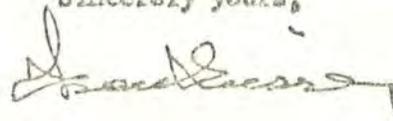
My Dear Mr. Ambassador:

With reference to the paragraph of Preamble of the Loan Agreement on Keban Hydroelectric and Transmission Line Project, which reads: "Whereas Borrower is prepared to maintain its efforts to make arrangements with the Governments of Iraq and Syria concerning the initial filling of Keban reservoir and has informed the Lenders that, in the absence of such arrangements, it will adhere to a program for the release of water downstream at Keban Dam also during the initial filling of the Keban reservoir...". I have the honour to state that the Government of Turkey affirms that it will not increase the amount of water stored in the reservoir during initial filling so as to cause the flow at immediate downstream of Keban to be less than as shown in the tabulation below for months specified whenever these flows are available from inflows to the Keban reservoir:

<u>Month</u>	<u>Release in cumecs from Keban Reservoir to immediate downstream when inflows available</u>
January	135
February	200
March	375
April	450
May	450
June	450
July	375
August	245
September	225
October	275
November	125
December	115

The releases specified above can in no way be construed as recognition by the Government of Turkey of any specific requirements or rights of downstream states, and in this respect the Government of Turkey specifically reserves to itself complete freedom of position in its negotiations on water rights.

Sincerely yours,



Minister of Finance

Project File  
Mr. Balis

# OFFICE MEMORANDUM

TO: Mr. Mervyn L. Weiner, Director-General, Operations Evaluations

DATE: October 26, 1981

FROM: Shiv S. Kapur, Director, OED

SUBJECT: Project Performance Audit Report on Turkey: Keban Transmission Project (Loan 568-TU) and TEK Power Transmission Project (Loan 763-TU)

10/29

I am attaching for your approval the Performance Audit Report on Turkey: Keban Transmission and TEK Power Transmission Projects supported by Loan 568-TU and Loan 763-TU respectively. Comments received from Central Projects Staff, the Europe, Middle East and North Africa Regional Office and the Borrower have been taken into account.

Attachment

See P. viii

Done  
11/3

cc: Messrs. Stern, SVPOP  
Baum, CPSVP  
Chaufournier, EMNVP  
Golsong, VPG

Very comprehensive & well-presented  
PPAM

→ S/k

ok

(W) 10/28

### COMMENTS RECEIVED

- DGO 10/29 -----
- CPS -----
- Region -----
- LEG -----
- SVPOP -----

OCT 29 1981

## OFFICE MEMORANDUM

TO: Files

DATE: October 22, 1981

FROM: R.W. <sup>Rx</sup>DatesSUBJECT: Turkey - PPAR on the Keban Transmission Project (Loan 568-TU)  
and the TEK Power Transmission Project (Loan 763-TU)

1. The original deadlines for Regional comments and country comments on the above PPAR were July 8 and August 17, 1981, respectively. In a Memorandum of June 23, 1981, Mr. Bart suggested that OED reconsider paras. 32 and 33, which discuss the international (riparian) aspects of the Keban project. In reply, Mr. Kapur proposed (Memorandum dated July 2, 1981) that we deal with this question after receiving full comments from the Regional staff, from CPS and from the country. CPS had already commented on the riparian question (Memorandum from Mr. Fish, dated June 10, 1981), as a result of which reference to the Government's agreement on a regime for filling the Keban reservoir had been deleted from para. 32 before sending the PPAR to the country. Mr. Bart was aware of this. No further comments were received from the Region or CPS prior to my return from home leave in August, although comments were received from the country, which simply said that they find the PPAR satisfactory.

2. After my return from home leave, I raised the matter again in several telephone conversations with the EMENA power division (Mr. Mathai), as a result of which I concluded that Mr. Bart's position remained unchanged. After discussion with Mr. Kapur on October 1, I amended the draft PPAR, making a minor change to para. 32 and deleting para. 33, which related primarily to the Karakaya project. Mr. Kapur informed Mr. Bart of this on October 2. In a Memorandum of October 6, Mr. Bart made two suggestions with regard to the amended para. 32: (i) that it should state explicitly that the study recommended a regime of minimum monthly releases during filling; and (ii) that it should reintroduce the reference to the Government's agreement on a filling regime. On October 14, I succeeded (after two earlier attempts) in contacting the Loan Officer (Mr. Kalim) and explained that Mr. Bart's suggestions could be taken into account, although I would appreciate it if Mr. Kalim could find some documentation of the agreement in the files. Mr. Kalim said he would look into the matter.

3. Since the PPAR has already been delayed by more than seven weeks and I have heard nothing further from Mr. Kalim - although I called his office on October 20 and 21, leaving messages with his Secretary - I am now finalizing the PPAR, taking Mr. Bart's comments into account, for issue to Mr. Weiner, prior to Board distribution.

Cleared with and cc: Mr. Kapur

cc: Messrs. Kalim, Davar, Mathai

*Project File  
Mr. Bates*

OFFICE MEMORANDUM

TO: Mr. Shiv S. Kapur, Director, OED

DATE: October 6, 1981

FROM: Maurice P. Bart, Director, EM2 *[Signature]*

SUBJECT: PPAR on Turkey Keban Transmission Project  
Loan 568-TU

*[Handwritten signature]*  
10/7

Thank you for your note of 10/2. I have serious reservations on one aspect of the revised para 32, that is the omission of the problem of releases during filling.

The sentence starting with "The study proposed the establishment..." omits the key operative recommendation of the study, namely minimum monthly releases during filling, which ought to be mentioned.

*Ok ?*

The omission is even more serious in the following sentence ("However, the Turkish Government undertook..."). I do not understand why the writers of the PPAR have chosen to leave out what we said in the PR and AR for the Keban Transmission Project, namely that the Turkish Government "agreed on a regime of controlled flow in the initial filling period of the dam, which is intended to meet the needs of downstream users". This is the central point of the international issue regarding Keban. It cannot be omitted.

*Because these are not reflected in the legal documents?*

My main concern in this regard is not to give the impression as your present draft does, that the Bank and the Keban syndicate went ahead with the project without any safeguard for the lower riparians on an issue which eventually proved to be very damaging to Iraq.

cc: Messrs. Davar, Reekie  
/bp

OCT 07 1981

1061

October 2, 1981

Mr. Bart,

Re: PPAR on Turkey Keban Trans-  
mission Project (Loan  
568-TU) and TEK Power Trans-  
mission Project (Loan  
763-TU) and our telephone  
conversation this afternoon

I am attaching a revised paragraph which deals with the international aspects of the project in the above PPAR. The subsequent para. 33, which appeared in the earlier version and related primarily to the Karakaya project, has been deleted. I believe the attached presentation is very understated and altogether in line with the factual situation.

If you have no further problems, I would now like to go ahead with this PPAR.

Shiv S. Kapur

Attachment

cc: Mr. Bates ✓

SSKapur: rmd

September 23, 1981

Mr. Kapur

Re: Turkey - PPAR on the Keban Transmission Project  
(Loan 568-TU) and the TEK Power Transmission  
Project (Loan 763-TU)

---

You will recall that Mr. Bart expressed his concern about the riparian issue (involving Turkey, Syria and Iraq) raised by OED in the above PPAR. His memo of June 23 is attached. You and I both felt at the time that it was not possible to drop the issue from the audit but we sent him a memo on July 2 (copy attached) saying that we would contact him again after getting comments from Turkey. The Turks (Treasury and TEK) have given us comments, which simply say that they find the PPAR satisfactory (copies attached).

I have since had several conversations with the EMENA power division (Mr. Mathai) explaining that I personally see no way of dropping the riparian question from the audit since it was discussed explicitly in the Appraisal and President's Reports (where certain assurances were given) and it was the major concern raised by EDs at the time of Board presentation.

I understand that Mr. Bart's position remains unchanged. He emphasizes the sensitive nature of the issue and Mr. Mathai points out that the issue is still very current. It has resurfaced through the recently-approved Karakaya project (downstream from Keban on the Euphrates). Apparently, the Iraqis in particular have just raised the riparian question in a direct communication with Mr. Clausen.

If we agree with Mr. Bart that "a full - and difficult - analysis of international aspects of the Keban dam" is necessary, then I think we should ask the EMENA Region to prepare the analysis for our consideration (I am not yet convinced that it is necessary to get into a full analysis of these aspects). They are much better acquainted with the history and they can also take into account the apparent nuances and sensitivities. In any case, if the story has to be told in full, their side would be required.

*There is an  
110 page document  
- the Karakaya  
App. Report*

I think we should discuss the problem before proceeding further but if you prefer I can draft a memo for your signature putting the proposal.

*R.W.*  
R.W. Bates

Attachment



# OFFICE MEMORANDUM

TO: Mr. Maurice P. Bart, Director, EM2

DATE: July 2, 1981

FROM: Shiv S. Kapur, Director, OED

SUBJECT: Turkey - PPAR on the Keban Transmission Project (Loan 568-TU)  
and the TEK Power Transmission Project (Loan 763-TU)

Thank you for your Memorandum of June 23, 1981 on the above subject. I think the most useful approach would be to discuss the issues which you raise after we have received the full comments from your Regional staff and from CPS (due on July 8) and also the comments from the relevant authorities in Turkey (due on August 17). In this way, we can deal with the audit as a whole, taking into account the various points of view. If you agree to this approach, I shall contact you again after we have received and examined these comments.

TEK

TÜRKİYE ELEKTRİK KURUMU

(Turkish Electrical Authority)

Capital : TL. 20.000.000.000

TELEKS

ADDRESS : Necatibey Caddesi No. 36 Yenisehir - Ankara/Turkey

CABLE : TEK - Ankara

TELEX : TEK TELEKS NO: (42245 TEKTR)

TELEGRAM  
Firm Address

IBRD  
1818 H. Street N.W.  
Washington D.C. 20433  
U.S.A.

36205

Our reference to be stated in  
your reply

604/P-914 1664

Ankara

August 7, 1981

10-8-81

We confirm our telegram released to you today as follows :

Address of Telegram

Telex No : 89650 World Bank

If there is any inconsistency between the telegram you received and the text of this confirmation please inform us as soon as possible.

ATTN. TO MR. SHIV S. KAPUR

THE "PROJECT PERFORMANCE INSPECTION REPORT" PREPARED BY YOUR BANK CONCERNING THE 568-TU NUMBERED KEBAN ENERGY TRANSMISSION LINES PROJECT AND 763-TU NUMBERED TEK ENERGY TRANSMISSION LINES PROJECT IS FOUND SATISFACTORY AND WE DO NOT HAVE ANY REMARKS. BEST REGARDS. TEK.

1981 AUG 12 AM 10:45  
1981  
RECORDS AND  
COMMUNICATIONS

MR. SKAPUR

DIRECTOR.

OPERATION S EVALUATION DEPARTMENT

INTSAFRD

WASHINGTON

REYOUR LETTER DATED JUNE 22, 1981. PROJECT PERFORMANCE AUDIT  
REPORT ONKEBAN TRANSMISSION PROJECT (LOAN 568- TU) AND TEK POWER  
TRANSMISSION PROJECT (LOAN 763. TU)

INOUR VIEW THE REPORT REASOABLY REFLECTS THE ISSUES AND PROBLEM  
OF THE SUBJECT PROJECTS AS WELL AS THE OVERALLPOWER SECTOR

REGARDS

AYDEMIRKOC

DIRECTOR GENERAL OF THE TREASURY

51116. 12.1981

⊙

WORLDBNK64145⊙

42285 NLYE TR

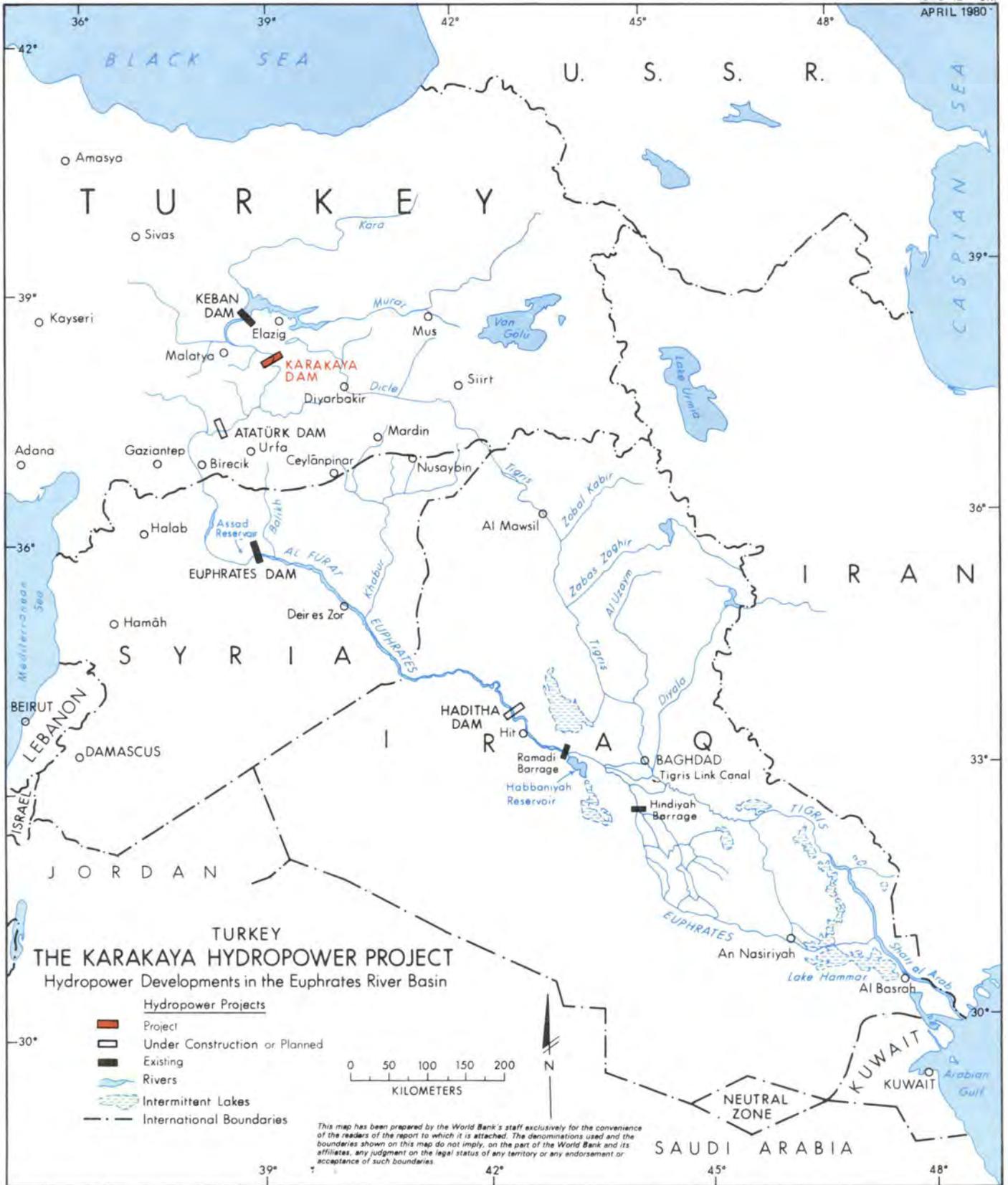
progressive expenditures on project works will be recorded. In fact, with effect from FY1982, Bank staff are required in all projects to confirm, at the time of appraisal, that an adequate accounting and internal control system exists for the recording and reporting of project-related financial transactions or will exist by the time that project expenditures commence.

#### International Aspects

34. The Bank did not contribute to the financing of the Keban hydroelectric station itself (PPAM para. 13); nevertheless, given the fact that the Keban hydroelectric project would create a large reservoir on the Euphrates River in Turkey, the President's Report for the Keban transmission project recognized that operation of the Keban dam and reservoir would affect downstream users of Euphrates waters in Iraq and Syria (see map). Discussions between the three riparian countries on the sharing of the Euphrates waters had taken place since 1962. At the request of the Keban Syndicate, the Bank in 1965 undertook a study of international water problems on the Euphrates River, the aim of which was to reach an independent and objective determination of acceptable river flows during reservoir filling, to identify long-term problems and to suggest means of solving them. The study recommended a regime of minimum monthly releases during filling and proposed the establishment of an international tripartite commission for the Euphrates River. Such a commission was not established; neither was any international agreement reached on the use of the Euphrates waters, despite the Syndicate's efforts. However, the President's Report pointed out that the Turkish government had undertaken to use its best endeavours to reach future agreement with Iraq and Syria on water sharing and agreed on a regime of controlled flow in the initial filling period of the dam, in light of the study, which was intended to meet the needs of downstream users. The President's Report concluded that any future agreement on the regulation of water releases was unlikely to affect the economics of the project, since the purpose of the dam was to conserve water and the Turkish power system was large enough to be able to absorb all the power generated by the release of downstream users' water requirements, irrespective of the time of release. The Bank continued to pursue the matter of an international agreement thereafter, in the context of the Karakaya and other projects, to bring about negotiations between the riparians to solve the issue, without success so far.

#### Supervision

35. Bank supervision of the two projects was satisfactory. From a technical point of view, neither project was particularly difficult, although some of the EHV construction for the Keban Transmission project was new to Turkey. Bank staff gave what assistance it could in dealing with the technical problems and in helping to overcome the delays caused by the financial problems of the Keban transmission line contractor (PCR para. 3.04). The institutional and financial problems related to TEK were much more intractable and considerable additional effort was devoted by Bank staff to tackling these problems through subsequent lending operations connected with the Elbistan and



This map has been prepared by the World Bank's staff exclusively for the convenience of the readers of the report to which it is attached. The denominations used and the boundaries shown on this map do not imply, on the part of the World Bank and its affiliates, any judgment on the legal status of any territory or any endorsement or acceptance of such boundaries.

FILE

Project File  
Mr. Balı

TEK

TÜRKİYE ELEKTRİK KURUMU

(Turkish Electrical Authority)

Capital : TL. 20.000.000.000

TELEKS

8/20

ADDRESS : Necatibey Caddesi No: 36 Yenisehir - Ankara/Turkey

CABLE : TEK - Ankara

TELEX : TEK TELEKS NO: (42245 TEKTR)

TELEGRAM  
Firm Address

IBRD  
1818 H. Street N.W.  
Washington D.C. 20433  
U.S.A.

36 20 5

Our reference to be stated in  
your reply

Ankara

604/P-914 1664

August 7, 1981

10-8-81

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Telex No : 89650 World Bank

If there is any inconsistency between the  
telegram you received and the text of this  
confirmation please inform us as soon as  
possible.

ATTN. TO MR. SHIV S. KAPUR

THE "PROJECT PERFORMANCE INSPECTION REPORT" PREPARED BY YOUR BANK CONCERNING  
THE 568-TU NUMBERED KEBAN ENERGY TRANSMISSION LINES PROJECT AND 763-TU NUMBERED  
TEK ENERGY TRANSMISSION LINES PROJECT IS FOUND SATISFACTORY AND WE DO NOT HAVE  
ANY REMARKS. BEST REGARDS. TEK.

DEADLINE FOR COMMENTS

Staff: 6/17  
Preliminary: 7/8  
Detailed: 8/17  
Country:

Ayhan ERKAN  
Asst. General Manager

Kamil TOKTAŞ  
General Manager

Bilgi için: İletim Hat.  
Pro. Dai. Bşk. lığı

AUG 20 1981

947

*File*

*Project File*

*Ma Perreira*

*J  
8/12*

1981 AUG 12 AM 10:45

RECORDS AND COMMUNICATIONS

*File*

MR. SKAPUR

DIRECTOR.

OPERATION S EVALUATION DEPARTMENT

INTBAFRD

WASHINGTON

REYOUR LETTER DATED JUNE 22,1981. PROJECT PERFORMANCE AUDIT REPORT ONKEBAN TRANSMISSON PROJECT(LOAN 568- TU) AND TEK POWER TRANSMISSON PROJECT (LOAN 763. TU)

INOUR VIEW THE REPORT REASOABLY REFLECTS THE ISSUES AND PROBLEM OF THE SUBJECT PROJECTS AS WELL AS THE OVERALLPOWER SECTOR

REGARDS

AYDEMIRKOC

DIRECTOR GENERAL OF THE TREASURY

51116. 12.1981

DEADLINES FOR COMMENTS

☐

Staff:  
Preliminary 6/17  
Detailed 7/8  
Country: 8/17

AUG 12 1981

916



June 22, 1981

Mr. Kanul Toktas,  
General Manager  
Turkiye Elektrik Kurumu  
Genel Mudurlugu  
Necatibey Caddesi 36  
Sihhiye-Ankara  
Turkey

Dear Mr. Toktas:

Re: Project Performance Audit Report on Turkey: Keban Transmission Project (Loan 568-TU) and TEK Power Transmission Project (Loan 763-TU)

The Operations Evaluation Department is an independently constituted unit within the World Bank Group. The functions of the Department include a review, shortly after completion of loan/credit disbursements, of the experience and results of all projects assisted by the Bank and the International Development Association. These performance audits are intended to evaluate the extent of achievement of project objectives, reasons for shortfalls or outstanding achievements, and the general effectiveness of the World Bank support for the lending operation. The audit focuses particularly on what the organization can learn from past experience.

I attach a copy of the first draft of the project performance audit report on Turkey: Keban Transmission Project (Loan 568-TU) and TEK Power Transmission Project Loan (763-TU). I would appreciate receiving any comments that you may have on the draft by August 17, 1981, so that we can take them into consideration in formulating our final conclusions before distributing the report to the Bank's Executive Directors.

We consider your views and comments as of crucial importance to reaching balanced conclusions concerning this project experience. In addition to reflecting them in the conclusions of the performance audit, we also propose to fully reproduce your views and comments in the final report. Should you find the present draft of this project performance audit report satisfactory and have no comments to make, I shall be grateful if you can inform me accordingly, preferably by cable. A copy of this final report, as distributed to the Executive Directors, will be sent to you for your information.

As you may know, Mr. Bates of this Department visited Turkey in November-December 1978 to discuss the Elbistan Lignite Mine and Power project (Loan 1023-TU) as part of a wider study by OED on the supervision of projects assisted by the Bank. On that occasion, he took the opportunity of discussing briefly with Mr. Cetin and others the experience under Loan 568-TU and Loan 763-TU and the results of those discussions have been taken into account in preparing the attached draft of the report. Again, I should like to thank TEK for the cooperation that Mr. Bates received on that occasion.

You will see from the attached copy of the draft project performance audit report that TEK's final reports on Loan 568-TU and Loan 763-TU, which were sent to the Bank in the form of letters dated January 28, 1977, have been included as an integral part of the report, because we believe that they include valuable information and views on the execution of the two projects. However, in its original form, one of the letters - covering Loan 568-TU - contained a few sentences critical of named contractors and a named consultant. These sentences could raise difficult legal implications if included in the final version of the report in view of the fact, as I have mentioned above, that it will be distributed to the Bank's Executive Directors and in this way has a potential circulation among all the Bank's member countries. Rather than omit the letter from the report, in the interests of TEK and of the Bank we have deleted those few sentences and the names of contractors/consultants from that particular letter. The letter covering Loan 763-TU raised no similar implications and is therefore included unchanged in the report. The full versions of both letters are, of course, on file and have been taken into account in preparing the project performance audit report. A copy of the original letter concerning Loan 568-TU is, however, also being given to the section in the Bank dealing with the consultants and their performance.

I am also sending a copy of the present report to the Minister of Energy and Natural Resources, the Minister of Finance, the Director General of the Treasury, and the Under-Secretary of Planning for their comments.

Yours sincerely,



Shiv S. Kapur  
Director

Operations Evaluation Department

Attachment

A copy of the Turkey  
PPAR was sent to the Legal  
Department (Mr Southall) for  
comments on June 26, 1981  
(preceded by a telephone  
conversation with Mr Southall  
describing the problem).

Mr Zia Kalim calls Alex  
to repeat Bart's concern  
& suggest that might have to  
be settled at Director level.

ROUTING SLIP		DATE: July 2, 1978
NAME		ROOM NO.
Mr Kaplan		
Mr Bates		
I agree.		
		7/2
APPROPRIATE DISPOSITION		NOTE AND RETURN
APPROVAL		NOTE AND SEND ON
CLEARANCE		PER OUR CONVERSATION
COMMENT		PER YOUR REQUEST
FOR ACTION		PREPARE REPLY
INFORMATION		RECOMMENDATION
INITIAL	✓	SIGNATURE
NOTE AND FILE		URGENT
REMARKS:		
<p>Attached are the Memo. we received from Mr Bark on the Turkey power audit and my proposed reply. While it was clear from our discussion that we both agree that deletion of the relevant paras. is not acceptable, I see no need to state that at present in the Memo.</p>		
FROM: R. Bates	ROOM NO.:	EXTENSION:

## OFFICE MEMORANDUM

Project file  
Mr. Bates

TO: Mr. Shiv Kapur, Director, OED

FROM: Maurice P. Bart, Director, EM2 *MB*

SUBJECT: PPAR - Keban Transmission Project (Loan 568-TU)

DATE: June 23, 1981

Please review and  
discuss - I don't quite  
see how we can drop  
the mention of this

1. I have sighted paras 32-33 of the above PPAR and been informed *important - issue -* of the changes your Department proposes to introduce in light of Mr. Fish's memo of June 10, regarding international aspects.
2. These two paras seem to be a broad brush and somewhat misleading summary of a very complex and sensitive issue.
3. For instance both the PR (para 22) and the AR (para 5.11) for the Keban Transmission Project specified that the Turkish Government "agreed on a regime of controlled flow in the initial filling period of the dam, which is intended to meet the needs of downstream users". In addition to the confidential letter referred to by Mr. Fish, this undertaking is repeated in the recital to Turkey's Loan Agreement with USAID for the Keban dam (with a reference to the program of releases transmitted in the above letter). The recital to the EIB Loan Agreement mentions equitable releases during filling. The question of releases is also mentioned in Annexes or Side Letters to Turkey's agreements with Germany and Italy on the Keban dam.
4. In view of the importance of this issue following the disastrous situation created for Iraq in 1974, I doubt the wisdom of including in the PPAR a truncated summary which will not stand scrutiny by any informed party. We should either make a full--and difficult-- analysis of international aspects of the Keban dam, or say nothing at all.
5. The same applies to the Bank's efforts on the riparian issue since 1972 (para 33). The efforts which were started then (c.f. Mr. Benjenk's memo of 1/20/72 to Mr. Knapp) tried to address the whole issue in the Euphrates and Tigris Basins. They were only incidentally related to such projects as Karakaya or Balikh in Syria, and much more to broader aspects, including the simultaneous filling of Keban and Tabqa, which was anticipated. To say that the Bank is continuing these efforts through Karakaya is misleading. Discussions with the three riparian countries, or between themselves, have been at a standstill for years, despite the valuable simulation model prepared by the Bank. Again, I would rather drop this paragraph rather than give an unnecessary summary liable to misinterpretation.

6/23

cc: Messrs. Pranich, Davar, Fish, Reekie  
/bp

## DEADLINES FOR COMMENTS

Staff: 6/17  
Preliminary 7/8  
Detailed 8/17  
Country: 8/17

JUN 23 1981

765

FILE

June 19, 1981

Mr. Kapur

Today or Monday we plan to send the draft PPAR on Turkey power to the country for comments (a copy is attached). You may recall that the final report of the Borrower (in the form of a letter to the Bank) is included in the PCR as an annex. This final report contained a few sentences critical of named contractors and consultants but rather than omit it completely from the PCR (it has some useful views and comments on the project) we agreed that I would edit it as necessary and write a letter to the Borrower explaining what we have done. I am therefore attaching a draft of such a letter for your consideration; it is the standard letter we use with two additional paras. The Ministries of Energy, Finance and Planning would receive the standard letter without the extra paras. I am also attaching a copy of the original version of the Borrower's final report with my editorial changes clearly marked so that you can see the extent of the editing.

If you agree with what I have done, I shall have the letter to the Borrower put into final and send it to you along with the standard letters to the Ministries for your signature.

  
R.W. Bates

→  
Please see a sentence that I have added to the draft letter. It seems OK otherwise, but should also be cleared with the Legal Department before we go into final draft.

  
6/19

Clearance given by Mr. Southall  
by telephone 6/29

(Appears as  
pp. 10-14 of PCR)

January 28, 1977

International Bank for Reconstruction  
and Development  
1818 H Street, N.W.  
Washington D.C. 20433  
U.S.A.

Our Ref: 610/DBK.I-901/  
Subject: Loan No. 568-TU  
FINAL REPORT

- Ref: a) Your letter dated 25th September, 1974
- b) Your letter dated 12th February, 1975

Our comments relating to the subjects referred in (a) and (b) above, have been submitted herewith.

As it is known, the Final Report dated 2nd December 1975 ~~which is herewith attached~~ prepared on the works in the scope of the credit, which were accomplished by our Consultant Firm ~~Commonwealth Inc. (CAI)~~, has been submitted to your Bank. At this Report, the activities carried through this work - from the initial stage to the end - and the critics on the work have been adequately explained by our Consultant. The Report had provided all the necessary information for your Bank, with the exception of the supply of the Gökçekaya-Ankara line, while the situation of this line on the time this Report was written, had been also explained. In any case, we deem it necessary to give explanations on the matters below.

As it is known, Keban-Ankara-Istanbul power transmission line and Ankara-Gökçekaya-Istanbul power transmission line and the substations connected to these lines have been the first 380-kV installations erected in our country. For this reason, some delays and faults have been experienced in the erection of the aforementioned substations and transmission lines. However, the major reasons of these delays are due to the various crises and circumstances faced in the world as well as in Turkey. In spite of this, due to the major delays occurred in the Gökçekaya and Keban power stations the termination dates have been extended for about 1,5-2 years ~~to SAE~~ and the substation investments have been slowed down in the initial stage, with the aim to avoid unnecessary investments. In addition, due to the rapid increase in the prices in the world and Turkey markets no installation work other than Ankara-Gökçekaya line have caused delays in the utilization of the energy produced by the Keban and Gökçekaya power stations.

Upon the abolishment of the contracts (~~references H.50 and H.40~~) drawn with ~~SAE and MITAŞ Companies~~, the installation of the Umraniye and Gölbaşı substations and the Kayseri capacitor stations as well as the erection of the Keban-Ankara line and the Gökçekaya-Ankara line through our Force Account and

a foreign and a local contractor

our own means, though limited, a team has been created which is qualified in separate project an erection work. By this team which was trained in these works, the 380-kV Seyitömer and Izmir substations, as well as the 380-kV Gökçekaya-Seyitömer and Izmir substations, as well as the 380-kV Gökçekaya-Seyitömer-Izmir and Seyitömer-Seydisehir transmission lines have been installed by the initiative of our Organization.

The costs of the mentioned installations have been far beyond the estimated costs, due to the delays and the crisis faced in the world and Turkey markets, as well as the big price increases. The lack of experience of our Organization from the administrative and personnel point of view, which is a newly-created entity, is also attributable to these results. Moreover, the laws, formalities, organization problems, impossibilities in recruiting and retaining technical staff and many other barriers, have effected this.

The major reasons for not being able to realize the aforesaid installations in the desired level and time, in parallel to your requests in the above-said letters, could be summarized as follows. We would highly appreciate if you would accept our regrets and show consideration to us for not being able to prepare a report of such a large scale requested by you, due to the resignation of our trained and qualified staff during this period.

a) Due to the rapid charges in the prices, rate of exchange, circumstances in the world and Turkey and the skyrocketing price increase in the materials such as oil, steel, etc., the main problem has been the disputes occurred with the contractors due to their delays which resulted with the cancellation of ~~the~~ <sup>certain</sup> MITAS and SAE contracts, thus putting us in a position of completing the works by our Force Account, for which we were not equipped beforehand.

Great delays have taken place in the completion of the Protection projects ~~of the Brown-Boveri (BBC) company~~. Delays of up to 2 years have been observed in the projects which were to be completed within 4 months following the date of bidding and due to this reason, the procurement of the protection material has been prolonged. However, through the big efforts of the TEK erection team, the control panel production, erection, cabling setting and testing works have been finalized and the substations have been brought to a position ready for operation, before the power station was ready for operation. In order to minimize the prices and these effects, TEK, despite the shortage of its experience, has shown a great effort to eliminate the troubles and inefficiency of SAE, MITAS, BBC and <sup>or other</sup> consultant firm ~~CAI~~, and have finalized the works.

Various contractors

in his own country

a foreign consultant firm

b) The performance of ~~CAI~~, with the exception of the delays in the services carried on ~~the U.S.A.~~ could be deemed as successful. However, we believe that the consultants have not been able to give us the necessary assistance, due to the fact that, the Company has not sent qualified staff to Turkey during the erection phase, as well as the works in Turkey.

The plans, projects, profiles, charts, technical information and operation manuals which were to be supplied to us, under the contract drawn with ~~CAI~~ have not been submitted and the firm has left the country. Moreover, they have not shown any interest when they were asked to give the reasons of deteriorations and have requested extra fee to examine the faults. On the other side, organizations like Electricite de France (EDF) and ASEA (Sweden) have made examinations

in order to solve the problems and extended their assistance, without any fee. The Chas. T. Main and Stone-Webster companies which have previously carried on consultancy services for TEK, have submitted the complete reports and documents-- which we are presently using--, at the end of the works.

Unfortunately, the performance of the contractors in this work have been very low and none of them have met their obligations under the contracts. This has been a very serious problem for TEK.

The design of the poles used in the lines have been made according to very light assumptions and the meteorological conditions of the country could not be estimated. For these reasons, by observing that 12 poles have fell down in the initial stage in Izmit during summer and the poles between Keban-Kayseri have fell down in the operation stage, it has been concluded that, the distribution of the poles have not been carried on in a proper manner. The falling down of the poles--in the erection stage--in the Keban line took place due to our fault in taking some measures.

c) No difficulties have occurred in the disbursements and procurements except the formalities and the credit has enabled us to have responsive bids and facilitated the payment procedure. Moreover, we have not faced any difficulties in transfer and financment.

However, we would like to emphasize that, the requests made for reports on subjects with great coverage and beyond the scope of TEK, which we believe, do not have direct relation with the credit highly occuppies our staff, who are in limited number and are already loaded with heavy work. This request causes further delays in our other activities. It would be much more easier for us to work, if information of less detailed nature could be requested.

d) The comments on the Bank transactions which cause to problems are herewith attached (Annex 1).

e) Owing to the Keban-Gokcekaya Project and the credits, our technical and administrative staff have been trained, both in Turkey and abroad, and have reached a level capable to construct the 380-kV lines and substations, without the assistance of consultancy. Therefore, from now on, the projects could be accomplished by TEK's technical staff, which is a very great improvement.

However, in order to attract and retain qualified and experienced technical staff our organization needs to be equipped with the necessary means.

f) Any kind of deviation has not been observed in the main financment plan, except the price increase.

g) The energy capacity of Turkey has shown an increase about 40%, through the Keban-Gokcekaya Projects, which forms the main framework of our interconnected system. This Project has made a great contribution to the development, industrialization and the flourishment of the social standard, as well as the extension of energy to our rural areas.

h) It is primarily essential that, in order to derive maximum benefit from the Project, the investments for the other transmission, distribution plants-- which would be used for the sale, transmission and distribution of the energy

obtained from the Keban and Gokcekaya system--should be increased and with prior consideration to training facilities, all the measures should be taken in order to retain adequate number of technical staff--for the construction of projects, installations, thus being able to reach to the level of industrialized nations.

With the exception of a few qualified specialists who would assist us in solving the problems--which are few--arise during the research, planning, project, design and erection works, we do not necessarily need specialists to such a great extent.

By our explanations we do hope that we have replied to your questions asked through your above referred letter and verbally. In case you should find some points in our report unsatisfactory please note that we shall be at your disposal to clarify such points.

We hope you will tolerate us for some missing points in report, if any.

Very truly yours

TURKISH ELECTRICITY AUTHORITY  
GENERAL MANAGEMENT

Encls. - ~~Final Report~~  
- ~~Annex 1~~  
- CAI Completion Report.

ANNEX 1

COMMENTS APPLICABLE TO LOAN NO. 568-TU

1. Sometimes the Bank effect payment to the suppliers very late which causes suppliers to write letters or send telex messages asking why the payment has not been effected although the shipment has been effected.

To avoid this the Bank can send a notification to the related supplier stating that they have received the payment application and the payment will be effected in the earliest convenience.

2. The Bank should send a statement quarterly or half yearly showing the actual disbursements and the balance of the loan which will be useful to keep tract of the loan simultaneously with the Bank so the over usage of the loan will be prevented.

Our withdrawal applications consist of three pages and on every page the same informations are repeated. To avoid these repetitions the information can be given on one page.

June 22, 1981

Mr. Yildirim Akturk  
Under Secretary  
Devlet Planlama Teskilati (SPO)  
Ankara  
Turkey

Dear Mr. Akturk:

Re: Project Performance Audit Report on Turkey: Keban Transmission Project (Loan 568-TU) and TEK Power Transmission Project (Loan 763-TU)

The Operations Evaluation Department is an independently constituted unit within the World Bank Group. The functions of the Department include a review, shortly after completion of loan/credit disbursements, of the experience and results of all projects assisted by the Bank and the International Development Association. These performance audits are intended to evaluate the extent of achievement of project objectives, reasons for shortfalls or outstanding achievements, and the general effectiveness of the World Bank support for the lending operation. The audit focuses particularly on what the organization can learn from past experience.

I attach a copy of the first draft of the project performance audit report on Turkey: Keban Transmission Project (Loan 568-TU) and TEK Power Transmission Project Loan (763-TU). I would appreciate receiving any comments that you may have on the draft by August 17, 1981, so that we can take them into consideration in formulating our final conclusions before distributing the report to the Bank's Executive Directors.

We consider your views and comments as of crucial importance to reaching balanced conclusions concerning this project experience. In addition to reflecting them in the conclusions of the performance audit, we also propose to fully reproduce your views and comments in the final report. Should you find the present draft of this project performance audit report satisfactory and have no comments to make, I shall be grateful if you can inform me accordingly, preferably by cable. A copy of this final report, as distributed to the Executive Directors, will be sent to you for your information.

- 2 -

I am also sending a copy of the present report to the Minister of Energy and Natural Resources, the Minister of Finance, the Director General of Treasury and the General Manager of TEK for their comments.

Yours sincerely,

A handwritten signature in black ink, appearing to read 'Shiv S. Kapur', with a long horizontal line extending to the right.

Shiv S. Kapur

Director

Operations Evaluation Department

Attachment

FILE

D R A F T

Mr. Kanul Toktas,  
General Manager  
Turkiye Elektrik Kurumu  
Genel Mudurlugu  
Necatibey Caddesi 36  
Sihhiye-Ankara  
Turkey

Dear Mr. Toktas:

Re: Project Performance Audit Report on Turkey: Keban Transmission Project (Loan 568-TU) and TEK Power Transmission Project (Loan 763-TU)

The Operations Evaluation Department is an independently constituted unit within the World Bank Group. The functions of the Department include a review, shortly after completion of loan/credit disbursements, of the experience and results of all projects assisted by the Bank and the International Development Association. These performance audits are intended to evaluate the extent of achievement of project objectives, reasons for shortfalls or outstanding achievements, and the general effectiveness of the World Bank support for the lending operation. The audit focuses particularly on what the organization can learn from past experience.

I attach a copy of the first draft of the project performance audit report on Turkey: Keban Transmission Project (Loan 568-TU) and TEK Power Transmission Project Loan (763-TU). I would appreciate receiving any comments that you may have on the draft by Aug.17, 1981, so that we can take them into consideration in formulating our final conclusions before distributing the report to the Bank's Executive Directors.

We consider your views and comments as of crucial importance to reaching balanced conclusions concerning this project experience. In addition to reflecting them in the conclusions of the performance audit, we also propose to fully reproduce your views and comments in the final report. Should you find the present draft of this project performance audit report satisfactory and have no comments to make, I shall be grateful if you can inform me accordingly, preferably by cable. A copy of this final report, as distributed to the Executive Directors, will be sent to you for your information.

As you may know, Mr. Bates of this Department visited Turkey in November-December 1978 to discuss the Elbistan Lignite Mine and Power project (Loan 1023-TU) as part of a wider study by OED on the supervision of projects assisted by the Bank. On that occasion, he took the opportunity of discussing briefly with Mr. Cetin and others the experience under Loan 568-TU and Loan 763-TU and the results of those discussion have been taken into account in preparing the attached draft of the report. Again, I should like to thank TEK for the cooperation that Mr. Bates received on that occasion.

You will see from the attached copy of the draft project performance audit report that TEK's final reports on Loan 568-TU and Loan 763-TU, which were sent to the Bank in the form of letters dated January 28, 1977, have been included as an integral part of the report, because we believe that they include valuable information and views on the execution of the two projects. However, in its original form, one of the letters - covering Loan 568-TU - contained a few sentences critical of named contractors and a named consultant. These sentences could raise difficult legal implications if included in the final version of the report in view of the fact, as I have mentioned above, that it will be distributed to the Bank's Executive Directors and in this way has a potential circulation among all the Bank's member countries. Rather than omit the letter from the report, in the interests of TEK <sup>and of the Bank</sup> we have deleted those few sentences and the names of contractors/consultants from that particular letter. The letter covering Loan 763-TU raised no similar implications and is therefore included unchanged in the report. The full versions of both letters are, of course, on file and have been taken into account in preparing the project performance audit report. *A copy of the original letter concerning Loan 568-TU is, however, also being given to the Section in the Bank dealing with consultants and their performance.* I am also sending a copy of the present report to the Minister of Energy and Natural Resources, the Minister of Finance and the Minister of Planning for their comments.

Yours sincerely,

Shiv S. Kapur  
Director  
Operations Evaluation Department

Attachment

*Project File  
Mr. Bates  
6/11*

# OFFICE MEMORANDUM

TO: Mr. Shiv S. Kapur, Director, OED  
Through: Mr. Warren C. Baum, CPSVP  
FROM: James J. Fish, Power Adviser, EGY

DATE: June 10, 1981

SUBJECT: Project Performance Audit Report;  
Turkey: Keban Transmission Project (Loan 568-TU) and  
TEK Power Transmission Project (Loan 763-TU)

Your memo of June 3, 1981

A possible issue may require modification of the PPAR prior to sending to Turkey.

In para. 32, International Aspects, it is noted that the government agreed on a regime for filling the reservoir which would meet the needs of the downstream riparians. While this is consistent with the statement in the appraisal report, in fact the "agreement" was contained in a confidential letter from the Minister of Finance to the U.S. Ambassador, the contents of which were not revealed to Syria and Iraq. Further, when it came time to monitor this undertaking the government repudiated the agreement stating that the Minister's letter did not constitute a formal agreement of government. In the event, simultaneous filling of the Keban and Assad (Syrian) reservoirs proved nearly disastrous for Iraq. Accordingly, deletion of the reference to agreement on the filling regime should be considered.

*Debate; since the government directly repudiated the letter. However, in view of the Bank requirement for such agreement on downstream riparian rights, we should consider saying that an agreement was required under the Bank's rules before the Bank proceeded with its financing of the project. However, no such agreement would appear to exist.*

A second issue which may arise concerns the rationale for the absence of direct financial participation in the Keban project despite our chairmanship of the syndicate. The reason was because the Bank's initial study of the project raised doubts as to the adequacy of preparation and economic justification. However, given the significance of the project to the Turkish economy, the Bank agreed to continue chairing the syndicate even though we did not participate directly in the project financing. I do not consider it necessary to modify the PPAR in this respect. ✓

cc: Messrs. Piccioto, Reekie (EMP), Bart, Davar (EM2), Rajagopalan (PAS), Bates (OED), Sheehan, Moore (EGY)

JJFish:ra

*Keban hydro. project itself not financed by Bank. Was under construction and Bank accepted USAID's position on riparian issue (Minister's letter had been given to AID). Bank felt not time to have separate assistance*

### DEADLINES FOR COMMENTS

Staff: Preliminary 6/17  
Detailed 7/8

Country: \_\_\_\_\_

JUN 11 1981

685



5.02 The main reasons for TEK's failure to reach the agreed 8% return have been:

- (a) delayed commissioning of projects such as Keban resulting in lower availability of hydropower for meeting the demand;
- (b) less-than-expected load growth due in part to lack of adequate supply (See Attachment 5);
- (c) staffing problems;
- (d) rising employment costs, mostly of unionized labor, (wages and salaries in 1976 were about 230% of the 1970 appraisal estimate); and
- (e) Government's unwillingness to approve tariff increases especially because of the unsettled political conditions in the country.

5.03 TEK's low rates of return coupled with inflationary increases in construction expenditures resulted in self-financing levels that were much lower than those estimated at appraisal. During the period 1971-1977, the self-financing level ranged from 11% to 37% as against the estimated range of 40% to 156% (See Attachment 9 for details).

5.04 Another serious financial problem which has beset TEK for the past few years is the problem of liquidity caused mainly by slow collection of receivables from municipalities despite a 15% discount for payment within one month and a penalty of 1% per month for payments thereafter (until these conditions were changed in June 1976). Since 1971, receivables have been consistently around four months' revenue, which is a very high level. At the end of April 1977 receivables which were outstanding for more than three months amounted to LT 3.5 billion, which itself is over five months' revenues. A significant portion of these outstandings was 2-3 years old. Government's solution to this problem has been consolidation and payment of intra-public sector debts. This has proved to be ineffective. After the consolidation of such debts in May 1975 under a law passed by Parliament, Government has again assumed responsibility for payment of TEK's bills for supply of electricity to municipalities after offsetting amounts due by TEK to various governmental agencies such as TKI, the Turkish Coal Enterprises, TPAO, the Turkish Petroleum Authority and tax authorities.

## 6. Justification of the Projects and Bank's Role

6.01 Over the period that has elapsed since the appraisal for Loan 568-TU, its completion and that of the works under Loan 763-TU, various factors have affected TEK. These are principally a) an unwillingness to price electrical energy at levels adequate to meet development needs, b) the salaries of non-unionized staff progressively fell 50% to 65% below the level of the private sector employing similar skills, c) the Government's policy of fuel price subsidy has kept coal and lignite prices below their economic worth, d) Government policy has led to excessive levels of staffing in the lower grades of TEK in many disciplines which serves to reduce productivity and inflate costs.

6.02 No rate of return was calculated for the Keban Transmission Line Project since the lines were inseparable from the Keban Project itself. However, an internal financial rate of return calculation was made for the 1971-74 time-slice of the generation/transmission investment program as part of the 763-TU appraisal. The forecast rate of return was 13%. This was derived by using forecast revenues as a measure of benefits and therefore is not a true economic return, but can be used to assess the adequacy of long-run tariff policy. A similar calculation using actual investment, operating cost and revenue data for the period 1971-76 (since the forecast sales target was reached only in 1976) yields a return of only 3% (Attachment 10). This result is not surprising in view of the two-year delay in completing the project and reaching the original sales forecast, and Government policy in holding down electricity prices. Average revenue per KWh in 1976 was 7% below forecast levels (in 1971 terms) despite a near-doubling of average fuel and operating cost (also in 1971 terms) compared with the appraisal estimate. The result was further depressed since, because of the delay in hydro project construction (principally Keban), TEK was forced to resort to expensive generation from oil-fueled gas turbines which were rushed into service in an attempt to meet the shortages.

6.03 The fact remains that both projects financed through these loans were essential for the power sector's development, and that from a purely technical standpoint the Projects have clearly fulfilled their purpose. However a major objective of the Projects lay in the institution-building field and here the extent to which the goals were achieved is less clear-cut. At the non-political levels in Turkey, both in government ministries and productive enterprises, there is a positive acceptance of those institution-building objectives which were the main justification for the lending operations. These were: the establishment of an autonomous, national power authority, the introduction of financial management techniques and policies designed to support the autonomous nature of the SEE, strengthening the sector development planning methods in terms of the nationally most economic program, and the enhanced cooperation of the authorities concerned, especially those of TEK and the Water Development Authority (DSI). Considering the improvements brought about through the medium of Loans 568-TU and 763-TU, and the deficiencies still existing, the two loans should be considered as having partially succeeded in their objectives and therefore as moderately successful.

6.04 Despite the relatively unsatisfactory institutional and financial performance, credit must be given to TEK for coping with growth in generation and sales of nearly three times in the decade 1968-1978, to a 4,000-MW system--large by any standards--and an investment program which saw asset values increase nearly ten times due to the rapid growth in a period of escalating international prices. As already stated, the TEK Power Transmission Project was a time-slice development and the cost of the Project was based on an estimate of the likely works to be constructed in the period. Changes in this plan would have been normal had the work been carried out during the plan period. As a result of the two-year delay, compounded by the financial, operational and inflationary problems experienced, numerous changes in minor and major detail inevitably had to be made. Since the works originally planned were closely tied to other works and handled in the books of accounts as indistinguishable parts of the whole, it is

THE WORLD BANK

PROJECT PERFORMANCE AUDIT REPORT

TURKEY: KEBAN TRANSMISSION PROJECT (LOAN 568-TU) AND  
TEK POWER TRANSMISSION PROJECT (LOAN 763-TU)

November 5, 1981

Operations Evaluation Department

## OFFICE MEMORANDUM

TO: Those Listed Below

DATE: December 30, 1980

FROM: Ipe Mathai, Acting Division Chief, EMPPE

72268

SUBJECT: TURKEY - Loan 568-TU - Keban Transmission Project  
 - Loan 763-TU - TEK Power Transmission Project  
COMBINED COMPLETION REPORT

Please find enclosed a copy of the combined Project Completion Report for the above Projects. The Report takes account of the comments offered by OED in December 1979 on an earlier version.

## Attachments

Distribution: Messrs. Picciotto (o/r), Haynes, Carmignani, Bart, Ms. Ruggeri, Rajagopalan (PAS-2), Rovani (4), Davar, Rajagopalan, Perera, Drake, Kapur (4), Green, Mathai, K. Jones, Ms. El Saifi

EMENA Files  
 Division Black Book  
 Division & Chron. Files

IMathai:ms

3.03

6.02

Attachment 10.

} Changes agreed with Mr. Mathai

Recvd. 12/31/80

BASIC DATA SHEET

Country : Turkey  
 Loan Number : 568-TU  
 Name of Project : Keban Transmission Lines

KEY PRODUCT DATA

<u>Item</u>	<u>Original Plan</u>	<u>Actual</u>
Total Project Cost (US\$ million)	35.9	73.0
Underrun or Overrun (%)		+103%
Loan Amount (US\$ million)	25.0	25.0
Disbursed	25.0	25.0
Cancelled		
Repaid to May 1977		3.2
Outstanding to May 1977		21.8
Date Physical Components Completed	June 1972	October 1976
Proportion Completed by Above Date (%)	100	100
Proportion of Time Underrun or Overrun (%)		+300% check
(Incremental) Internal Rate of Return (%)		N/A
Financial Performance	3% ROR in 1970-72	Achieved in 1971 but not thereafter

OTHER PROJECT DATA

<u>Item</u>	<u>Original Plan</u>	<u>Revisions</u>	<u>Actual</u>
First Mention in Files or Timetable	-	-	11.29.61
Government's Application	-	-	Not identified
Negotiations			10.9.68
Board Approval			10.29.68
Loan Agreement			10.31.68
Effectiveness	1.6.69		1.6.69
Closing Date	9.30.72	Four Times	9.20.74
Borrower		Republic of Turkey	
Executing Agency		TEK as successor to ETIBANK	
Fiscal Year of Borrower		Calendar year	
Follow-on Project Name		TEK Transmission I	
Loan Number		763-TU	
Amount		US\$24.0 million	
Loan Agreement		June 22, 1971	

MISSION DATA

	<u>Month, Year</u>	<u>No. of Weeks</u>	<u>No. of Persons</u>	<u>Manweeks</u>	<u>Date of Report</u>
Identification					N/A
Preparation					N/A
Preappraisal					
Appraisal	Jan. 1968	4	2	8	10.14.68
<b>Total</b>		<b>4</b>	<b>2</b>	<b>8</b>	
Supervision I	Aug. 1969	2	1	2	9.9.69
Supervision II	Oct. 1969	2	1	2	10.21.69
Supervision III	Oct. 1970	4	3	12	12.29.70
Supervision IV	Sep. 1971	1	2	2	10.22.71
Supervision V	Feb. 1972	1	1	1	2.16.72
Supervision VI	Oct. 1972	1	1	1	10.31.72
Supervision VII	Sep. 1973	0	1	0	None
Supervision VIII	Nov. 1974	0	2	0	None
Supervision IX	Mar. 1976	1	3	3	4.7.76
Supervision X	Oct. 1976	1	2	2	11.24.76
Completion	Jan. 1977	1	1	1	N/A
<b>Total</b>		<b>14</b>	<b>18</b>	<b>26</b>	

COUNTRY EXCHANGE RATES

<u>Name of Currency (Abbreviation)</u>	<u>Lira (LT)</u>
Appraisal Year Average - 1968	US\$1 = LT 9.08
Intervening Years Average - 1969	US\$1 = LT 9.04
- 1970	US\$1 = LT 11.25
- 1971	US\$1 = LT 14.86
- 1972	US\$1 = LT 14.15
- 1973	US\$1 = LT 14.15
- 1974	US\$1 = LT 13.93
- 1975	US\$1 = LT 14.44
Completion Year Average - 1976	US\$1 = LT 16.05

BASIC DATA SHEET

Country : Turkey  
 Loan Number : 763-TU  
 Name of Project : TEK Power Transmission I

KEY PROJECT DATA

	Original Plan	Actual or Current Estimate
Total Project Cost (US\$ million)	65.1 <sup>1/</sup>	Probably double original*
Underrun or Overrun (%)		Probably 100%
Loan Amount (US\$ million)		24.0
Disbursed	-	24.0
Cancelled	-	Nil
Repaid to May 1977	-	1.1
Outstanding to May 1977	-	22.9
Date Physical Components Completed	9/74	9/76
Proportion Completed by Above Date (%)	100	100
Proportion of Time Underrun or Overrun (%)		61
(Incremental) Internal Rate of Return (%)	13.4%	2/
Financial Performance	8% ROR in 1971	Achieved in 1972 but not thereafter
Institutional Performance		

OTHER PROJECT DATA

	Original Plan	Revision	Actual
Appraisal			Sept/Oct 1970
Negotiations			5.5.71
Board Approval			6.15.71
Loan Agreement			6.22.71
Effectiveness	9.15.71	9.15.71	10.4.71
Closing Date	1.31.75	12.31.75	6.30.76
Borrower		Turkiye Elektrik Kurumu (TEK)	Turkiye Elektrik Kurumu (TEK)
Executing Agency			
Fiscal Year of Borrower			
Follow-on Project Name	Calendar Year		
Loan Number		TEK II	
Amount		1194-TU	
Loan Agreement		US\$56.0 million	

MISSION DATA

	Month, Year	No. of Weeks	No. of Persons	Manweeks	Date of Report
Identification					N/A
Preparation					N/A
Preappraisal					N/A
Appraisal		4		8	5.28.71
Total		4		8	
Supervision I	Aug. 1971	2	2	4	10.22.71
Supervision II	Feb. 1972	2	1	2	4.11.72
Supervision III	Sept 1973	2	1	2	-
Supervision IV	Nov. 1974	0	2	0	-
Supervision V	Mar. 1976	1	3	3	4.7.76
Supervision VI	Oct. 1976	1	2	2	11.24.76
Completion	Jan. 1977	1	1	1	N/A
Total		9	12	14	

COUNTRY EXCHANGE RATES

Name of Currency (Abbreviation)	Lira (LT)
Appraisal Year Average - 1970	US\$1 = LT 15
Intervening Years Average - 1971	US\$1 = LT 14.86
- 1972	US\$1 = LT 14.15
- 1973	US\$1 = LT 14.15
- 1974	US\$1 = LT 13.93
- 1975	US\$1 = LT 14.44
Completion Year Average - 1976	US\$1 = LT 16.05

<sup>1/</sup> To this figure could be added \$2 million in respect of interest during construction and \$3.9 million of foreign cost which was financed from other foreign credits in respect of imports of steel from Japan and medium voltage transformers from Romania.

<sup>2/</sup> By the nature of the project an internal financial rate of return cannot be calculated but a rate of return based on the time slice 1971-1974 was accepted leading to the figure shown. Due to the substantial differences both in time of completion and assumed specific investment and operating costs and revenue levels in meaningful comparative figure is not possible to calculate and has not been attempted.

\* See para 6.04.

TURKEY

LOANS 568-TU AND 763-TU COMPLETION REPORT

KEBAN AND TEK POWER TRANSMISSION PROJECTS

1. Introduction

1.01 Attached are completion reports for these two projects, prepared by the Turkish Electricity Authority (TEK), dated January 28, 1978, designated Attachments 1 and 2 respectively, and a cost estimate for the Keban Transmission Project at Attachment 3. Since both projects formed part of TEK's investment program for the period, a combined Project Completion Report is appropriate. Although TEK's reports are dated January 1977, further information required for the analysis was obtained only a year later. The following information supplements that contained in these reports.

Project Description

1.02 The Keban Transmission Project (Loan 568-TU) consisted of approximately 1460 km of extra-high-voltage (380 kV) transmission lines linking Istanbul and Ankara with the 620-MW Keban Hydroelectric Project which was being constructed at the same time. The TEK Transmission Project consisted essentially of TEK's transmission construction program for 1971-1974, comprising about 4,000 km of 154 and 30-kV lines and 1,500 MVA of substations and other equipment. Although planned for completion in 1971 and 1974 respectively, the Projects were completed only in 1976 and 1977.

CHECK  
||  
b  
data  
sheet

c.f. Bank data sheet (1972)  
Mar. 30 (1976)

Project Objectives

1.03 Aside from the critical need for the physical facilities included in the Projects, a principal objective was to improve organization and financial responsibility in the government-controlled part of the sector. To this end, with the active assistance of the Bank and its special adviser, Lord Hinton of Bankside, the Turkiye Elektrik Kurumu (Turkish Electricity Authority - TEK) was established on October 25, 1970, under Law No. 1312 of July 1970 from the power group of ETIBANK, the original beneficiary under Loan 568-TU. This was the first step to integrate a very large number of independent power facilities into a coherent central electricity authority. The law drafted with the help of the Bank and Lord Hinton, incorporated agreements reached with the Government on the scope and functions of the national electricity authority and the areas within which the authority would have autonomy. The draft reflected the stated intention of Law 440 that State Economic Enterprises (SEE) (of which TEK is one) be run autonomously in accordance with commercial principles and as though they were

private stock companies. The TEK law, as passed, fell short of this principally in the degree of autonomy accorded to the new organization and especially in the lack of freedom to set salaries and terms of service of non-unionized staff. Another change which has materially affected TEK's central role in power planning and operations is that, contrary to the agreement reached with the Government, the planning, design and construction of hydroelectric projects continued to be the responsibility of DSI, the Turkish Water Development Authority. The appointment of TEK's general manager and his assistants is also the prerogative of the Government, rather than a function of TEK's board.

1.04 Whilst the establishment of TEK brought generation and transmission facilities under one authority, distribution to the ultimate customers continues to remain in the hands of municipalities. Exceptions to this general statement exist. They are two relatively minor concession areas, large industrial and other consumers outside municipal areas of jurisdiction, and some autoproducers.

1.05 Prior to Loan 568-TU the Bank had made one loan (1952) for the Seyhan Dam in the Cukurova concession area, one credit (1963) to cover the foreign exchange cost of a third generator in the Seyhan power station and a credit (1964) for the Mersin thermal power station also in the Cukurova concession area. In 1965 the Bank, which led the financing consortium (EIB, KfW, USAID, France and Italy) for the main Keban hydropower project, participated by contributing to the finance of the associated transmission lines, on condition that the Government took steps to improve the efficiency of the power industry. A start on the implementation of the needed reorganization which had been identified by ETIBANK's expatriate consultants was made possible by the application of a portion of a 1965 Bank technical assistance grant of up to US\$1.95 million to cover the foreign exchange costs.

## 2. Project Preparation and Appraisal

2.01 The Keban transmission lines financed under Loan 568-TU were designed and supervised during construction by expatriate consultants 'A' who were themselves financed by USAID through their association with the Gökcekaya line forming part of the system connecting Keban and the Gökcekaya hydro plant with Istanbul. The works financed under Loan 763-TU were designed by TEK's own staff assisted by expatriate consultant 'B' for network studies.

2.02 The Power Group of ETIBANK, the forerunner of TEK, was considered, at the time of appraisal of the Keban Transmission Line Project, to be competently managed and staffed. By 1970 TEK had recognized the need for reorganization and approached Electricité de France (EdF) for assistance, and by the time Loan 763-TU was being considered, the appraisal report noted that Government was considering revisions to the personnel law which might hamper classification and retention of professional staff. Employment conditions as since imposed by the personnel law, have led to the steady flight of competent staff to the private sector and this has been a major factor in the generally poor performance of the Borrower and the consequent delays in the two projects being evaluated here.

2.03 Contrary to the intentions of Law 440, as described above, the public power industry has been traditionally tightly controlled particularly as to the charge it could levy for energy; thus, bulk electricity is sold at a price insufficient to generate adequate resources for investment. Loans 568-TU and 763-TU sought to achieve the objective of internally generating a reasonable portion of the capital expansion requirements by obtaining acceptance of a minimum 8% rate of return based on realistically valued average net fixed assets in service (a provision repeated in principle in the TEK law though without a specific requirement for periodic revaluation). Government's unwillingness for political reasons to increase power rates in step with high inflation and development needs is reflected in the repeated failure to reach the agreed financial targets.

2.04 Periodic revaluation being necessary for the realistic adjustment of tariffs and for appropriate cash generation under inflationary conditions, the loan documents reflect the agreements reached on asset revaluation based on consultants' recommendations. Briefly, the loan agreement under Loan 763-TU required TEK to establish revaluation principles and methods satisfactory to the Bank based on the recommendations of consultants for computing the return from 1973 onwards.

### 3. Project Implementation

3.01 The Keban transmission lines originally were planned to be completed in 1970, soon after the commissioning of the first Keban unit. In practice, essential parts of the lines were completed more than two years late, but still in time for the first unit of Keban which was itself eventually commissioned in September 1974. Final completion was not until October 1976. Construction of the lines was initially contracted with expatriate firm 'C' which ran into financial difficulties due to prolongation of the construction period and devaluation of the Turkish lira. As a result of these difficulties, the contractor was forced to abandon the work and TEK completed the project by force account. Shortage of skilled staff and inexperience in management of such a large line construction project lay at the root of much of the subsequent delay. However, learning the hard way can be a good school provided the personnel stay with the organization to apply their experience, and indeed subsequently TEK has successfully managed a major expansion of the 380-kV system; nonetheless, TEK's completion report specifically complains of the inability to recruit and retain technical staff and cites recent resignation of trained personnel.

3.02 The TEK Transmission Project was a "time-slice" project comprising TEK's transmission program for the years 1971 through 1974. Due in part to the shortage of skilled staff mentioned above, many of the facilities included in the original project were not completed until 1977 although there were many minor changes in the scope of the project (principally line locations and substation sizes) over the project period to accommodate the needs of a dynamic and growing system. Attachment 4 gives TEK's forecast sales under Loan 763-TU and actuals for the period 1970-1977 (The forecasts for 1970-1972 were updates of the sales estimated under Loan 568-TU, taking into account the latest market conditions).

It will be seen that partly as a result of generation shortages (Keban delay), the sales target forecast in the appraisal report for 1974 was not reached until 1976. Attachment 5 gives the main reasons for the shortfall in TEK's sales during the period 1970-1977.

3.03 Although the Keban transmission lines have carried the energy generated at Keban to the load centers in the West, some disturbing problems have been encountered. Although there had been ample experience in the country with steel-tower transmission lines at lower voltages, the Keban lines introduced several innovations including bundled conductors, tension stringing, and refined designs incorporating high-strength steel. Such lines require a high standard of field erection and installation practices and TEK experienced some initial difficulties in coping with these. In addition, the standard Turkish loading criteria proved inadequate for the unprecedented ice loading experienced on the Istanbul-Ankara portion of the line, and subsequent design changes were required. Also, ever since the generators were commissioned there has been a debate as to whether some unexplained oscillations in the power system originate from the alternators and their control, or are a function of the transmission line characteristics. No positive identification of the cause has been made although an improvement seems to have been experienced with the bringing into service of the Gökcekaya/Ankara section of the line in 1976 and TEK, ~~continues to work with their~~ consultants and the manufacturers, ~~to resolve~~ the problem. *has resolved*

*Working*

3.04 The Bank and its associates, particularly the staff of USAID, endeavored to assist project implementation by repeated representations to the government authorities to clear bureaucratic delays occasioned by such things as import licence problems, the supply of steel for transmission line towers and the like. The Bank also participated in discussions between TEK and the Keban transmission line contractor in an attempt to resolve the issue involving the transfer of Turkish lira to the country of the contractor, including direct approaches to the Government of that country to find ways to resolve the dispute. The Bank agreed to the completion of the Keban line by TEK force account only when all hope of success had faded, at which point it assisted in the setting up of construction schedules, equipment requirements, etc.

*SUPERVISION*

Disbursements

3.05 Attachment 6 gives a comparison of the actual disbursements with the original forecasts for each of the two loans. It will be seen that for both loans, only 70% had been disbursed by the original Project completion dates (1971 for Loan 568-TU and 1974 for Loan 763-TU). The actual loan allocations are compared with the forecast allocations in Attachment 7.

4. Tariffs

4.01 As a condition of effectiveness of Loan 763-TU, TEK's tariffs were raised on average 50% effective July 1, 1971 (from about 16 kurus per kWh to a little over 23 kurus per kWh). This was expected to place TEK's finances on

a satisfactory footing and in fact during 1972, the first year for which the increased tariffs were effective for a whole year, TEK by and large achieved the agreed rate of return on 8% on revalued assets (see TEK's Income Statement in Attachment 8). It was only when TEK was beset by large inflationary cost increases with consequential effect on the manpower situation and the implementation of projects and by Government's reluctance to raise tariffs in its effort to hold down inflation that TEK's financial situation started to deteriorate.

4.02 Under Loan 763-TU, a fuel adjustment clause was introduced in TEK's tariffs at the Bank's urging whereby increases in fuel costs are automatically recovered from consumers without a general tariff revision. This proved to be of significant help to TEK in 1973 and 1974 since the clause helped TEK to pass on to customers, without Government approval, its soaring fuel costs as a result of the surge in international oil prices. When the average tariff level was around 24 kurus per KWh, the fuel adjustment charge rose from 3.5 kurus per KWh in December 1973 to 15.1 kurus per KWh in January 1974 raising the price of electricity to the consumer 42% in just about two months. Without the automatic fuel adjustment clause it is certain that there would have been major lags in recovering the increased fuel costs from customers, which would have led to a further serious deterioration in TEK's financial condition.

5. Financial Aspects

1023

5.01 Loan 763-TU required TEK to earn an 8% return on revalued net fixed assets and to continue to revalue assets in future as prices change. Any shortfall in a year is required to be made up within the next two years; an overrun could be applied to offset any shortfall in one or more of the next three years (Loan 568-TU had substantially the same provisions). Fulfillment of this covenant would have meant significant tariff increases from time to time. However, after a 50% tariff increase in July 1971, there was no effective action until June 1976 to raise tariffs except for increasing the fuel surcharge because of the circumstances detailed below, and TEK has not met the rate of return covenant (8% on revalued net fixed assets) by varying margins from 1970 to date (by 2.5% in 1970, 3.1% in 1971, marginally in 1972, 5.3% in 1973, 5.7% in 1974, 5.4% in 1975 and 3.9% in 1976). The surge in oil prices in 1973-1974 (para 4.02) made the task of ensuring TEK's financial viability rather difficult. In connection with Loan 763-TU, in view of the time required for the economy to adjust itself to the rapid price escalation, the Bank agreed to a longer-term approach for TEK to meet the required 8% as follows:

- This was agreed with Elbista (L 7623)*
- (a) Government would establish not later than March 15, 1975 a new basic tariff yielding TEK a net average revenue of 51 kurus/KWh; and
  - (b) from 1976 onwards, TEK would earn an 8% return on a revalued asset base.

These targets were not fully realized. However taking into account Government's anti-inflationary and economic stabilization policies, agreement was subsequently reached with Government that TEK would earn an 8% return from 1977 on a revalued asset base as agreed and that for 1976, such action including tariff adjustments would be taken by January 1, 1976 as would enable TEK to earn a 6% return in that year. However in the difficult political conditions then prevailing and in the absence of a strong Government able to provide political leadership, tariff action was delayed until May 1976 when rates were raised an average of about 20% with effect from June 1, 1976. Government approved further marginal adjustments in TEK's tariffs effective April 1, 1977 in order to enable TEK to increase its earnings. Again TEK's tariffs were raised about 42% effective September 10, 1977 but the increased revenues were largely offset by increases in fuel prices <sup>1/</sup> and in wages and salaries with the result that TEK's rate of return in 1977 was only about 3.4%. TEK's actual rates of return for 1971-1977 are given in comparison with the forecast returns in Attachment 8.

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<sup>1/</sup> The revised tariffs of September 10 were based on the increased fuel prices introduced at that time and the fuel surcharge was made applicable only to subsequent fuel price increases.

5.02 The main reasons for TEK's failure to reach the agreed 8% return have been:

- (a) delayed commissioning of projects such as Keban resulting in lower availability of hydropower for meeting the demand;
- (b) less-than-expected load growth due in part to lack of adequate supply (See Attachment 5.);
- (c) staffing problems;
- (d) rising employment costs, mostly of unionized labor, (wages and salaries in 1976 were about 230% of the 1970 appraisal estimate); and
- (e) Government's unwillingness to approve tariff increases especially because of the unsettled political conditions in the country.

5.03 TEK's low rates of return coupled with inflationary increases in construction expenditures resulted in self-financing levels that were much lower than those estimated at appraisal. During the period 1971-1977, the self-financing level ranged from 11% to 37% as against the estimated range of 40% to 156% (See Attachment 9 for details). *The shortfall was made up through additional borrowings and government contributions.*

5.04 Another serious financial problem which has beset TEK for the past few years is the problem of liquidity caused mainly by slow collection of receivables from municipalities despite a 15% discount for payment within one month and a penalty of 1% per month for payments thereafter (until these conditions were changed in June 1976). Since 1971, receivables have been consistently around four months' revenue, which is a very high level. At the end of April 1977 receivables which were outstanding for more than three months amounted to LT 3.5 billion, which itself is over five months' revenues. A significant portion of these outstandings was 2-3 years old. Government's solution to this problem has been consolidation and payment of intra-public sector debts. This has proved to be ineffective. After the consolidation of such debts in May 1975 under a law passed by Parliament, Government has again assumed responsibility for payment of TEK's bills for supply of electricity to municipalities after offsetting amounts due by TEK to various governmental agencies such as TKI, the Turkish Coal Enterprises, TPAO, the Turkish Petroleum Authority and tax authorities.

## 6. Justification of the Projects and Bank's Role

6.01 Over the period that has elapsed since the appraisal for Loan 568-TU, its completion and that of the works under Loan 763-TU, various factors have affected TEK. These are principally a) an unwillingness to price electrical energy at levels adequate to meet development needs, b) the salaries of non-unionized staff progressively fell 50% to 65% below the level of the private sector employing similar skills, c) the Government's policy of fuel price subsidy has kept coal and lignite prices below their economic worth, d) Government policy has led to excessive levels of staffing in the lower grades of TEK in many disciplines which serves to reduce productivity and inflate costs.

6.02 No rate of return was calculated for the Keban Transmission Line Project since the lines were inseparable from the Keban Project itself. However, an internal financial rate of return calculation was made for the 1971-74 time-slice of the generation/transmission investment program as part of the 763-TU appraisal. The forecast rate of return was 13%. This was derived by using forecast revenues as a measure of benefits and therefore is not a true economic return, but can be used to assess the adequacy of long-run tariff policy. A similar calculation using actual investment, operating cost and revenue data for the period 1971-76 (since the forecast sales target was reached only in 1976) yields a return of only 3% (Attachment 10). This result is not surprising in view of the two-year delay in completing the project and reaching the original sales forecast, and Government policy in holding down electricity prices. Average revenue per KWh in 1976 was 7% below forecast levels (in 1971 terms) despite a near-doubling of average fuel and operating cost (also in 1971 terms) compared with the appraisal estimate. The result was further depressed since, because of the delay in hydro project construction (principally Keban), TEK was forced to resort to expensive generation from oil-fueled gas turbines which were rushed into service in an attempt to meet the shortages.

3

6.03 The fact remains that both projects financed through these loans were essential for the power sector's development, and that from a purely technical standpoint the Projects have clearly fulfilled their purpose. However a major objective of the Projects lay in the institution-building field and here the extent to which the goals were achieved is less clear-cut. At the non-political levels in Turkey, both in government ministries and productive enterprises, there is a positive acceptance of those institution-building objectives which were the main justification for the lending operations. These were: the establishment of an autonomous, national power authority, the introduction of financial management techniques and policies designed to support the autonomous nature of the SEE, strengthening the sector development planning methods in terms of the nationally most economic program, and the enhanced cooperation of the authorities concerned, especially those of TEK and the Water Development Authority (DSI). Considering the improvements brought about through the medium of Loans 568-TU and 763-TU, and the deficiencies still existing, the two loans should be considered as having partially succeeded in their objectives and therefore as moderately successful.

6.04 Despite the relatively unsatisfactory institutional and financial performance, credit must be given to TEK for coping with a growth in generation and sales of nearly three times in the decade 1968-1978, to a 4000-MW system--large by any standards--and an investment program which saw asset values increase nearly ten times due to the rapid growth in a period of escalating international prices. As already stated, the TEK Power Transmission Project was a time-slice development and the cost of the Project was based on an estimate of the likely works to be constructed in the period. Changes in this plan would have been normal had the work been carried out during the plan period. As a result of the two-year delay, compounded by the financial, operational and inflationary problems experienced, numerous changes in minor and major detail inevitably had to be made. Since the works originally planned were closely tied to other works and handled in the books of accounts as indistinguishable parts of the whole, it is

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with (quite  
unsuccessful) &  
France (field  
in sup. reports),  
Actualy perm  
not seem to  
do this

CHECK

This refers to Lr. 763 but cost estimate for 568 not much better

not now possible to determine accurately the final costs of the various components of the Project. The best judgement is that the final costs are of the order of double the original estimates.

7. Overall Achievements

7.01 So far, although the Bank's aims have not been fully achieved, significant steps have been taken towards these goals. Mainly through the help of consultants financed by the technical assistance grant of US\$1.95 million and partly also through the impetus provided by the two loans in question, TEK has established an adequate accounting and reporting system. The establishment of the system itself is a significant achievement although it is not being used properly for management purposes. Key accounting staff have also been trained in selected utilities in the USA. As regards other institutional improvements, for basically political reasons, institutional autonomy of TEK does not exist. Its technical operations have suffered because it is unable to hold an adequate level of experienced and competent staff. Despite a general shortage of competent staff its system planning has remained satisfactory, but implementation has been adversely affected by these constraints. What success has been achieved is as a result of the efforts of a constantly reducing core of dedicated and competent people. The Bank was instrumental in introducing dynamic system planning methods through the development of computer programs, and the Turkish system was used to test a general linear planning model developed in the Bank. The development program, which indicated the need for rapid introduction of thermal plant to meet the demand in 1974-78, was not then adopted by Government despite the Bank's urgings and the severe shortages in these years are now a matter of history. TEK's skills in drafting bidding documents and operating procurement procedures have steadily improved as a result of the work of the consultants and by association with the Bank so that in many fields consultants are no longer essential. In the financial area, implementation of the principle of automatic recovery of increased fuel costs from customers is a significant step forward. So also is the general acceptance of the concept of working towards a specific financial goal of an 8% rate of return on revalued assets. Even in respect of a matter such as revaluation on which there is no agreement in developed countries as to principles and methods, principles and methods have been agreed and implemented.

7.02 Because of inadequate tariff levels and a large expansion program in a period of high inflation, TEK has been unable to generate an adequate level of cash to support the power sector investment needs, and internal and external borrowings to support the investment program contributed substantially to the economic crisis faced by the Government in 1977/78. TEK still has a critical liquidity problem and it is unable to apply such remedies as are provided in the law to secure the prompt payments of outstanding bills. The decline in quality of its professional staff is still a problem. These fundamental problems, which drained the vitality of TEK, are shared by other SEEs to substantially the same degree and their solution, requiring political willingness, does not seem possible through application of normal project lending methods which focus on only a single sector. Subsequently, the Bank has made a deliberate effort to deal with these problems on a country basis, although without tangible progress as yet, and this was reflected in subsequent loans for TEK (1023-TU of June 28, 1974 and 1194-TU of June 14, 1976), so the dialogue is continuing.

Attachments

But his found back after - 60% Lead

Agree a quote estimate of expenses study see also "Project" pp 37-41. Despite considerable money Bank had two serious projects in the power sector. It could not achieve any of them. It cost for an. to recover, but it cost for had negative value to be accepted - Bank

It cost for had negative value to be accepted - Bank

January 28, 1977

International Bank for Reconstruction  
and Development  
1818 H Street, N.W.  
Washington D.C. 20433  
U.S.A.

Our Ref: 610/DBK.I-901/  
Subject: Loan No. 568-TU  
FINAL REPORT

Ref: a) Your letter dated 25th September, 1974  
b) Your letter dated 12th February, 1975

Our comments relating to the subjects referred in (a) and (b) above, have been submitted herewith.

x  
As it is known, the Final Report dated 2nd December 1975 - which is herewith attached - prepared on the works in the scope of the credit, which were accomplished by our Consultant Firm Commonwealth Inc. (CAI), has been submitted to your Bank. At this Report, the activities carried through this work - from the initial stage to the end - and the critics on the work have been adequately explained by our Consultant. The Report had provided all the necessary information for your Bank, with the exception of the supply of the Gökçekaya-Ankara line, while the situation of this line on the time this Report was written, had been also explained. In any case, we deem it necessary to give explanations on the matters below.

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ill effects  
As it is known, Keban-Ankara-Istanbul power transmission line and Ankara-Gökçekaya-Istanbul power transmission line and the substations connected to these lines have been the first 380-kV installations erected in our country. For this reason, some delays and faults have been experienced in the erection of the aforementioned substations and transmission lines. However, the major reasons of these delays are due to the various crises and circumstances faced in the world as well as in Turkey. In spite of this, due to the major delays occurred in the Gökçekaya and Keban power stations the termination dates have been extended for about 1,5-2 years to SAE and the substation investments have been slowed down in the initial stage, with the aim to avoid unnecessary investments. In addition, due to the rapid increase in the prices in the world and Turkey markets no installation work other than Ankara-Gökçekaya line have caused delays in the utilization of the energy produced by the Keban and Gökçekaya power stations.

Upon the abolishment of the contracts (references H.50 and H.40) drawn with SAE and MİTAS Companies, the installation of the Umraniye and Gölbaşı substations and the Kayseri capacitor stations as well as the erection of the Keban-Ankara line and the Gökçekaya-Ankara line through our Force Account and

our own means, though limited, a team has been created which is qualified in separate project an erection work. By this team which was trained in these works, the 380-kV Seyitömer and Izmir substations, as well as the 380-kV Gökçekaya-Seyitömer and Izmir substations, as well as the 380-kV Gökçekaya-Seyitömer-Izmir and Seyitömer-Seydisehir transmission lines have been installed by the initiative of our Organization.

The costs of the mentioned installations have been far beyond the estimated costs, due to the delays and the crisis faced in the world and Turkey markets, as well as the big price increases. The lack of experience of our Organization from the administrative and personnel point of view, which is a newly-created entity, is also attributable to these results. Moreover, the laws, formalities, organization problems, impossibilities in recruiting and retaining technical staff and many other barriers, have effected this.

The major reasons for not being able to realize the aforesaid installations in the desired level and time, in parallel to your requests in the above-said letters, could be summarized as follows. We would highly appreciate if you would accept our regrets and show consideration to us for not being able to prepare a report of such a large scale requested by you, due to the resignation of our trained and qualified staff during this period.

a) Due to the rapid charges in the prices, rate of exchange, circumstances in the world and Turkey and the skyrocketing price increase in the materials such as oil, steel, etc., the main problem has been the disputes occurred with the contractors due to their delays which resulted with the cancellation of the MITAS and SAE contracts, thus putting us in a position of completing the works by our Force Account, for which we were not equipped beforehand.

Great delays have taken place in the completion of the Protection projects of the Brown-Boveri (BBC) company. Delays of up to 2 years have been observed in the projects which were to be completed within 4 months following the date of bidding and due to this reason, the procurement of the protection material has been prolonged. However, through the big efforts of the TEK erection team, the control panel production, erection, cabling setting and testing works have been finalized and the substations have been brought to a position ready for operation, before the power station was ready for operation. In order to minimize the prices and these effects, TEK, despite the shortage of its experience, has shown a great effort to eliminate the troubles and inefficiency of SAE, MITAŞ, BBC and consultant firm CAI, and have finalized the works.

b) The performance of CAI, with the exception of the delays in the services carried on the U.S.A. could be deemed as successful. However, we believe that the consultants have not been able to give us the necessary assistance, due to the fact that, the Company has not sent qualified staff to Turkey during the erection phase, as well as the works in Turkey.

The plans, projects, profiles, charts, technical information and operation manuals which were to be supplied to us, under the contract drawn with CAI have not been submitted and the firm has left the country. Moreover, they have not shown any interest when they were asked to give the reasons of deteriorations and have requested extra fee to examine the faults. On the other side, organizations like Electricite de France (EDF) and ASEA (Sweden) have made examinations

in order to solve the problems and extended their assistance, without any fee. The Chas. T. Main and Stone-Webster companies which have previously carried on consultancy services for TEK, have submitted the complete reports and documents-- which we are presently using--, at the end of the works.

Unfortunately, the performance of the contractors in this work have been very low and none of them have met their obligations under the contracts. This has been a very serious problem for TEK.

*Tech. problems = incorrect*

The design of the poles used in the lines have been made according to very light assumptions and the meteorological conditions of the country could not be estimated. For these reasons, by observing that 12 poles have fell down in the initial stage in Izmit during summer and the poles between Keban-Kayseri have fell down in the operation stage, it has been concluded that, the distribution of the poles have not been carried on in a proper manner. The falling down of the poles--in the erection stage--in the Keban line took place due to our fault in taking some measures.

c) No difficulties have occurred in the disbursements and procurements except the formalities and the credit has enabled us to have responsive bids and facilitated the payment procedure. Moreover, we have not faced any difficulties in transfer and financment.

However, we would like to emphasize that, the requests made for reports on subjects with great coverage and beyond the scope of TEK, which we believe, do not have direct relation with the credit highly occupies our staff, who are in limited number and are already loaded with heavy work. This request causes further delays in our other activities. It would be much more easier for us to work, if information of less detailed nature could be requested.

d) The comments on the Bank transactions which cause to problems are herewith attached (Annex 1).

*Trg in construction*

e) Owing to the Keban-Gokcekaya Project and the credits, our technical and administrative staff have been trained, both in Turkey and abroad, and have reached a level capable to construct the 380-kV lines and substations, without the assistance of consultancy. Therefore, from now on, the projects could be accomplished by TEK's technical staff, which is a very great improvement.

However, in order to attract and retain qualified and experienced technical staff our organization needs to be equipped with the necessary means.

f) Any kind of deviation has not been observed in the main financment plan, except the price increase.

*Supplier*

g) The energy capacity of Turkey has shown an increase about 40%, through the Keban-Gokcekaya Projects, which forms the main framework of our interconnected system. This Project has made a great contribution to the development, industrialization and the flourishment of the social standard, as well as the extension of energy to our rural areas.

h) It is primarily essential that, in order to derive maximum benefit from the Project, the investments for the other transmission, distribution plants-- which would be used for the sale, transmission and distribution of the energy

obtained from the Keban and Gokcekaya system--should be increased and with prior consideration to training facilities, all the measures should be taken in order to retain adequate number of technical staff--for the construction of projects, installations, thus being able to reach to the level of industrialized nations.

With the exception of a few qualified specialists who would assist us in solving the problems--which are few--arise during the research, planning, project, design and erection works, we do not necessarily need specialists to such a great extent.

By our explanations we do hope that we have replied to your questions asked through your above referred letter and verbally. In case you should find some points in our report unsatisfactory please note that we shall be at your disposal to clarify such points.

We hope you will tolerate us for some missing points in report, if any.

Very truly yours

TURKISH ELECTRICITY AUTHORITY  
GENERAL MANAGEMENT

~~Encls. - Final Report  
- Annex 1  
- CAI Completion Report.~~

ANNEX 1

COMMENTS APPLICABLE TO LOAN NO. 568-TU

1. Sometimes the Bank effect payment to the suppliers very late which causes suppliers to write letters or send telex messages asking why the payment has not been effected although the shipment has been effected.

To avoid this the Bank can send a notification to the related supplier stating that they have received the payment application and the payment will be effected in the earliest convenience.

2. The Bank should send a statement quarterly or half yearly showing the actual disbursements and the balance of the loan which will be useful to keep tract of the loan simultaneously with the Bank so the over usage of the loan will be prevented.

Our withdrawal applications consist of three pages and on every page the same informations are repeated. To avoid these repetitions the information can be given on one page.

IBRD LOAN NO. 568-TU (25 Million \$.)  
ACTUAL DISBURSEMENTS

1969	1970	1971	1972	1973	1974
7.554.954,02	6.498.164,11	3.697.705,94	3.135.992,60	3.206.756,38	916.426,96
	Cumulative as end of 1970	Cumulative as end of 1971	Cumulative as end of 1972	Cumulative as end of 1973	Cumulative as end of 1974
	14.043.118,13	17.740.824,07	20.876.816,67	24.083.573,05	25.000.000

IBRD LOAN NO. 763-TU (24 Million \$)  
ACTUAL DISBURSEMENTS

1971	1972	1973	1974	1975	1976
2.016.288,40	2.962.137,72	6.060.284,65	6.948.046,51	6.373.989,53	993.514,19
	Cumulative as end of 1972	Cumulative as end of 1973	Cumulative as end of 1974	Cumulative as end of 1975	Cumulative as end of 1976
	4.978.426,12	11.038.710,77	17.986.757,28	24.360.746,81	25.354.261,00

Note: Difference is due to the variations  
in courses.

T E K

TURKIYE ELEKTRIK KURUMU

Ankara, Jan. 28, 1977

INTERNATIONAL BANK FOR  
RECONSTRUCTION AND DEVELOPMENT

1818 H Street, N.W.,  
Washington, D.C. 20433

U.S.A.

Our ref: 610/DBK.II-901/381

Subject: Loan No. 763-TU

Final Report

Y. Ref: Your letter dated Jan. 26, 1977

As you know, the loan No. 763-TU for US\$ 24.000.000 is not a project loan but is a credit granted to meet a part of our foreign exchange requirement that is necessary to finance the installation, revision and extension of 1330 MVA substations and 2800 km long 154 and 30 kV power transmission lines which will be connected to the interconnected system.

*Change in scope* | The substations and lines to be financed under this credit have been shown in our 1972 investment program. However due to our urgent needs that may occur in later years the program for 1972 has been changed and the funds have been transferred to the installations included in our program for 1973 and 1974. The names of substations and lines after the use of this credit have been shown on the attached lists.

The credit No. 763-TU was intended to be used for the completion of the equipment necessary for the substations which have already been built and for the installation of new substations which have just been included in the program.

The equipment to be procured under this credit are used:

- 1) In the installation of new substations,
- 2) In the completion of equipment for the substations which have been built,
- 3) To increase the power of some substations which are in operation,
- 4) For addition of feeders which became necessary as the result of growth in the networks,

*Change in scope* |

5) As system spares.

Number of substations, the equipment for which is to be procured through 763-TU is 136,

- Number of substations in which the transformers will be installed : 114
- Number of transformers : 139
- Transformer power : 3405 MVA
- Transformer power expected by this credit : 1330 MVA
- Transformer power procured through credit : 2075 MVA
- Number of transformers procured through the credit : 48
- Number of substations in which transformers were installed : 34

As seen on the above table, in the 1973 investment program it was planned that 139 each 3405 MVA transformers were to be financed through this credit. In the credit agreement, however, credit has been granted for 1330 MVA transformers. On the other hand, due to our urgent need, 48 each 25, 50 and 100 MVA transformers which are not manufactured in Turkey have been financed under this loan. The remaining 91 each 1430 MVA transformers were obtained through the TEK's own means. The names of substations on which the transformers were installed are listed on the attached table.

Change in scope

A list showing the names of substations where the power transformers, circuit breakers, capacitors that obtained under this loan and the names of transmission lines is also attached.

It must be considered normal that during the 4 years period between the validity date of loan agreement and the completion of foreign expenditures there had to be changes on some projects. For this is a program credit and using it for the urgent needs will be more advantageous for the Turkish economy.

Change in scope

The equipment that is financed through the 763-TU credit, has been ordered on the "stock order" basis. That is, instead of ordering the complete equipment for each substation, all the necessary equipment have been ordered on the whole for the overhead lines and substations which were decided beforehand, as separate items. Besides, this is the policy TEK has carried out for a long time in the obtainment of equipment.

The 80% of overhead lines and substations on which these equipment was used, has been completed by January 1977. It is expected that the remaining part will be completed within 6 months, that is the end of June 1977. This result can be considered as a good proof that the use of this credit has fulfilled the requirements.

In the scope of project, in section A (1) 380 kV equipment has been planned for Adapazari, Kayseri and Umraniye substations and also for 380 kV Kayseri substation the capacity of serial capacitor banks were to be increased.

As the final study and planning in our 380 kV system during the validity of this credit has not been completed and the production installation to be connected to the 380 kV system was delayed, it was not possible to obtain equipment through this credit for the above mentioned substations. Besides, as you know the new credit No. 1194-TU has been granted for our 380 kV system.

In the section A (1) of the project for Istanbul, 100 MVAR capacitors were planned. We have ordered a total of 156 MVAR capacitors to be used not only for Istanbul but for all places in our system which require capacitors. The 84 MVAR of these capacitors have been mounted in Istanbul. The remaining 72 MVAR have been mounted in the TEK interconnected system where required.

The general comments on the credit:

There has not been a big problem during the carrying out of the credit. However, the procedures such as before sending them to the firms sending of specifications to the Bank for approval as required by the credit agreement and obtaining the Bank's approval after the award is made, cause a certain amount of delay on the orders. Yet, both Bank and TEK did their best to complete the procedures in promptness.

Another point regarding this credit is that by our last order we exceeded the limitation of the credit. By covering this small amount through our own sources, however, this problem has been solved.

No consulting firm has been engaged for this credit. As it is known, conformity with the specifications and responsiveness have been the basic criterion for selection among the supplier firms and the firm has been chosen within this framework. Generally, the firms have not caused any delays in the delivery of material and no important trouble has been faced during the application term of the credit.

The costs of the above-said installations have been far beyond the estimations, due to the delays and the crisis faced in

the World and Turkey markets, as well as the big price increases. The shortage of experience of our Organization from the administrative out personnel point-of-view, which is a newly-created body, is also attributable to these results. Moreover, the laws, formalities, organizational problems, and impossibilities in recruiting and retaining technical personnel and many other barriers have effected this.

The major reasons for not being able to realize the afore-said installations in the desired level and time, in parallel to your requests in the above-shown letters, could be summarized as follows. We would highly appreciate if you would accept our regrets and show consideration to us for not being able to prepare a report of such a magnitude, due to the resignation of our trained out qualified staff during this period.

Manpower  
problems /

a) Due to the rapid change in the prices, rates of exchange, circumstances in the world and Turkey as well as the skyrocketing price increases in the materials such as oil, steel, etc., the costs have shown a great increase.

As it is known, all the projects, specifications, material procurements and erections have been accomplished by TEK. The bureaucratic obstacles and excess of formalities have resulted in delays in the material procurements.

b) There hasn't been any problems in the performance of the contractors and consultants during the utilization of this credit.

c) No difficulties have occurred in the disbursements and procurements except the formalities, bureaucratic barriers. The credit has enabled us to have responsive bids and facilitated the payment procedure. For this reason, there hasn't been any transfer and financment difficulties.

However, we would like to emphasize that, the requests made for reports on subjects with great coverage and beyond the scope of TEK, which we believe, do not have direct relation with the credit highly occupies our staff, who are in limited number and are already loaded with heavy work. These requests cause further delays in our other activities. It would be very useful for us, if information of less detailed nature could be requested.

d) Comments on Bank transactions which cause to problems is submitted hereiwth (Annex 1).

e) The 154-kV transmission lines and substations have been by our Organization and our technical staff, without the assistance of the consultants. However in order to retain trained staff in the Organization should be equipped with the facilities which could attract qualified and trained staff in adequate number, who would have access to foreign languages. This is a matter of status.

f) In the main financment plan, any kind of problem has not been observed, with the exception of the price increase and changes in the plans. The material which was not provided through the Loan, have been obtained by our own resources.

*Snorkle* / g) A great development, industrialization and a great vitality and various benefits in the social life have been achieved by the transmission lines and substations installed through the 763-TU Loan. Moreover energy has been extended to many rural areas deprived of electrical energy.

h) In order to derive maximum benefit from the lines and substations installed through the Loan 763-TU, it is necessary to construct new lines and substations to be connected to those. For increasing the investments, the financment should be obtained beforehand and the facilities should be provided in order to recruit and retain technical staff. The training of the technical staff is also an important factor.

The personnel who would do the research, planning, project design and erection work should also be provided with adequate possibilities.

By our explanations we do hope that we have replied to your questions asked through your above referred letter and verbally. In case you should find some points in our report unsatisfactory please note that we shall be at your disposal to clarify such points.

We hope you will tolerate us for some missing points in report, if any.

Very Truly Yours,  
TURKISH ELECTRICITY AUTHORITY  
GENERAL MANAGEMENT

Encls (-Annex)

- Substation and Trans.  
Lines Schedule
- Material List.

LOAN NO. 763-TU

ANNEX 1

COMMENTS APPLICABLE TO LOAN NO. 763-TU

- 1) Sometimes the Bank effect payment to the suppliers very late which causes suppliers to write letters or send telex messages asking why the payment has not been effected although the shipment has been effected.

To avoid this the Bank can send a notification to the related supplier stating that they have received the payment application and the payment will be effected in the earliest convenience.

- 2) -The Bank should send a statement quarterly or half yearly showing the actual disbursements and the balance of the loan which will be useful to keep track of the loan simultaneously with the Bank so the over usage of the loan will be prevented.
- Our withdrawal applications consist of three pages and on every page the same informations are repeated. To avoid these repetitions the information can be given on one page.

IBRD LOAN NO. 563-TU (25 Million \$.)  
ACTUAL DISBURSEMENTS

1969	1970	1971	1972	1973	1974
7.554.954,02	6.498.164,11	3.697.705,94	3.135.992,60	3.206.756,38	916.426,96
	Cumulative as end of 1970	Cumulative as end of 1971	Cumulative as end of 1972	Cumulative as end of 1973	Cumulative as end of 1974
	14.043.118,13	17.740.824,07	20.876.816,67	24.083.573,05	25.000.000

IBRD LOAN NO. 763-TU (24 Million \$)  
ACTUAL DISBURSEMENTS

1971	1972	1973	1974	1975	1976
2.016.288,40	2.962.137,72	6.060.284,65	6.948.046,51	6.373.989,53	993.514,19
	Cumulative as end of 1972	Cumulative as end of 1973	Cumulative as end of 1974	Cumulative as end of 1975	Cumulative as end of 1976
	4.978.426,12	11.038.710,77	17.986.757,28	24.360.746,81	25.354.261,00

Note: Difference is due to the variations  
in courses.

TURKEY

Keban Transmission Lines

Estimated Cost of the Bank Project

<u>Keban-Istanbul 380-kV Line</u>	<u>-----Millions of LT-----</u>			<u>-----Millions of US\$-----</u>		
	<u>Local</u>	<u>Foreign</u>	<u>Total</u>	<u>Local</u>	<u>Foreign</u>	<u>Total</u>
1460 km 380-kV line	69.3	135.5	204.8	7.6	14.9	22.5
Ankara substation	8.0	13.4	21.4	0.9	1.5	2.4
Istanbul substation	9.3	10.1	19.4	1.0	1.1	2.1
Kayseri substation	2.6	4.4	7.0	0.3	0.5	0.8
Keban substation	0.2	1.1	1.3	-	0.1	0.1
Gökçekaya line and sub- station material	-	4.8	4.8	-	0.5	0.5
Contingencies <u>1/</u>	8.9	8.4	17.3	1.0	1.0	2.0
Engineering	1.4	6.4	7.8	0.2	0.7	0.9
Interest during construction	<u>13.3</u>	<u>28.5</u>	<u>41.8</u>	<u>1.5</u>	<u>3.1</u>	<u>4.6</u>
<b>TOTAL</b>	<u>113.0</u>	<u>212.6</u>	<u>325.6</u>	<u>12.5</u>	<u>23.4</u>	<u>35.9</u>

Actual cost	685.4	591.5 <sup>3/</sup>	1276.9 <sup>3/</sup>	39.2	33.8	73.0 <sup>2/ 3/</sup>
Increase over estimate				+214%	+44%	+103%

1/ US\$1 = LT 9.08 as of October 1968

2/ US\$1 = LT 17.5

3/ As the expenditure of foreign cost was made progressively at various rates of exchange relative to US\$, the true total cost in terms of LT is less than stated here and conversely the total \$ equivalent of local costs is greater than stated here.

December 1980

TURKEY

TEK TRANSMISSION PROJECT (LOAN 763-TU)

SALES FROM THE INTERCONNECTED SYSTEM

<u>Year</u>	<u>Forecast (GWh)</u>	<u>Actual (GWh)</u>
1970	5,820	5,606
1971	7,508	7,013
1972	9,709	8,464
1973	12,310	9,344
1974	14,741	10,239
1975	16,392	12,183
1976	17,595	14,640
1977	19,188	16,213
	<u>103,263</u>	<u>83,702</u>

December 1980

1987, below forecast

TURKEY

TEK TRANSMISSION PROJECT I (LOAN 763-TU)

Reasons for the Difference Between Forecast and Actual Demands

1. The main reason for the slowdown in the estimated load growth has been the slowdown of industrial and economic activity in the country coupled with a shortage of generating plant due to delays in the construction of new plants and the breakdown of major plants in service. The investment programs and construction lead times assumed by Turkish planners proved to have been unrealistic in the light of the financial, human and other resources available to TEK and DSI since 1970, as illustrated by the following instances. In 1970, they anticipated commissioning of the Elbistan Lignite Power Project in 1976 (now expected in 1982), a nuclear power plant in 1977 (now expected in the nineties), the Oymapinar hydroelectric plant in 1978 (now expected in 1982) and the Karakaya hydroelectric plant in 1979 (now expected in 1986). In 1970, the serious financial and manpower constraints which considerably slowed down all subsequent construction activity could not be foreseen. In the event, because of drastic delays in the construction of generating plants, power supply in Turkey was woefully inadequate at least from 1972. The stop-gap and costly arrangement of erecting combustion turbines to meet the power supply situation only alleviated the problem and could not solve it. To make matters worse, major generating plants, such as the Keban and Ambarli plants, also suffered from technical problems, damages and fires, as well as a shortage of fuel oil. The Ambarli power plant (3x110 MW) was out of commission on account of a cable fire from June 6, 1977 until mid-August 1977. Keban III and IV went out of commission on June 8, 1977 on account of the malfunctioning of certain safety mechanisms and could be brought back into operation only in September-October 1977.

2. As a result of the above delays and breakdowns, power consumption had for some years to be physically restricted to the available generation. TEK has taken several measures to restrict power consumption, such as regular and daily power cuts of five to six hours' duration in all large cities, load shedding and frequency and voltage reductions. No systematic attempts have been made to assess the magnitude of power supply restrictions in Turkey or to evaluate the losses to the national economy caused by these restrictions.

3. The load forecasts beyond three years, i.e. from 1973 onwards, were also somewhat optimistic. Such medium-term load forecasts cannot be precisely determined and an error of the order of  $\pm 10\%$  is not unusual. It will be seen that while the actuals for 1970 and 1971 were close to the forecasts (5,606 GWh vs. forecast of 5,820 in 1970; 7,013 GWh vs. forecast of 7,508 in 1971), the actual for 1979 was 16% short of the forecast. One reason for the large divergence between the medium-term forecasts and the actuals is that large industrial loads failed to materialize as planned owing to changes in the economy and other factors. The following are illustrative examples of major lags in industrial consumption. In

1970, it was expected that the Aluminum and Ferro-Chrome industries would in 1977 reach an annual consumption of 1,500 GWh and 740 GWh respectively; however, their actual consumption even in 1980 is of the order of only 500 GWh and 150 GWh respectively. The cement industry was estimated to reach an annual consumption of 485 GWh in 1977 but the actual consumption in that year turned out to be only 150 GWh.

December 1980

Loan 568Cumulative Estimated and Actual Disbursements  
(US\$ million)

As of Dec.	<u>1968</u>	<u>1969</u>	<u>1970</u>	<u>1971</u>	<u>1972</u>	<u>1973</u>	<u>1974</u>
(i) Appraisal Estimate <u>2/</u>	1.8	15.6	20.4	25.0	25.0	25.0	25.0
(ii) Actual <u>1/</u>	-	7.5	14.0	17.7	20.9	24.1	25.0
(ii) as % of (i)		48	68	70	83	96	100

Loan 763Cumulative Estimated and Actual Disbursements  
(US\$ million)

As of Dec.	<u>1971</u>	<u>1972</u>	<u>1973</u>	<u>1974</u>	<u>1975</u>	Sept. <u>1976</u>
(i) Appraisal Estimate <u>3/</u>	6.3	15.1	22.8	24.0	24.0	24.0
(ii) Actual <u>1/</u>	.02	3.2	9.9	16.8	23.0	24.0
(ii) as % of (i)	.3	21	43	70	96	100

1/ Source: IBRD Statements of Loans2/ Source: Appraisal Report IBRD No. TO-686a dated October 14, 19683/ Source: Appraisal Report IBRD No. PU-69a dated May 28, 1971

December 1980

ACTUAL AND FORECAST LOAN ALLOCATIONS

Loan 568-TU

<u>Category</u>	<u>Description</u>	<u>Amount Disbursed (Expressed in US\$)</u>	<u>Loan Agreement</u>
1.	Keban/Istanbul Transmission Line	17,066,049.82	14,900,000
2.	Ankara/Istanbul, Kayseri and Keban Substations	2,335,685.39	3,200,000
3.	Goekcekaya Transmission Line and Substation Materials	0.-	500,000
4.	Interest and other Charges During Construction	4,364,700.00	3,100,000
5.	Local Currency Expenditures	1,233,564.69	2,300,000
6.	Unallocated	0.-	1,000,000
<b>Total</b>		<u>25,000,000.00</u>	<u>25,000,000</u>

Loan 763-TU

<u>Category</u>	<u>Description</u>	<u>Amount Disbursed (Expressed in US\$)</u>	<u>Loan Agreement</u>
1.	Transmission & Substation equipment, materials & installation	21,742,284.16	18,300,000
2.	Distribution capacitors	0.-	400,000
3.	Special vehicles & testing equip.	441,325.95	1,900,000
4.	Consultants' services & training	82,260.29	200,000
5.	Interest & other charges on the Loan accrued on or before Mar.31, 1975	1,734,129.60	2,000,000
6.	Unallocated	0.-	1,200,000
		<u>24,000,000.00</u>	<u>24,000,000</u>

December 1980

MARKET  
IRAN TRANSMISSION LINE PROJECT AND TEP TRANSMISSION PROJECT I  
LOANS 663-TT AND 764-TT  
Income Statements for the Years Ended December 31, 1971-1977  
(In Millions)

	1971		1972		1973		1974		1975		1976		1977	
	Forecast	Actual	Forecast	Actual	Forecast	Actual	Forecast	Actual	Forecast	Actual	Forecast	Actual	Forecast	Actual
<b>Generation - GWh</b>														
Hydro	1,507	1,765	2,487	2,291	3,129	1,973	6,205	2,604	8,496	4,671	8,691	6,661	9,227	7,843
Thermal - Coal	1,235	1,361	1,280	1,365	1,250	1,416	1,250	1,428	1,280	1,362	1,251	1,251	1,251	1,196
- Lignite	1,025	1,302	2,660	1,357	3,010	1,477	4,360	1,498	4,360	1,474	5,860	2,820	7,460	3,282
- Fuel Oil	3,785	3,192	3,222	4,035	4,890	4,781	4,374	4,390	3,974	3,792	1,155	3,964	3,171	3,998
- Gas	-	-	-	29	-	391	-	54	-	496	-	411	-	1,176
Nuclear	-	-	-	-	-	-	-	-	-	-	-	-	300	-
<b>Total Generation</b>	<b>7,522</b>	<b>7,620</b>	<b>10,249</b>	<b>9,081</b>	<b>13,209</b>	<b>10,035</b>	<b>16,219</b>	<b>10,474</b>	<b>18,110</b>	<b>11,721</b>	<b>19,486</b>	<b>14,737</b>	<b>21,456</b>	<b>17,195</b>
<b>Purchased Power - GWh</b>	<b>245</b>	<b>272</b>	<b>302</b>	<b>372</b>	<b>302</b>	<b>428</b>	<b>5</b>	<b>802</b>	<b>5</b>	<b>1,572</b>	<b>5</b>	<b>1,371</b>	<b>5</b>	<b>776</b>
<b>Total Generated &amp; Purchased - GWh</b>	<b>8,170</b>	<b>7,892</b>	<b>10,551</b>	<b>9,453</b>	<b>13,511</b>	<b>10,463</b>	<b>16,224</b>	<b>11,250</b>	<b>18,115</b>	<b>13,293</b>	<b>19,491</b>	<b>16,108</b>	<b>21,461</b>	<b>17,970</b>
Station Use - GWh	402	422	490	484	696	532	560	321	999	459	1,080	705	1,270	316
Transmission Losses - GWh	260	457	285	502	502	500	623	622	724	621	844	763	1,203	841
<b>Total Used and Lost - GWh</b>	<b>662</b>	<b>879</b>	<b>775</b>	<b>986</b>	<b>1,204</b>	<b>1,132</b>	<b>1,183</b>	<b>1,132</b>	<b>1,723</b>	<b>1,110</b>	<b>1,924</b>	<b>1,468</b>	<b>2,473</b>	<b>1,767</b>
<b>Sales - GWh</b>	<b>7,508</b>	<b>7,013</b>	<b>9,779</b>	<b>8,464</b>	<b>12,310</b>	<b>9,331</b>	<b>14,741</b>	<b>10,239</b>	<b>16,392</b>	<b>12,183</b>	<b>17,566</b>	<b>14,640</b>	<b>19,188</b>	<b>16,213</b>
<b>Average Revenue per kWh - Korus</b>	<b>21.14<sup>(1)</sup></b>	<b>20.18<sup>(1)</sup></b>	<b>23.00</b>	<b>23.92</b>	<b>22.09</b>	<b>26.03</b>	<b>22.41</b>	<b>25.37<sup>(1)</sup></b>	<b>22.48</b>	<b>40.07<sup>(1)</sup></b>	<b>22.76</b>	<b>45.33<sup>(1)</sup></b>	<b>23.02</b>	<b>61.78<sup>(1)</sup></b>
<b>Operating Revenues</b>	<b>1,587</b>	<b>1,416</b>	<b>2,233</b>	<b>2,026</b>	<b>2,719</b>	<b>2,435</b>	<b>3,223</b>	<b>4,033</b>	<b>3,685</b>	<b>4,886</b>	<b>4,006</b>	<b>6,637</b>	<b>4,417</b>	<b>10,017</b>
<b>Operating Expenses</b>														
Fuel - Coal	90	125	101	173	101	187	101	193	101	207	38	219	38	400
- Lignite	39	61	84	90	114	102	124	101	124	108	134	151	247	225
- Fuel Oil	333	343	354	412	490	588	355	1,377	364	1,203	380	1,142	294	1,622
- Gas Oil	-	-	-	14	-	233	-	562	-	590	-	460	-	1,542
- Uranium	-	-	-	-	-	-	-	-	-	-	-	-	-	37
Cost of Power Purchased	32	40	39	89	39	71	1	221	1	519	1	430	1	376
Materials other than Fuel	22	30	31	27	34	34	36	39	39	46	45	188	53	139
Wages and Salaries	107	125	167	165	198	220	223	357	251	486	294	551	349	1,197
Miscellaneous Expenses	34	34	44	41	50	50	57	66	62	74	71	59	79	102
Depreciation	313	322	425	340	522	590	695	668	728	929	808	1,251	934	1,893
Taxes other than Income Taxes	5	12	14	5	15	5	20	5	21	5	25	36	38	13
Income Taxes	183	74	292	192	340	61	520	44	642	130	602	610	740	745
<b>Total Operating Expenses</b>	<b>1,168</b>	<b>1,166</b>	<b>1,551</b>	<b>1,451</b>	<b>1,867</b>	<b>2,143</b>	<b>2,132</b>	<b>3,644</b>	<b>2,332</b>	<b>4,270</b>	<b>2,541</b>	<b>5,246</b>	<b>3,212</b>	<b>5,254</b>
<b>Net Operating Income</b>	<b>428</b>	<b>250</b>	<b>682</b>	<b>474</b>	<b>852</b>	<b>298</b>	<b>1,171</b>	<b>390</b>	<b>1,353</b>	<b>616</b>	<b>1,464</b>	<b>1,291</b>	<b>1,608</b>	<b>1,763</b>
<b>Other Income</b>	<b>18</b>	<b>2</b>	<b>15</b>	<b>130</b>	<b>16</b>	<b>5</b>	<b>15</b>	<b>87</b>	<b>16</b>	<b>147</b>	<b>16</b>	<b>101</b>	<b>16</b>	<b>132</b>
<b>Gross Income</b>	<b>446</b>	<b>252</b>	<b>697</b>	<b>484</b>	<b>868</b>	<b>303</b>	<b>1,186</b>	<b>477</b>	<b>1,369</b>	<b>763</b>	<b>1,480</b>	<b>1,392</b>	<b>1,624</b>	<b>1,895</b>
(Less) Interest charged to Operations	153	134	235	178	389	213	362	240	353	371	379	488	434	588
<b>Net Income</b>	<b>293</b>	<b>118</b>	<b>462</b>	<b>277</b>	<b>530</b>	<b>88</b>	<b>824</b>	<b>76</b>	<b>1,016</b>	<b>392</b>	<b>1,101</b>	<b>712</b>	<b>1,187</b>	<b>1,307</b>
<b>Rate of Return</b>														
<b>Average Net Fixed Assets in Service<sup>(2)</sup></b>	<b>5,206</b>	<b>5,115</b>	<b>6,649</b>	<b>5,951</b>	<b>8,869</b>	<b>10,640</b>	<b>13,212</b>	<b>16,582</b>	<b>16,245</b>	<b>23,992</b>	<b>16,921</b>	<b>31,466</b>	<b>18,991</b>	<b>31,186</b>
<b>Rate of Return - Net Operating Income as % of Average Net Fixed Assets in Service</b>	<b>3.16</b>	<b>4.89</b>	<b>10.23</b>	<b>7.97</b>	<b>5.62</b>	<b>2.74</b>	<b>8.56</b>	<b>2.31</b>	<b>6.28</b>	<b>2.55</b>	<b>8.65</b>	<b>4.1</b>	<b>8.45</b>	<b>3.44</b>

<sup>(1)</sup> Forecast figures reflected revaluation as of December 31, 1969.  
Actual figures reflect revaluation of all Fixed Assets in Service as follows:

- (a) as at end of 1971 and 1972 to the 1970 price level;
- (b) as at end of 1973 to the 1973 price level;
- (c) as at end of 1974 and 1975 to the 1974 price level;
- (d) as at end of 1976 to the 1976 price level; and
- (e) as at end of 1977 to the 1977 price level.

<sup>(2)</sup> Assumed a tariff increase raising average tariffs to 23 korus per kWh (about 48% increase) effective April 1, 1971, with no subsequent revisions through 1977.

<sup>(3)</sup> Reflects a tariff increase of about 50% effective July 1, 1971 raising average tariffs to 23.3 korus per kWh.

<sup>(4)</sup> Reflects effect of fuel surcharge levied from time to time.

<sup>(5)</sup> Reflects a tariff increase of about 20% effective June 1, 1976 for all consumers except cement, fertilizer and aluminum-producing industries for which old tariffs continued to apply, the difference between revenues at the old and new tariffs being granted to IEE as a subsidy by Government. Thus the effect on IEE's revenues was as if the tariff increase applied to all its sales.

<sup>(6)</sup> Reflects a tariff increase raising IEE's average revenue from active and reactive energy to 70 korus per kWh effective September 10, 1977.

## TURKEY

## KEBAH TRANSMISSION LINE PROJECT AND TEK TRANSMISSION PROJECT I

## LOANS 568-TU AND 763-TU

Internal Cash Generation 1971-1977  
(LT Millions)

	1971		1972		1973		1974		1975		1976		1977	
	Forecast	Actual	Forecast	Actual	Forecast	Actual	Forecast	Actual	Forecast	Actual	Forecast	Actual	Forecast	Actual
<u>Internal Cash Generation</u>														
Gross Income	443	252	697	445	868	301	1,186	334	1,369	565	1,480	1,200	1,621	1,630
Depreciation	313	322	425	340	522	590	695	668	728	929	808	1,251	934	1,823
Internal Cash Generation	756	574	1,122	785	1,390	891	1,881	1,002	2,097	1,494	2,288	2,451	2,555	3,523
<u>Debt Service</u>														
Amortization	143	197	199	211	214	419	286	308	461	773	706	462	335	1,434
Interest charged to Operations	153	134	235	172	329	213	362	258	353	371	379	488	434	588
Total Debt Service	296	331	434	383	543	632	648	566	814	1,144	1,085	950	769	2,022
Net Internal Cash Generation	460	243	688	402	847	259	1,233	436	1,283	350	1,203	1,501	1,786	1,501
Construction Expenditure	1,150	1,016	1,375	1,096	1,024	1,298	1,681	2,770	1,641	3,269	1,171	5,986	1,148	7,869
Self-Financing Level - % <sup>1/1</sup>	40	24	50	37	83	20	73	16	78	11	103	25	156	19

<sup>1/1</sup> Net Internal Cash Generation as a percentage of Construction Expenditure.

December 1980

TURKEY

Loan 763-TU: TEK Transmission Project

Calculation of Rate of Return

	<u>1970</u>	<u>1971</u>	<u>1972</u>	<u>1973</u>	<u>1974</u>	<u>1975</u>	<u>1976</u>	<u>1977-2005</u>
1. TOTAL SALES, GWh	5,606	7,013	8,464	9,344	10,239	12,183	14,640	
2. SALES ATTRIBUTABLE PROJECT, GWh		1,407	2,858	3,738	4,633	6,577	9,034	9,734
<u>COSTS (Millions LT)</u>								
3. Total fuel costs		529	689	1,110	2,233	2,066	1,972	
4. Other operating costs		229	322	375	682	1,128	1,575	
5. Total operating costs		<u>758</u>	<u>1,011</u>	<u>1,485</u>	<u>2,915</u>	<u>3,194</u>	<u>3,547</u>	
6. Average operating cost/kWh sold, LT <sup>/1</sup>		0.1081	0.1194	0.1589	0.2848	0.2622	0.2423	
7. Operating costs attributable project <sup>/2</sup>		152	341	594	1,319	1,724	2,189	2,189
<u>Construction expenditures:</u>								
8. TEK		954	1,043	1,216	2,558	2,932	5,494	
9. BSI (hydropower)		752	931	1,543	1,027	1,612	2,580	
10. TOTAL COSTS ATTRIBUTABLE PROJECT		<u>1,858</u>	<u>2,315</u>	<u>3,353</u>	<u>4,904</u>	<u>6,268</u>	<u>10,263</u>	<u>2,189</u>
<u>REVENUES (Millions LT)</u>								
11. Total electricity revenues		1,415	2,025	2,435	4,053	4,882	6,637	
12. Average revenue/kWh sold, LT <sup>/3</sup>		0.2018	0.2392	0.2606	0.3939	0.4007	0.4533	
13. REVENUES ATTRIBUTABLE PROJECT <sup>/4</sup>		<u>284</u>	<u>684</u>	<u>974</u>	<u>1,825</u>	<u>2,635</u>	<u>4,095</u>	<u>4,095</u>

RATE OF RETURN - 8%

- <sup>/1</sup> Line 5 + Line 1.  
<sup>/2</sup> Line 2 x Line 6.  
<sup>/3</sup> Line 11 + Line 1.  
<sup>/4</sup> Line 2 x Line 12.

December 1980

# OFFICE MEMORANDUM

TO: Those Listed Below

DATE: December 30, 1980

FROM: Ipe Mathai, Acting Division Chief, EMPPE

SUBJECT: TURKEY - Loan 568-TU - Keban Transmission Project  
- Loan 763-TU - TEK Power Transmission Project  
COMBINED COMPLETION REPORT

Please find enclosed a copy of the combined Project Completion Report for the above Projects. The Report takes account of the comments offered by OED in December 1979 on an earlier version.

## Attachments

Distribution: Messrs. Picciotto (o/r), Haynes, Carmignani, Bart, Ms. Ruggeri, Rajagopalan (PAS-2), Rovani (4), Davar, Rajagopalan, Perera, Drake, Kapur (4), Green, Mathai, K. Jones, Ms. El Saifi

EMENA Files  
Division Black Book  
Division & Chron. Files

IMathai:ms

1097  
12/31

PPAR UNIT COST SHEET

PROJECT: Turkey Power (Lns. 763 & 568)

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Man-Days

PREPARED BY: R. W. Bates 26.13

APPROVED BY: Shiv S. Kapur \_\_\_\_\_

TOTAL OED COST:

Staff 26.13

Consultant -

TOTAL 26.13

DATE: October 26, 1981

PCR Assessment: The quality of the original PCR was unacceptable and was returned to the Region in December 1979. The quality of the revised version (submitted to OED in December 1980) is no more than mediocre but accepted as adequate.

PROJECT PERFORMANCE AUDIT REPORT

TURKEY: KEBAN TRANSMISSION PROJECT (LOAN 568-TU) AND  
TEK POWER TRANSMISSION PROJECT (LOAN 763-TU)

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PROJECT PERFORMANCE AUDIT REPORT

TURKEY: KEBAN TRANSMISSION PROJECT (LOAN 568-TU) AND  
TEK POWER TRANSMISSION PROJECT (LOAN 763-TU)

PREFACE

This report presents the results of a performance audit of the Keban Transmission and TEK<sup>1/</sup> Power Transmission projects, for which Loans 568-TU and 763-TU were approved in October 1968 and June 1971 in the sums of US\$25 million and US\$24 million respectively. Loan 568-TU was closed in August, 1974 and Loan 763-TU in June, 1976. Both loans were fully disbursed.

The Project Performance Audit Report (PPAR) consists of a Project Performance Audit Memorandum (PPAM) prepared by the Operations Evaluation Department (OED) and a Project Completion Report (PCR) prepared by the Europe, Middle East and North Africa Regional Office. TEK's final reports on Loans 568-TU and 763-TU are included as part of the PCR (Attachments 1 and 2). The two projects have been covered in a combined PPAR since they shared common institutional and financial objectives and the physical works in both cases were part of an integrated development of the national transmission grid; in the event, the projects also faced similar experiences and problems which are especially noteworthy in so far as they cover an important period in the evolution of the power sector in Turkey and they lead to a number of general conclusions regarding the role of the Bank in that evolution.

A first draft of the PCR was submitted to OED in June 1978, taking into account information gathered during a completion mission to Turkey in January 1977, the final reports written by the borrower in January 1977, and supplementary information provided by the borrower on later occasions. OED reviewed this first draft and discussed it with the government and the Borrower in November 1978, during the course of a country visit carried out for OED's Supervision Study<sup>2/</sup>. Subsequently, OED suggested a number of ways in which the PCR should be modified; in December, 1980, the Region revised the PCR and further minor changes were made in the PCR during the auditing process.

OED has reviewed the final version of the PCR, the Appraisal and President's Reports, the minutes of the Board discussions, the loan documents, supervision reports and other documents in Bank files. Based upon this

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1/ Turkiye Elektrik Kurumu (the Turkish Electricity Authority).

2/ Operational Policy Review: The Supervision of Bank Projects (Report No. 2858 of February, 1980).

review, discussions with Bank staff, the findings of the Supervision Study and the discussions which took place with the government and borrower in Turkey in November, 1978, the PPAM agrees with the principal analysis and conclusions in the PCR.

Section I of the PPAM provides a summary of the experience under Loans 568-TU and 763-TU. Section II relates the physical objectives of the projects to their sectoral context and introduces two additional issues (monitoring project costs and the international aspects of Loan 568-TU). Furthermore, to reach a broader understanding of the Bank's role in the power sector in Turkey, Section II considers more fully the institutional and financial objectives which were articulated at the time of appraisal of Loans 568-TU and 763-TU; it links those objectives to the progress which had already been achieved during the period of project preparation; and it shows how the Bank pursued them through subsequent loans to the power sector and through its structural adjustment lending. Finally, in the light of Section II, conclusions are drawn in Section III of the PPAM on the extent to which the original objectives were realistic, the extent to which they were achieved, and the extent to which their achievement was constrained by influences extending beyond the scope of a series of conventional project loans.

Following normal OED procedures, a draft copy of this report was sent to the Government and TEK for comments. Those replies which were received are reproduced as appendices to the PPAM.

PROJECT PERFORMANCE AUDIT BASIC DATA SHEET

TURKEY: KEBAN TRANSMISSION PROJECT  
(LOAN 568-TU)

KEY PROJECT DATA

<u>Item</u>	<u>Appraisal Estimate</u>	<u>Actual</u>
Total Project Cost (US\$ million)	35.9	73.0
Overrun (%)	-	103%
Loan Amount (US\$ million)	-	25.0
Disbursed	-	25.0
Cancelled	-	Nil
Date Physical Components Completed	6/72	10/76
Proportion Completed by Appraisal		
Target Date (%)	100	60
Proportion of Time Overrun (%)	-	118
Incremental Financial Rate of Return (%)	N/A	N/A
Financial Performance	8% rate of return on re-valued assets. from 1970.	Achieved in 1972 but not thereafter.
Institutional Performance	-	Sector objectives reasonably successful but performance of TEK disappointing in respect of staffing and management.

Cumulative Estimated and Actual Disbursements  
(US\$ million)

	<u>As of December</u>	<u>1968</u>	<u>1969</u>	<u>1970</u>	<u>1971</u>	<u>1972</u>	<u>1973</u>	<u>1974</u>
(i) Appraisal Estimate	1.8	15.6	20.4	25.0	25.0	25.0	25.0	25.0
(ii) Actual	-	7.5	14.0	17.7	20.9	24.1	25.0	
(ii) as % of (i)	-	48	68	70	83	96	100	

OTHER PROJECT DATA

<u>Item</u>	<u>Original Plan</u>	<u>Revisions</u>	<u>Actual</u>
First Mention in Files or Timetable	-	-	11/29/61
Government's Application	-	-	-
Negotiations	-	-	10/09/68
Board Approval	-	-	10/29/68
Loan Agreement	-	-	10/31/68
Effectiveness	01/06/69	-	01/06/69
Closing Date	09/30/72	Four Times	08/31/74
Borrower	-	Republic of Turkey	
Executing Agency	-	Turkiye Elektrik Kurumu (TEK) as successor to ETIBANK	
Fiscal Year of Borrower	-	Calendar Year	
Follow-on Project Name	-	TEK Power Transmission Project	
Loan Number	-	763-TU	
Amount	-	US\$24.0 million	
Loan Agreement	-	June 22, 1971	

MISSION DATA

	<u>Month, Year</u>	<u>No. of Weeks</u>	<u>No. of Persons</u>	<u>Man-weeks</u>	<u>Date of Report</u>
Identification	-	-	-	-	N/A
Preparation	-	-	-	-	N/A
Preappraisal	-	-	-	-	-
Appraisal	01/68	<u>4</u>	<u>2</u>	<u>8</u>	10/14/68
Total		<u>4</u>	<u>2</u>	<u>8</u>	
Supervision I	08/69	2	1	2	09/09/69
Supervision II	10/69	2	1	2	10/21/69
Supervision III	10/70	4	3	12	12/29/70
Supervision IV	09/71	1	2	2	10/22/71
Supervision V	02/72	1	1	1	02/16/72
Supervision VI	10/72	1	1	1	10/31/72
Supervision VII	09/73	0	1	0	None
Supervision VIII	11/74	0	2	0	None
Supervision IX	03/76	1	3	3	04/07/76
Supervision X	10/76	1	2	2	11/24/76
Completion	01/77	<u>1</u>	<u>1</u>	<u>1</u>	N/A
Total		<u>14</u>	<u>18</u>	<u>26</u>	

COUNTRY EXCHANGE RATES

Name of Currency (Abbreviation)		Lira (LT)
Appraisal Year Average	- 1968	US\$1 = LT 9.08
Intervening Years Average	- 1969	US\$1 = LT 9.04
	- 1970	US\$1 = LT 11.25
	- 1971	US\$1 = LT 14.86
	- 1972	US\$1 = LT 14.15
	- 1973	US\$1 = LT 14.15
	- 1974	US\$1 = LT 13.93
	- 1975	US\$1 = LT 14.44
Completion Year Average	- 1976	US\$1 = LT 16.05

PROJECT PERFORMANCE AUDIT BASIC DATA SHEET

TURKEY: TEK POWER TRANSMISSION PROJECT  
(LOAN 763-TU)

KEY PROJECT DATA

<u>Item</u>	<u>Appraisal Estimate</u>	<u>Actual</u>
Total Project Cost (US\$ million)	67.1/a	Probably double original/b
Overrun (%)	-	Probably 100%
Loan Amount (US\$ million)	-	24.0
Disbursed	-	24.0
Cancelled	-	Nil
Date Physical Components Completed	09/74	6/77
Proportion Completed by Appraisal Target Date (%)	100	70
Proportion of Time Overrun (%)	-	85
(Incremental) Internal Rate of Return (%)	13.4	3
Financial Performance	8% rate of return on re-valued assets from 1972.	Achieved in 1972 but not thereafter.
Institutional Performance	-	Sector objectives reasonably successful but performance of TEK disappointing in respect of staffing and management.

Cumulative Estimated and Actual Disbursements  
(US\$ million)

<u>As of December</u>	<u>1971</u>	<u>1972</u>	<u>1973</u>	<u>1974</u>	<u>1975</u>	<u>Sept. 1974</u>
(i) Appraisal Estimate	6.3	15.1	22.8	24.0	24.0	24.0
(ii) Actual	.02	3.2	9.9	16.8	23.0	24.0
(ii) as % of (i)	.3	21	43	70	96	100

/a To this figure could be added \$3.9 million of foreign cost which was financed from other foreign credits in respect of imports of steel from Japan and medium voltage transformers from Romania.

/b See PPAM para 32 and PCR para. 6.04.

OTHER PROJECT DATA

<u>Item</u>	<u>Original Plan</u>	<u>Revisions</u>	<u>Actual</u>
Appraisal	-	-	9/70
Negotiations	-	-	05/05/71
Board Approval	-	-	06/15/71
Loan Agreement	-	-	06/22/71
Effectiveness	09/15/71	09/15/71	10/04/71
Closing Date	03/31/75	12/31/75	06/30/76
Borrower	Turkiye Elektrik Kurumu (TEK)		
Executing Agency	Turkiye Elektrik Kurumu (TEK)		
Fiscal Year of Borrower	Calendar Year		
Follow-on Project Name	Elbistan Lignite Mine and Power Project		
Loan Number	1023-TU		
Amount	US\$148.0 million		
Loan Agreement	6/28/76		

MISSION DATA

	<u>Month, Year</u>	<u>No. of Weeks</u>	<u>No. of Persons</u>	<u>Man-weeks</u>	<u>Date of Report</u>
Identification	-	-	-	-	N/A
Preparation	-	-	-	-	N/A
Preappraisal	-	-	-	-	N/A
Appraisal	-	<u>4</u>	-	<u>8</u>	05/28/71
Total		<u>4</u>	-	<u>8</u>	
Supervision I	08/71	2	2	4	10/22/71
Supervision II	02/72	2	1	2	14/11/72
Supervision III	09/73	2	1	2	-
Supervision IV	11/74	0	2	0	-
Supervision V	03/76	1	3	3	04/07/76
Supervision VI	10/76	1	2	2	11/24/76
Completion	02/77	<u>1</u>	<u>1</u>	<u>1</u>	N/A
Total		<u>9</u>	<u>12</u>	<u>14</u>	

COUNTRY EXCHANGE RATES

Name of Currency (Abbreviation)		Lira (LT)
Appraisal Year Average	- 1970	US\$1 = LT 15
Intervening Years Average	- 1971	US\$1 = LT 14.86
	- 1972	US\$1 = LT 14.15
	- 1973	US\$1 = LT 14.15
	- 1974	US\$1 = LT 13.93
	- 1975	US\$1 = LT 14.44
Completion Year Average	- 1976	US\$1 = LT 16.05

PROJECT PERFORMANCE AUDIT REPORT

TURKEY: KEBAN TRANSMISSION PROJECT (LOAN 568-TU) AND  
TEK POWER TRANSMISSION PROJECT (LOAN 763-TU)

HIGHLIGHTS

Loans 568-TU and 763-TU were the Bank's first two loans to TEK and its predecessor Etibank and provided foreign exchange to help finance necessary transmission work in Turkey's main interconnected power system. Both projects met their physical objectives (PPAM para. 7, PCR para. 6.03) but with long implementation delays and large cost overruns (PPAM paras. 3-5, PCR paras. 3.01-3.02 and Attachments 1 and 2).

Recurrent deficiencies in the overall power supply situation combined with an underlying growth in demand which fell short of expectations led to an increase in energy sales over the project period which was 19% lower than projected at appraisal (PPAM para. 6, PCR Attachments 4 and 5). This in turn, when taken with delays in project implementation and tariff increases which did not keep pace with increases in costs, caused the reestimated incremental financial rate of return (IFRR) on the TEK Power Transmission project to fall to 3% compared with 13% estimated at appraisal. No IFRR was calculated at appraisal for the Keban Transmission project (PPAM para. 7, PCR para. 6.02). Delays in the implementation of the two transmission projects do not appear to have contributed to the deficiencies in power supply, which stemmed mainly from shortages of generating plant caused by delays in TEK's construction program and by outages (PPAM paras. 3, 6).

The preparation, appraisal and implementation of these two projects covered a particularly interesting period in the evolution of the power sector in Turkey and represented the earlier stages of a substantial and continuing effort by the Bank to participate in institution building and the improvement of sector policies in pricing and finance. The results were mixed and in no small measure influenced adversely by the wider economic, social, political and legal structure of the country (PPAM para. 39). Through the projects, a significant step forward was taken in improving the overall organization of the power sector (PPAM para. 27). However, TEK has not achieved reasonable autonomy in management and staffing (PPAM para. 30) and it has not been able to pursue pricing policies which would place it on a sound financial footing. The rate of return on assets and internal cash generation in consequence fell well short of expectations (PPAM para. 11, PCR paras. 5.01-5.03). TEK has also suffered from liquidity problems, due largely to high accounts receivable with respect to municipalities (PPAM para. 11, PCR para. 5.04).

Other points of particular interest are:

- substitution of a cash generation covenant for a rate of return covenant in a follow-on project (PPAM para. 25);
- management and staffing problems (PPAM paras. 30-31, PCR paras. 3.01, 7.01-7.02 and Attachments 1 and 2);
- difficulty in monitoring actual project costs (PPAM paras. 32-33, PCR para. 6.04);
- international aspects of the Keban hydroelectric project (PPAM para. 34);
- Bank supervision of the projects (PPAM paras. 12 and 35, PCR para. 3.04);
- TEK completed the Keban Transmission project by Force Account, which provided valuable experience to the organization, for example in implementing the follow-on project (PCR para. 3.01 and Attachment 1).

what is the point of interest?  
see comments on Colombia Telecom draft PPAR

This is a much better presentation, which tells reader what the point is and why it is noted.

Shouldn't the Highlights add a sentence, or a brief paragraph, underlining the "lesson" of these projects, which could be said to confirm the lessons of other projects on the subject of institutional reform: appraisals tend to be over-optimistic about what is feasible, "autonomy" is difficult because it is highly political and may have to be pursued in stages, as has turned out to be the case here, and over a series of operations (as has been said before!)

## PROJECT PERFORMANCE AUDIT REPORT

### TURKEY: KEBAN TRANSMISSION PROJECT (LOAN 568-TU) AND TEK POWER TRANSMISSION PROJECT (LOAN 763-TU)

#### I. PROJECT SUMMARY

1. Bank involvement in the power sector in Turkey dates back nearly 30 years; over this period, there have been ten loans, three credits and a technical assistance grant (see Appendix 1). Initially, Bank operations focussed on projects in the area served by the Cukurova Electric Company (CEAS) and two of these projects, supported by Loans 623-TU and 775-TU, have already been the subject of performance audits<sup>1/</sup>. Since the formation of a syndicate of lenders in 1965 to finance the Keban dam, under the chairmanship of the Bank, the Bank increasingly turned its attention to the country's main interconnected power system, operated by Etibank and (from 1970) by its successor, TEK. Loans 568-TU and 763-TU were the first two of a series of loans reflecting this change in lending strategy.

2. For Loan 568-TU, made in 1968, Etibank was the beneficiary. The project consisted of 1460 km of extra-high voltage (EHV) transmission lines linking Ankara and Istanbul with the Keban hydroelectric plant, then under construction. The first four units of Keban, with a combined capacity of 620 MW, were expected to be in operation late in 1971 or early in 1972. The main parts of the Keban Transmission project were scheduled to be completed in time for the commissioning of the first unit with overall completion of the project planned for June 1972. Loan 763-TU was made to TEK in 1971 and helped to carry the development of the national grid a stage further by financing a time slice of TEK's 1971-74 transmission construction program. The principal works were about 4,000 km of 154 kV and 30 kV lines, 1,500 MVA of substations and other equipment. Planned completion of the TEK Power Transmission project was in September 1974.

3. While the Keban Transmission project experienced implementation delays, the essential components were completed by September 1974, in time for the commissioning of the Keban hydroelectric plant, which was also delayed. Final completion of the overall transmission project took place in October, 1976, more than four years behind schedule. Initially, the transmission project was delayed by difficulties with a contractor, who encountered financial problems and had to abandon the work, after which TEK completed the project by force account (PCR para. 3.01 and Attachment 1). Also, according to TEK (PCR Attachment 1), project implementation was deliberately slowed down in the earlier stages to avoid unnecessary investments in view of the delay in

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<sup>1/</sup> Project Performance Audit Report on the Third and Fourth Cukurova Power Projects (Report No. 1372 of November 30, 1976).

completion of the Keban power station. Subsequently, TEK suffered management problems and a shortage of skilled staff, which caused further delays (PCR Attachment 1). The project has fulfilled its main purpose of transmitting energy from Keban to the principal load centers in Ankara and Istanbul but technical problems have been experienced, notably ice loading between Ankara and Istanbul and unexplained oscillations in the power system. Following design changes and further work and study by TEK, its consultants and the manufacturers, these problems have been resolved or substantially reduced (PCR paras. 3.01, 3.03 and Attachment 1).

4. The TEK Power Transmission project was also delayed, by nearly three years, actual completion taking place in June 1977. This delay was partly caused by the same management and staffing difficulties which afflicted the Keban Transmission project. As envisaged at appraisal, there were a number of minor revisions in scope during the course of implementation, in order to adjust the individual project elements to the actual pattern of system growth (PCR para. 3.02 and Attachment 2).

5. Both projects experienced cost overruns of about 100%, although no accurate determination of the final total cost is possible and the PCR is unable to provide any breakdown of the total into main components (PPAM para. 32). The principal factors underlying the cost overruns are: the delays in implementation; local and international inflation; currency realignments; and TEK's management and staffing difficulties (PCR Attachments 1 and 2).

6. Total energy sales over the period 1970-77 were 19% lower than projected, partly because the underlying growth in demand fell short of expectations, due to a general slowdown in industrial and economic activity and the failure of certain specific large industrial loads to materialize as planned; superimposed on this were recurrent shortages of generating plant, caused by construction delays and outages (PCR Attachments 4 and 5). As a result, the level of energy sales forecast for 1974 (the original planned completion date) was not reached until 1977; consequently, the delay in implementing the TEK Power Transmission project does not appear to have affected the overall power supply situation<sup>1/</sup>.

7. At the time of appraisal, the projects were justified as integral and essential parts of TEK's long-term transmission system development; although energy sales grew more slowly than projected at appraisal, in retrospect the need for the projects has been confirmed (PCR Attachments 1 and 2). However, since it is not possible to justify transmission projects of this kind in isolation from other investments in the power system, the benefits of the projects are not separately quantifiable. For this reason, no incremental financial rate of return (IFRR) was calculated at appraisal for the

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<sup>1/</sup> This view seems to be supported by TEK. See PCR, Attachment 1.

Keban Transmission project. As part of the appraisal for the TEK Power Transmission project, an IFRR was calculated on the whole 1971-74 time slice of TEK's investment program, including generation as well as transmission, yielding an IFRR of about 13%. The IFRR recalculated on a similar basis for the actual implementation period is about 3%. This reduction in the estimated IFRR is due to the delay in project implementation, growth in energy sales slower than projected and tariff increases which did not keep pace with increases in capital and operating costs (PCR para. 6.02).

8. Aside from the projects' essential physical works, Loans 568-TU and 763-TU had important institutional and financial objectives, which, if achieved, would have had far reaching effects on the power sector. Principally, the sector was to be reorganized and consolidated, by integrating power facilities at the bulk supply level within a national power authority, that authority was to be given reasonable institutional autonomy and it was to be placed on a sound financial footing. As a parallel effort, supporting the same objectives, the Bank made a technical assistance grant in 1965 (PPAM paras. 16-17).

9. Reasonable progress towards these institutional and financial goals had already been made by the time the Keban Transmission project was appraised, with the administrative consolidation of power activities within Etibank, the drafting of a law to create TEK, and the appointment of consultants to undertake the first stage of the technical assistance grant. A requirement for Etibank to earn an 8% rate of return on revalued assets was included in the loan documents for Loan 568-TU (PPAM paras. 16-18). When the TEK Power Transmission project was appraised, the TEK law had been passed. While it differed in several respects from the Bank's original expectations, it included the requirement for TEK to earn an 8% rate of return on revalued assets and it represented a significant step forward in improving the overall organization of the sector by bringing together, within a national power authority, the responsibility for generation and transmission, with only minor exceptions. These achievements should not be underestimated, although coordination with the State Hydraulic Works (Devlet Su Iseri or DSI) needs to be improved and distribution remains in the hands of municipalities (PPAM paras. 16-21, 27).

10. Notwithstanding these achievements, reasonable autonomy for TEK has not been achieved and TEK has not been placed on a sound financial footing, although several important improvements have been made in specific areas related to management, planning and finance (PPAM paras 37-38). To some extent, the limitations on TEK's autonomy were known or anticipated when Loans 568-TU and 763-TU were approved and indeed were acknowledged as being among the more important ways in which the TEK law differed from the Bank's original expectations. For example, the appraisal report for Loan 763-TU recognized that, as a State Economic Enterprise (SEE), TEK was subject to controls in the area of pricing and staffing. Nevertheless, even granted the fact that TEK was a new entity, the appraisal report must be judged in retrospect as overoptimistic in its expectations.

11. The institutional performance of TEK has suffered through a lack of continuity in top management and of experienced middle-level administrative and technical personnel. Financial performance, as measured by the rate of return on revalued assets and by internal cash generation, has suffered as a result and also because of inadequate tariffs, delayed commissioning of projects and slower-than-expected sales growth. Only in 1972 did TEK come close to meeting its rate of return requirement while internal cash generation was well below the levels estimated at appraisal, so that TEK has been unable to support a reasonable proportion of its own investment program. A further problem has been liquidity, due largely to TEK's inability to collect revenues from municipalities for electricity sold to them (PCR para. 5.04). The problem of accounts receivable was recognized at appraisal in both projects but no specific measures were proposed. Subsequently, direct efforts to reduce municipal overdues have been made in the context of follow-on projects and the government has taken steps as result of these efforts but the problem persists.

12. Bank supervision of Loans 568-TU and 763-TU was satisfactory. Supervision missions visited Turkey on average about every 10 months for Loan 568-TU and about once a year in the case of Loan 763-TU. In addition, there were frequent country visits related to the preparation, appraisal and supervision of follow-on projects (PPAM para. 35 and PCR, para. 3.04).

## II. SUPPLEMENTARY COMMENTS AND MAIN ISSUES

### The Projects and the Sector Development Program

13. In 1968, Turkey was implementing a long-term development program of generation and transmission for the power sector. Investment expenditures related to this program for the period 1968-72 were identified in the Government's second Five-Year Plan and amounted to nearly US\$1 billion, of which Etibank and DSI accounted for 38% and 43% respectively, while the balance (19%) consisted of extensions to the CEAS system, municipal systems and rural electrification. A major element in the DSI program was completion of the Keban hydroelectric station, on which the main civil works had started in 1966, following the formation of a Syndicate of lenders under the chairmanship of the World Bank (PCR para. 1.05). Other members of the Syndicate were France, Germany, Italy, U.S.A. and the European Investment Bank. An important part of Etibank's program was the construction of a national interconnected transmission system, comprising a 380-kV EHV grid to supplement a 154-kV system then in existence. The Keban Transmission project, with a total estimated cost of US\$35.9 million, was part of the first stage of this EHV system development, consisting of transmission lines and related substations to connect the Keban hydroelectric station with the principal load centers in Ankara and Istanbul. Thus, Loan 568-TU accounted for about 10% of Etibank's total capital development program for the period 1968-72 and represented IBRD's contribution to the Keban project; other members of the Syndicate

financed the dam, power house and related facilities. It was expected, when Loan 568-TU was appraised in January 1968, that the first four units of the Keban station, with a combined installed capacity of 620MW, would be in operation late in 1971 or early in 1972.

14. Loan 763-TU financed a project to carry the development of the national grid a stage further, by the construction of various links and additions which would unite or strengthen existing installations. At the time of appraisal, in September 1970, planned investment for the power sector during the period 1971-77 was approaching US\$1.5 billion. TEK, having succeeded Etibank, was scheduled to implement works amounting to one-half the program, while DSI would undertake some 43%; distribution works by municipalities and generation and transmission facilities to be constructed by CEAS were the remaining works in the sector program, accounting for 7% of the total. TEK's 1971-77 investment program included the second stage development of the EHV system, additions to the 154-kV system and work on lower voltage lines. On completion of the 1971-77 program, all major distribution systems and generating stations in the country would be interconnected. The TEK Transmission project, with a total estimated cost of US\$65.1 million, was a time-slice of this program, covering the transmission construction envisaged in the period 1971-74 and accounting for nearly 10% of TEK's total 1971-77 investment requirements.

#### Institutional and Financial Objectives

15. From an institutional point of view, the Turkish power sector at the time of appraisal of the Keban Transmission project was fragmented and complex. Four state organizations (EIEI<sup>1/</sup>, Etibank, Iller Bank and DSI), a half-dozen or so private companies (the largest of which was CEAS), a large number of private industrial firms and more than 600 municipalities and villages were involved with generating, transmitting and distributing electricity in Turkey. EIEI was a planning and statistical organization for the whole of the electrical supply industry; Etibank put into effect the plans for development initiated by EIEI; Iller Bank assisted municipalities and villages with the finance and construction of their electricity systems; and DSI developed and operated multipurpose hydroelectric projects in cooperation with EIEI.

16. A key objective of the Bank and other members of the Keban syndicate was to help the government reorganize and consolidate the electric power sector and place it on a sound financial footing. To this end, legislation was drafted with the assistance of the Bank and placed before Parliament in December 1966 to create TEK as the sole generating and transmitting agency of the government, with control of its own planning and development and powers to take over municipal systems if requested by the municipalities. At

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<sup>1/</sup> Elektrik Isleri Etut Idaresi.

the time of appraisal of Loan 568-TU, it was expected that the legislation would be passed later in 1968 or early in 1969. Meanwhile, as a first step, an interim reorganization became effective on January 1, 1968, under which all of Etibank's power activities were consolidated by administrative action into the Etibank Power Group. Although not a separate legal entity, the Power Group was a distinct enterprise with its own budgeting and accounting arrangements; it assumed responsibility for operating the DSI hydroelectric stations and had transferred to it from EIEI responsibility for most electric planning activities. DSI was to secure Etibank's agreement before beginning the construction of new hydroelectric installations within Etibank's service areas. Similarly, no municipality connected to Etibank's system or which could be supplied more economically by Etibank would be permitted to build or extend its own generating plant in future.

17. A further measure to help reorganize the electric power sector was the 1965 technical assistance grant of US\$1.95 million, which covered the foreign exchange costs of consultants to assist the government in making the transition to TEK. Specifically, the following objectives were to be achieved: centralized dispatching of power; centralized planning and coordination of construction programs; and management of the industry in accordance with commercial and industrial practices, including appropriate accounting systems.

18. The goal of placing the power sector on a sound financial footing led to agreement on an acceptable financial rate of return on the realistic net value of the fixed power assets in service, whether owned or merely operated by the Power Group. Tariffs were to be set so as to achieve a minimum rate of return of 8% after taxes on a realistically valued asset base, commencing with 1970, any shortfall in one year being made up in the following year. However, because of the relatively large amount of new power assets coming into service with Keban in 1971 and 1972, it was also agreed that a 7% rate of return would be acceptable for the year in which Keban came into service and for the next two years. Acknowledging the uncertainty about when asset revaluation could take place, the Bank and Etibank agreed during negotiations on an 'ad hoc' basis for adjusting the book value of assets and Etibank was given the option to have revaluation based on the outcome of a consultant's study.

19. In the event, the TEK law was passed in July 1970 and became effective as Law No. 1312 in October of the same year, when TEK took over the Power Group of Etibank and commenced operations. The work of the consultants hired under the technical assistance grant by this time was well under way; the first phase had been completed and reports issued, covering a new system of accounts, budgeting and reporting, and purchasing and stores procedures. Consultants had also been hired for the second phase, which involved helping TEK to implement the proposals which had been made in the first phase and recommending a scheme for the revaluation of assets.

20. TEK, like Etibank, was established as a SEE and therefore subject to Law 440, passed in 1964. SEEs are supposed to be run on commercial lines and are subject to taxation like private joint stock companies but in practice they have been closely supervised by government and their autonomy has been limited with regard to framing personnel policies and structuring salary scales and the government has played an active role in determining the prices of their goods and services. Originally, when the Bank assisted the government in drafting the TEK Legislation, it had envisaged that TEK would be granted autonomy in its personnel policies, with freedom to hire and fire personnel of all ranks and to set salary and wage levels which would ensure the appointment and retention of competent personnel. In addition, TEK was to determine its own tariffs, subject to government approval only according to rules which would be clearly defined in the TEK law. These principles were spelled out in Minutes of Agreement between the Bank and the government early in 1966. As finally approved, the TEK law required TEK's personnel policies to conform to the general personnel policy prescribed by government for all SEEs. Furthermore, a Decree of 1967 removed the freedom of certain SEEs, including the electricity industry, to determine prices and made them subject to approval by the Council of Ministers.

21. These limitations on TEK in the areas of staffing and tariffs due to its status as a SEE were known or anticipated at the time of appraisal of Loan 568-TU. They were again acknowledged in the appraisal report for Loan 763-TU but it was concluded that TEK did enjoy sufficient autonomy in staffing to permit efficient utilization of manpower and to attract competent employees. With regard to tariffs, TEK's position was to be safeguarded by: (i) extending the rate of return covenant from Loan 568-TU, with certain modifications; (ii) providing that the fuel-cost adjustment clause in TEK's supply contracts, which recovered increases in fuel costs from consumers automatically, would be retained and enforced; and (iii) making a 60% tariff increase a condition of loan effectiveness. The modifications to the rate of return covenant permitted TEK to make up a shortfall in its rate of return in two years rather than in the following year but removed the concession allowing a temporary drop in the rate of return to 7% following the commissioning of Keban, since it was no longer thought to be necessary. The appraisal report further recognized that the 'ad hoc' basis for asset revaluation agreed upon at the time of Loan 568-TU was inappropriate due to the 1970 currency devaluation and the omission of DSI assets taken over by TEK. For the purpose of Loan 763-TU, the Bank agreed with TEK and the government on an updated method of asset revaluation, to be effective by December 31, 1972 and subsequently modified in the light of the recommendations of the consultants hired for the second phase of the technical assistance grant; these recommendations were expected in 1972 and were to be used for computing the rate of return from 1973 onwards. It should be noticed that the 8% rate of return requirement in Loan 568-TU had also been made part of the TEK law; since the method of computing the return was not specified in the law, it was clarified in the loan agreement for Loan 763-TU.

## Financial Results

### (1) Revaluation of assets.

22. TEK did not adjust its books by December 31, 1972 to reflect agreed asset values. Furthermore, although the recommendations of the consultants appointed for the second phase of the technical assistance grant were issued in April 1972, those recommendations were not acted upon to revalue assets from 1973 onwards. Actual revision of TEK's books, therefore, to reflect asset values in accordance with the consultants' recommendations as of December 31, 1973, was made a condition of effectiveness of the subsequent loan to TEK for the Elbistan Lignite Mine and Power project (Loan 1023-TU). Although the revaluation action was late by more than two years, TEK did revalue its assets for 1973 and 1974 by the middle of 1975, according to principles accepted by the Bank, and this did not delay the effectiveness of Loan 1023 which hinged on the rate of return question.

### (ii) Rate of return and tariffs.

23. A tariff increase took place in July 1971 (although it was 50% rather than 60%), as a result of which TEK came close to earning its 8% rate of return in 1972 for the first and last time (PCR para. 5.01). No further tariff action took place, aside from the application of the fuel-cost adjustment clause, until June 1976. In the meantime, the Bank appraised two further projects - the Elbistan project in late 1973 and the Second TEK Power Transmission project (Loan 1194-TU) in late 1974. Details of the events relating to the tariff question, from 1974 until the end of 1979, have been described in the case study for the Elbistan project contained in OED's Supervision Study and in the PCR (para. 5.01) so that only an outline of the events is given here.

24. Board approval for the Elbistan project took place in June 1974 but as a condition of effectiveness it was agreed that TEK would take specific steps to increase tariffs to yield an estimated rate of return of 5.4% for 1975 and further tariff increases would be implemented to produce a rate of return of 8% for 1976 and thereafter. Board presentation of the Second TEK Power Transmission project was delayed pending the agreed action. In view of the macroeconomic situation, the tariff increases did not materialise but a compromise was reached in the fall of 1975 whereby TEK would be permitted to earn a 6% rate of return in 1976 and 8% thereafter. With this understanding, the Second TEK Power Transmission project was presented to the Board and approved in November 1975. Continuing difficulties with inflation and other internal problems in fact delayed action on tariffs until June 1976, at which time Loan 1023-TU became effective and Loan 1194-TU was signed. The effectiveness of Loan 1194-TU was, however, postponed pending further action to permit TEK to earn an 8% return commencing in 1977. Tariff increases were effected in 1977 but TEK's rate of return continued to fall short of the covenanted 8%. After intense discussions, the Bank agreed in April 1978 to waive the rate of return covenant on the understanding that tariffs would be increased gradually to yield an 8% return by 1982. Based on this agreement, Loan 1194-TU became effective in April 1978.

25. Since 1978, the government has requested (in 1979) the substitution of a cash generation covenant for the rate of return covenant and in conjunction with the Karakaya Hydropower project (Loan 1844-TU approved in May 1980), the Bank acceded to the request with effect from 1981 <sup>1/</sup>. A further major development was the new economic policy package announced by the government in January 1980, shortly before the Bank's first structural adjustment loan (approved in March 1980). According to the announcement, most price controls on SEEs were abolished and the SEEs are now required to cover operating costs and generate sufficient funds towards their own investment needs. An exception was made for electricity tariffs charged for aluminum and ferrochrome production but the government is to reimburse TEK for any losses which it may incur as a result. Immediately after the announcement, in February 1980, electricity tariffs were increased nearly 130% above April 1979 levels.

(iii) Fuel-cost adjustment clause.

26. Given the government's reluctance to approve general increases in TEK's tariffs, the fuel-cost adjustment clause proved to be an important vehicle for TEK to offset at least some of its cost increases, especially after the 1973 international oil price increases (PCR para. 4.02). Automatic application of the clause was repeated as a covenant in Loan 1023-TU. Contrary to these agreements, the clause was eliminated from TEK's tariffs at the time of the increase in June 1976. The clause was reinstated in 1977, following representations from the Bank, but technically it is no longer automatic and needs the approval of the Ministry of Energy and Natural Resources for its application. This is a departure from the principles of Loan 763-TU even though in practice the Ministry has apparently confined its attention to verifying the details of TEK's calculations and has given its approval, at least until 1980.

Institutional Development

27. At the sectoral level, the efforts to bring about greater coordination and consolidation of power activities, which were initiated during the preparation of the Keban project and which gained momentum thereafter, have met with a considerable measure of success. A first step was the administrative consolidation of power activities within Etibank (PPAM para. 16). Following passage of the TEK law in 1970, in place of four state organizations responsible for power sector development (PPAM para. 15), there are now two - TEK and DSI. EIEI has become a study and research institute, mainly involved in geological investigations and hydrological studies, although it also acts as a consulting agency for TEK and DSI. TEK is charged with the responsibility for the general electrification of Turkey, the construction of thermal

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<sup>1/</sup> The Bank itself had recognized for some time that the substantive issue for TEK was one of internal cash generation for the self-financing of investment rather than formal compliance with the rate of return covenant. See, for example, the Appraisal Report for the Elbistan project.

power plants, transmission and distribution networks, rural electrification and the generation and transmission of electricity in bulk. In this role, it has taken over operation of the power stations previously operated by Etibank, DSI, the Municipalities and Iller Bank and is responsible for generation and transmission in 63 of 67 provinces. While there are two concession companies in the other four provinces, the most important being CEAS, they are interconnected with the TEK network and their operations are fully coordinated. TEK now owns more than 90% of total installed generating capacity in Turkey, it accounted for 83% of total generation in 1978 and its interconnected system covers almost the entire country. However, a large number of municipalities - more than 100 - still distribute electricity which they buy in bulk from TEK. DSI continues to plan and build hydroelectric projects but under the TEK law must do so in cooperation with TEK. In practice, TEK is still not sufficiently involved in the identification, selection and design stages for hydroelectric schemes but the problem is being pursued through the Karakaya project, now under implementation.

28. As far as TEK itself is concerned, the appraisal report for Loan 763-TU pointed out that further organizational modifications were required to cope with its increased autonomy and new responsibilities and this would be examined in the third and final phase of the technical assistance grant. With regard to top management, the appraisal report concluded that it was too soon to judge the actual extent of TEK's autonomy. However, in line with the 1966 Minutes of Agreement, it was anticipated that TEK's General Manager would be appointed for five years to ensure stability and continuity in management.

29. The management consultants for the third phase of the technical assistance grant were hired in October 1971 and issued their final report in March 1973. Albeit with a long delay, this has led to improvements in the organization of TEK, notably through the greater decentralization of authority to regional offices.

30. By the time of the Elbistan appraisal, it was clear that management stability and continuity were not being achieved. The appointment of TEK's General Manager is a government prerogative and there were three changes in General Manager in the first four years of TEK's existence. Furthermore, after enactment of a common Personnel Law for SEEs in January 1971, the general staffing situation deteriorated as salaries became even less attractive and acute personnel shortages became evident. By July 1973, 48% of authorized technical positions were vacant and there was an overall shortage of 47%. Also, the turnover of experienced middle-level administrative and technical staff was high as they looked for better opportunities elsewhere. In the context of the Elbistan project, the Bank attempted to ameliorate the problem by having the government agree to the hiring of certain staff on special contract and the appointment of a General Manager for a minimum three-year term. Additionally, the government took some steps to improve the general salary conditions of SEEs in 1975. Nevertheless, staffing problems remain critical.

31. During negotiations for the Second TEK Power Transmission project - by which time the shortage of technical staff had risen to 59% and the overall shortage to 49% - TEK agreed to carry out a detailed manpower study for the period 1977-81 and the Bank reiterated its view that the General Manager of TEK should normally be appointed for a minimum three-year term. Some success was evident in bringing greater continuity to the post of General Manager after 1974, although a major change in TEK's top management, including the General Manager, again took place in the second half of 1978. The manpower study has now been finished and concludes that TEK's manpower problems can only be resolved by a basic SEE reform, e.g., to free the SEEs from the Personnel Law. The new economic policy package of January 1980 (PPAM para. 25) does envisage some substantial changes in the government's approach to the SEEs and subsequent action taken by government in the areas of management and staffing show that a basic reform of the SEEs is now receiving attention. The Bank continues to pursue the matter under the Second TEK Power Transmission project.

#### Monitoring Project Costs

32. Although the loan documents for Loans 568-TU and 763-TU contain the standard requirement that adequate records should be maintained to record the progress and cost of the projects, the PCR is unable to give any breakdown of the actual cost of the two projects or even, in the case of Loan 763-TU, a reasonably accurate estimate of the total. The Bank urged TEK on several occasions to supply data on actual project costs but TEK was unable to do so. The PCR (para. 6.04) gives two principal reasons for this situation: frequent changes in the composition of the project items and difficulty in separating project costs from other ongoing capital works in the development program. Changes in the content of projects of this kind during the course of implementation are not unusual and in the case of Loan 763-TU the appraisal report made it clear that individual components were likely to alter. If the borrower's accounting system is not designed to distinguish the cost of individual project items from non-project items, as seems to have been the case, the problem of estimating actual project costs upon project completion is further compounded. No doubt the acute staffing shortages suffered by TEK aggravated the accounting difficulties.

33. The problem of estimating final project costs was not unique to the two loans under review - it was noticed in seven public utilities projects audited in CY1980<sup>1/</sup> - but the extent of the problem was more serious than encountered with other projects in the past. In future, greater attention should be given at an early stage in the project - preferably at appraisal but certainly no later than the first supervision mission - to ensuring that

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<sup>1/</sup> See, for example, the Project Performance Audit Report on the Guatemala First Telecommunications Project (Loan 792-GU), Report No. 2908 of March 21, 1980.

progressive expenditures on project works will be recorded. In fact, with effect from FY1982, Bank staff are required in all projects to confirm, at the time of appraisal, that an adequate accounting and internal control system exists for the recording and reporting of project-related financial transactions or will exist by the time that project expenditures commence.

#### International Aspects

34. The Bank did not contribute to the financing of the Keban hydroelectric station itself (PPAM para. 13); nevertheless, given the fact that the Keban hydroelectric project would create a large reservoir on the Euphrates River in Turkey, the appraisal report for the Keban transmission project recognized that operation of the Keban dam and reservoir would affect downstream users of Euphrates waters in Iraq and Syria (see map). Discussions between the three riparian countries on the sharing of the Euphrates waters had taken place since 1962. At the request of the Keban Syndicate, the Bank in 1965 undertook a study of international water problems on the Euphrates River, the aim of which was to reach an independent and objective determination of acceptable river flows during reservoir filling, to identify long-term problems and to suggest means of solving them. The study recommended a regime of minimum monthly releases during filling and proposed the establishment of an international tripartite commission for the Euphrates River. Such a commission was not established; neither was any international agreement reached on the use of the Euphrates waters, despite the Syndicate's efforts. However, the Turkish government undertook to use its best endeavours to reach future agreement with Iraq and Syria on water sharing and, according to the President's Report, the government agreed on a regime of controlled flow in the initial filling period of the dam, in light of the study, which was intended to meet the needs of downstream users. The President's Report concluded that any future agreement on the regulation of water releases was unlikely to affect the economics of the project, since the purpose of the dam was to conserve water and the Turkish power system was large enough to be able to absorb all the power generated by the release of downstream users' water requirements, irrespective of the time of release. The Bank continued to pursue the matter of an international agreement thereafter, in the context of the Karakaya and other projects, to bring about negotiations between the riparians to solve the issue, without success so far.

#### Supervision

35. Bank supervision of the two projects was satisfactory. From a technical point of view, neither project was particularly difficult, although some of the EHV construction for the Keban Transmission project was new to Turkey. Bank staff gave what assistance it could in dealing with the technical problems and in helping to overcome the delays caused by the financial problems of the Keban transmission line contractor (PCR para. 3.04). The institutional and financial problems related to TEK were much more intractable and considerable additional effort was devoted by Bank staff to tackling these problems through subsequent lending operations connected with the Elbistan and

Second TEK Power Transmission projects. In the matter of the Bank's reporting requirements, TEK has expressed the view that they were unduly onerous relative to the needs of the project and the competing demands on TEK's staff. TEK has also commented on ways of improving the Bank's disbursement procedures (PCR Attachments 1 and 2).

### III. CONCLUSIONS

#### Physical Objectives

36. Physical achievements under Loans 568-TU and 763-TU were generally satisfactory. While the projects were completed with large time and cost overruns, initial technical problems were encountered and some minor ones persist, both projects were an integral part of TEK's system development and have carried out essential tasks as envisaged. However, the loans also had major institutional and financial objectives; here, the achievements were at best mixed and in certain important ways disappointing.

#### Institutional Objectives

37. At the sectoral level, much was achieved in terms of coordination and consolidation. In bulk power supply, TEK was created and is established as the national authority solely responsible for generation and transmission, with only minor exceptions, although further coordination between TEK and DSI is desirable. Considerable fragmentation still exists at the retail level but the integration of municipal and other local systems was not a goal of these two projects; however, it was not precluded by the institutional changes which occurred and it is in fact currently under consideration<sup>1/</sup>. Within TEK, there have been institutional achievements, for example some training of key accounting and technical staff (PCR para. 7.01 and Attachment 1), a greater decentralization of authority to regional offices and improvements in system planning and procurement. Nevertheless, the fundamental aim of building a reasonably autonomous institution has not been achieved, as seen most noticeably through frequent management changes and the lack of freedom in personnel and tariff policies.

#### Financial Objectives

38. Perhaps most disappointing of all was the very limited progress made towards the achievement of financial objectives. As the PCR points out (para. 7.01), a number of specific improvements were made, albeit with some delays and due in part to the technical assistance grant: principles and

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<sup>1/</sup> See the President's Report for the Second Structural Adjustment Loan (Report No. P-3034-TU of April 20, 1981).

methods of asset revaluation have been agreed and implemented and an adequate accounting and reporting system was established. TEK has furnished audited accounts to the Bank in a reasonably timely manner although, during the period of supervision of Loans 568-TU and 763-TU, the Bank was not satisfied with the way in which the audit was carried out<sup>1/</sup>. These improvements were important in their own right but the key objective of placing TEK on a sound financial footing has not been achieved. Due largely to TEK's lack of freedom in tariff policies, TEK came close to meeting the rate of return target only in 1972 and internal cash generation was always inadequate. Accounts receivable have consistently posed a serious problem and were a prime cause of poor liquidity, which at times has led to TEK's inability to pay suppliers. Even in the application of the fuel-cost adjustment clause, which was of great assistance to TEK, there has been some retreat from the principle of automaticity.

#### The Role of the Bank

39. The case study for the Elbistan project contained in OED's Supervision Study concluded that the Bank and the relevant authorities in Turkey did not substantially disagree over the principles underlying the main objectives of that project and the authorities recognized the long-term value of the institutional and other improvements advocated by the Bank. The fundamental problems which arose stemmed mainly from a difference in approach towards the time horizon over which the agreed principles could be implemented and from the fact that many problems were related to the broader economic, social and legal structure of Turkey, particularly as it affected the SEE system. Furthermore, the problems had to be viewed against a background of sensitive political developments and a period of growing economic difficulties. These same conclusions are valid for Loans 568-TU and 763-TU since their key institutional and financial objectives were no different from those incorporated in the Elbistan project.

40. While the impact of exogenous influences - notably world and national economic and political events - on the achievement of the projects' objectives could not reasonably have been foreseen, the Bank was to an extent at least aware of the structural problems at the time of appraisal of Loans 568-TU and 763-TU. In particular, the appraisal reports pointed to the restrictions imposed upon TEK in the areas of tariffs and personnel policies due to its status as a SEE (PPAM para. 21). However, in retrospect it can be concluded that the Bank was over-optimistic about the achievements which were

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<sup>1/</sup> Standard covenants requiring the submission of audited accounts in a manner satisfactory to the Bank were included in Loans 568-TU and 763-TU. A discussion of Bank experience with TEK's audit procedures can be found in OED's Supervision Study. According to the appraisal report for the Karakaya project, the audit provisions for TEK's accounts are now satisfactory to the Bank.

possible in the context of conventional project loans, partly no doubt because TEK was a new organization even at the time when the second of the two loans was approved.

41. In the event, the magnitude of the problems and the structural resistance to change proved to be too great; ultimately the Bank accepted that there were clear limits to the persuasion which it could exercise, despite the considerable influence which might be expected to flow from its involvement in the Elbistan and the Second TEK Power Transmission projects. The effectiveness of the Elbistan loan and the presentation, signing and effectiveness of the Second TEK Power Transmission loan were all delayed with at best limited results (PPAM para. 24). Hence, by remaining active in the power sector, it was necessary for the Bank to respond flexibly to the sector's problems, to address the broader structural problems in so far as it could and to look for institutional improvements over a longer time horizon: the role of the Bank should be judged in this light.

42. With regard to the broader approach, the Bank has maintained a close dialogue with the relevant authorities on macroeconomic questions - and specifically on the problem of strengthening the SEEs - through its country economic work and the program and structural adjustment loans. Within the power sector, the Bank has adapted its general audit requirements to the specific circumstances of TEK, 'ad hoc' arrangements were made to tackle staffing problems (although with little success) and the Bank's approach to the rate of return and tariff questions has been successively modified, resulting finally in the shift from a rate of return covenant to one based upon internal cash generation. The new economic policy package announced in January 1980 and measures introduced subsequently, which focussed among other things upon the reform of the SEEs, may represent the essential first steps towards the major structural and institutional changes required in the longer term.

LOANS AND CREDITS TO THE POWER  
SECTOR IN TURKEY

1. Flood Control, Irrigation and Power (Loan 63-TU) - US\$25.2 million in 1952, for the multipurpose Seyhan dam, 36 MW of power plant and associated irrigation and transmission works;
2. Cukurova Power (Credit 34-TU) - US\$1.7 million in 1963, for a third unit of 18 MW at the Seyhan station;
3. Second Cukurova Power (Credit 59-TU) - US\$24.0 million in 1964, for a 100 MW thermal station at Mersin, a 70 MW hydroelectric station at Kadincik and associated substations;
4. Keban Transmission (Loan 568-TU) - US\$25 million in 1968, for the 380KV transmission lines from the Keban hydroelectric project to Istanbul and Ankara, with associated substations;
5. Third Cukurova Power (Loan 623-TU) - US\$11.5 million in 1969, for the second stage of Kadincik (50 MW);
6. Turkiye Elektrik Kurumu Power Transmission (Loan 763-TU) - US\$24.0 million in 1971 for expanding TEK's transmission system;
7. Fourth Cukurova Power (Loan 775-TU) - US\$7.0 million in 1971, for transmission facilities and to cover increased foreign exchange costs of the second Kadincik project;
8. Ceyhan Aslantas Multi-purpose (Loan/Credit 883/360-TU) - US\$44 million and US\$30 million respectively in 1973, for a multi-purpose project which would, inter alia, generate annually 500 GWh of hydroelectric energy;
9. Istanbul Power Distribution (Loan 892-TU) - US\$14 million in 1973, for part of the electricity construction program of the Istanbul Electricity, Tramway and Tunnel Co., and studies to determine the long-term electricity, transport and gas organization of Istanbul;
10. Elbistan Lignite Mine and Power Project (Loan 1023-TU) - US\$148 million in 1974 for development of an open-cast lignite mine and construction of a lignite-fueled thermal power station with four 300 MW units and transmission lines connecting Elbistan with Kayseri and Ankara;
11. Second TEK Power Transmission (Loan 1194-TU) - US\$56 million in 1976 for expanding TEK's transmission system, training of TEK engineers, a nationwide tariff study, transmission studies and a manpower study;
12. Karakaya Hydropower (Loan 1844-TU) - US\$120 million in 1980 for the construction of a dam and six 300 MW hydroelectric units on the Euphrates river;

Note: In addition, the Bank made a technical assistance grant in 1965 for up to US\$1.95 million to cover the foreign exchange costs of studies and the implementation of recommendations for the reorganization of the power sector.

In retrospect, the Bank was over-optimistic at appraisal about the achievements which were feasible under Loans 568-TU and 763-TU and subsequent experience underlines a lesson which has been learned in other projects. Institutional change, especially the achievement of reasonable autonomy, takes time and may have to be pursued in stages, through broader macroeconomic work as well as through a series of lending operations, as turned out to be the case in Turkey (PPAM paras. 40-42).

Other points of particular interest are:

- substitution of a cash generation covenant for a rate of return covenant in a follow-on project (PPAM para. 25);
- causes of management and staffing problems and efforts to deal with them (PPAM paras. 30-31, PCR paras. 3.01, 7.01-7.02 and Attachments 1 and 2);
- difficulty in monitoring actual project costs points to a need to confirm at appraisal that an adequate system exists to record and report project-related financial transactions (PPAM paras. 32-33, PCR para. 6.04);
- attempts to reach international agreement on the use of Euphrates waters in the context of the Keban hydroelectric project were unsuccessful (PPAM para. 34);
- Bank supervision of the two projects was satisfactory; the intractable institutional and financial problems related to TEK required considerable additional supervision effort through subsequent lending operations (PPAM paras. 12 and 35, PCR para. 3.04); and
- TEK completed the Keban Transmission project by Force Account, which provided valuable experience to the organization, for example in implementing the follow-on project (PCR para. 3.01 and Attachment 1).

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APPENDIX 2

42205 WLYE TR

TELEX FROM THE GOVERNMENT

1991 AUG 12 AM 10:45  
COMMUNICATIONS

MR. SKAPUR

DIRECTOR.

OPERATIONS EVALUATION DEPARTMENT

INTOAFRO

WASHINGTON

RE YOUR LETTER DATED JUNE 22, 1991. PROJECT PERFORMANCE AUDIT  
REPORT ON KEBAN TRANSMISSION PROJECT (LOAN 560- TU) AND TEK POWER  
TRANSMISSION PROJECT (LOAN 763. TU)

IN YOUR VIEW THE REPORT REASONABLY REFLECTS THE ISSUES AND PROBLEMS  
OF THE SUBJECT PROJECTS AS WELL AS THE OVERALL POWER SECTOR  
REGARDS

AYDEMIRKOC

DIRECTOR GENERAL OF THE TREASURY

51110. 12.1991

WORLDWIDE641450

42205 WLYE TR

T E K

TÜRKİYE ELEKTRİK KURUMU

(Turkish Electrical Authority)

Capital : TL. 20.000.000.000

T E L E K S

ADDRESS : Necatibey Caddesi No. 36 Yenisehir - Ankara/Turkey

CABLE : TEK - Ankara

TELEX : TEK TELEKS NO: (42245 TEKTR)

TELEGRAM  
Firm AddressIBRD  
1818 H. Street N.W.  
Washington D.C. 20433  
U.S.A.

36205

Our reference to be stated in  
your reply

604/P-914

1804

Ankara

August 7, 1981

10-3-81

We confirm our telegram released to you today as follows :

Address of Telegram

Telex No : 89650 World Bank

If there is any inconsistency between the  
telegram you received and the text of this  
confirmation please inform us as soon as  
possible.

ATTN. TO MR. SHIV S. KAPUR

THE "PROJECT PERFORMANCE INSPECTION REPORT" PREPARED BY YOUR BANK CONCERNING  
THE 568-TU NUMBERED KEBAN ENERGY TRANSMISSION LINES PROJECT AND 763-TU NUMBERED  
TEK ENERGY TRANSMISSION LINES PROJECT IS FOUND SATISFACTORY AND WE DO NOT HAVE  
ANY REMARKS. BEST REGARDS. TEK.Ayhan ERKAN  
Asst. General ManagerKamil TOKTAŞ  
General ManagerBilgi için: İletim Hat.  
Pro.Dai.Eşk.lığı

TURKEY

LOANS 568-TU AND 763-TU COMPLETION REPORT

KEBAN AND TEK POWER TRANSMISSION PROJECTS

1. Introduction

1.01 Attached are completion reports for these two projects, prepared by the Turkish Electricity Authority (TEK), dated January 28, 1978, designated Attachments 1 and 2 respectively, and a cost estimate for the Keban Transmission Project at Attachment 3. Since both projects formed part of TEK's investment program for the period, a combined Project Completion Report is appropriate. Although TEK's reports are dated January 1977, further information required for the analysis was obtained only a year later. The following information supplements that contained in these reports.

Project Description

1.02 The Keban Transmission Project (Loan 568-TU) consisted of approximately 1460 km of extra-high-voltage (380 kV) transmission lines linking Istanbul and Ankara with the 620-MW Keban Hydroelectric Project which was being constructed at the same time. The TEK Transmission Project consisted essentially of TEK's transmission construction program for 1971-1974, comprising about 4,000 km of 154 and 30-kV lines and 1,500 MVA of substations and other equipment. Although planned for completion in 1970 and 1974 respectively, the Projects were completed only in 1976 and 1977.

Project Objectives

1.03 Aside from the critical need for the physical facilities included in the Projects, a principal objective was to improve organization and financial responsibility in the government-controlled part of the sector. To this end, with the active assistance of the Bank and its special adviser, Lord Hinton of Bankside, the Turkiye Elektrik Kurumu (Turkish Electricity Authority - TEK) was established on October 25, 1970, under Law No. 1312 of July 1970 from the power group of ETIBANK, the original beneficiary under Loan 568-TU. This was the first step to integrate a very large number of independent power facilities into a coherent central electricity authority. The law drafted with the help of the Bank and Lord Hinton, incorporated agreements reached with the Government on the scope and functions of the national electricity authority and the areas within which the authority would have autonomy. The draft reflected the stated intention of Law 440 that State Economic Enterprises (SEE) (of which TEK is one) be run autonomously in accordance with commercial principles and as though they were

private stock companies. The TEK law, as passed, fell short of this principally in the degree of autonomy accorded to the new organization and especially in the lack of freedom to set salaries and terms of service of non-unionized staff. Another change which has materially affected TEK's central role in power planning and operations is that, contrary to the agreement reached with the Government, the planning, design and construction of hydroelectric projects continued to be the responsibility of DSI, the Turkish Water Development Authority. The appointment of TEK's general manager and his assistants is also the prerogative of the Government, rather than a function of TEK's board.

1.04 Whilst the establishment of TEK brought generation and transmission facilities under one authority, distribution to the ultimate customers continues to remain in the hands of municipalities. Exceptions to this general statement exist. They are two relatively minor concession areas, large industrial and other consumers outside municipal areas of jurisdiction, and some autoproducers.

1.05 Prior to Loan 568-TU the Bank had made one loan (1952) for the Seyhan Dam in the Cukurova concession area, one credit (1963) to cover the foreign exchange cost of a third generator in the Seyhan power station and a credit (1964) for the Mersin thermal power station also in the Cukurova concession area. In 1965 the Bank, which led the financing consortium (EIB, KfW, USAID, France and Italy) for the main Keban hydropower project, participated by contributing to the finance of the associated transmission lines, on condition that the Government took steps to improve the efficiency of the power industry. A start on the implementation of the needed reorganization which had been identified by ETIBANK's expatriate consultants was made possible by the application of a portion of a 1965 Bank technical assistance grant of up to US\$1.95 million to cover the foreign exchange costs.

## 2. Project Preparation and Appraisal

2.01 The Keban transmission lines financed under Loan 568-TU were designed and supervised during construction by expatriate consultants 'A' who were themselves financed by USAID through their association with the Gökçekaya line forming part of the system connecting Keban and the Gökçekaya hydro plant with Istanbul. The works financed under Loan 763-TU were designed by TEK's own staff assisted by expatriate consultant 'B' for network studies.

2.02 The Power Group of ETIBANK, the forerunner of TEK, was considered, at the time of appraisal of the Keban Transmission Line Project, to be competently managed and staffed. By 1970 TEK had recognized the need for reorganization and approached Electricité de France (EdF) for assistance, and by the time Loan 763-TU was being considered, the appraisal report noted that Government was considering revisions to the personnel law which might hamper classification and retention of professional staff. Employment conditions as since imposed by the personnel law, have led to the steady flight of competent staff to the private sector and this has been a major factor in the generally poor performance of the Borrower and the consequent delays in the two projects being evaluated here.

2.03 Contrary to the intentions of Law 440, as described above, the public power industry has been traditionally tightly controlled particularly as to the charge it could levy for energy; thus, bulk electricity is sold at a price insufficient to generate adequate resources for investment. Loans 568-TU and 763-TU sought to achieve the objective of internally generating a reasonable portion of the capital expansion requirements by obtaining acceptance of a minimum 8% rate of return based on realistically valued average net fixed assets in service (a provision repeated in principle in the TEK law though without a specific requirement for periodic revaluation). Government's unwillingness for political reasons to increase power rates in step with high inflation and development needs is reflected in the repeated failure to reach the agreed financial targets.

2.04 Periodic revaluation being necessary for the realistic adjustment of tariffs and for appropriate cash generation under inflationary conditions, the loan documents reflect the agreements reached on asset revaluation based on consultants' recommendations. Briefly, the loan agreement under Loan 763-TU required TEK to establish revaluation principles and methods satisfactory to the Bank based on the recommendations of consultants for computing the return from 1973 onwards.

### 3. Project Implementation

3.01 The Keban transmission lines originally were planned to be completed in 1970, in time for the commissioning of the first Keban unit. Completion was subsequently revised to June 1972. In practice, essential parts of the lines were completed more than two years late, but still in time for the first unit of Keban which was itself eventually commissioned in September 1974. Final completion was not until October 1976. Construction of the lines was initially contracted with expatriate firm 'C' which ran into financial difficulties due to prolongation of the construction period and devaluation of the Turkish lira. As a result of these difficulties, the contractor was forced to abandon the work and TEK completed the project by force account. Shortage of skilled staff and inexperience in management of such a large line construction project lay at the root of much of the subsequent delay. However, learning the hard way can be a good school provided the personnel stay with the organization to apply their experience, and indeed subsequently TEK has successfully managed a major expansion of the 380-kV system; nonetheless, TEK's completion report specifically complains of the inability to recruit and retain technical staff and cites recent resignation of trained personnel.

3.02 The TEK Transmission Project was a "time-slice" project comprising TEK's transmission program for the years 1971 through 1974. Due in part to the shortage of skilled staff mentioned above, many of the facilities included in the original project were not completed until 1977 although there were many minor changes in the scope of the project over the project period (principally line locations and substation sizes) to accommodate the needs of a dynamic and growing system. Attachment 4 gives TEK's forecast sales under Loan 763-TU and actuals for the period 1970-1977 (The forecasts for 1970-1972 were updates of the sales estimated under Loan 568-TU, taking into account the latest market conditions).

It will be seen that partly as a result of generation shortages (Keban delay), the sales target forecast in the appraisal report for 1974 was not reached until 1976. Attachment 5 gives the main reasons for the shortfall in TEK's sales during the period 1970-1977.

3.03 Although the Keban transmission lines have carried the energy generated at Keban to the load centers in the West, some disturbing problems have been encountered. Although there had been ample experience in the country with steel-tower transmission lines at lower voltages, the Keban lines introduced several innovations including bundled conductors, tension stringing, and refined designs incorporating high-strength steel. Such lines require a high standard of field erection and installation practices and TEK experienced some initial difficulties in coping with these. In addition, the standard Turkish loading criteria proved inadequate for the unprecedented ice loading experienced on the Istanbul-Ankara portion of the line, and subsequent design changes were required. Also, ever since the generators were commissioned there has been a debate as to whether some unexplained oscillations in the power system originate from the alternators and their control, or are a function of the transmission line characteristics. No positive identification of the cause has been made although an improvement seems to have been experienced with the bringing into service of the Gökçekaya/Ankara section of the line in 1976 and TEK, working with its consultants and the manufacturers, has resolved the problem.

3.04 The Bank and its associates, particularly the staff of USAID, endeavored to assist project implementation by repeated representations to the government authorities to clear bureaucratic delays occasioned by such things as import licence problems, the supply of steel for transmission line towers and the like. The Bank also participated in discussions between TEK and the Keban transmission line contractor in an attempt to resolve the issue involving the transfer of Turkish lira to the country of the contractor, including direct approaches to the Government of that country to find ways to resolve the dispute. The Bank agreed to the completion of the Keban line by TEK force account only when all hope of success had faded, at which point it assisted in the setting up of construction schedules, equipment requirements, etc.

#### Disbursements

3.05 Attachment 6 gives a comparison of the actual disbursements with the original forecasts for each of the two loans. It will be seen that for both loans, only 70% had been disbursed by the original Project completion dates (1971 for Loan 568-TU and 1974 for Loan 763-TU). The actual loan allocations are compared with the forecast allocations in Attachment 7.

#### 4. Tariffs

4.01 As a condition of effectiveness of Loan 763-TU, TEK's tariffs were raised on average 50% effective July 1, 1971 (from about 16 kurus per kWh to a little over 23 kurus per kWh). This was expected to place TEK's finances on

a satisfactory footing and in fact during 1972, the first year for which the increased tariffs were effective for a whole year, TEK by and large achieved the agreed rate of return on 8% on revalued assets (see TEK's Income Statement in Attachment 8). It was only when TEK was beset by large inflationary cost increases with consequential effect on the manpower situation and the implementation of projects and by Government's reluctance to raise tariffs in its effort to hold down inflation that TEK's financial situation started to deteriorate.

4.02 Under Loan 763-TU, a fuel adjustment clause was introduced in TEK's tariffs at the Bank's urging whereby increases in fuel costs are automatically recovered from consumers without a general tariff revision. This proved to be of significant help to TEK in 1973 and 1974 since the clause helped TEK to pass on to customers, without Government approval, its soaring fuel costs as a result of the surge in international oil prices. When the average tariff level was around 24 kurus per KWh, the fuel adjustment charge rose from 3.5 kurus per KWh in December 1973 to 15.1 kurus per KWh in January 1974 raising the price of electricity to the consumer 42% in just about two months. Without the automatic fuel adjustment clause it is certain that there would have been major lags in recovering the increased fuel costs from customers, which would have led to a further serious deterioration in TEK's financial condition.

5. Financial Aspects

5.01 Loan 763-TU required TEK to earn an 8% return on revalued net fixed assets and to continue to revalue assets in future as prices change. Any shortfall in a year is required to be made up within the next two years; an overrun could be applied to offset any shortfall in one or more of the next three years (Loan 568-TU had substantially the same provisions). Fulfillment of this covenant would have meant significant tariff increases from time to time. However, after a 50% tariff increase in July 1971, there was no effective action until June 1976 to raise tariffs except for increasing the fuel surcharge because of the circumstances detailed below, and TEK has not met the rate of return covenant (8% on revalued net fixed assets) by varying margins from 1970 to date (by 2.5% in 1970, 3.1% in 1971, marginally in 1972, 5.3% in 1973, 5.7% in 1974, 5.4% in 1975 and 3.9% in 1976). The surge in oil prices in 1973-1974 (para 4.02) made the task of ensuring TEK's financial viability rather difficult. In connection with Loan 1023-TU, in view of the time required for the economy to adjust itself to the rapid price escalation, the Bank agreed to a longer-term approach for TEK to meet the required 8% as follows:

- (a) Government would establish not later than March 15, 1975 a new basic tariff yielding TEK a net average revenue of 51 kurus/KWh; and
- (b) from 1976 onwards, TEK would earn an 8% return on a revalued asset base.

These targets were not fully realized. However taking into account Government's anti-inflationary and economic stabilization policies, agreement was subsequently reached with Government that TEK would earn an 8% return from 1977 on a revalued asset base as agreed and that for 1976, such action including tariff adjustments would be taken by January 1, 1976 as would enable TEK to earn a 6% return in that year. However in the difficult political conditions then prevailing and in the absence of a strong Government able to provide political leadership, tariff action was delayed until May 1976 when rates were raised an average of about 20% with effect from June 1, 1976. Government approved further marginal adjustments in TEK's tariffs effective April 1, 1977 in order to enable TEK to increase its earnings. Again TEK's tariffs were raised about 42% effective September 10, 1977 but the increased revenues were largely offset by increases in fuel prices 1/ and in wages and salaries with the result that TEK's rate of return in 1977 was only about 3.4%. TEK's actual rates of return for 1971-1977 are given in comparison with the forecast returns in Attachment 8.

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1/ The revised tariffs of September 10 were based on the increased fuel prices introduced at that time and the fuel surcharge was made applicable only to subsequent fuel price increases.

5.02 The main reasons for TEK's failure to reach the agreed 8% return have been:

- (a) delayed commissioning of projects such as Keban resulting in lower availability of hydropower for meeting the demand;
- (b) less-than-expected load growth due in part to lack of adequate supply (See Attachment 5.);
- (c) staffing problems;
- (d) rising employment costs, mostly of unionized labor, (wages and salaries in 1976 were about 230% of the 1970 appraisal estimate); and
- (e) Government's unwillingness to approve tariff increases especially because of the unsettled political conditions in the country.

5.03 TEK's low rates of return coupled with inflationary increases in construction expenditures resulted in self-financing levels that were much lower than those estimated at appraisal. During the period 1971-1977, the self-financing level ranged from 11% to 37% as against the estimated range of 40% to 156% (See Attachment 9 for details).

5.04 Another serious financial problem which has beset TEK for the past few years is the problem of liquidity caused mainly by slow collection of receivables from municipalities despite a 15% discount for payment within one month and a penalty of 1% per month for payments thereafter (until these conditions were changed in June 1976). Since 1971, receivables have been consistently around four months' revenue, which is a very high level. At the end of April 1977 receivables which were outstanding for more than three months amounted to LT 3.5 billion, which itself is over five months' revenues. A significant portion of these outstandings was 2-3 years old. Government's solution to this problem has been consolidation and payment of intra-public sector debts. This has proved to be ineffective. After the consolidation of such debts in May 1975 under a law passed by Parliament, Government has again assumed responsibility for payment of TEK's bills for supply of electricity to municipalities after offsetting amounts due by TEK to various governmental agencies such as TKI, the Turkish Coal Enterprises, TPAO, the Turkish Petroleum Authority and tax authorities.

## 6. Justification of the Projects and Bank's Role

6.01 Over the period that has elapsed since the appraisal for Loan 568-TU, its completion and that of the works under Loan 763-TU, various factors have affected TEK. These are principally a) an unwillingness to price electrical energy at levels adequate to meet development needs, b) the salaries of non-unionized staff progressively fell 50% to 65% below the level of the private sector employing similar skills, c) the Government's policy of fuel price subsidy has kept coal and lignite prices below their economic worth, d) Government policy has led to excessive levels of staffing in the lower grades of TEK in many disciplines which serves to reduce productivity and inflate costs.

6.02 No rate of return was calculated for the Keban Transmission Line Project since the lines were inseparable from the Keban Project itself. However, an internal financial rate of return calculation was made for the 1971-74 time-slice of the generation/transmission investment program as part of the 763-TU appraisal. The forecast rate of return was 13%. This was derived by using forecast revenues as a measure of benefits and therefore is not a true economic return, but can be used to assess the adequacy of long-run tariff policy. A similar calculation using actual investment, operating cost and revenue data for the period 1971-76 (since the forecast sales target was reached only in 1976) yields a return of only 3% (Attachment 10). This result is not surprising in view of the two-year delay in completing the project and reaching the original sales forecast, and Government policy in holding down electricity prices. Average revenue per KWh in 1976 was 7% below forecast levels (in 1971 terms) despite a near-doubling of average fuel and operating cost (also in 1971 terms) compared with the appraisal estimate. The result was further depressed since, because of the delay in hydro project construction (principally Keban), TEK was forced to resort to expensive generation from oil-fueled gas turbines which were rushed into service in an attempt to meet the shortages.

6.03 The fact remains that both projects financed through these loans were essential for the power sector's development, and that from a purely technical standpoint the Projects have clearly fulfilled their purpose. However a major objective of the Projects lay in the institution-building field and here the extent to which the goals were achieved is less clear-cut. At the non-political levels in Turkey, both in government ministries and productive enterprises, there is a positive acceptance of those institution-building objectives which were the main justification for the lending operations. These were: the establishment of an autonomous, national power authority, the introduction of financial management techniques and policies designed to support the autonomous nature of the SEE, strengthening the sector development planning methods in terms of the nationally most economic program, and the enhanced cooperation of the authorities concerned, especially those of TEK and the Water Development Authority (DSI). Considering the improvements brought about through the medium of Loans 568-TU and 763-TU, and the deficiencies still existing, the two loans should be considered as having partially succeeded in their objectives and therefore as moderately successful.

6.04 Despite the relatively unsatisfactory institutional and financial performance, credit must be given to TEK for coping with a growth in generation and sales of nearly three times in the decade 1968-1978, to a 4000-MW system--large by any standards--and an investment program which saw asset values increase nearly ten times due to the rapid growth in a period of escalating international prices. As already stated, the TEK Power Transmission Project was a time-slice development and the cost of the Project was based on an estimate of the likely works to be constructed in the period. Changes in this plan would have been normal had the work been carried out during the plan period. As a result of the two-year delay, compounded by the financial, operational and inflationary problems experienced, numerous changes in minor and major detail inevitably had to be made. Since the works originally planned were closely tied to other works and handled in the books of accounts as indistinguishable parts of the whole, it is

not now possible to determine accurately the final costs of the various components of the Project. The best judgement is that the final costs are of the order of double the original estimates.

## 7. Overall Achievements

7.01 So far, although the Bank's aims have not been fully achieved, significant steps have been taken towards these goals. Mainly through the help of consultants financed by the technical assistance grant of US\$1.95 million and partly also through the impetus provided by the two loans in question, TEK has established an adequate accounting and reporting system. The establishment of the system itself is a significant achievement although it is not being used properly for management purposes. Key accounting staff have also been trained in selected utilities in the USA. As regards other institutional improvements, for basically political reasons, institutional autonomy of TEK does not exist. Its technical operations have suffered because it is unable to hold an adequate level of experienced and competent staff. Despite a general shortage of competent staff its system planning has remained satisfactory, but implementation has been adversely affected by these constraints. What success has been achieved is as a result of the efforts of a constantly reducing core of dedicated and competent people. The Bank was instrumental in introducing dynamic system planning methods through the development of computer programs, and the Turkish system was used to test a general linear planning model developed in the Bank. The development program, which indicated the need for rapid introduction of thermal plant to meet the demand in 1974-78, was not then adopted by Government despite the Bank's urgings and the severe shortages in these years are now a matter of history. TEK's skills in drafting bidding documents and operating procurement procedures have steadily improved as a result of the work of the consultants and by association with the Bank so that in many fields consultants are no longer essential. In the financial area, implementation of the principle of automatic recovery of increased fuel costs from customers is a significant step forward. So also is the general acceptance of the concept of working towards a specific financial goal of an 8% rate of return on revalued assets. Even in respect of a matter such as revaluation on which there is no agreement in developed countries as to principles and methods, principles and methods have been agreed and implemented.

7.02 Because of inadequate tariff levels and a large expansion program in a period of high inflation, TEK has been unable to generate an adequate level of cash to support the power sector investment needs, and internal and external borrowings to support the investment program contributed substantially to the economic crisis faced by the Government in 1977/78. TEK still has a critical liquidity problem and it is unable to apply such remedies as are provided in the law to secure the prompt payments of outstanding bills. The decline in quality of its professional staff is still a problem. These fundamental problems, which drained the vitality of TEK, are shared by other SEEs to substantially the same degree and their solution, requiring political willingness, does not seem possible through application of normal project lending methods which focus on only a single sector. Subsequently, the Bank has made a deliberate effort to deal with these problems on a country basis, although without tangible progress as yet, and this was reflected in subsequent loans for TEK (1023-TU of June 28, 1974 and 1194-TU of June 14, 1976), so the dialogue is continuing.

January 28, 1977

International Bank for Reconstruction  
and Development  
1818 H Street, N.W.  
Washington D.C. 20433  
U.S.A.

Our Ref: 610/DBK.I-901/  
Subject: Loan No. 568-TU  
FINAL REPORT

Ref: a) Your letter dated 25th September, 1974  
b) Your letter dated 12th February, 1975

Our comments relating to the subjects referred in (a) and (b) above, have been submitted herewith.

As it is known, the Final Report dated 2nd December 1975 prepared on the works in the scope of the credit, which were accomplished by our Consultant Firm, has been submitted to your Bank. At this Report, the activities carried through this work - from the initial stage to the end - and the critics on the work have been adequately explained by our Consultants. The Report had provided all the necessary information for your Bank, with the exception of the supply of the Gökçekaya-Ankara line, while the situation of this line on the time this Report was written, had been also explained. In any case, we deem it necessary to give explanations on the matters below.

As it is known, Keban-Ankara-Istanbul power transmission line and Ankara-Gökçekaya-Istanbul power transmission line and the substations connected to these lines have been the first 380-kV installations erected in our country. For this reason, some delays and faults have been experienced in the erection of the aforementioned substations and transmission lines. However, the major reasons of these delays are due to the various crises and circumstances faced in the world as well as in Turkey. In spite of this, due to the major delays occurred in the Gökçekaya and Keban power stations the termination dates have been extended for about 1, 5-2 years and the substation investments have been slowed down in the initial stage, with the aim to avoid unnecessary investments. In addition, due to the rapid increase in the prices in the world and Turkey markets no installation work other than Ankara-Gökçekaya line have caused delays in the utilization of the energy produced by the Keban and Gökçekaya power stations.

Upon the abolishment of the contracts drawn with a foreign and a local contractor, the installation of the Umraniye and Gölbaşı substations and the Kayseri capacitor stations as well as the erection of the Keban-Ankara line and the Gökçekaya-Ankara line through our Force Account and

our own means, though limited, a team has been created which is qualified in separate project an erection work. By this team which was trained in these works, the 380-kV Seyitömer and Izmir substations, as well as the 380-kV Gökçekaya-Seyitömer and Izmir substations, as well as the 380-kV Gökçekaya-Seyitömer-Izmir and Seyitömer-Seydisehir transmission lines have been installed by the initiative of our Organization.

The costs of the mentioned installations have been far beyond the estimated costs, due to the delays and the crisis faced in the world and Turkey markets, as well as the big price increases. The lack of experience of our Organization from the administrative and personnel point of view, which is a newly-created entity, is also attributable to these results. Moreover, the laws, formalities, organization problems, impossibilities in recruiting and retaining technical staff and many other barriers, have effected this.

The major reasons for not being able to realize the aforesaid installations in the desired level and time, in parallel to your requests in the above-said letters, could be summarized as follows. We would highly appreciate if you would accept our regrets and show consideration to us for not being able to prepare a report of such a large scale requested by you, due to the resignation of our trained and qualified staff during this period.

a) Due to the rapid charges in the prices, rate of exchange, circumstances in the world and Turkey and the skyrocketing price increase in the materials such as oil, steel, etc., the main problem has been the disputes occurred with the contractors due to their delays which resulted with the cancellation of certain contracts, thus putting us in a position of completing the works by our Force Account, for which we were not equipped beforehand.

Great delays have taken place in the completion of the Protection projects. Delays of up to 2 years have been observed in the projects which were to be completed within 4 months following the date of bidding and due to this reason, the procurement of the protection material has been prolonged. However, through the big efforts of the TEK erection team, the control panel production, erection, cabling setting and testing works have been finalized and the substations have been brought to a position ready for operation, before the power station was ready for operation. In order to minimize the prices and these effects, TEK, despite the shortage of its experience, has shown a great effort to eliminate the troubles and inefficiency of various contractors and a foreign consultant firm, and have finalized the works.

b) The performance of a foreign consultant firm, with the exception of the delays in the services carried in his own country could be deemed as successful. However, we believe that the consultants have not been able to give us the necessary assistance, due to the fact that, the Company has not sent qualified staff to Turkey during the erection phase, as well as the works in Turkey.

The design of the poles used in the lines have been made according to very light assumptions and the meteorological conditions of the country could not be estimated. For these reasons, by observing that 12 poles have fell down in the initial stage in Izmit during summer and the poles between Keban-Kayseri have fell down in the operation stage, it has been concluded that, the distribution of the poles have not been carried on in a proper manner. The falling down of the poles--in the erection stage--in the Keban line took place due to our fault in taking some measures.

c) No difficulties have occurred in the disbursements and procurements except the formalities and the credit has enabled us to have responsive bids and facilitated the payment procedure. Moreover, we have not faced any difficulties in transfer and financemnt.

However, we would like to emphasize that, the requests made for reports on subjects with great coverage and beyond the scope of TEK, which we believe, do not have direct relation with the credit highly occupies our staff, who are in limited number and are already loaded with heavy work. This request causes further delays in our other activities. It would be much more easier for us to work, if information of less detailed nature could be requested.

d) The comments on the Bank transactions which cause to problems are herewith attached (Annex 1).

e) Owing to the Keban-Gokcekaya Project and the credits, our technical and administrative staff have been trained, both in Turkey and abroad, and have reached a level capable to construct the 380-kV lines and substations, without the assistance of consultancy. Therefore, from now on, the projects could be accomplished by TEK's technical staff, which is a very great improvement.

However, in order to attract and retain qualified and experienced technical staff our organization needs to be equipped with the necessary means.

f) Any kind of deviation has not been observed in the main financemnt plan, except the price increase.

g) The energy capacity of Turkey has shown an increase about 40%, through the Keban-Gokcekaya Projects, which forms the main framework of our interconnected system. This Project has made a great contribution to the development, industrialization and the flourishment of the social standard, as well as the extension of energy to our rural areas.

h) It is primarily essential that, in order to derive maximum benefit from the Project, the investments for the other transmission,distribution plants-- which would be used for the sale, transmission and distribution of the energy

obtained from the Keban and Gokcekaya system--should be increased and with prior consideration to training facilities, all the measures should be taken in order to retain adequate number of technical staff--for the construction of projects, installations, thus being able to reach to the level of industrialized nations.

With the exception of a few qualified specialists who would assist us in solving the problems--which are few--arise during the research, planning, project, design and erection works, we do not necessarily need specialists to such a great extent.

By our explanations we do hope that we have replied to your questions asked through your above referred letter and verbally. In case you should find some points in our report unsatisfactory please note that we shall be at your disposal to clarify such points.

We hope you will tolerate us for some missing points in report, if any.

Very truly yours

TURKISH ELECTRICITY AUTHORITY  
GENERAL MANAGEMENT

ANNEX 1

COMMENTS APPLICABLE TO LOAN NO. 568-TU

1. Sometimes the Bank effect payment to the suppliers very late which causes suppliers to write letters or send telex messages asking why the payment has not been effected although the shipment has been effected.

To avoid this the Bank can send a notification to the related supplier stating that they have received the payment application and the payment will be effected in the earliest convenience.

2. The Bank should send a statement quarterly or half yearly showing the actual disbursements and the balance of the loan which will be useful to keep tract of the loan simultaneously with the Bank so the over usage of the loan will be prevented.

Our withdrawal applications consist of three pages and on every page the same informations are repeated. To avoid these repetitions the information can be given on one page.

T E K

TURKIYE ELEKTRIK KURUMU

Ankara, Jan. 28, 1977

INTERNATIONAL BANK FOR  
RECONSTRUCTION AND DEVELOPMENT

1818 H Street, N.W.,  
Washington, D.C. 20433

U.S.A.

Our ref: 610/DBK.II-901/381

Subject: Loan No. 763-TU

Final Report

Y. Ref: Your letter dated Jan. 26, 1977

As you know, the loan No. 763-TU for US\$ 24.000.000 is not a project loan but is a credit granted to meet a part of our foreign exchange requirement that is necessary to finance the installation, revision and extension of 1330 MVA substations and 2800 km long 154 and 30 kV power transmission lines which will be connected to the interconnected system.

The substations and lines to be financed under this credit have been shown in our 1972 investment program. However due to our urgent needs that may occur in later years the program for 1972 has been changed and the funds have been transferred to the installations included in our program for 1973 and 1974. The names of substations and lines after the use of this credit have been shown on the attached lists<sup>1/</sup>.

The credit No. 763-TU was intended to be used for the completion of the equipment necessary for the substations which have already been built and for the installation of new substations which have just been included in the program.

The equipment to be procured under this credit are used:

- 1) In the installation of new substations,
- 2) In the completion of equipment for the substations which have been built,
- 3) To increase the power of some substations which are in operation,
- 4) For addition of feeders which became necessary as the result of growth in the networks,

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<sup>1/</sup> OED Note: Not included but available on file.

5) As system spares.

Number of substations, the equipment for which is to be procured through 763-TU is 136,

- Number of substations in which the transformers will be installed	: 114
- Number of transformers	: 139
- Transformer power	: 3405 MVA
- Transformer power expected by this credit	: 1330 MVA
- Transformer power procured through credit	: 2075 MVA
- Number of transformers procured through the credit	: 48
- Number of substations in which transformers were installed	: 34

As seen on the above table, in the 1973 investment program it was planned that 139 each 3405 MVA transformers were to be financed through this credit. In the credit agreement, however, credit has been granted for 1330 MVA transformers. On the other hand, due to our urgent need, 48 each 25, 50 and 100 MVA transformers which are not manufactured in Turkey have been financed under this loan. The remaining 91 each 1430 MVA transformers were obtained through the TEK's own means. The names of substations on which the transformers were installed are listed on the attached table 1/.

A list showing the names of substations where the power transformers, circuit breakers, capacitors that obtained under this loan and the names of transmission lines is also attached.

It must be considered normal that during the 4 years period between the validity date of loan agreement and the completion of foreign expenditures there had to be changes on some projects. For this is a program credit and using it for the urgent needs will be more advantageous for the Turkish economy.

The equipment that is financed through the 763-TU credit, has been ordered on the "stock order" basis. That is, instead of ordering the complete equipment for each substation, all the necessary equipment have been ordered on the whole for the overhead lines and substations which were decided beforehand, as separate items. Besides, this is the policy TEK has carried out for a long time in the obtainment of equipment.

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1/ OED Note: Not included but available on file.

The 80% of overhead lines and substations on which these equipment was used, has been completed by January 1977. It is expected that the remaining part will be completed within 6 months, that is the end of June 1977. This result can be considered as a good proof that the use of this credit has fulfilled the requirements.

In the scope of project, in section A (1) 380 kV equipment has been planned for Adapazari, Kayseri and Umraniye substations and also for 380 kV Kayseri substation the capacity of serial capacitor banks were to be increased.

As the final study and planning in our 380 kV system during the validity of this credit has not been completed and the production installation to be connected to the 380 kV system was delayed, it was not possible to obtain equipment through this credit for the above mentioned substations. Besides, as you know the new credit No. 1194-TU has been granted for our 380 kV system.

In the section A (1) of the project for Istanbul, 100 MVAR capacitors were planned. We have ordered a total of 156 MVAR capacitors to be used not only for Istanbul but for all places in our system which require capacitors. The 84 MVAR of these capacitors have been mounted in Istanbul. The remaining 72 MVAR have been mounted in the TEK interconnected system where required.

The general comments on the credit:

There has not been a big problem during the carrying out of the credit. However, the procedures such as before sending them to the firms sending of specifications to the Bank for approval as required by the credit agreement and obtaining the Bank's approval after the award is made, cause a certain amount of delay on the orders. Yet, both Bank and TEK did their best to complete the procedures in promptness.

Another point regarding this credit is that by our last order we exceeded the limitation of the credit. By covering this small amount through our own sources, however, this problem has been solved.

No consulting firm has been engaged for this credit. As it is known, conformity with the specifications and responsiveness have been the basic criterion for selection among the supplier firms and the firm has been chosen within this framework. Generally, the firms have not caused any delays in the delivery of material and no important trouble has been faced during the application term of the credit.

The costs of the above-said installations have been far beyond the estimations, due to the delays and the crisis faced in

the World and Turkey markets, as well as the big price increases. The shortage of experience of our Organization from the administrative out personnel point-of-view, which is a newly-created body, is also attributable to these results. Moreover, the laws, formalities, organizational problems, and impossibilities in recruiting and retaining technical personnel and many other barriers have effected this.

The major reasons for not being able to realize the afore-said installations in the desired level and time, in parallel to your requests in the above-shown letters, could be summarized as follows. We would highly appreciate if you would accept our regrets and show consideration to us for not being able to prepare a report of such a magnitude, due to the resignation of our trained out qualified staff during this period.

a) Due to the rapid change in the prices, rates of exchange, circumstances in the world and Turkey as well as the skyrocketing price increases in the materials such as oil, steel, etc., the costs have shown a great increase.

As it is known, all the projects, specifications, material procurements and erections have been accomplished by TEK. The bureaucratic obstacles and excess of formalities have resulted in delays in the material procurements.

b) There hasn't been any problems in the performance of the contractors and consultants during the utilization of this credit.

c) No difficulties have occurred in the disbursements and procurements except the formalities, bureaucratic barriers. The credit has enabled us to have responsive bids and facilitated the payment procedure. For this reason, there hasn't been any transfer and financment difficulties.

However, we would like to emphasize that, the requests made for reports on subjects with great coverage and beyond the scope of TEK, which we believe, do not have direct relation with the credit highly occupies our staff, who are in limited number and are already loaded with heavy work. These requests cause further delays in our other activities. It would be very useful for us, if information of less detailed nature could be requested.

d) Comments on Bank transactions which cause to problems is submitted herewith (Annex 1).

e) The 154-kV transmission lines and substations have been by our Organization and our technical staff, without the assistance of the consultants. However in order to retain trained staff in the Organization should be equipped with the facilities which could attract qualified and trained staff in adequate number, who would have access to foreign languages. This is a matter of status.

f) In the main financment plan, any kind of problem has not been observed, with the exception of the price increase and changes in the plans. The material which was not provided through the Loan, have been obtained by our own resources.

g) A great development, industrialization and a great vitality and various benefits in the social life have been achieved by the transmission lines and substations installed through the 763-TU Loan. Moreover energy has been extended to many rural areas deprived of electrical energy.

h) In order to derive maximum benefit from the lines and substations installed through the Loan 763-TU, it is necessary to construct new lines and substations to be connected to those. For increasing the investments, the financment should be obtained beforehand and the facilities should be provided in order to recruit and retain technical staff. The training of the technical staff is also an important factor.

The personnel who would do the research, planning, project design and erection work should also be provided with adequate possibilities.

By our explanations we do hope that we have replied to your questions asked through your above referred letter and verbally. In case you should find some points in our report unsatisfactory please note that we shall be at your disposal to clarify such points.

We hope you will tolerate us for some missing points in report, if any.

Very Truly Yours,  
TURKISH ELECTRICITY AUTHORITY  
GENERAL MANAGEMENT

LOAN NO. 763-TU

ANNEX 1

COMMENTS APPLICABLE TO LOAN NO. 763-TU

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- 2) -The Bank should send a statement quarterly or half yearly showing the actual disbursements and the balance of the loan which will be useful to keep track of the loan simultaneously with the Bank so the over usage of the loan will be prevented.
- Our withdrawal applications consist of three pages and on every page the same informations are repeated. To avoid these repetitions the information can be given on one page.

TURKEY

Keban Transmission Lines

Estimated Cost of the Bank Project

<u>Keban-Istanbul 380-kV Line</u>	<u>---Millions of LT---</u>			<u>---Millions of US\$---</u>		
	<u>Local</u>	<u>Foreign</u>	<u>Total</u>	<u>Local</u>	<u>Foreign</u>	<u>Total</u>
1460 km 380-kV line	69.3	135.5	204.8	7.6	14.9	22.5
Ankara substation	8.0	13.4	21.4	0.9	1.5	2.4
Istanbul substation	9.3	10.1	19.4	1.0	1.1	2.1
Kayseri substation	2.6	4.4	7.0	0.3	0.5	0.8
Keban substation	0.2	1.1	1.3	-	0.1	0.1
Gökçekaya line and sub-station material	-	4.8	4.8	-	0.5	0.5
Contingencies <u>1/</u>	8.9	8.4	17.3	1.0	1.0	2.0
Engineering	1.4	6.4	7.8	0.2	0.7	0.9
Interest during construction	<u>13.3</u>	<u>28.5</u>	<u>41.8</u>	<u>1.5</u>	<u>3.1</u>	<u>4.6</u>
<b>TOTAL</b>	<u>113.0</u>	<u>212.6</u>	<u>325.6</u>	<u>12.5</u>	<u>23.4</u>	<u>35.9</u>

Actual cost	685.4	591.5	<u>3/</u> 1276.9 <u>3/</u>	39.2	33.8	73.0 <u>2/</u> <u>3/</u>
Increase over estimate				+214%	+44%	+103%

1/ US\$1 = LT 9.08 as of October 1968

2/ US\$1 = LT 17.5

3/ As the expenditure of foreign cost was made progressively at various rates of exchange relative to US\$, the true total cost in terms of LT is less than stated here and conversely the total \$ equivalent of local costs is greater than stated here.

December 1980

TURKEY

TEK TRANSMISSION PROJECT (LOAN 763-TU)

SALES FROM THE INTERCONNECTED SYSTEM

<u>Year</u>	<u>Forecast (GWh)</u>	<u>Actual (GWh)</u>
1970	5,820	5,606
1971	7,508	7,013
1972	9,709	8,464
1973	12,310	9,344
1974	14,741	10,239
1975	16,392	12,183
1976	17,595	14,640
1977	19,188	16,213

December 1980

TURKEY

TEK TRANSMISSION PROJECT I (LOAN 763-TU)

Reasons for the Difference Between Forecast and Actual Demands

1. The main reason for the slowdown in the estimated load growth has been the slowdown of industrial and economic activity in the country coupled with a shortage of generating plant due to delays in the construction of new plants and the breakdown of major plants in service. The investment programs and construction lead times assumed by Turkish planners proved to have been unrealistic in the light of the financial, human and other resources available to TEK and DSI since 1970, as illustrated by the following instances. In 1970, they anticipated commissioning of the Elbistan Lignite Power Project in 1976 (now expected in 1982), a nuclear power plant in 1977 (now expected in the nineties), the Oymapinar hydroelectric plant in 1978 (now expected in 1982) and the Karakaya hydroelectric plant in 1979 (now expected in 1986). In 1970, the serious financial and manpower constraints which considerably slowed down all subsequent construction activity could not be foreseen. In the event, because of drastic delays in the construction of generating plants, power supply in Turkey was woefully inadequate at least from 1972. The stop-gap and costly arrangement of erecting combustion turbines to meet the power supply situation only alleviated the problem and could not solve it. To make matters worse, major generating plants, such as the Keban and Ambarli plants, also suffered from technical problems, damages and fires, as well as a shortage of fuel oil. The Ambarli power plant (3x110 MW) was out of commission on account of a cable fire from June 6, 1977 until mid-August 1977. Keban III and IV went out of commission on June 8, 1977 on account of the malfunctioning of certain safety mechanisms and could be brought back into operation only in September-October 1977.

2. As a result of the above delays and breakdowns, power consumption had for some years to be physically restricted to the available generation. TEK has taken several measures to restrict power consumption, such as regular and daily power cuts of five to six hours' duration in all large cities, load shedding and frequency and voltage reductions. No systematic attempts have been made to assess the magnitude of power supply restrictions in Turkey or to evaluate the losses to the national economy caused by these restrictions.

3. The load forecasts beyond three years, i.e. from 1973 onwards, were also somewhat optimistic. Such medium-term load forecasts cannot be precisely determined and an error of the order of  $\pm 10\%$  is not unusual. It will be seen that while the actuals for 1970 and 1971 were close to the forecasts (5,606 GWh vs. forecast of 5,820 in 1970; 7,013 GWh vs. forecast of 7,508 in 1971), the actual for 1979 was 16% short of the forecast. One reason for the large divergence between the medium-term forecasts and the actuals is that large industrial loads failed to materialize as planned owing to changes in the economy and other factors. The following are illustrative examples of major lags in industrial consumption. In

1970, it was expected that the Aluminum and Ferro-Chrome industries would in 1977 reach an annual consumption of 1,500 GWh and 740 GWh respectively; however, their actual consumption even in 1980 is of the order of only 500 GWh and 150 GWh respectively. The cement industry was estimated to reach an annual consumption of 485 GWh in 1977 but the actual consumption in that year turned out to be only 150 GWh.

December 1980

Loan 568

Cumulative Estimated and Actual Disbursements  
(US\$ million)

As of Dec.	<u>1968</u>	<u>1969</u>	<u>1970</u>	<u>1971</u>	<u>1972</u>	<u>1973</u>	<u>1974</u>
(i) Appraisal Estimate <u>2/</u>	1.8	15.6	20.4	25.0	25.0	25.0	25.0
(ii) Actual <u>1/</u>	-	7.5	14.0	17.7	20.9	24.1	25.0
(ii) as % of (i)		48	68	70	83	96	100

Loan 763

Cumulative Estimated and Actual Disbursements  
(US\$ million)

As of Dec.	<u>1971</u>	<u>1972</u>	<u>1973</u>	<u>1974</u>	<u>1975</u>	Sept. <u>1976</u>
(i) Appraisal Estimate <u>3/</u>	6.3	15.1	22.8	24.0	24.0	24.0
(ii) Actual <u>1/</u>	.02	3.2	9.9	16.8	23.0	24.0
(ii) as % of (i)	.3	21	43	70	96	100

1/ Source: IBRD Statements of Loans

2/ Source: Appraisal Report IBRD No. TO-686a dated October 14, 1968

3/ Source: Appraisal Report IBRD No. PU-69a dated May 28, 1971

December 1980

ACTUAL AND FORECAST LOAN ALLOCATIONS

Loan 568-TU

<u>Category</u>	<u>Description</u>	<u>Amount Disbursed (Expressed in US\$)</u>	<u>Loan Agreement</u>
1.	Keban/Istanbul Transmission Line	17,066,049.82	14,900,000
2.	Ankara/Istanbul, Kayseri and Keban Substations	2,335,685.39	3,200,000
3.	Goekcekaya Transmission Line and Substation Materials	0.-	500,000
4.	Interest and other Charges During Construction	4,364,700.00	3,100,000
5.	Local Currency Expenditures	1,233,564.69	2,300,000
6.	Unallocated	0.-	1,000,000
Total		<u>25,000,000.00</u>	<u>25,000,000</u>

Loan 763-TU

<u>Category</u>		<u>Amount Disbursed (Expressed in US\$)</u>	<u>Loan Agreement</u>
1.	Transmission & Substation equipment, materials & installation	21,742,284.16	18,300,000
2.	Distribution capacitors	0.-	400,000
3.	Special vehicles & testing equip.	441,325.95	1,900,000
4.	Consultants' services & training	82,260.29	200,000
5.	Interest & other charges on the Loan accrued on or before Mar.31, 1975	1,734,129.60	2,000,000
6.	Unallocated	0.-	1,200,000
		<u>24,000,000.00</u>	<u>24,000,000</u>

December 1980

Attachment 8

TURKEY  
NEAR TRANSMISSION LINE PROJECT AND TEP TRANSMISSION PROJECT  
LOANS 663-TT AND 764-TT  
 Income Statements for the Years Ended December 31, 1971-1977  
 (in millions)

	1971		1972		1973		1974		1975		1976		1977	
	Forecast	Actual	Forecast	Actual	Forecast	Actual	Forecast	Actual	Forecast	Actual	Forecast	Actual	Forecast	Actual
Generation - GWh														
Hydro	1,867	1,765	2,487 <sup>1</sup>	2,291	3,129	1,973	5,205	2,504	8,496	4,601	5,695	5,551	9,272	7,843
Thermal - Coal	1,235	1,361	1,280	1,365	1,280	1,416	1,250	1,425	1,280	1,352	1,351	1,351	1,351	1,196
- Lignite	1,285	1,302	2,660	1,357	3,910	1,477	4,360	1,436	4,360	1,474	4,861	2,827	4,460	3,258
- Fuel Oil	3,755	3,198	3,322	4,039	4,890 <sup>2</sup>	4,781	4,374	4,290	3,974	3,792	4,155	3,864	3,171	3,958
- Gas	-	-	-	29	-	391	-	54	-	496	-	411	-	1,176
Nuclear	-	-	-	-	-	-	-	-	-	-	-	-	300	-
Total Generation	7,922	7,620	10,249	9,051	13,209	10,038	16,219	10,474	16,110	11,721	19,486	14,737	21,446	17,198
Purchased Power - GWh	245	272	302	372	304	438	4	804	5	1,572	5	1,171	5	795
Total Generated & Purchased - GWh	8,167	7,892	10,551	9,423	13,514	10,476	16,224	11,258	16,115	13,223	20,491	15,908	21,451	17,993
Station Use - GWh	402	422	490	484	696	532	360	321	399	489	1,050	702	1,277	916
Transmission Losses - GWh	260	257	255	203	208	200	223	222	224	261	307	263	3,303	841
Total Used and Lost - GWh	662	679	745	687	904	732	583	543	623	750	1,357	965	4,580	1,757
Sales - GWh	7,505	7,013	9,709	8,464	12,310	9,344	14,741	10,239	14,392	12,183	17,595	14,640	19,158	16,213
Average Revenue per kWh - Kurus	21.14 <sup>3</sup>	20.18 <sup>3</sup>	23.00	23.92	22.09	26.01	22.41	19.13 <sup>4</sup>	22.48	40.07 <sup>5</sup>	22.76	45.13 <sup>6</sup>	23.02	21.70 <sup>6</sup>
Operating Revenues	1,487	1,416	2,233	2,026	2,719	2,432	3,273	1,923	3,255	4,886	4,006	6,527	4,417	3,507
Operating Expenses														
Fuel - Coal	90	125	101	173	101	187	101	193	101	207	38	210	35	400
- Lignite	39	51	84	90	114	102	124	101	124	106	15	171	247	225
- Fuel Oil	333	343	354	412	450	586	355	1,377	364	1,203	380	1,142	294	1,622
- Gas Oil	-	-	-	14	-	233	-	562	-	550	-	450	-	1,542
- Uranium	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cost of Power Purchased	32	40	39	89	39	71	1	221	1	515	1	130	1	396
Materials other than Fuel	22	30	31	27	34	34	36	35	38	40	45	188	51	130
Wages and Salaries	107	125	167	165	198	220	223	357	251	486	294	861	340	1,107
Miscellaneous Expenses	34	34	44	41	50	50	57	66	62	74	71	50	70	102
Depreciation	313	322	425	340	322	590	595	665	728	929	805	1,251	934	1,803
Taxes other than Income Taxes	9	12	14	8	19	8	23	8	21	8	28	37	13	13
Income Taxes	183	74	322	108	340	63	320	44	642	130	108	610	74	74
Total Operating Expenses	1,162	1,166	1,481	1,441	1,867	2,143	2,132	3,044	2,332	4,270	5,441	7,146	8,212	8,254
Net Operating Income	425	250	682	477	652	292	1,177	151	1,353	618	1,464	1,281	1,205	1,753
Other Income	18	2	15	30	15	2	15	27	10	147	16	21	25	132
Gross Income	443	252	697	445	668	301	1,196	178	1,363	634	1,480	1,302	1,230	1,885
(Less) Interest charged to Operations	153	134	235	172	329	213	362	245	353	371	379	488	434	659
Net Income	290	118	462	273	339	88	834	73	1,010	263	1,101	714	796	1,226
Rate of Return														
Average Net Fixed Assets in Service <sup>7</sup>	9,206	8,115	6,669	5,951	5,859	10,440	13,211	10,322	14,347	21,092	14,921	10,467	16,340	11,186
Rate of Return - Net Operating Income as % of Average Net Fixed Assets in Service	3.16	4.89	10.23	7.97	5.62	2.74	5.50	2.11	5.25	2.55	5.55	4.1	5.45	3.44

<sup>1</sup> Forecast figures reflected revaluation as of December 31, 1969.  
 Actual figures reflect revaluation of all Fixed Assets in Service as follows:  
 (a) as at end of 1971 and 1972 to the 1970 price level;  
 (b) as at end of 1973 to the 1973 price level;  
 (c) as at end of 1974 and 1975 to the 1974 price level;  
 (d) as at end of 1976 to the 1976 price level; and  
 (e) as at end of 1977 to the 1977 price level.

<sup>2</sup> Assumed a tariff increase raising average tariffs to 23 kurus per kWh (about 48% increase) effective April 1, 1973, with no subsequent revisions through 1977.  
<sup>3</sup> Reflects a tariff increase of about 50% effective July 1, 1971 raising average tariffs to 23.3 kurus per kWh.  
<sup>4</sup> Reflects effect of fuel surcharge levied from time to time.  
<sup>5</sup> Reflects a tariff increase of about 20% effective June 1, 1975 for all consumers except cement, fertilizer and aluminum-producing industries for which old tariffs continued to apply; the difference between revenues at the old and new tariffs being granted to TEK as a subsidy by Government. Thus the effect on TEK's revenues was as if the tariff increase applied to all its sales.  
<sup>6</sup> Reflects a tariff increase raising TEK's average revenue from active and reactive energy to 70 kurus per kWh effective September 10, 1977.  
 December 1980

TURKEY  
 KENAH TRANSMISSION LINE PROJECT AND TEK TRANSMISSION PROJECT I  
 LOANS 568-TU AND 763-TU  
 Internal Cash Generation 1971-1977  
 (IT Millions)

	1971		1972		1973		1974		1975		1976		1977	
	Forecast	Actual	Forecast	Actual	Forecast	Actual	Forecast	Actual	Forecast	Actual	Forecast	Actual	Forecast	Actual
<u>Internal Cash Generation</u>														
Gross Income	443	252	697	445	868	301	1,186	334	1,369	565	1,480	1,200	1,621	1,630
Depreciation	313	322	425	340	522	590	695	668	728	929	808	1,251	934	1,893
Internal Cash Generation	756	574	1,122	785	1,390	891	1,881	1,002	2,097	1,494	2,288	2,451	2,555	3,523
<u>Debt Service</u>														
Amortization	143	197	199	211	214	419	286	308	461	773	706	462	335	1,434
Interest charged to Operations	153	134	235	172	329	213	362	258	353	371	379	488	434	588
Total Debt Service	296	331	434	383	543	632	648	566	814	1,144	1,085	950	769	2,022
Net Internal Cash Generation	460	243	688	402	847	259	1,233	436	1,283	350	1,203	1,501	1,786	1,501
Construction Expenditure	1,150	1,016	1,375	1,096	1,024	1,298	1,681	2,770	1,641	3,269	1,171	5,986	1,148	7,869
Self-Financing Level - % <sup>/1</sup>	40	24	50	37	83	20	73	16	78	11	103	25	156	19

<sup>/1</sup> Net Internal Cash Generation as a percentage of Construction Expenditure.

TURKEY

TEK TRANSMISSION PROJECT (LOAN 763-TU)

	<u>1970</u>	<u>1971</u>	<u>1972</u>	<u>1973</u>	<u>1974</u>	<u>1975</u>	<u>1976</u>	<u>1977-2005</u>
1. TOTAL SALES, GWh	5,606	7,013	8,464	9,344	10,239	12,183	14,640	
2. SALES ATTRIBUTABLE PROJECT, GWh		1,407	2,858	3,738	4,633	6,577	9,034	9,034
<u>COSTS (Millions LT)</u>								
3. Total fuel costs		529	689	1,110	2,233	2,066	1,972	
4. Other operating costs		229	322	375	683	1,128	1,575	
5. Total operating costs		758	1,011	1,485	2,916	3,194	3,547	
6. Average operating cost/kWh sold, LT <sup>/1</sup>		0.1081	0.1194	0.1589	0.2848	0.2622	0.2423	
Operating costs attributable project <sup>/2</sup>		152	341	594	1,319	1,724	2,189	2,189
7. Construction expenditures:								
8. TEK		954	1,043	1,216	2,558	2,932	5,494	
9. DSI (hydropower)		752	931	1,543	1,027	1,612	2,580	
10. TOTAL COSTS ATTRIBUTABLE PROJECT		<u>1,858</u>	<u>2,315</u>	<u>3,353</u>	<u>4,904</u>	<u>6,268</u>	<u>10,263</u>	<u>2,189</u>
<u>BENEFITS (Millions LT)</u>								
11. Total electricity revenues		1,415	2,025	2,435	4,033	4,882	6,637	
12. Average revenue/kWh sold, LT <sup>/3</sup>		0.2018	0.2392	0.2606	0.3939	0.4007	0.4533	
13. REVENUES ATTRIBUTABLE PROJECT <sup>/4</sup>		<u>284</u>	<u>684</u>	<u>974</u>	<u>1,825</u>	<u>2,635</u>	<u>4,095</u>	<u>4,095</u>
14. Price Index <sup>/5</sup>		0.5610	0.6280	0.7240	0.8390	1.0000	1.1730	1.4920
15. NET REVENUES ATTRIBUTABLE PROJECT (1975 PRICES) <sup>/6</sup>		-2,806	-2,597	-3,286	-3,670	-3,633	-5,258	1,277

RATE OF RETURN - 3%

/1 Line 5 ÷ Line 1

/2 Line 2 x Line 6

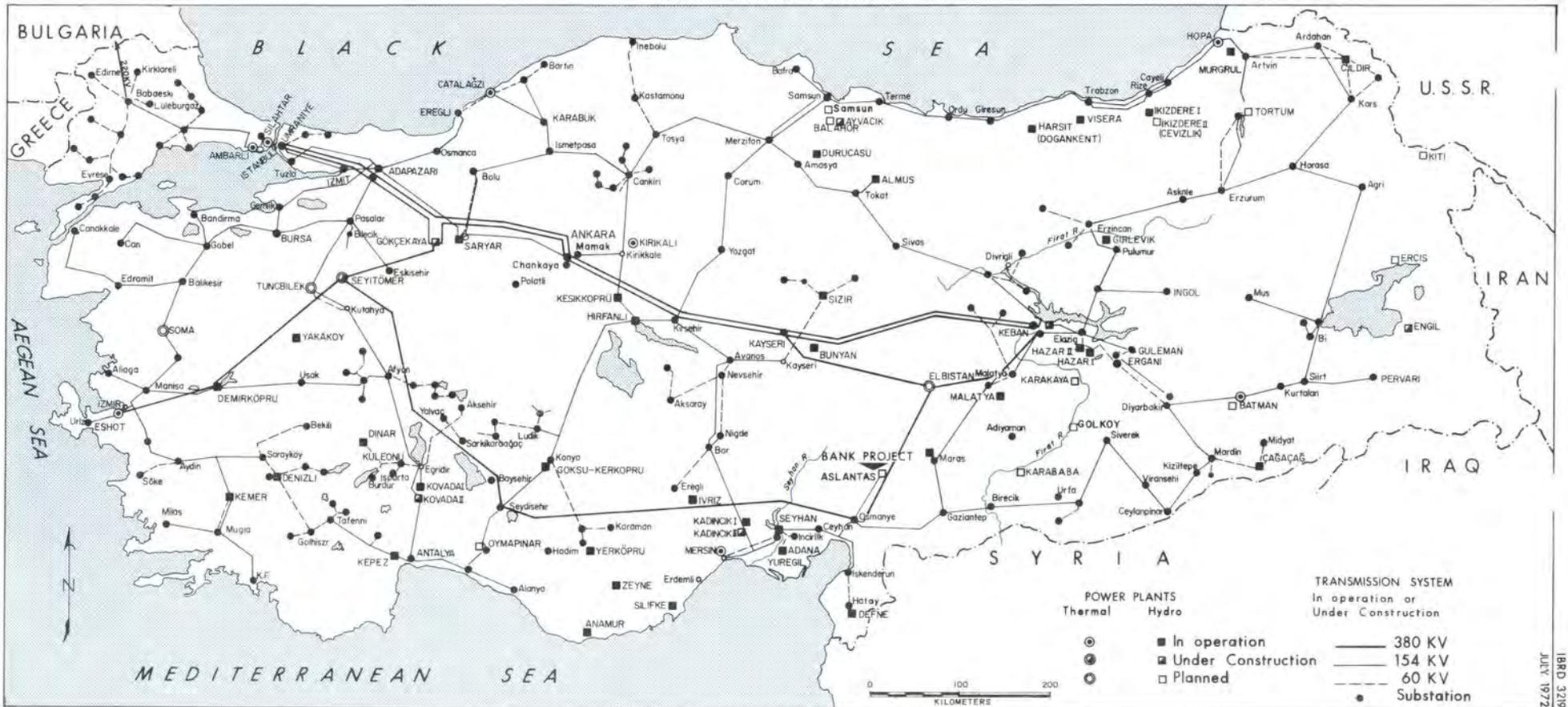
/3 Line 11 ÷ Line 1

/4 Line 2 x Line 12

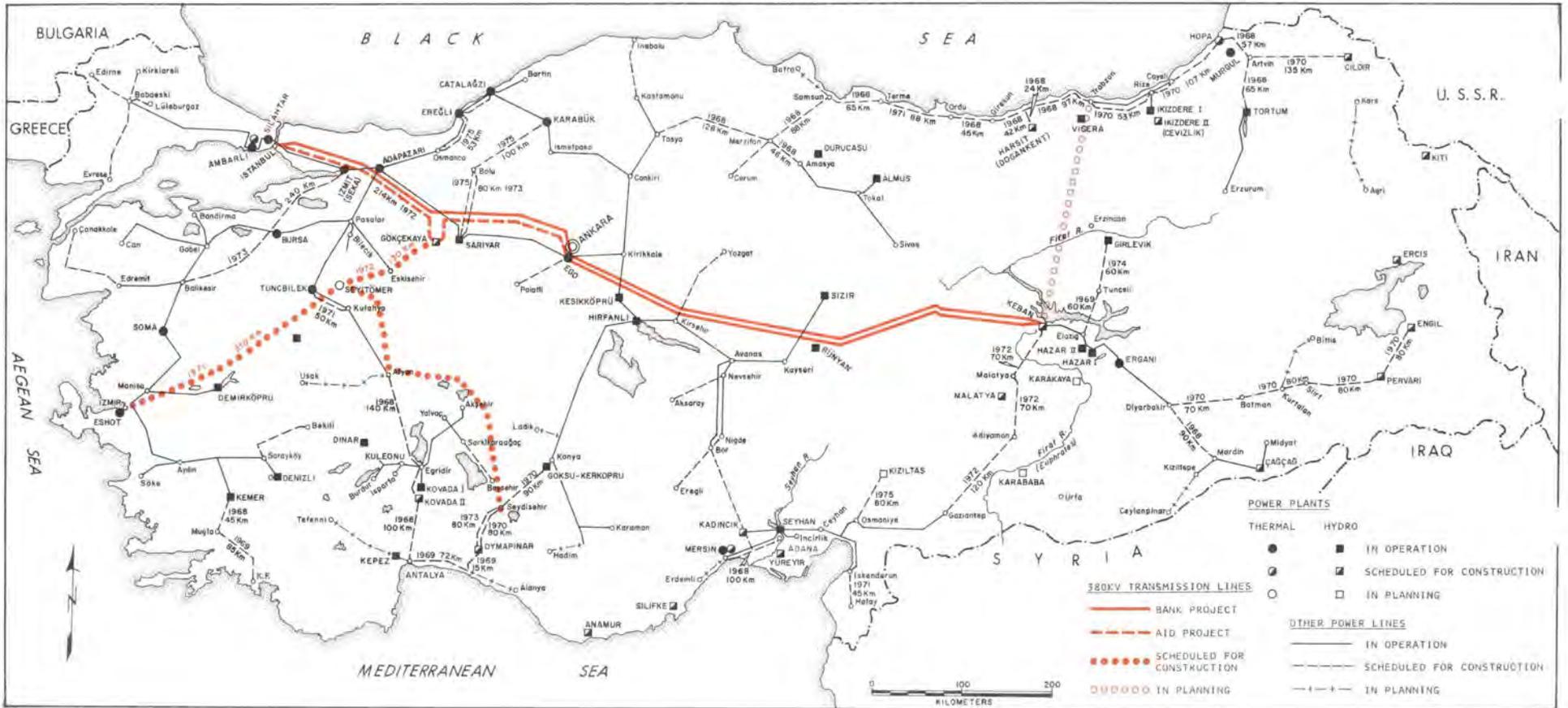
/5 Index of consumer prices (1975 = 100) from IMF International Financial Statistics

/6 (Line 13 - Line 10) ÷ Line 14

# TURKEY ELECTRIFICATION PLAN



# TURKEY ELECTRIFICATION PLAN



## OFFICE MEMORANDUM

TO: J. Fish, EMP

DATE December 10, 1979

FROM: R.W. Bates, OED

SUBJECT: TURKEY: Completion Report for Keban Transmission Project and  
TEK Power Transmission Project (Loan 568-TU and Loan 763-TU)

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2. TEK's final reports appear as Attachments I, II and III to the PCR. I would have preferred to see the relevant material incorporated in the PCR but if these reports are to be attached:
  - (i) we would need decent copies for reproduction, which may involve retyping;
  - (ii) comparison has to be provided between actual disbursements and the appraisal forecasts for each of the two loans (Attachment I, p. 6 and Attachment II, p. 14). On Loan 763-TU, TEK's data show a discrepancy between the total amount disbursed and the original amount. I have therefore prepared the attached table 1, which could be used instead. To round out the picture, I also attach table 2, showing the actual vs. the projected loan allocations, which should be included in the PCR with any relevant comment;
  - (iii) Attachment II, pp. 8-13 are of no value and should be deleted;
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3. Annex 1 should be expanded to cover Loan 763-TU. On the estimates of actual cost for the two loans, see point 5.

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6. There is only the briefest reference in the PCR to the actual demand vs. the appraisal forecast (e.g. paras. 5.02(b) and 6.02). I have therefore compiled the data in table 3. The PCR should comment on deviations of the actual demand from the forecast, noting in particular the extent of load shedding. Comparisons could be referred to the demand forecast in Loan 763-TU, with a brief comment on how this was revised from Loan 568-TU. Relevant points on the shortfall of demand might be: delays in the extension of the interconnected system, delays in the addition of specific new large loads (the aluminum plant?) and the lack of adequate supply.

7. The discussion of reasons for delay in the project supported by Loan 763-TU should be expanded, with a clearer statement about the project's operating experience (satisfactory or otherwise) since completion.

8. The discussion of the financial aspects (notably Section 5) should be supported by financial statements. I am sure you have these through the Bank's follow-on lending in Elbistan and TEK II. In particular, TEK's internal cash generation performance vs. the appraisal forecast should be more explicit.

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Loan 568Cumulative Estimated and Actual Disbursements  
(US\$ million)

As of Dec.	<u>1968</u>	<u>1969</u>	<u>1970</u>	<u>1971</u>	<u>1972</u>	<u>1973</u>	<u>1974</u>
(i) Appraisal Estimate <u>2/</u>	1.8	15.6	20.4	25.0	25.0	25.0	25.0
(ii) Actual <u>1/</u>	-	7.5	14.0	17.7	20.9	24.1	25.0
(ii) as % of (i)		48	68	70	83	96	100

Loan 763Cumulative Estimated and Actual Disbursements  
(US\$ million)

As of Dec.	<u>1971</u>	<u>1972</u>	<u>1973</u>	<u>1974</u>	<u>1975</u>	Sept. <u>1976</u>
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(ii) Actual <u>1/</u>	.02	3.2	9.9	16.8	23.0	24.0
(ii) as % of (i)	.3	21	43	70	96	100

1/ Source: IBRD Statements of Loans2/ Source: Appraisal Report IBRD No. TO-686a dated October 14, 19683/ Source: Appraisal Report IBRD No. PU-69a dated May 28, 1971

ACTUAL AND FORECAST LOAN ALLOCATIONSLoan 568-TU

<u>Category</u>	<u>Description</u>	<u>Amount Disbursed (Expressed in US\$)</u>	<u>Loan Agreement</u>
1.	Keban/Istanbul Transmission Line	17,066,049.82	14,900,000
2.	Ankara/Istanbul, Kayseri and Keban Substations	2,335,685.39	3,200,000
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4.	Interest and other Charges During Construction	4,364,700.00	3,100,000
5.	Local Currency Expenditures	1,233,564.69	2,300,000
6.	Unallocated	0.-	1,000,000
	Total	<u>25,000,000.00</u>	<u>25,000,000</u>

Loan 763-TU

<u>Category</u>		<u>Amount Disbursed (Expressed in US\$)</u>	<u>Loan Agreement</u>
1.	Transmission & Substation equipment, materials & installation	21,742,284.16	18,300,000
2.	Distribution capacitors	0.-	400,000
3.	Special vehicles & testing equip.	441,325.95	1,900,000
4.	Consultants' services & training	82,260.29	200,000
5.	Interest & other charges on the Loan accrued on or before Mar.31, 1975	1,734,129.60	2,000,000
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<u>Year</u>	<u>Forecast</u> <sup>1/</sup> (GWh)	<u>Actual</u> (GWh)
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---

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<b>ROUTING SLIP</b>		DATE
NAME		ROOM NO.
<i>Mr. Kaptur</i>		
	APPROPRIATE DISPOSITION	NOTE AND RETURN
	APPROVAL	NOTE AND SEND ON
	COMMENT	PER OUR CONVERSATION
	FOR ACTION	PER YOUR REQUEST
<input checked="" type="checkbox"/>	INFORMATION	PREPARE REPLY
	INITIAL	RECOMMENDATION
	NOTE AND FILE	SIGNATURE
<p>REMARKS</p> <div style="text-align: center; margin: 20px 0;">  <p style="font-size: 2em; font-family: cursive;">FILE</p> </div>		
FROM	<i>R. Bates</i>	ROOM NO.    EXTENSION

## OFFICE MEMORANDUM

Mr. Bates

This Division

DATE December 10, 1979

TO: J. Fish, EMP

Seems to be done

FROM: R.W. Bates, OED

Shabby PCR as a

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(i) Appraisal Estimate <u>2/</u>	1.8	15.6	20.4	25.0	25.0	25.0	25.0
(ii) Actual <u>1/</u>	-	7.5	14.0	17.7	20.9	24.1	25.0
(ii) as % of (i)		48	68	70	83	96	100

Loan 763Cumulative Estimated and Actual Disbursements  
(US\$ million)

As of Dec.	<u>1971</u>	<u>1972</u>	<u>1973</u>	<u>1974</u>	<u>1975</u>	Sept. <u>1976</u>
(i) Appraisal Estimate <u>3/</u>	6.3	15.1	22.8	24.0	24.0	24.0
(ii) Actual <u>1/</u>	.02	3.2	9.9	16.8	23.0	24.0
(ii) as % of (i)	.3	21	43	70	96	100

1/ Source: IBRD Statements of Loans

2/ Source: Appraisal Report IBRD No. TO-686a dated October 14, 1968

3/ Source: Appraisal Report IBRD No. PU-69a dated May 28, 1971

ACTUAL AND FORECAST LOAN ALLOCATIONSLoan 568-TU

<u>Category</u>	<u>Description</u>	<u>Amount Disbursed (Expressed in US\$)</u>	<u>Loan Agreement</u>
1.	Keban/Istanbul Transmission Line	17,066,049.82	14,900,000
2.	Ankara/Istanbul, Kayseri and Keban Substations	2,335,685.39	3,200,000
3.	Goekcekaya Transmission Line and Substation Materials	0.-	500,000
4.	Interest and other Charges During Construction	4,364,700.00	3,100,000
5.	Local Currency Expenditures	1,233,564.69	2,300,000
6.	Unallocated	0.-	1,000,000
	Total	<u>25,000,000.00</u>	<u>25,000,000</u>

Loan 763-TU

<u>Category</u>		<u>Amount Disbursed (Expressed in US\$)</u>	<u>Loan Agreement</u>
1.	Transmission & Substation equipment, materials & installation	21,742,284.16	18,300,000
2.	Distribution capacitors	0.-	400,000
3.	Special vehicles & testing equip.	441,325.95	1,900,000
4.	Consultants' services & training	82,260.29	200,000
5.	Interest & other charges on the Loan accrued on or before Mar.31, 1975	1,734,129.60	2,000,000
6.	Unallocated	0.-	1,200,000
		<u>24,000,000.00</u>	<u>24,000,000</u>

SALES FROM THE INTERCONNECTED SYSTEM

<u>Year</u>	<u>Forecast <sup>1/</sup> (GWh)</u>	<u>Actual (GWh)</u>
1970	5,820	5,606
1971	7,508	7,013
1972	9,709	8,464
1973	12,310	9,344
1974	14,741	10,239
1975	16,392	12,183
1976	17,595	14,640
1977	19,188	16,460 <u>2/</u>

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1/ Source: Appraisal Report for Loan 763-TU

2/ Estimate

1975

<u>Actions to system (Megawatts)</u>	<u>MW</u>	<u>Type</u>	<u>Capability (mw)</u>
ALIAĞA G.T (UNIT: I-II)	60.0	Thermal	50.0
KEBAN (UNIT: IV-V)	315.0	Hydro	300.0
GILDIR	15.4	"	12.0
ISDEMİR	50.0	Thermal	45.0
BATMAN	15.0	"	10.0
TOTAL:	455.4		417.0 (312.0 Hydro)

1976

ALIAĞA G.T (UNIT: III-IV)	60.0	Thermal	50.0
GÖRGEKAYA (UNIT: IV)	92.8	Hydro	90.0
AKSA	21.2	Thermal	10.0
DERME	7.7	Hydro+Thermal	5.0
DEFNE	3.0	Hydro	2.0
TOTAL:	184.7		157.0 (95.0 Hydro)

COMMONWEALTH ASSOCIATES, INC.

C/O T.E.K. ŞEBEKELER DAİRESİ BAŞKANLIĞI  
NECATİBEY CAD. NO. 5  
SİHİYE — ANKARA  
TURKEY

H.9.12

Tel : 12 84 67  
Cables : COMAS, ANKARA

December 9, 1974

T.E.K.  
General Management

SUBJECT: Gökçekaya and Keban 380 KV Transmission Projects  
Completion Report

Gentlemen:

Please refer to your letter Ref. 614/Keb-662/218 8635 dated October 8, 1974 and the I.B.R.D. letter dated September 25, 1974 attached thereto on the subject of a completion report for the above Projects.

We have prepared a preliminary version of a completion report and are attaching a copy of this hereto. If you wish you can use this as a basis for a completion report to be prepared by you, or alternatively you may prefer to give us comments on this preliminary report and we can incorporate these into a final completion report.

It would appear from the I.B.R.D. letter that the completion report is not required until the Gökçekaya - Ankara 380 KV line is complete, and consequently the final version would require to be prepared within the next nine months or so.

Sincerely,

*George D. Nicholson*

George D. Nicholson  
Field Project Manager

cc: Mr. H. P. Hullett  
Mr. R. E. Felmsbee  
TEK, Şebekeler Dai. Bşk.

GDN:mk

TÜRKİYE ELEKTRİK İŞLETİM VE DAĞITIM ANKARA ŞİRKETİ	
Şebekeler Bölge Müdürlüğü	
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20/12

COMPLETION REPORT ON GÖKÇEKAYA AND KEBAN TRANSMISSION PROJECTS

GENERAL

The Projects comprised the planning, design, and construction of the Gökçekaya Transmission Project and the Keban Transmission Project.

Gökçekaya Transmission Project comprised:

- (1) 380 KV 50 cycle 3-phase single-circuit power transmission lines approximately 380 KM in length linking Gökçekaya hydro-electric power plant with Ankara and Istanbul cities.
- (2) Ankara step-down substation consisting of two 150 MVA auto-transformers stepping down from 380 KV to the Ankara city 154 KV network. The substation has two 380 KV transmission lines coming from Keban, one 380 KV line going to Istanbul and one 380 KV line from Gökçekaya.
- (3) Istanbul step-down substation consisting of two 150 MVA auto-transformers stepping down from 380 KV to the Istanbul city 154 KV network. The substation has one 380 KV transmission line coming from Gökçekaya.

Keban Transmission Project comprised:

- (1) 380 KV 50 cycle 3-phase single-circuit power transmission lines approximately 1450 KM in length with two lines linking Keban hydro-electric power plant with Ankara city including a series capacitor station at Kayseri and one line continuing from Ankara to Istanbul.

- (2) Extension to Istanbul step-down substation consisting of two more 150 MVA auto-transformers stepping down from 380 KV to the Istanbul city 154 KV network. The substation extension provided for one 380 KV transmission line coming from Ankara.

The concept and initial basic design of the Projects was organized under the sponsorship of Elektrik İşleri Etüd İdaresi (EIE), who retained as consulting engineers, Commonwealth Associates Inc. (CAI) Jackson, Michigan to make studies, design the Projects, train the Client's engineers and advise and assist in procurement and construction management. Subsequently all of EIE's functions with respect to the Projects was assumed by Etibank, and were later transferred from Etibank to Türkiye Elektrik Kurumu (TEK). The design, procurement, and contracting were under the direction of the TEK Şebekeler Dairesi Başkanlığı (Networks Department).

The initial survey and selection of line routes was carried out by the Client in Turkey, and the results were passed to the Consultant in Jackson, Michigan for tower spotting, selection of tower types and heights and preparation of construction lists, and sag tables for conductors and shield wire. The tender documents for line construction, including the supply of foundation material and tower steelwork, were prepared in Ankara jointly by the Client and Consultant, based on technical specifications provided by the Consultant in Jackson.

Page 3

The tender documents for line insulators, conductors, fittings and construction equipment were also prepared in Ankara jointly by the Client and Consultant, based on technical specifications provided by the Consultant in Jackson. Evaluation of the bids and placing and handling of contracts for the procurement of line material and equipment and for line construction were also carried out jointly in Ankara.

The installation of foundations and supply and erection of towers on the Gökçekaya-Ankara and Gökçekaya-Istanbul lines were initially contracted to Madeni İnşaat İşleri T.A.Ş. (MITAŞ) of Turkey, but, since this company defaulted on their contractual obligations during the course of construction, the remaining work is being carried out by TEK Şebeke Tesis Dairesi (Construction Department), who have also been responsible from the outset for the erection of insulators and conductors for these lines.

The installation of foundations, supply and erection of towers, and erection of Owner-furnished insulators and conductors on the two Keban-Ankara lines and on the Ankara-Istanbul line was initially contracted to Società Anonima Elettificazione (SAE) of Italy, but, since this company also defaulted on their contractual obligations during the course of construction, the remaining work has been carried out by TEK Şebeke Tesis Dairesi.

The original design work for the substations was carried out in the Consultant's Jackson Office, and the tender documents for the procurement of substation material and construction equipment were prepared in Ankara jointly by the Client and Consultant, based on technical specifications provided by the Consultant in Jackson. Evaluation of the bids and the placing and handling of contracts for the procurement of substation material and equipment were also carried out jointly in Ankara.

The erection of the step-down substations at Ankara and Istanbul and of the series capacitor station at Kayseri has been carried out by TEK Şebeke Tesis Dairesi as originally planned.

Local currency for the construction of the Projects has been used to the maximum extent consistent with the capabilities of domestic industry. The MİTAS contract and part of the SAE contract were paid in Turkish Lira, which has also been used for some of the material and equipment purchases and for a portion of the Engineer's fee.

International Bank for Reconstruction and Development (World Bank) Loan No. 568-TU amounting to \$ 25 million provided the foreign exchange necessary for the SAE contract and for a large share of line material, line construction equipment and substation material purchases.

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USAID Loan 277-H-060 amounting to \$ 5,690,000 provided the U.S. Dollars for a lesser portion of the substation material, a small amount of line material, some items of construction equipment, and part of the engineering costs.

USAID Loan 277-H-063 amounting to \$ 2,608,000 provided the balance of the U.S. Dollar portion of the Engineer's fee, and the U.S. Dollar cost of automotive and radio equipment purchased for the Projects.

Detailed information on the expenditures incurred under these various foreign exchange loans, and on local Turkish Lira expenditures have been given in the Quarterly Reports which have been regularly published throughout the course of the Projects. Generally, these foreign exchange loans, arranged at the beginning of the Projects, proved more than sufficient to carry the Projects through to completion, and all financing arrangements proved satisfactory.

While, as would be expected, a few major problems arose during the implementation of these Projects, none of these proved to be insuperable, and all were overcome with a satisfactory final result. The primary objective of the Projects, which was to provide for the transmission of electric power, generated at Gökçekaya and Keban hydro-electric stations to Ankara and Istanbul cities can be said to have been successfully achieved. A secondary objective of the Projects, which was to train local staff in EHV work, was also achieved with appropriate training carried out both in the Consultant's design office in the U.S.A. and also in the field in Turkey. This has proved to be the case in so far that the Client has felt confident and competent enough to carry out subsequent EHV projects without outside help.

While these EHV projects were new to Turkey, they generally followed practices and procedures already established in other countries, and nothing unexpected or untoward arose in their implementation. Any changes caused in the country of an environmental, sociological or demographic nature were to be expected and are of insignificant dimensions.

#### TRANSMISSION LINES 380 KV

The 380 KV lines Gökçekaya-Istanbul, Keban-Ankara, and Ankara-Istanbul are complete and energized. The Gökçekaya-Ankara 380 KV line is approximately 44% complete and final completion is scheduled for August, 1975.

These lines have been constructed to recognized international standards in accordance with the engineering designs and specifications prepared by Commonwealth Associates, Inc. and there have been no significant departures therefrom. The performance of the lines in service has proved satisfactory and acceptable.

These are the first lines to be constructed in Turkey at 380 KV, at which voltage tension stringing of the conductors is required. The new technique of tension stringing was successfully mastered by the construction crews, under the supervision and guidance of experienced field supervisors on the Consultant's staff. The remainder of the work, comprising installation of foundations and erection of towers, is not significantly different at 380 KV from 154 KV and lower voltage construction, and presented no difficulty to the construction crews.

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The main problem which arose during the construction of the transmission lines was the failure of the two line construction contractors to complete their contracts. On the Keban Project SAE completed the Ankara-Istanbul 380 KV line, but installed only 692 tower foundations and erected only 208 towers on the Keban-Ankara 380 KV lines before running into financial difficulties. Their financial difficulties can in retrospect be put down to a combination of bidding too low a contract price initially, and not carrying out the work subsequently in accordance with the original time schedule. Also a major devaluation of the Turkish Lira in August, 1970 from 9 TL equals 1 \$ to 15 TL equals \$ 1 caused them a serious financial loss. The contract ended up in arbitration and the Arbitrators assessed damages to the Owner of TL 25 million. The outstanding work of the contract was however successfully completed by TEK Construction Department ahead of the completion of the Keban dam and hydro-electric station.

On the Gökçekaya Project Mitas completed the installation of foundations and erection of towers on the Gökçekaya-Istanbul line, but installed only 272 foundations and erected only 220 towers on the Gökçekaya-Ankara line, before they also ran into financial difficulties. The contract is presently under Arbitration, and the outstanding work under the contract, and also the stringing of conductors on the Gökçekaya-Ankara line will be carried out by TEK Construction Department. The Gökçekaya-Istanbul 380 KV line was completed ahead of the completion of the Gökçekaya Dam and provided an outlet at Istanbul for the energy generated at Gökçekaya hydro-electric station.

## SUBSTATIONS - 380 KV

### General

The 380 KV substations in Istanbul and Ankara and the series capacitor station in Kayseri have been virtually 100% completed. All three substations have been energized and commissioned either partly or completely.

International standards and engineering practices were observed and maintained during the construction period and the work was performed in general accordance with the engineering designs and specifications prepared by Commonwealth Associates Inc. and other supplementary documents and instructions provided by the vendors and manufacturers of equipment. The very few deviations from these documents are considered to be minor and were necessitated only because of variations in local conditions.

The performance and functioning of the Istanbul and Ankara substations during operation is considered both satisfactory and acceptable.

At present, electric energy which is generated by the Keban and Gökçekaya power plants is transported by the 380 KV transmission lines to the EHV substations in Ankara and Istanbul and this bulk energy is transferred to 154 KV and distributed at this voltage via the existing networks.

The substation and series capacitor station works were constructed entirely by TEK personnel. The manufacturer's experts - Westinghouse for the Istanbul transformers and A.S.E.A. for the Kayseri capacitors - were brought in for supervision and special instruction work only. In general, the TEK construction personnel engaged in checking and

Page 9

testing were experienced and capable to perform this work satisfactorily. For some work that was performed for the first time in Turkey, e.g. aluminum bus welding, E.P.V. transformer site erection, considerable time was spent for instructive training before the actual work took place. The personnel who undertook these tasks showed extreme devotion and were keen to learn the new techniques. Improvisation sometimes had to be resorted to in order to overcome the lack of special equipment and material e.g. the aluminum bus piping was bent in a variety of ways due to the reluctance of TEK to purchase regular pipe-bending equipment. Also a few busbar fittings were made by welding aluminum pieces together. While the end result was satisfactory, it is felt that it would have been more economical to have had proper equipment and material supplied by other specialists in these items.

Originally, four Westinghouse 380 KV transformers were ordered under the Gökçekaya Project, two of which were to have been installed at Istanbul and two at Ankara, and under the Keban Project the two additional 380 KV transformers for Istanbul were ordered from Mitsubishi. A decision was made later, for obvious reasons, to install all four Westinghouse transformers at Istanbul, and the two Mitsubishi units at Ankara, and this decision was subsequently put into effect. A further deviation from the original planning was to install the two spare 380 KV circuit breakers ordered for Ankara substation in Istanbul to improve the overall 380 KV system control.

Istanbul Substation

In Istanbul substation electrical energy has been received from the Gökçekaya power plant and transferred since the latter part of 1973.

The 380 KV Gökçekaya line side of the substation with auto-transformer bank no. 11 was completed, energized and commissioned in October 1973. The operation was performed in general accordance with the engineering study reports in energizing the line, synchronizing with the Gökçekaya power plant and transporting energy to the substation.

Auto-transformer No. 10 was reconditioned in the second quarter of 1974 and it was energized and commissioned in June 1974. At present both auto-transformer banks which are connected in parallel are in operation and loaded to a capacity of about 180 MW of energy from the Gökçekaya power plant. The operation of the substation has been to date satisfactory and uneventful.

The other two auto-transformer units No. 12 & 13 have been also reconditioned and the test results indicate that the units are dry and satisfactory for energization. Work now is concentrated in completing the 380 KV Ankara line side. The recently received air compressors have been installed and the erection and completion of air circuit breaker No. 125 in addition to a few connections will render the substation ready for final checking and eventual energization of the transmission line Istanbul-Ankara at 380 KV.

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The technical work of the substation, comprising, equipment erection, and installation, aluminum bus welding, connections, wiring, controls, etc. and also checking and testing, was performed in an acceptable manner comparable to similar installations in USA. The usual minor difficulties and problems which were encountered during the time of construction, primarily due to lack of proper and adequate equipment, were tackled and solved satisfactorily. It is considered that the substation is constructed in general accordance with U.S. and international standards applicable to EHV installations.

The Westinghouse auto-transformers which became the main problem during the time of construction have been corrected after a prolonged operation of drying the units under vacuum and heat, and filtering the insulating oil to acceptable standards. These transformers were manufactured during 1969 and delivered to Istanbul deckside in January 1970. The erection and treatment work took place in the summer of 1972 under the supervision of a Westinghouse representative. Although the erection and bridging work were performed with a reasonably short time the transformer oil filtering equipment and material were both inadequate and old to properly perform such a task. In addition another critical factor which was discovered later was the poor quality of local nitrogen and dry air. In some cylinders the moisture and water content was found to be excessively high and this moisture was absorbed by the insulating oil and the transformer windings, and this problem took some time to cure. It is recommended that the auto-transformers be fitted with a metallic drum in the piping that provides nitrogen and the drum be filled with silica gel

Page 12

to prevent moist nitrogen entering the transformer. In addition the purchase of MW transformer treatment equipment of a proper size is highly desirable to keep the transformers dry and prolong the life of such expensive equipment. As of to-day this equipment has not been procured although a specification has been prepared and forwarded to TEK's management.

The construction in general did not deviate significantly from the original designs. The very few deviations, as listed below, will not in any significant way prevent the substation's good electrical performance.

1. Water drainage system. The system is incomplete and consequently inoperative. The yard is not graded and rain water drains into the cable trenches. The gravel surfacing has not yet been installed and the yard during the rainy season is unacceptably muddy.
2. Structure foundation details. This deviation was made to adopt TEK standards, which are in general acceptable.
3. Cable trenches. It was recommended that a metallic screen be placed above the trenches as a magnetic screen to prevent interference to the control cables from the 380 KV overhead busses. This application is not fulfilled yet.

4. Grounding. A number of grounding rods and the grounding mats under the disconnect switches are omitted.
5. The distance between the attended control house and the unattended relay house has created a problem in operating the substation and reporting faults to the dispatching center in acceptable time.

#### Ankara Substation

In Ankara substation energy has been received from the Keban power plant via the Keban North 380 KV transmission line and transferred to 154 KV since early September, 1974.

The complete switchyard has been energized and the two transformers have been commissioned and loaded to a recorded maximum of 200 MW. The only part that remains unfinished is the dead-end tower and the connection for the Gökçekaya line, and also the energization of the Ankara-Istanbul line at 380 KV. The Keban South 380 KV transmission line is energized at 380 KV but it is not yet transmitting energy since some work is incomplete at the Keban terminal. The procedure to energize the transmission lines to Keban was altered from the one recommended in the engineering study reports, and the pre-condition to have the Istanbul-Ankara line energized at 380 KV was not observed. TEK, however had prepared new studies based on the present electric system, and it was correctly proved that the dynamic voltage at the Keban terminal at the time of switching would not cause damage to the equipment.

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The operation of the substation in the past few months, with the exception of normal initial discrepancies which were corrected, has been both satisfactory and acceptable.

The two Mitsubishi auto-transformers, the line reactors and the air circuit breakers comprised the large size equipment in construction. The erection, assembly, installation and testing of these and all other equipment, although it offered a new challenge in Turkey, were performed in an acceptable manner comparable to similar installations in USA.

The difficulties and problems which were encountered during the construction period were primarily due to lack of proper and adequate equipment and in some instances were due to new techniques being tried for the first time in the country. However, all these problems were tackled and solved satisfactorily.

The substation was fully checked and tested prior to energization. The relays and control instruments were also checked and tested prior to energization, with the protective relays coordinated in accordance with the vendor's instructions and a protective system was provided to comply with the engineering studies.

It is considered that the substation is technically constructed in general accordance with the engineering designs, US and International Standards applicable to EHV installations.

The construction in general did not deviate significantly from the original designs and the deviations are similar to some of those described for the Istanbul substation.

Kayseri Series Capacitor Station

In Kayseri the station was energized and tested under 380 KV power in early September, 1974 when the Ankara to Keban transmission lines were energized.

Some components which are damaged in transportation were either replaced by new ones or repaired and tested to prove satisfactory prior to installation.

The station was completely checked and tested under the supervision of an ASEA representative and the only discrepancy found was the incapability of the air circuit breakers for automatic re-insertion. This discrepancy is presently under correction and the station will be in operation when both Ankara-Keban transmission lines are commissioned.

The work was performed technically in accordance with the engineering design, and international standards and practices were observed and maintained. The very few deviations are insignificant and similar to some of the deviations mentioned in the section for Istanbul.

The station is considered complete and its performance and functioning is expected to be satisfactory after commissioning and putting into service.

TURKEY

Annex 1

Keban Transmission Lines

Estimated Cost of the Bank Project

<u>Keban-Istanbul 380-kV Line</u>	<u>-----Millions of LT-----</u>			<u>-----Millions of US\$-----</u>		
	<u>Local</u>	<u>Foreign</u>	<u>Total</u>	<u>Local</u>	<u>Foreign</u>	<u>Total</u>
1460 km 380-kV line	69.3	135.5	204.8	7.6	14.9	22.5
Ankara substation	8.0	13.4	21.4	0.9	1.5	2.4
Istanbul substation	9.3	10.1	19.4	1.0	1.1	2.1
Kayseri substation	2.6	4.4	7.0	0.3	0.5	0.8
Keban substation	0.2	1.1	1.3	-	0.1	0.1
Gökçekaya line and sub- station material	-	4.8	4.8	-	0.5	0.5
Contingencies <u>1/</u>	8.9	8.4	17.3	1.0	1.0	2.0
Engineering	1.4	6.4	7.8	0.2	0.7	0.9
Interest during construction	<u>13.3</u>	<u>28.5</u>	<u>41.8</u>	<u>1.5</u>	<u>3.1</u>	<u>4.6</u>
TOTAL	<u>113.0</u>	<u>212.6</u>	<u>325.6</u>	<u>12.5</u>	<u>23.4</u>	<u>35.9</u>
Actual cost	685.4	591.5 <sup>3/</sup>	1276.9 <sup>3/</sup>	39.2	33.8	73.0 <sup>2/</sup> <sup>3/</sup>
Increase over estimate				+214%	+44%	+103%

1/ US\$1 = LT 9.08 as of October 1968

2/ US\$1 = LT 17.5

3/ As the expenditure of foreign cost was made progressively at various rates of exchange relative to US\$, the true total cost in terms of LT is less than stated here and conversely the total \$ equivalent of local costs is greater than stated here.

# OFFICE MEMORANDUM

TO: Those listed below

DATE: June 28, 1978

FROM: Nigel Green 

SUBJECT: TURKEY - Loan 568-TU - Keban Transmission Project  
- Loan 763-TU - TEK Power Transmission Project  
COMBINED COMPLETION REPORT

Please find enclosed a copy of the combined Project Completion Report for the above projects.

Distribution: Messrs. Knox, Pollan, Bart, Moini, van der Tak, Rovani (4),  
Fish, Russell, Finzi, Maffei, Perera, Subramanian, Jeurling,  
Kapur (4), Ken Jones, Davar, Rajagopalan, Mathai, Green  
Ms. Evans  
Division Black Book  
EMENA, Division & Chron Files

/mas

TURKEY: KEBAN AND TEK POWER TRANSMISSION PROJECTS  
(LOANS 568-TU AND 763-TU)

1. Introduction

1.01 Attached are completion reports for these two projects, prepared by the Turkish Electricity Authority (TEK), dated January 28, 1978, designated Attachments I and II respectively, some supplemental information sheets, (Attachment III), and a project completion report for the Keban Transmission Project (568-TU) dated December 9, 1974, prepared by the consultants, Commonwealth Associates, Inc. (U.S.), (Attachment IV)<sup>1/</sup>. A cost estimate for the Keban Transmission Project, comparative basic data sheets for the two projects, and a recalculation of the rate of return for the project financed under 763-TU are given in Annexes 1-4. The following information supplements that contained in these reports.

Project Description

1.02 The Keban Transmission Project (Loan 568-TU) consists of approximately 1460 km of extra-high-voltage (380 kV) transmission lines linking Istanbul and Ankara with the 620-MW Keban hydroelectric project which was being constructed at the same time. The Second TEK Transmission Project consisted essentially of TEK's transmission construction program for 1971-1974, comprising about 4000 km of 154 and 30-kV lines and 1500 MVA of substations and other equipment. Although planned for completion in 1971 and 1974 respectively, the projects were completed only in 1976 and 1977. Since both projects formed part of TEK's investment program for the period, a combined completion report is appropriate. Although TEK's reports are dated January 1977, further information required for the analysis was obtained only a year later hence the timing of this report.

Project Objectives

1.03 Aside from the critical need for the physical facilities included in the Projects, a principal objective was to improve organization and financial responsibility in the government-controlled part of the sector. To this end, with the active assistance of the Bank and its special adviser, Lord Hinton of Bankside, the Turkiye Elektrik Kurumu (Turkish Electricity Authority - TEK) was established on October 25, 1970, under Law No. 1312 of July 1970 from the power group of ETIBANK, the original beneficiary under Loan 568-TU. This was the first step to integrate a very large number of independent power facilities into a coherent central electricity authority. The law drafted with the help of the Bank and Lord Hinton, incorporated agreements reached with the Government on the scope and functions of the national electricity authority and the areas within which the authority would have autonomy. The draft reflected the stated intention of Law 440 that State Economic Enterprises (SEE) (of which TEK is one) be run autonomously in accordance with commercial principles and as though they were

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<sup>1/</sup> The consultants completed their work on the project in 1974, and the project was then completed by TEK's own staff.

private stock companies. The TEK law as passed, fell short of this principally in the degree of autonomy accorded to the new organization and especially in the lack of freedom to set salaries and terms of service of non-unionized staff. Another change which has materially affected TEK's central role in power planning and operations is that, contrary to the agreement reached with the Government, the planning, design and construction of hydroelectric projects continued to be the responsibility of DSI, the Turkish Water Development Authority. The appointment of TEK's general manager and his assistants is also the prerogative of the Government, rather than a function of TEK's board.

1.04 Whilst the establishment of TEK brought generation and transmission facilities under one authority, distribution to the ultimate customers continues to remain in the hands of municipalities. Exceptions to this general statement exist. They are two relatively minor concession areas, large industrial and other consumers outside municipal areas of jurisdiction, and some autoproducers.

1.05 Prior to Loan 568-TU the Bank had made one loan (1952) for the Seyhan Dam in the Cukurova concession area, one credit (1963) to cover the foreign exchange cost of a third generator in the Seyhan power station and a credit (1964) for the Mersin thermal power station also in the Cukurova concession area. In 1965 the Bank, which led the financing consortium (EIB, KfW, USAID, France and Italy) for the main Keban hydropower project, participated by contributing to the finance of the associated transmission lines, on condition that the Government took steps to improve the efficiency of the power industry. A start on the implementation of the needed reorganization which had been identified by ETIBANK's consultants, Ebasco Services Inc., was made possible by the application of a portion of a 1965 Bank technical assistance grant of up to US\$1.95 million to cover the foreign exchange costs.

## 2. Project Preparation and Appraisal

2.01 The Keban transmission lines financed under Loan 568-TU were designed and supervised during construction by Commonwealth Associates Inc. who were themselves financed by USAID through their association with the Gökçekaya line forming part of the system connecting Keban and the Gökçekaya hydro plant with Istanbul. The works financed under Loan 763-TU were designed by TEK's own staff assisted by the Italian Electrical Research Center (CESI) for network studies.

2.02 The Power Group of ETIBANK, the forerunner of TEK, was considered at the time of appraisal of the Keban Transmission Line Project to be competently managed and staffed. By 1970 TEK had recognized the need for reorganization and approached Electricité de France (EdP) for assistance, and by the time Loan 763-TU was being considered, the appraisal report noted that Government was considering revisions to the personnel law which might hamper classification and retention of professional staff. Employment conditions as since imposed by the personnel law, have led to the steady flight of competent staff to the private sector and this had been a major factor in the generally poor performance of the Borrower and the consequent delays in the two projects being evaluated here.

2.03 Contrary to the intentions of Law 440, as described in the introduction, the public power industry has been traditionally tightly controlled particularly as to the charge it could levy for energy; thus, bulk electricity is sold at a price inadequate to generate adequate resources for investment. Loans 568-TU and 763-TU sought to achieve the objective of internally generating a reasonable portion of the capital expansion requirements by obtaining acceptance of a minimum 8% rate of return based on realistically valued average net fixed assets in service (a provision repeated in principle in the TEK law though without a specific requirement for periodic revaluation). Government's unwillingness for political reasons to increase power rates in step with high inflation and development needs is reflected in the repeated failure to reach the agreed financial targets.

2.04 Periodic revaluation being necessary for the realistic adjustment of tariffs and for appropriate cash generation under inflationary conditions, the loan documents reflect the agreements reached on asset revaluation based on consultants' recommendations. Briefly, the loan agreement under Loan 763-TU required TEK to establish revaluation principles and methods satisfactory to the Bank based on the recommendations of consultants for computing the return from 1973 onwards.

### 3. Project Implementation

3.01 The Keban transmission lines originally were planned to be completed in 1970, soon after the commissioning of the first Keban unit. In practice, essential parts of the lines were completed more than two years late, but still just in time for the first unit of Keban which was itself eventually commissioned in September 1974. Final completion was not until October 1976. Construction of the lines was initially contracted with an Italian firm which ran into financial difficulties due to prolongation of the construction period and devaluation of the Turkish lira. As a result of these difficulties, the contractor was forced to abandon the work and TEK completed the project by force account. Shortage of skilled staff and inexperience in management of such a large line construction project lay at the root of much of the subsequent delay. However, learning the hard way can be a good school provided the personnel stay with the organization to apply their experience, and indeed subsequently TEK has successfully managed a major expansion of the 380-kV system; nonetheless, TEK's completion report specifically complains of the inability to recruit and retain technical staff and cites recent resignation of trained personnel.

3.02 The TEK Transmission Project was a "time-slice" project comprising TEK's transmission program for the years 1971 through 1974. Due in part to the shortage of skilled staff mentioned above, many of the facilities included in the original project were not completed until 1977 although there were many minor changes in the scope of the project (principally line locations and substation sizes) over the project period to accommodate the needs of a dynamic and growing system. Even so, partly as a result of generation shortages (Keban delay), the sales target forecast in the appraisal report for 1974 was not reached until 1976.

3.03 Although the Keban transmission lines have carried the energy generated at Keban to the load centers in the West, some disturbing problems have been encountered. Although there had been ample experience in the country with steel-tower transmission lines at lower voltages, the Keban lines introduced several innovations including bundled conductors, tension stringing, and refined designs incorporating high-strength steel. Such lines require a high standard of field erection and installation practices and TEK experienced some initial difficulties in coping with these. In addition, the standard Turkish loading criteria proved inadequate for the unprecedented ice loading experienced on the Istanbul-Ankara portion of the line, and subsequent design changes were required. Also, ever since the generators were commissioned there has been a debate as to whether some unexplained oscillations in the power system originate from the alternators and their control, or are a function of the transmission line characteristics. No positive identification of the cause has been made although an improvement seems to have been experienced with the bringing into service of the Gökçekaya/Ankara section of the line in 1976 and TEK continues to work with their consultants (CESI) and the manufacturers to resolve the problem.

3.04 The Bank and its associates, particularly the staff of USAID, endeavored to assist project implementation by repeated representations to the government authorities to clear bureaucratic delays occasioned by such things as import licence problems, the supply of steel for transmission line towers and the like. The Bank also participated in discussions between TEK and the Keban transmission line contractor in an attempt to resolve the issue involving the transfer of Turkish lira to Italy, including direct approaches to the Italian Ministry of Finance to find ways to resolve the dispute. The Bank agreed to the completion of the Keban line by TEK force account only when all hope of success had faded at which point it assisted in the setting up of construction schedules, equipment requirements, etc.

#### 4. Tariffs

4.01 As a condition of effectiveness of Loan 763-TU, TEK's tariffs were raised on average 50% effective July 1, 1971 (from about 16 kurus per KWh to about 24 kurus per KWh). This was expected to place TEK's finances on a satisfactory footing and in fact during 1972, the first year for which the increased tariffs were effective for a whole year, TEK by and large achieved the agreed rate of return of 8% on revalued assets. It was only when TEK was beset by large inflationary cost increases with consequential effect on the manpower situation and the implementation of projects and by Government's reluctance to raise tariffs in its effort to hold down inflation that TEK's financial situation started to deteriorate.

4.02 Under Loan 763-TU, a fuel adjustment clause was introduced in TEK's tariffs at the Bank's urging whereby increases in fuel costs are automatically recovered from consumers without a general tariff revision. This proved to be of significant help to TEK in 1973 and 1974 since the clause helped TEK to pass on to customers, without Government approval, its soaring fuel costs as a result

of the surge in international oil prices. When the average tariff level was around 24 kurus per KWh, the fuel adjustment charge rose from 3.5 kurus per KWh in December 1973 to 15.1 kurus per KWh in January 1974 raising the price of electricity to the consumer 42% in just about two months. Without the automatic fuel adjustment clause it is certain that there would have been major lags in recovering the increased fuel costs from customers, which would have led to a further serious deterioration in TEK's financial condition.

## 5. Financial Aspects

5.01 Loan 763-TU required TEK to earn an 8% return on revalued net fixed assets and to continue to revalue assets in future as prices change. Any shortfall in a year is required to be made up within the next two years; an overrun could be applied to offset any shortfall in one or more of the next three years (Loan 568-TU had substantially the same provisions). Fulfillment of this covenant would have meant significant tariff increases from time to time. However, after a 50% tariff increase in July 1971, there was no effective action until June 1976 to raise tariffs except for increasing the fuel surcharge because of the circumstances detailed below, and TEK has not met the rate of return covenant (8% on revalued net fixed assets) by varying margins from 1970 to date (by 2.5% in 1970, 3.1% in 1971, marginally in 1972, 5.3% in 1973, 5.7 in 1974 and 1975 and 3.9 in 1976). The surge in oil prices in 1973-1974 (para 4.02) made the task of ensuring TEK's financial viability rather difficult. In connection with Loan 763-TU, in view of the time required for the economy to adjust itself to the rapid price escalation, the Bank agreed to a longer-term approach for TEK to meet the required 8% as follows:

- (a) Government would establish not later than March 15, 1975 a new basic tariff yielding TEK a net average revenue of 51 kurus/KWh; and
- (b) from 1976 onwards, TEK would earn an 8% return on a revalued asset base.

These targets were not fully realized. However taking into account Government's anti-inflationary and economic stabilization policies, agreement was subsequently reached with Government that TEK would earn an 8% return from 1977 on a revalued asset base as agreed and that for 1976, such action including tariff adjustments would be taken by January 1, 1976 as would enable TEK to earn a 6% return in that year. However in the difficult political conditions then prevailing and in the absence of a strong Government able to provide political leadership, tariff action was delayed until May 1976 when rates were raised an average of about 20% with effect from June 1, 1976. Government approved further marginal adjustments in TEK's tariffs effective April 1, 1977 in order to enable TEK to increase its earnings. Again TEK's tariffs were raised about 42% effective September 10, 1977 but the increased revenues were largely offset by increases in fuel prices and in wages and salaries with the result that TEK's rate of return in 1977 is estimated to be only about 6.5%.

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5.02 The main reasons for TEK's failure to reach the agreed 8% return have been:

- (a) delayed commissioning of projects such as Keban resulting in lower availability of hydropower for meeting the demand;
- (b) less-than-expected load growth due in part to lack of adequate supply;
- (c) staffing problems;
- (d) rising employment costs, mostly of unionized labor, (wages and salaries in 1976 were about 230% of the 1970 appraisal estimate); and
- (e) Government's unwillingness to approve tariff increases especially because of the unsettled political conditions in the country.

5.03 Another serious financial problem which has beset TEK for the past few years is the problem of liquidity caused mainly by slow collection of receivables from municipalities despite a 15% discount for payment within one month and a penalty of 1% per month for payments thereafter (until these conditions were changed in June 1976). Since 1971, receivables have been consistently around four months' revenue, which is a very high level. At the end of April 1977 receivables which were outstanding for more than three months amounted to LT 3.5 billion, which itself is over five months' revenues. A significant portion of these outstandings was 2-3 years old. Government's solution to this problem has been consolidation and payment of intra-public sector debts. This has proved to be ineffective. After the consolidation of such debts in May 1975 under a law passed by Parliament, Government has again assumed responsibility for payment of TEK's bills for supply of electricity to municipalities after offsetting amounts due by TEK to various governmental agencies such as TKI, the Turkish Coal Enterprises, TAPAO, the Turkish Petroleum Authority and tax authorities.

## 6. Justification of the Projects and Bank's Role

6.01 Over the period that has elapsed since the appraisal for Loan 568-TU, its completion and that of the works under Loan 763-TU, various factors have affected TEK. These are principally a) an unwillingness to price electrical energy at levels adequate to meet development needs, b) the salaries of non-unionized staff progressively fell 50% to 65% below the level of the private sector employing similar skills, c) the Government's policy of fuel price subsidy has kept coal and lignite prices below their economic worth, d) Government policy has led to excessive levels of staffing in the lower grades of TEK in many disciplines which serves to reduce productivity and inflate costs.

6.02 No rate of return was calculated for the Keban Transmission Line Project since the lines were inseparable from the Keban Project itself, however, an internal financial rate of return calculation was made for the 1971-74 time-slice of the generation/transmission investment program as part of the 763-TU appraisal. The forecast rate of return was 13%. This was derived by using forecast revenues as a measure of benefits and therefore is not a true economic return, but can be used to assess the adequacy of long-run tariff policy. A similar calculation using actual investment, operating cost and revenue data for the period 1971-76 (since the forecast sales target was reached only in 1976) yields a return of only 8% (Annex 4). This result is not surprising in view of the two-year delay in completing the project and reaching the original sales forecast, and Government policy in holding down electricity prices. Average revenue per KWh in 1976 was 7% below forecast levels (in 1971 terms) despite a near-doubling of average fuel and operating cost (also in 1971 terms) compared with the appraisal estimate. The result was further depressed since, because of the delay in hydro project construction (principally Keban), TEK was forced to resort to expensive generation from oil-fueled gas turbines which were rushed into service in an attempt to meet the shortages.

6.03 The fact remains that both projects financed through these loans were essential for the power sector's development, and a judgement can be made as to their efficacy regarding the major reasons for lending identified in the appraisal reports which clearly lie in the institution-building field. At the non-political levels in Turkey, both in government ministries and productive enterprises, there is a positive acceptance of those institution-building objectives which were the main justification for the lending operations. These were: the establishment of an autonomous, national power authority, the introduction of financial management techniques and policies designed to support the autonomous nature of the SEE, strengthening the sector development planning methods in terms of the nationally most economic program, and the enhanced cooperation of the authorities concerned, especially those of TEK and the Water Development Authority (DSI). Considering the improvements brought about through the medium of Loans 568-TU and 763-TU, and the deficiencies still existing, the two loans should be considered as having partially succeeded in their objectives and therefore as moderately successful.

6.04 Despite the relatively unsatisfactory institutional and financial performance, credit must be given to TEK for coping with a growth in generation and sales of nearly three times in the decade 1968-1978, a 4000-MW system--large by any standards--and an investment program which saw asset values increase nearly ten times due to the rapid growth in a period of escalating international prices. Under these circumstances and given the types of project and long construction periods, the 100% cost overruns experienced on the projects were not unusual.

6.05 So far, although the Bank's aims have not been fully achieved, significant steps have been taken towards these goals. Mainly through the help of consultants financed by the technical assistance grant of US\$1.95 million and partly also

through the impetus provided by the two loans in question, TEK has established an adequate accounting and reporting system. Key accounting staff have also been trained in selected utilities in the USA. The reporting system is however not being used properly for management purposes. However the establishment of the system itself is a significant achievement. As regards other institutional improvements, for basically political reasons, institutional autonomy of TEK does not exist. Its technical operations have suffered because it is unable to hold an adequate level of experienced and competent staff. Despite a general shortage of competent staff its system planning has remained satisfactory, but implementation has been adversely affected by these constraints. What success has been achieved is as a result of the efforts of a constantly reducing core of dedicated and competent people. The Bank was instrumental in introducing dynamic system planning methods through the development of computer programs, and the Turkish system was used to test a general linear planning model developed in the Bank. The development program, which indicated the need for rapid introduction of thermal plant to meet the demand in 1974-78, was not then adopted by Government despite the Bank's urgings and the severe shortages in these years are now a matter of history. TEK's skills in drafting bidding documents and operating procurement procedures have steadily improved as a result of the work of the consultants and by association with the Bank so that in many fields consultants are no longer essential. In the financial area, implementation of the principle of automatic recovery of increased fuel costs from customers is a significant step forward. So also is the general acceptance of the concept of working towards a specific financial goal of an 8% rate of return on revalued assets. Even in respect of a matter such as revaluation on which there is no agreement in developed countries as to principles and methods, principles and methods have been agreed and implemented.

6.06 Because of inadequate tariff levels and a large expansion program in a period of high inflation, TEK has been unable to generate an adequate level of cash to support the power sector investment needs, and internal and external borrowings to support the investment program contributed substantially to the economic crisis faced by the Government in 1977/78. TEK still has a critical liquidity problem and it is unable to apply such remedies as are provided in the law to secure the prompt payments of outstanding bills. The decline in quality of its professional staff is still a problem. These fundamental problems, which drained the vitality of TEK, are shared by other SEEs to substantially the same degree and their solution, requiring political willingness, does not seem possible through application of normal project lending methods which focus on only a single sector. Subsequently, the Bank has made a deliberate effort to deal with these problems on a country basis, although without tangible progress as yet, and this was reflected in subsequent loans for TEK (1023-TU of June 28, 1974 and 1194-TU of June 14, 1976) so the dialogue is continuing.

Europe, Middle East and North Africa Regional Office

June, 1978

INTERNATIONAL BANK FOR  
RECONSTRUCTION AND DEVELOPMENT  
1818 H. Street N.W.  
Washington D.C. 20433

U.S.A.

Attention : Mr. Fish

Our Ref. : 610/DEK.I-901/  
Subject : Loan No. 568-TU  
FINAL REPORT

- Ref : a) Your letter dated 25th 9, 1974  
b) Your letter dated 12th 2, 1975

Our comments relating to the subjects referred in (a) and (b) above, have been submitted herewith.

As it is known, the Final Report dated 2nd, December 1975- which is herewith attached - prepared on the works in the scope of the credit, which were accomplished by our Consultant Firm Commonwealth Inc (CAI), has been submitted to your Bank. At this Report, the activities carried through this work - from the initial stage to the end - and the critics on the work have been adequately explained by our Consultant. The Report had provided all the necessary information for your Bank, with the exception of the supply of the Gökçekaya-Ankara line, while the situation of this line on the time this Report was written, had been also explained. In any case, we deem it necessary to give explanations on the matters below.

As it is known, Keban-Ankara-Istanbul power transmission line, and Ankara-Gökçekaya-Istanbul power transmission line and the substations connected to these lines have been the first 380-KV installations erected in our country. For this reason, some delays and faults have been experienced in the erection of the aforementioned substations and transmission lines. However, the major reasons of these delays are due to the various crises and circumstances faced in the world as well as in Turkey. In spite of this, due to the major delays occurred in the Gökçekaya and Keban power stations the termination dates have been extended for about 1,5-2 years to SAE and the substation investments have been slowed-down in the initial stage, with the aim to avoid unnecessary investments. In addition, due to the rapid increase in the prices in the world and Turkey markets no installation work other than Ankara-Gökçekaya line have caused delays in the utilization of the energy produced by the Keban and Gökçekaya power stations.

Upon the abolishment of the contracts (references H.50 and H.40) drawn with SAE and MITAŞ Companies, the installation of the Ümraniye and Gölbaşı substations and the Kayseri Capacitor stations as well as the erection of the Keban-Ankara line and the Gökçekaya-Ankara line through our Force Account and our own means, should be considered as a very big accomplishment. Through this, though limited, a team has been created which is qualified in separate project an erection work. By this team which was trained in these works, the 380-KV Seyitömer and İzmir substations, as well as the 380-KV Gökçekaya-Seyitömer-İzmir and Seyitömer-Seydişehir transmission lines have been installed by the initiative of our Organization.

The costs of the mentioned installations have been far beyond the estimated costs, due to the delays and the crisis faced in the World and Turkey markets, as well as the big price increases. The lack of experience of our Organization from the administrative and personnel point-of-view, which is a newly-created entity, is also attributable to these results. Moreover, the Laws, formalities, organization problems, impossibilities in recruiting and retaining technical staff and many other barriers, have effected this.

The major reasons for not being able to realize the afore-said installations in the desired level and time, in parallel to your requests in the above-said letters, could be summarized as follows. We would highly appreciate if you would accept our regrets and show consideration to us for not being able to prepare a report of such a largescale requested by you, due to the resignation of our trained and qualified staff during this period.

a) Due to the rapid charges in the prices, rate of exchange, circumstances in the world and Turkey and the skyrocketing price increase in the materials such as oil, steel etc, the main problem has been the disputes occurred with the contractors due to their delays which resulted with the cancellation of the MITAŞ and SAE contracts thus putting us in a position of completing the works by our Force Account, for which we were not equipped beforhand.

Great delays have taken place in the completion of the protection projects of the Brown-Boveri (BBC) company. Delays of upto 2 years have been observed in the projects which were to be completed within 4 months following the date of bidding and due to this reason, the procurement of the protection material has been prolonged. However, through the big efforts of the TEK erection team, the control pannel production, erection, cableing, and testing works have been finalized and the substations have been brought to a position ready for operation, before the powerstation was ready for operation. In order to minimize the

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prices and these effects, TEK, despite the shortage of its experience, has shown a great effort to eliminate the troubles and inefficiency of SAE, MİTAS, BBC and consultant firm CAI, and have finalized the works.

b) The performance of CAI, with the exception of the delays in the services carried on in U.S.A., could be deemed as successful. However, we believe that the consultants have not been able to give us the necessary assistance, due to the fact that, the Company has not sent qualified staff to Turkey during the erection phase, as well as the works in Turkey.

The plans, projects, profiles, charts, technical information and operation manuals which were to be supplied to us, under the contract drawn with CAI have not been submitted and the firm has left the Country. Moreover, they have not shown any interest when they were asked to give the reasons of deteriorations and have requested extra fee to examine the faults. On the other side, organizations like Electricité de France (EDF) and ASEA (Sweden) have made examinations in order to solve the problems and extended their assistance, without any fee. The Chas.T.Main and Stone-Webster companies which have previously carried on consultancy services for TEK, have submitted the complete reports and documents - which we are presently using - , at the end of the works.

Unfortunately the performance of the contractors in this work have been very low and none of them have met their obligations under the contracts. This has been a very serious problem for TEK.

The design of the poles used in the lines have been made according to very light assumptions and the meteorological conditions of the Country could not be estimated. For these reasons, by observing that 12 poles have fell down in the initial stage in İzmit during summer and the poles between Keban-Kayseri have fell down in the operation stage, it has been concluded that, the distribution of the poles have not been carried on in a proper manner. The falling down of the poles - in the erection stage - in the Keban line took place due to our fault in taking some measures.

c) No difficulties have occurred in the disbursements and procurements except the formalities and the credit has enabled us to have responsive bids and facilitated the payment procedure. Moreover, we have not faced any difficulties in transfer and financing.

However, we would like to emphasize that, the requests made for reports on subjects with great coverage and beyond the scope of TEK, which we believe, do not have direct relation with

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the credit highly occupies our staff, who are in limited number and are already loaded with heavy work. This request causes further delays in our other activities. It would be much more easier for us to work, if information of less detailed nature could be requested.

d) The comments on the Bank transactions which cause to problems are herewith attached (Annex-1).

e) Owing to the Keban-Gökçekaya Project and the credits, our technical and administrative staff have been trained, both in Turkey and abroad, and have reached a level capable to construct the 380-KV lines and substations, without the assistance of consultancy. Therefore, from now on, the projects could be accomplished by TEK's technical staff, which is a very great improvement.

However, in order to attract and retain qualified and experienced technical staff our Organization needs to be equipped with the necessary means.

f) Any kind of deviation has not been observed in the main financment plan, except the price increase.

g) The energy capacity of Turkey has shown an increase about 40%, through the Keban-Gökçekaya Projects, which forms the main framework of our Interconnected System. This Project has made a great contribution to the development, industrialization and the flourishment of the social standart, as well as the extension of energy to our rural areas.

h) It is primarily essential that, in order to derive maximum benefit from the Project, the investments for the other transmission, distribution plants - which would used for the sale, transmission and distribution of the energy obtained from the Keban and Gökçekaya system - should be increased and with prior consideration to training facilities, all the measures should be taken in order to retain adequate number of technical staff - for the construction of projects, installations - , thus being able to reach to the level of industrialized nations.

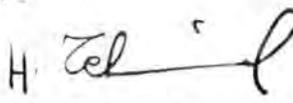
With the exception of a few qualified specialists who would assist us in solving the problems - which are few - arise during the research, planning, project, design and erection works, we do not necessarily need specialists to such a great extent.

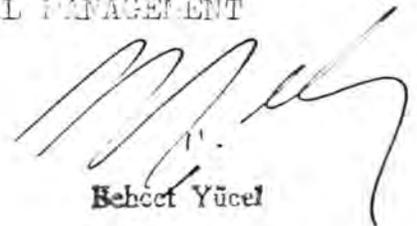
By our explanations we do hope that we have replied to your questions asked through your above referred letter and verbally. In case you should find some points in our report unsatisfactory please note that we shall be at your disposal to clarify such points.

We hope you will tolerate us for some missing points in report, if any.

Encls. - Final Report  
- Annex 1  
- CAI Completion report

Very Truly Yours  
TURKISH ELECTRICITY AUTHORITY  
GENERAL MANAGEMENT

  
Hüseyin TEKİNEL  
Genel Md. Yd. (Enerji)

  
Behcet Yücel

ANNEX 1

COMMENTS APPLICABLE TO LOAN NO. 568-TU

- 1) Sometimes the Bank effect payment to the suppliers very late which causes suppliers to write letters or send telex messages asking why the payment has not been effected although the shipment has been effected.

To avoid this the Bank can send a notification to the related supplier stating that they have received the payment application and the payment will be effected in the earliest convenience.

- 2)-The Bank should send a statement quarterly or half yearly showing the actual disbursements and the balance of the loan which will be useful to keep track of the loan simultaneously with the Bank so the over usage of the loan will be prevented.

-Our withdrawal applications consist of three pages and on every page the same informations are repeated. To avoid these rep. the information can be given on one page.

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IBRD LOAN NO. 568-TU (25 Million \$.)  
ACTUAL DISBURSEMENTS

1969	1970	1971	1972	1973	1974
7.554.954,02	6.498.164,11	3.697.705,94	3.135.992,60	3.206.756,38	916.426,96
	Cumilative as end of 1970	Cumilative as end of 1971	Cumilative as end of 1972	Cumilative as end of 1973	Cumilative as end of 1974
	14.043.118,13	17.740.824,07	20.876.816,67	24.083.573,05	25.000.000

IBRD LOAN NO. 763-TU (24 Million \$)  
ACTUAL DISBURSEMENTS

1971	1972	1973	1974	1975	1976
2.016.288,40	2.962.137,72	6.060.284,65	6.948.046,51	6.373.989,53	993.514,19
	Cumilative as end of 1972	Cumilative as end of 1973	Cumilative as end of 1974	Cumilative as end of 1975	Cumilative as end of 1976
	4.978.426,12	11.038.710,77	17.986.757,28	24.360.746,81	25.354.261,00

NOTE: Difference is due to the variations  
in courses.

Ankara, Jan.28, 1977

INTERNATIONAL BANK FOR  
RECONSTRUCTION AND DEVELOPMENT

1818 H Street, N.W.,  
Washington, D.C. 20433

U. S. A.

Our ref: 610/TBK.II-901/381

Subject: Loan No. 763-TU

Final Report 774

Y.Ref: Your letter dated Jan.26, 1977

As you know, the loan No.763-TU for US\$ 24.000.000 is not a project loan but is a credit granted to meet a part of our foreign exchange requirement that is necessary to finance the installation, revision and extension of 1330 MVA substations and 2800 km long 154 and 30 kV power transmission lines which will be connected to the interconnected system.

The substations and lines to be financed under this credit have been shown in our 1972 investment program. However due to our urgent needs that may occur in later years the program for 1972 has been changed and the funds have been transferred to the installations included in our program for 1973 and 1974. The names of substations and lines after the use of this credit have been shown on the attached lists.

The credit No.763-TU was intended to be used for the completion of the equipment necessary for the substations which have already been built and for the installation of new substations which have just been included in the program.

The equipment to be procured under this credit are used :

- 1) In the installation of new substations,
- 2) In the completion of equipment for the substations which have been built,
- 3) To increase the power of some substations which are in operation,

./..

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- 4) For addition of feeders which became necessary as the result of growth in the networks,
- 5) As system spares.

Number of substations, the equipment for which is to be procured through 763-TU is 136,

- Number of substations in which the transformers will be installed : 114
- Number of transformers : 139
- Transformer power : 3405 MVA
- Transformer power expected by this credit : 1330 MVA
- Transformer power procured through credit : 2075 MVA
- Number of transformers procured through the credit : 48
- Number of substations in which transformers were installed : 34

As seen on the above table, in the 1973 investment program it was planned that 139 each 3405 MVA transformers were to be financed through this credit. In the credit agreement, however, credit has been granted for 1330 MVA transformers. On the other hand, due to our urgent need, 48 each 25, 50 and 100 MVA transformers which are not manufactured in Turkey have been financed under this loan. The remaining 91 each 1430 MVA transformers were obtained through the TEK's own means. The names of substations on which the transformers were installed are listed on the attached table.

./..

Jan.28, 1977

A list showing the names of substations where the power transformers, circuit breakers, capacitors that obtained under this loan and the names of transmission lines is also attached.

It must be considered normal that during the 4 years period between the validity date of loan agreement and the completion of foreign expenditures there had to be changes on ~~some~~ projects. For this is a program credit and using it for the urgent needs will be more advantageous for the Turkish economy.

The equipment that is financed through the 763-TU credit, has been ordered on the "stock order" basis. That is, instead of ordering the complete equipment for each substation, all the necessary equipment have been ordered on the whole for the overhead lines and substations which were decided beforehand, as separate items. Besides, this is the policy TEK has carried out for a long time in the obtainment of equipment.

The 80% of overhead lines and substations on which ~~these~~ equipment was used, has been completed by January 1977. It is expected that the remaining part will be completed within 6 months, that is the end of June 1977. This result can be considered as a good proof that the use of this credit has fulfilled the requirements.

In the scope of project, in section A (1) 380 kV equipment has been planned for Adapazari, Kayseri and Ümraniye substations and also for 380 kV Kayseri substation the capacity of serial capacitor banks were to be increased.

As the final study and planning in our 380 kV system during the validity of this credit has not been completed and the production installation to be connected to the 380 kV system was delayed, it was not possible to obtain equipment through this credit for the above mentioned substations. Besides, as you know the new credit No. 1194-TU has been granted for our 380 kV system.

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In the section A (1) of the project for İstanbul, 100 MVAR capacitors were planned. We have ordered a total of 156 MVAR capacitors to be used not only for İstanbul but for all places in our system which require capacitors. The 84 MVAR of these capacitors have been mounted in İstanbul. The remaining 72 MVAR have been mounted in the TEK interconnected system wherever required.

The general comments on the credit:

There has not been a big problem during the carrying out of the credit. However, the procedures such as before sending them to the firms sending of specifications to the Bank for approval as required by the credit agreement and obtaining the Bank's approval after the award is made, cause a certain amount of delay on the orders. Yet, both Bank and TEK did their best to complete the procedures in promptness.

Another point regarding this credit is that by our last order we exceeded the limitation of the credit. By covering this small amount through our own sources, however, this problem has been solved.

No consulting firm has been engaged for this credit. As it is known, conformity with the specifications and responsiveness have been the basic criterion for selection among the supplier firms and the firm has been chosen within this framework. Generally, the firms have not caused any delays in the delivery of material and no important trouble has been faced during the application term of the credit.

The costs of the above-said installations have been far beyond the estimations, due to the delays and the crisis faced in the World and Turkey Markets, as well as the big price increases. The shortage of experience of our Organization from the administrative out personnel point-of-view, which is a newly-created body, is also attributable to these results. Moreover, the laws, formalities, organizational problems, and impossibilities in recruiting and retaining technical personnel and many other barriers have effected this.

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The major reasons for not being able to realize the afore-said installations in the desired level and time, in parallel to your requests in the above-shown letters, could be summarized as follows. We would highly appreciate if you would accept our regrets and show consideration to us for not being able to prepare a report of such a magnitude, due to the resignation of our trained out qualified staff during this period.

a) Due to the rapid change in the prices, rates of exchange, circumstances in the world and Turkey as well as the skyrocketing price increases in the materials such as oil, steel, etc., the costs have shown a great increase.

As it is known, all the projects, specifications, material procurements and erections have been accomplished by TEK. The bureaucratic obstacles and excess of formalities have resulted in delays in the material procurements.

b) There hasn't been any problems in the performance of the contractors and consultants during the utilization of this credit.

c) No difficulties have occurred in the disbursements and procurements except the formalities, bureaucratic barriers. The credit has enabled us to have responsive bids and facilitated the payment procedure. For this reason, there hasn't been any transfer and financenment difficulties.

However, we would like to emphasize that, the requests made for reports on subjects with great coverafe and beyond the scope of TEK, which we believe, do not have direct relation with the credit highly occupies our staff, who are in limited number and are already loaded with heavy work. These requests cause further delays in our other activities. It would be very useful for us, if information of less detailed nature could be requested.

d) Comments on Bank transactions which cause to problems is submitted herewith (Annex 1).

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610/DBK.II-901/381

Jan. 28, 1977

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e) The 154-kV transmission lines and substations have been by our Organization and our technical staff, without the assistance of the consultants. However in order to retain trained staff in the Organization should be equipped with the facilities which could attract qualified and trained staff in adequate number, who would have access to foreign languages. This is a matter of status.

f) In the main financemement plan, any kind of problem has not been observed, with the exception of the price increase and changes in the plans. The material which was not provided through the Loan, have been obtained by our own resaurces.

g) A great development, industrialization and a great vitality and various benefits in the social life have been achieved by the transmission lines and substations installed through the 763-TU Loan. Moreover energy has been extended to many rural areas deprived of electrical energy.

h) In order to derive maximum benefit from the lines and substations installed through the Loan 763-TU, it is necessary to construct new lines and substations to be connected to those. For increasing the investments, the financemement should be obtained beforehand and the facilities should be provided in order to : recruit and retain technical staff. The training of the technical staff is also an important factor.

The personnel who would do the research, planning, project design and erection work should also be provided with adequate possibilities.

By our explanations we do hope that we have replied to your questions asked through your above referred letter and verbally. In case you should find some points in our report unsatisfactory please note that we shall be at your disposal to clarify such points.

We hope you will tolerate us for some missing points in report, if any.

Very Truly Yours,  
TURKISH ELECTRICITY AUTHORITY  
GENERAL MANAGEMENT

Encls (-Annex)

- Su station and Trans,  
Lines Schedule
- Material List.

LOAN NO. 763-TU

ANNEX 1

COMMENTS APPLICABLE TO LOAN NO. 763-TU

1) Sometimes the Bank effect payment to the suppliers very late which causes suppliers to write letters or send telex messages asking why the payment has not been effected although the shipment has been effected.

To avoid this the Bank can send a notification to the related supplier stating that they have received the payment application and the payment will be effected in the earliest convenience.

2) -The Bank should send a statement quarterly or half yearly showing the actual disbursements and the balance of the loan which will be useful to keep track of the loan simultaneously with the Bank so the over usage of the loan will be prevented.

-Our withdrawal applications consist of three pages and on every page the same informations are repeated. To avoid these repetitions the information can be given on one page.

LOAN No. 763-TU

POWER TRANSFORMER ORDERS AND CAPACITIES FINANCED  
LOAN NO. 763- TU

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<u>Contract (Order No.)</u>	<u>Quantity</u>	<u>Unit Capacity</u>	<u>Total Capacity</u>
103-ST/192	6	25 MVA	150 MVA
103-ST/192 A	2	25 MVA	50 MVA
103-ST/192 B	21	25 MVA	525 MVA
103-ST/178	9	50 MVA	450 MVA
103-ST/178 A	1	100 MVA	100 MVA
103-ST/178 B	2	50 MVA	100 MVA
103-ST/129	4	100 MVA	400 MVA
103-ST/129 A	3	100 MVA	300 MVA
	<hr/>		<hr/>
TOTAL	48		2075 MVA

## THE LIST OF SUBSTATION WHERE TRANSFORMERS ARE INSTALLED

Project No.	Substation	Characteristics
+ 67.D.02.0294	Aliağa	154/6.3 kV, 25 MVA
+ 67.D.02.0520	Antalya	154/66 kV "
+ 68.D.02.3612	Maraş	154/31.5 kV "
+ 68.D.02.3732	Telhamut	" "
+ 68.D.02.3801	İzmir II	154/34.5 kV, 100 MVA " 50 MVA
+ 68.D.02.3824	Malatya	154/31.5 kV 25 MVA
+ 69.D.02.0270	Adapazarı(Ext)	154/34.5 kV, 50 MVA
+ 69.D.02.0470	Erzurum	" 25 MVA
+ 69.D.02.0622	Bursa Sanayi(Ext)	" 50 MVA
- 70.D.02.0090	Aksaray	" 2x100 MVA
- 70.D.02.0100	Altıntepe	" 2x100 MVA
+ 70.D.02.0420	Mardin(Ext)	154/31.5 kV 25 MVA
+ 68.D.02.3642	Çinkir	154/15.8 kV 2x25 MVA 154/31.5 kV 25 MVA
+ 70.D.02.0160	Gemlik II	154/34.5 kV " 154/6.3 kV "
+ 70.D.02.0240	Mamak	154/34.5 kV 100 MVA
+ 70.D.02.0250	İzmir III	" 50 MVA
+ 71.D.02.0310	Ferrokrom	" 2x50 MVA
+ 72.D.02.0180	İzmit II	154/34.5 kV 50 MVA
- 72.D.02.0180	Akköprü(Ext)	" 2x100 MVA
+ 72.D.02.0560	Trabzon(Ext)	154/31.5 kV 50 MVA
+ 72.D.02.0610	Yarımcı(Ext)	" 2x50 MVA
+ 72.080.76	İzmir Sant.	34.5/10.5 kV 2x25 MVA
+ 72.750.76	Paşalar(Ext)	154/66 kV 25 MVA 154/34.5 kV "
+ 73.D.02.200	Çorlu(Ext)	" "
+ 71.D.02.0370	Balıkesir(Ext)	" "

<u>Project No.</u>	<u>Substation</u>	<u>Characteristics</u>	
+ 73.490.76	Çerkezköy	154/34.5 kV	2x25 MVA
+ 72.290.76	Çirçıp	"	"
+ 73.D.02.0270	Edirne(Ext)	"	25 MVA
+ 71.D.02.0190	Manisa(Ext)	"	"
+ 72.310.75	Seyitömer(Ext)	"	"
+ 74.540.77	Orhangazi	"	"
+ 74.590.76	Tunçbilek(Ext)	"	"
+ 74.280.76	Denizli(Ext)	"	"
+ 68.D.02.3790	Tuzla(Ext)	"	50 MVA

+ completed

- continued

170 kV CIRCUIT BREAKER ORDERS  
AND  
CAPACITIES FINANCED LOAN NO.763-TU

ORDER NO.	Q'ty	ORDER NO.	Q'ty	
			170 kV	66 kV
103-ŞT/101	(77 each)	103-ŞT/187	(70 each)	
+ Seyitömer	2	- Biga (Tv)	4	2
+ Yıldıztepe (Tv)	6	+ İzmit (Tv)	5	-
+ Davutpaşa (Tv)	5	- Sarıyar (Tv)	2	-
+ Ümraniye (Tv)	10	- Gelendost (Tv)	-	1
+ Ambarlı (Tv)	3	+ Çaycuma (Tv)	-	1
+ Akköprü (Tv)	4	+ Sarımsaklı	-	1
+ İzmir II	9	- Diliskelesi	4	-
+ Mamak	6	+ Gaziantep (Tv)	1	-
+ Kartal	6	- Urfa (Tv)	1	-
- Adapazarı (Tv)	7	- Orhangazi	4	-
+ Gölbaşı	2	- Suruç	4	-
+ Yarımca (Tv)	3	- Alaçatı	1	-
+ Tunçbilek (Tv)	2	- Akçakale	1	-
		+ Çırçıp	6	3
		+ Hopa	1	-
		- Sinop	2	1
		- Konya (Tv)	-	-
		+ Sarayköy (Tv)	1	-

- 2 -

ORDER NO.	Q'ty	ORDER NO.	Q'ty
103-ŞT/187 A	(115 each)	103-ŞT/187 A	(115 each)
+ Çinkur	4	+ Diyarbakır (Tv)	2
+ İzmir III	1	+ Gaziantep (Tv)	1
- Akşehir	1	+ Edirne	1
+ Kars	3	+ Bursa Sanayi (Tv)	1
+ Babaeski (Tv)	3	+ Çerkezköy	1
+ Hadımköy (Tv)	2	+ Tunceli	3
+ Malatya	2	+ Paşalar (Tv)	1
+ Aliağa	9	+ Pülümür	3
- Bingöl	3	+ Sivas (Tv)	3
+ Karamürsel	3	- Çakmakaya	1
- Siirt	3	- Horasan	4
- Afyon (Tv)	1	- Ardahan	3
+ Trabzon (Tv)	1	+ Tunçbilek (Tv)	6
+ Erzurum (Tv)	1	+ Kayseri (Tv)	1
+ Çanakkale (Tv)	1	- Doğubeyazıt	2
+ Kırka	1	- Kayseri II	6
+ Muğla (Tv)	1	- Bağışlı	1
+ Ferrokrom	6	- Engil	4
- Erdemir	2	- Çıldır	2
+ Elbistan	1		
+ Aşkale	3+1		
- Avanos (Tv)	1		
- Demirdağ	4		
+ Denizli (Tv)	4		
+ Adıyaman	3		
- Tosya (Tv)	2		
+ Mardin (Tv)	1		

Note:

- + completed
- continued

Tv= Extension

LOAN No. 763-TU

THE LIST OF SUBSTATIONS WHERE SHUNT CAPACITOR BANKS  
TO BE INSTALLED (PROJECT NO. 69. D. 02. 0740)

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Yıldıztepe	35 kV	$2(2 \times 10.5) = 42$ MVar
Davutpaşa	"	" "
Bursa Sanayi	"	$2 \times 10.5 = 21$ MVar
Bursa	35 kV	$2 \times 6 = 12$ MVar
Edirne	"	5
Çerkezköy	"	6
Çanakkale	"	6
İzmit II	"	6
Babaeski	69 kV	5.8
Samsun II	6.3 kV	5
Genlik	6.3 kV	5

---

156 MVar

IBRD LOAN NO. 568-TU (25 Million \$.)  
ACTUAL DISBURSEMENTS

1969	1970	1971	1972	1973	1974
7.554.954,02	6.498.164,11	3.697.705,94	3.135.992,60	3.206.756,38	916.426,96
	Cumulative as end of 1970	Cumulative as end of 1971	Cumulative as end of 1972	Cumulative as end of 1973	Cumulative as end of 1974
	14.043.118,13	17.740.824,07	20.876.816,67	24.083.573,05	25.000.000

IBRD LOAN NO. 763-TU (24 Million \$)  
ACTUAL DISBURSEMENTS

1971	1972	1973	1974	1975	1976
2.016.288,40	2.962.137,72	6.060.284,65	6.948.046,51	6.373.989,53	993.514,19
	Cumulative as end of 1972	Cumulative as end of 1973	Cumulative as end of 1974	Cumulative as end of 1975	Cumulative as end of 1976
	4.978.426,12	11.038.710,77	17.986.757,28	24.360.746,81	25.354.261,00

NOTE: Difference is due to the variations  
in courses.

Dear Mr. Green

The values given in these tables are fundamental statistical values. As for the statistics made before 1970 we can not tell the criteria on which they are used upon because they are not proposed by TEK. For this reason in proposing 1970 values Etibank's Activity Reports were used. As for large and small industrial groups satisfactory data was not available so only total values are given.

Please we informed.

Statistic Service

*[Handwritten signature]*

EMENA Trade Department  
Planning & Policy Development Div  
Lec: TUR-7-30  
Date: 8/17/77  
Author: No  
Revised:

Number of Consumers Supplied by TEK in the years from 1968 to 1976 and their consumption by categories.

	1968		1969		1970		1971		1972		1973		1974		1975		* 1976	
	Number	Gwh	Number	Gwh	Number	Gwh	Number	Gwh	Number	Gwh	Number	Gwh	Number	Gwh	Number	Gwh	Number	Gwh
Small Ind	**		**		311	55	309	58	412	100	446	144	464	178	683	353	800	361
Large Ind					165	2328	185	2823	200	3,357	245	3,637	262	3,941	313	4,677	390	6,357
Total Ind	153	1687	205	2038	476	2,383	494	2881	612	3,457	691	3,781	726	4,119	996	5,030	1190	6,718
Small Municip	230	347	325	419	453	366	703	499	849	708	1087	832	1113	848	1163	902	1293	1423
Large Municip	16	2248	17	2416	22	2795	26	3502	31	4175	38	4466	42	4937	50	5752	57	6557
Total Municip	246	2695	342	2835	475	3,161	729	4001	880	4883	1125	5298	1155	5785	1213	6654	1350	7980
Villages	3	15	589	25	885	33	1545	60	2398	75	3324	127	3903	168	4987	272	5800	288
Non-Indus	129	33	142	31	160	29	175	70	250	43	370	133	401	167	566	227	624	364
Total 2475	903	4330	1270	4918	1996	5646	2943	7012	4140	8464	5510	9344	6185	10239	7762	12183	9024	15,350

\* Temporary

\*\* Figures are not available

Consumption of three largest municipalities in years  
from 1968 to 1976

kwh Sold by TEK

(Gwh)

	1968	1969	1970	1971	1972	1973	1974	1975	1976*
ISTANBUL	1207	1242	1480	1914	2147	2328	2407	2919	3050
ANKARA	442	500	532	569	692	724	702	745	850
IZMIR	273	276	289	391	499	541	562	639	680

Percentage of TEK's Sales

(%)

	1968	1969	1970	1971	1972	1973	1974	1975	1976*
ISTANBUL	27.98	25.25	26.40	27.30	25.37	24.91	23.51	23.96	19.89
ANKARA	10.21	10.17	9.49	8.41	8.18	7.75	6.86	6.12	5.53
IZMIR	6.30	5.61	5.38	5.58	5.90	5.79	5.49	5.25	4.42

Additional kwh generation by consumer's own plant  
(Gwh)

	1968	1969	1970	1971	1972	1973	1974	1975	1976*
ISTANBUL	258	420	371	-	-	-	-	-	-
ANKARA	31	25	28	33	32	40	40	34	35
IZMIR	108	139	150	87	37	-	-	-	-

\* Temporary



4 AVAILABLE POWER CAPACITY AND PEAK LOAD CAPACITY OF THE INTERCONNECTED SYSTEM

YEARS	AVAILABLE POWER CAPACITY OF THE INTERCONNECTED SYSTEM		AVAILABLE POWER CAPACITY OF THE ETIBANK-TEK		PEAK LOAD CAPACITY OF SYSTEM	AVAILABLE POWER CAPACITY IN THE POWER PLANTS NEWLY PUT IN SERVICE
	TOTALS	HYDRD	TOTALS	HYDRD		
1968	1221	469	950	450	978	—
1969	1222	469	950	450	1064	New Units: Bursa Municipality - 1.0 MW
1970	1515	497	1358	478	1248	New Units: Almus - 27 MW, Ambarlı (Unit II and III) - 260 MW, Durucası - 1.0 MW, Giresun SEKA - 5 MW, Owner ship passed to TEK: Silahlar - 120 MW.
1971	1763	587	1646	586	1506	New Units: Ambarlı (Unit IV) - 150 MW, Doğan kent - 20 MW, Kovada II - 50 MW, İkizdere - 15 MW, Vişera - 1.0 MW, Dinar - 1.0 MW, Kovada I - 6 MW, Çaycuma SEKA - 8 MW, Owner ship passed to TEK: İzmir (ESHOT) - 30 MW, Kayaköy - 2 MW, Denizli - 1.0 MW, Göksu - 11 MW, Sızır - 4 MW
1972	1888	611	1726	586	1656	New Units: Bornova - 40 MW, Seydişehir - 40 MW, Dalaman - 16 MW, Samsun Azot - 5 MW, Kepez - 24 MW
1973	2359	725	2197	700	1757	New Units: Hopa - 50 MW, Seyitömer - 280 MW, Seydişehir - 27 MW, Gökçekaya (Unit I) - 90 MW, Tortum - 24 MW.
1974	3106	1330	2693	1130	2366	New Units: Hazar G.T. - 26 MW, Seydişehir (Unit VI, VII, VIII) - 40 MW, Ceyhan - 3 MW, Çaç-çaç - 10 MW, Gökçekaya (Unit II) - 90 MW, Keban - 300 MW, Hazar - I - II - 26 MW, Kernek - 1.0 MW, Çorum cement - 2 MW, Gaziantep cement - 4 MW, Pınarhisar cement - 3 MW, Ergani - 4 MW, Mersin - 100 MW, Kadıncık I - 65 MW, Murgul - 3 MW, Kadıncık - II - 50 MW, Seyhan - 60 MW, Yüreğir - 0 MW.
1975	3523	1642	3055	1442	2729	New Units: Aliğa - 50 MW, Keban (Unit III - V) - 300 MW, Gıdır - 12 MW, İskemir - 45 MW, Batman - 10 MW
1976	3680	1737	3195	1532	3135	New Units: Aliğa (Unit III - IV) - 50 MW, Gökçekaya (Unit III) - 90 MW, Akşa - 10 MW, Derne - 5 MW, Defne - 2 MW.

Note: The available power capacity of the power plants is considered.

3.2.1977  
A. KADIR ÖZEN

(AK)

1968

Existing Plant owned by Etibank's Consumers:

	MW	Type	Capability (MW)
SILAHTAR (Istanbul)	122.3	Thermal	120.0
ESHOT (Izmir)	40.0	"	30.0
EGO (Ankara)	26.6	"	20.0
FREGLI (Steel)	20.0	"	20.0
KARABUK (Steel)	20.0	"	10.0
GÖRSEL (Yerköprü)	10.6	Hydro	11.0
SEKA (Izmit)	11.0	Thermal	7.0
SIRIR	6.8	Hydro	4.0
KAYAKÖY (İller Bank)	3.8	"	2.0
BURSA (Sümerbank)	6.3	Thermal	5.0
DENİZLİ	1.6	Hydro	1.0
BÜNYAN	1.4	"	1.0
Miscellaneous	60.0	Thermal	40.0
<b>TOTAL:</b>	<b>330.4</b>		<b>271.0 (19.0 Hydro)</b>

B- Existing Plant owned by Etibank or leased from DSI:

SARIYAR	160.0	Hydro	160.0
HİRFANLI (DSİ)	96.0	"	96.0
ŞATALAZZI (Coal fired)	129.0	Thermal	120.0
TUNGBİLEK (Lignite fired)	129.0	"	120.0
AMBARLI (Oil fired)	220.0	"	220.0
SOMA (Lignite fired)	44.0	"	40.0
KEMER (DSİ)	48.0	Hydro	48.0
DEMİRKÖPRÜ (DSİ)	69.0	"	70.0
KESİRKÖPRÜ (DSİ)	76.0	"	76.0
<b>TOTAL:</b>	<b>971.0</b>		<b>950.0 (450.0 Hydro)</b>

1969

Actions to system (Megawatts)

BURSA MUNICIPALITIE	1.3	Thermal	1.0
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1970

AMBARLI (UNİT: III-V)	260.0	Thermal	260.0
SILAHTAR (Owner ship passed to TEK)	—	"	—
ALMUS	27.0	Hydro	27.0
DUKKASU	0.8	"	1.0
GİRELİN SEKA	8.0	Thermal	5.0
<b>TOTAL:</b>	<b>295.8</b>		<b>293.0 (26. Hydro)</b>

1971

additions to system (Megawatts)

	MW	Type	Capability (MW)
AMBARLI (UNIT: IV)	150.0	Thermal	150.0
İSMİR (Owner ship passed to TEK)	—	"	—
DOĞANKENT (New unit)	24.6	"	20.0
KOVADA II (New unit)	51.2	Hydro	50.0
KAYARCI (Owner ship passed to TEK)	—	"	—
İKİZDERE (New)	15.1	"	12.0
DENİZLİ (Owner ship passed to TEK)	—	"	—
VİŞEPA (New)	1.0	"	1.0
DINAR (New)	1.1	"	1.0
KOVADA I (New)	6.3	"	6.0
GÖKSU (New)	—	"	—
SIZIR (New)	—	"	—
ŞAYGAMA SEKA (New)	9.5	Thermal	8.0
<b>TOTAL:</b>	<b>260.8</b>		<b>248.0 (90.0 Hydro)</b>

1972

BORNOVA	45.0	Thermal	40.0
SEYDİŞEHİR	45.0	"	40.0
DALAMAN SEKA	26.2	"	16.0
SAMSUN AZOT	7.2	"	5.0
KEPEZ	26.4	Hydro	24.0
<b>TOTAL:</b>	<b>149.8</b>		<b>125.0 (24.0 Hydro)</b>

1973

HÜPA	50.0	Thermal	50.0
SEYİTÖMER	300.0	"	280.0
SEYDİŞEHİR (UNIT: IV-V)	30.0	"	27.0
GÜÇEKAYA (UNIT: I)	92.8	Hydro	30.0
TURKUM	26.2	"	24.0
<b>TOTAL:</b>	<b>439.0</b>		<b>411.0 (114.0 Hydro)</b>

1974

HAZAR G-T	30.0	Thermal	26.0
SEYDİŞEHİR (UNIT: VI-VII-VIII)	45.0	"	40.0
LEYHAN	3.6	Hydro	3.0
ŞİĞ-ÇAĞ	19.4	"	10.0
GÜÇEKAYA (UNIT: II)	92.8	"	30.0
HAZAR I-II	30.2	"	26.0
KEBAN	3.5	"	300.0
KIRSEK	6.3	"	1.0
GÖKUMCUMENİ	2.3	Thermal	2.0
GAZİP " "	7.5	"	7.0
PAZISAR " "	1.0	"	3.0
YUNUS	5.1	"	7.0
MURŞİT	100.0	"	100.0
MURŞİT	3.5	"	3.0
PAZISAR II	11.0	Hydro	65.0
SEYİTÖMER II	11.0	"	51.0
ŞİĞ-ÇAĞ	11.0	"	6.0
HAZAR III	11.0	"	—
<b>TOTAL:</b>	<b>439.0</b>		<b>747.0 (200.0 Hydro)</b>

# OFFICE MEMORANDUM

To: Those listed below

DATE: June 28, 1978

FROM: Nigel Green *Ng Green*

SUBJECT: TURKEY - Loan 568-TU - Keban Transmission Project  
- Loan 763-TU - TEK Power Transmission Project  
COMBINED COMPLETION REPORT

Please find enclosed a copy of the combined Project Completion Report for the above projects.

Distribution: Messrs. Knox, Pollan, Bart, Moini, van der Tak, Rovani (4), Fish, Russell, Finzi, Maffei, Perera, Subramanian, Jeurling, Kapur (4), Ken Jones, Davar, Rajagopalan, Mathai, Green Ms. Evans  
Division Black Book  
EMENA, Division & Chron Files

/mas

*Sup<sup>d</sup> Rep. 11-24-74  
summaries sit<sup>d</sup> re.  
certain covenants.*

The construction in general did not deviate significantly from the original designs and the deviations are similar to some of those described for the Istanbul substation.

Kayseri Series Capacitor Station

In Kayseri the station was energized and tested under 380 KV power in early September, 1974 when the Ankara to Keban transmission lines were energized.

Some components which are damaged in transportation were either replaced by new ones or repaired and tested to prove satisfactory prior to installation.

The station was completely checked and tested under the supervision of an ASEA representative and the only discrepancy found was the incapability of the air circuit breakers for automatic re-insertion. This discrepancy is presently under correction and the station will be in operation when both Ankara-Keban transmission lines are commissioned.

The work was performed technically in accordance with the engineering design, and international standards and practices were observed and maintained. The very few deviations are insignificant and similar to some of the deviations mentioned in the section for Istanbul.

The station is considered complete and its performance and functioning is expected to be satisfactory after commissioning and putting into service.

## TURKEY

Annex 1

Keban Transmission LinesEstimated Cost of the Bank Project *at Appraisal*

<u>Keban-Istanbul 380-kV Line</u>	----Millions of LT----			----Millions of US\$----		
	<u>Local</u>	<u>Foreign</u>	<u>Total</u>	<u>Local</u>	<u>Foreign</u>	<u>Total</u>
1460 km 380-kV line	69.3	135.5	204.8	7.6	14.9	22.5
Ankara substation	8.0	13.4	21.4	0.9	1.5	2.4
Istanbul substation	9.3	10.1	19.4	1.0	1.1	2.1
Kayseri substation	2.6	4.4	7.0	0.3	0.5	0.8
Keban substation	0.2	1.1	1.3	-	0.1	0.1
Gökçekaya line and sub- station material	-	4.8	4.8	-	0.5	0.5
Contingencies <u>1/</u>	8.9	8.4	17.3	1.0	1.0	2.0
Engineering	1.4	6.4	7.8	0.2	0.7	0.9
Interest during construction	<u>13.3</u>	<u>28.5</u>	<u>41.8</u>	<u>1.5</u>	<u>3.1</u>	<u>4.6</u>
TOTAL	<u>113.0</u>	<u>212.6</u>	<u>325.6</u>	<u>12.5</u>	<u>23.4</u>	<u>35.9</u>

Actual cost	685.4	591.5 <sup>3/</sup>	1276.9 <sup>3/</sup>	39.2	33.8	73.0 <sup>2/ 3/</sup>
Increase over estimate				+214%	+44%	+103%

1/ US\$1 = LT 9.08 as of October 1968

2/ US\$1 = LT 17.5

3/ As the expenditure of foreign cost was made progressively at various rates of exchange relative to US\$, the true total cost in terms of LT is less than stated here and conversely the total \$ equivalent of local costs is greater than stated here.

## BASIC DATA SHEET

Country : Turkey  
 Loan Number : 568-TU  
 Name of Project : Keban Transmission Lines

## KEY PROJECT DATA

Item	Original Plan	Actual or Current Estimate
Total Project Cost (US\$ million)	35.9	73.0
Underrun or Overrun (%)		+103%
Loan Amount (US\$ million)		25.0
Disbursed	-	25.0
Cancelled	-	N/A
Repaid to May 1977	-	3.2
Outstanding to May 1977	-	21.8
Date Physical Components Completed	June 1972	October 1976
Proportion Completed by Above Date (%)	100	100
Proportion of Time Underrun or Overrun (%)	-	+500%
(Incremental) Internal Rate of Return (%)		N/A
Financial Performance	8% ROR in 1970-72	Achieved in 1971 but not thereafter.

## OTHER PROJECT DATA

Item	Original Plan	Revisions	Actual or Est. Actual
First Mention in Files or Timetable	-	-	11.29.61
Government's Application	-	-	Not identified
Negotiations			10.9.68
Board Approval			10.29.68
Loan Agreement			10.31.68
Effectiveness	1.6.69		1.6.69
Closing Date	9.30.72	Four times	9.20.74
Borrower		Republic of Turkey	
Executing Agency		TEK as successor to ETIBANK	
Fiscal Year of Borrower		Calendar year	
Follow-on Project Name		TEK Transmission I	
Loan Number		763-TU	
Amount		US\$24.0 million	
Loan Agreement		June 22, 1971	

## MISSION DATA

	Month, Year	No. of Weeks	No. of Persons	Manweeks	Date of Report
Identification					N/A
Preparation					N/A
Preappraisal					
Appraisal	Jan. 1968	<u>4</u>	<u>2</u>	<u>8</u>	10.14.68
Total		<u>4</u>	<u>2</u>	<u>8</u>	
Supervision I	Aug. 1969	2	1	2	9.9.69
Supervision II	Oct. 1969	2	1	2	10.21.69
Supervision III	Oct. 1970	4	3	12	12.29.70
Supervision IV	Sept 1971	1	2	2	10.22.71
Supervision V	Feb. 1972	1	1	1	2.16.72
Supervision VI	Oct. 1972	1	1	1	10.31.72
Supervision VII	Sept 1973	0	1	0	None
Supervision VIII	Nov. 1974	0	2	0	None
Supervision IX	Mar. 1976	1	3	3	4.7.76
Supervision X	Oct. 1976	1	2	2	11.24.76
Completion	Jan. 1977	<u>1</u>	<u>1</u>	<u>1</u>	N/A
Total		<u>14</u>	<u>18</u>	<u>26</u>	

## COUNTRY EXCHANGE RATES

Name of Currency (Abbreviation)	Rate (Lira)
Appraisal Year Average - 1968	US\$1 = LT 9.08
Intervening Years Average - 1969	US\$1 = LT 9.04
- 1970	US\$1 = LT 11.25
- 1971	US\$1 = LT 14.86
- 1972	US\$1 = LT 14.15
- 1973	US\$1 = LT 14.15
- 1974	US\$1 = LT 13.93
- 1975	US\$1 = LT 14.44
Completion Year Average - 1976	US\$1 = LT 16.05

BASIC DATA SHEET

Country : Turkey  
 Loan Number : 763-TU  
 Name of Project : TEK Power Transmission I

REVISION

KEY PROJECT DATA

	<u>Original Plan</u>	<u>Actual or Current Estimate</u>
Total Project Cost (US\$ million)	65.1 <sup>1/</sup>	Probably double original Probably 100%
Underrun or Overrun (%)		24.0
Loan Amount (US\$ million)		24.0
Disbursed	-	Nil
Cancelled	-	1.1
Repaid to May 1977	-	22.9
Outstanding to May 1977	-	9/76
Date Physical Components Completed	9/74	100
Proportion Completed by Above Date (%)	100	61
Proportion of Time Underrun or Overrun (%)		2/
(Incremental) Internal Rate of Return (%)	13.4%	8% ROR in 1971
Financial Performance		Achieved in 1972 but not thereafter
Institutional Performance		

*more precise?*

OTHER PROJECT DATA

	<u>Original Plan</u>	<u>Revisions</u>	<u>Actual or Est. Actual</u>
Appraisal			Sept/Oct 1970
Negotiations			5.5.71
Board Approval			6.15.71
Loan Agreement			6.22.71
Effectiveness	9.15.71	9.15.71	10.4.71
Closing Date	3.31.75	12.31.75	6.30.76
Borrower		Turkiye Elektrik Kurumu (TEK)	
Executing Agency		Turkiye Elektrik Kurumu (TEK)	
Fiscal Year of Borrower		-	
Follow-on Project Name	Calendar Year		
Loan Number		TEK II	
Amount		1194-TU	
Loan Agreement		US\$56.0 million	

MISSION DATA

	<u>Month, Year</u>	<u>No. of Weeks</u>	<u>No. of Persons</u>	<u>Manweeks</u>	<u>Date of Report</u>
Identification					N/A
Preparation					N/A
Preappraisal					N/A
Appraisal		4		8	5.28.71
Total		4		8	
Supervision I	Aug. 1971	2	2	4	10.22.71
Supervision II	Feb. 1972	2	1	2	4.11.72
Supervision III	Sept 1973	2	1	2	
Supervision IV	Nov. 1974	0	2	0	-
Supervision V	Mar. 1976	1	3	3	4.7.76
Supervision VI	Oct. 1976	1	2	2	11.24.76
Completion	Jan. 1977	1	1	1	N/A
Total		9	12	14	

COUNTRY EXCHANGE RATES

Name of Currency (Abbreviation)	Lira (LT)
Appraisal Year Average - 1970	US\$1 = <del>LT 15</del> LT 11.25
Intervening Years Average - 1971	US\$1 = LT 14.86
- 1972	US\$1 = LT 14.15
- 1973	US\$1 = LT 14.15
- 1974	US\$1 = LT 13.93
- 1975	US\$1 = LT 14.44
Completion Year Average - 1976	US\$1 = LT 16.05

1/ To this figure could be added \$2 million in respect of interest during construction and \$3.9 million of foreign cost which was financed from other foreign credits in respect of imports of steel from Japan and medium voltage transformers from Romania.

2/ By the nature of the project an internal financial rate of return cannot be calculated but a rate of return based on the time slice 1971-1974 was attempted leading to the figure shown. Due to the substantial differences both in time of completion and assumed specific investment and operating costs and revenue levels a meaningful comparative figure is not possible to calculate and has not been attempted.

*Are these statistics compatible? (Also, fig not shown in Table but in text)*

Page 4

The original design work for the substations was carried out in the Consultant's Jackson Office, and the tender documents for the procurement of substation material and construction equipment were prepared in Ankara jointly by the Client and Consultant, based on technical specifications provided by the Consultant in Jackson. Evaluation of the bids and the placing and handling of contracts for the procurement of substation material and equipment were also carried out jointly in Ankara.

The erection of the step-down substations at Ankara and Istanbul and of the series capacitor station at Kayseri has been carried out by TEK Şebeke Tesisi Dairesi as originally planned.

Local currency for the construction of the Projects has been used to the maximum extent consistent with the capabilities of domestic industry. The MİTAS contract and part of the SAE contract were paid in Turkish Lira, which has also been used for some of the material and equipment purchases and for a portion of the Engineer's fee.

International Bank for Reconstruction and Development (World Bank) Loan No. 568-TU amounting to \$ 25 million provided the foreign exchange necessary for the SAE contract and for a large share of line material, line construction equipment and substation material purchases.

Page 5

USAID Loan 277-H-060 amounting to \$ 5,690,000 provided the U.S. Dollars for a lesser portion of the substation material, a small amount of line material, some items of construction equipment, and part of the engineering costs.

USAID Loan 277-H-063 amounting to \$ 2,608,000 provided the balance of the U.S. Dollar portion of the Engineer's fee, and the U.S. Dollar cost of automotive and radio equipment purchased for the Projects.

Detailed information on the expenditures incurred under these various foreign exchange loans, and on local Turkish Lira expenditures have been given in the Quarterly Reports which have been regularly published throughout the course of the Projects. Generally, these foreign exchange loans, arranged at the beginning of the Projects, proved more than sufficient to carry the Projects through to completion, and all financing arrangements proved satisfactory.

Time? Was  
large  
cost  
over-run

While, as would be expected, a few major problems arose during the implementation of these Projects, none of these proved to be insuperable, and all were overcome with a satisfactory final result. The primary objective of the Projects, which was to provide for the transmission of electric power, generated at Gökçekaya and Keban hydro-electric stations to Ankara and Istanbul cities can be said to have been successfully achieved. A secondary objective of the Projects, which was to train local staff in EHV work, was also achieved with appropriate training carried out both in the Consultant's design office in the U.S.A. and also in the field in Turkey. This has proved to be the case in so far that the Client has felt confident and competent enough to carry out subsequent EHV projects without outside help.

C.F. P.C.R.  
para 3.03

TEK  
agree?  
No!!

While these EHV projects were new to Turkey, they generally followed practices and procedures already established in other countries, and nothing unexpected or untoward arose in their implementation. Any changes caused in the country of an environmental, sociological or demographic nature were to be expected and are of insignificant dimensions.

#### TRANSMISSION LINES 380 KV

The 380 KV lines Gökçekaya-Istanbul, Keban-Ankara, and Ankara-Istanbul are complete and energized. The Gökçekaya-Ankara 380 KV line is approximately 44% complete and final completion is scheduled for August, 1975.

These lines have been constructed to recognized international standards in accordance with the engineering designs and specifications prepared by Commonwealth Associates, Inc. and there have been no significant departures therefrom. The performance of the lines in service has proved satisfactory and acceptable.

These are the first lines to be constructed in Turkey at 380 KV, at which voltage tension stringing of the conductors is required. The new technique of tension stringing was successfully mastered by the construction crews, under the supervision and guidance of experienced field supervisors on the Consultant's staff. The remainder of the work, comprising installation of foundations and erection of towers, is not significantly different at 380 KV from 154 KV and lower voltage construction, and presented no difficulty to the construction crews.

The main problem which arose during the construction of the transmission lines was the failure of the two line construction contractors to complete their contracts. On the Keban Project SAE completed the Ankara-Istanbul 380 KV line, but installed only 692 tower foundations and erected only 208 towers on the Keban-Ankara 380 KV lines before running into financial difficulties. Their financial difficulties can in retrospect be put down to a combination of bidding too low a contract price initially, and not carrying out the work subsequently in accordance with the original time schedule. Also a major devaluation of the Turkish Lira in August, 1970 from 9 TL equals 1 \$ to 15 TL equals \$ 1 caused them a serious financial loss. The contract ended up in arbitration and the Arbitrators assessed damages to the Owner of TL 25 million. The outstanding work of the contract was however successfully completed by TTK Construction Department ahead of the completion of the Keban dam and hydro-electric station.

On the Gökçekaya Project Mitag completed the installation of foundations and erection of towers on the Gökçekaya-Istanbul line, but installed only 272 foundations and erected only 220 towers on the Gökçekaya-Ankara line, before they also ran into financial difficulties. The contract is presently under Arbitration, and the outstanding work under the contract, and also the stringing of conductors on the Gökçekaya-Ankara line will be carried out by TTK Construction Department. The Gökçekaya-Istanbul 380 KV line was completed ahead of the completion of the Gökçekaya Dam and provided an outlet at Istanbul for the energy generated at Gökçekaya hydro-electric station.

## SUBSTATIONS - 380 KV

### General

The 380 KV substations in Istanbul and Ankara and the series capacitor station in Kayseri have been virtually 100% completed. All three substations have been energized and commissioned either partly or completely.

International standards and engineering practices were observed and maintained during the construction period and the work was performed in general accordance with the engineering designs and specifications prepared by Commonwealth Associates Inc. and other supplementary documents and instructions provided by the vendors and manufacturers of equipment. The very few deviations from these documents are considered to be minor and were necessitated only because of variations in local conditions.

The performance and functioning of the Istanbul and Ankara substations during operation is considered both satisfactory and acceptable.

At present, electric energy which is generated by the Keban and Gökçekaya power plants is transported by the 380 KV transmission lines to the EHV substations in Ankara and Istanbul and this bulk energy is transferred to 154 KV and distributed at this voltage via the existing networks.

The substation and series capacitor station works were constructed entirely by TEK personnel. Two manufacturer's experts - Westinghouse for the Istanbul transformers and A.S.E.A. for the Kayseri capacitors - were brought in for supervision and special instruction work only.

In general, the TEK construction personnel engaged in checking and

Page 9

testing were experienced and capable to perform this work satisfactorily. For some work that was performed for the first time in Turkey, e.g. aluminum bus welding, E.P.V. transformer site erection, considerable time was spent for instructive training before the actual work took place. The personnel who undertook these tasks showed extreme devotion and were keen to learn the new techniques. Improvisation sometimes had to be resorted to in order to overcome the lack of special equipment and material e.g. the aluminum bus piping was bent in a variety of ways due to the reluctance of TEK to purchase regular pipe-bending equipment. Also a few busbar fittings were made by welding aluminum pieces together. While the end result was satisfactory, it is felt that it would have been more economical to have had proper equipment and material supplied by other specialists in these items.

Originally, four Westinghouse 380 KV transformers were ordered under the Gökçekaya Project, two of which were to have been installed at Istanbul and two at Ankara, and under the Keban Project the two additional 380 KV transformers for Istanbul were ordered from Mitsubishi. A decision was made later, for obvious reasons, to install all four Westinghouse transformers at Istanbul, and the two Mitsubishi units at Ankara, and this decision was subsequently put into effect. A further deviation from the original planning was to install the two spare 380 KV circuit breakers ordered for Ankara substation in Istanbul to improve the overall 380 KV system control.

### Istanbul Substation

In Istanbul substation electrical energy has been received from the Gökçekaya power plant and transferred since the latter part of 1973.

The 380 KV Gökçekaya line side of the substation with auto-transformer bank no. 11 was completed, energized and commissioned in October 1973. The operation was performed in general accordance with the engineering study reports in energizing the line, synchronizing with the Gökçekaya power plant and transporting energy to the substation.

Auto-transformer No. 10 was reconditioned in the second quarter of 1974 and it was energized and commissioned in June 1974. At present both auto-transformer banks which are connected in parallel are in operation and loaded to a capacity of about 180 MW of energy from the Gökçekaya power plant. The operation of the substation has been to date satisfactory and uneventful.

The other two auto-transformer units No. 12 & 13 have been also reconditioned and the test results indicate that the units are dry and satisfactory for energization. Work now is concentrated in completing the 380 KV Ankara line side. The recently received air compressors have been installed and the erection and completion of air circuit breaker No. 125 in addition to a few connections will render the substation ready for final checking and eventual energization of the transmission line Istanbul-Ankara at 380 KV.

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The technical work of the substation, comprising, equipment erection, and installation, aluminum bus welding, connections, wiring, controls, etc. and also checking and testing, was performed in an acceptable manner comparable to similar installations in USA. The usual minor difficulties and problems which were encountered during the time of construction, primarily due to lack of proper and adequate equipment, were tackled and solved satisfactorily. It is considered that the substation is constructed in general accordance with U.S. and international standards applicable to EHV installations.

The Westinghouse auto-transformers which became the main problem during the time of construction have been corrected after a prolonged operation of drying the units under vacuum and heat, and filtering the insulating oil to acceptable standards. These transformers were manufactured during 1969 and delivered to Istanbul deckside in January 1970. The erection and treatment work took place in the summer of 1972 under the supervision of a Westinghouse representative. Although the erection and bridging work were performed with a reasonably short time the transformer oil filtering equipment and material were both inadequate and old to properly perform such a task. In addition another critical factor which was discovered later was the poor quality of local nitrogen and dry air. In some cylinders the moisture and water content was found to be excessively high and this moisture was absorbed by the insulating oil and the transformer windings, and this problem took some time to cure. It is recommended that the auto-transformers be fitted with a metallic drum in the piping that provides nitrogen and the drum be filled with silica gel

to prevent moist nitrogen entering the transformer. In addition the purchase of MW transformer treatment equipment of a proper size is highly desirable to keep the transformers dry and prolong the life of such expensive equipment. As of to-day this equipment has not been procured although a specification has been prepared and forwarded to TEK's management.

The construction in general did not deviate significantly from the original designs. The very few deviations, as listed below, will not in any significant way prevent the substation's good electrical performance.

1. Water drainage system. The system is incomplete and consequently inoperative. The yard is not graded and rain water drains into the cable trenches. The gravel surfacing has not yet been installed and the yard during the rainy season is unacceptably muddy.
2. Structure foundation details. This deviation was made to adopt TEK standards, which are in general acceptable.
3. Cable trenches. It was recommended that a metallic screen be placed above the trenches as a magnetic screen to prevent interference to the control cables from the 380 KV overhead busses. This application is not fulfilled yet.

4. Grounding. A number of grounding rods and the grounding mats under the disconnect switches are omitted.
5. The distance between the attended control house and the unattended relay house has created a problem in operating the substation and reporting faults to the dispatching center in acceptable time.

#### Ankara Substation

In Ankara substation energy has been received from the Keban power plant via the Keban North 380 KV transmission line and transferred to 154 KV since early September, 1974.

The complete switchyard has been energized and the two transformers have been commissioned and loaded to a recorded maximum of 200 MW. The only part that remains unfinished is the dead-end tower and the connection for the Gökçekaya line, and also the energization of the Ankara-Istanbul line at 380 KV. The Keban South 380 KV transmission line is energized at 380 KV but it is not yet transmitting energy since some work is incomplete at the Keban terminal. The procedure to energize the transmission lines to Keban was altered from the one recommended in the engineering study reports, and the pre-condition to have the Istanbul-Ankara line energized at 380 KV was not observed. TEK, however had prepared new studies based on the present electric system, and it was correctly proved that the dynamic voltage at the Keban terminal at the time of switching would not cause damage to the equipment.

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The operation of the substation in the past few months, with the exception of normal initial discrepancies which were corrected, has been both satisfactory and acceptable.

The two Mitsubishi auto-transformers, the line reactors and the air circuit breakers comprised the large size equipment in construction. The erection, assembly, installation and testing of these and all other equipment, although it offered a new challenge in Turkey, were performed in an acceptable manner comparable to similar installations in USA.

The difficulties and problems which were encountered during the construction period were primarily due to lack of proper and adequate equipment and in some instances were due to new techniques being tried for the first time in the country. However, all these problems were tackled and solved satisfactorily.

The substation was fully checked and tested prior to energization. The relays and control instruments were also checked and tested prior to energization, with the protective relays coordinated in accordance with the vendor's instructions and a protective system was provided to comply with the engineering studies.

It is considered that the substation is technically constructed in general accordance with the engineering designs, US and International Standards applicable to EHV installations.

IBRD LOAN NO. 568-TU (25 Million \$.)  
ACTUAL DISBURSEMENTS

1969	1970	1971	1972	1973	1974
7.554.954,02	6.498.164,11	3.697.705,94	3.135.992,60	3.206.756,38	916.426,96
	Cumulative as end of 1970	Cumulative as end of 1971	Cumulative as end of 1972	Cumulative as end of 1973	Cumulative as end of 1974
	14.043.118,13	17.740.824,07	20.876.816,67	24.083.573,05	25.000.000

IBRD LOAN NO. 763-TU (24 Million \$)  
ACTUAL DISBURSEMENTS

1971	1972	1973	1974	1975	1976
2.016.288,40	2.962.137,72	6.060.284,65	6.948.046,51	6.373.989,55	993.514,19
	Cumulative as end of 1972	Cumulative as end of 1973	Cumulative as end of 1974	Cumulative as end of 1975	Cumulative as end of 1976
	4.978.426,12	11.038.710,77	17.986.757,28	24.360.746,81	25.354.261,00

NOTE: Difference is due to the variations  
in currencies.

*Small excess over  
loan amount covered  
from IDA's own  
resources See Att. II,  
p. 4.*

Dear Mr. Green

The values given in these tables are fundamental statistical values. As for the statistics made before 1970 we can not tell the criteria on which they are used upon because they are not proposed by TEK. For this reason in proposing 1970 values Etibank's Activity Reports were used. As for large and small industrial groups satisfactory data was not available so only total values are given.

Please we informed.

Statistic Service

*[Handwritten signature]*  
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EMENA Public Department  
Public and Energy Development Div.  
Date: TUR-7-30  
By: 2/17/77  
Asst: [initials]  
[initials]

Interconnected System  
CS. AR 763 Annex 6.

Number of Consumers supplied by TEK in the years from 1968 to 1976 and their consumption by categories.

	1968		1969		1970		1971		1972		1973		1974		1975		* 1976	
	Number	Gwh	Number	Gwh	Number	Gwh	Number	Gwh	Number	Gwh	Number	Gwh	Number	Gwh	Number	Gwh	Number	Gwh
Small Ind	**		**		311	55	309	58	412	100	446	144	464	178	683	353	800	361
Large Ind					165	2328	185	2823	200	3357	245	3637	262	3941	313	4677	390	6357
Total Ind	153	1687	205	2038	476	2383	494	2881	612	3457	691	3781	726	4119	996	5030	1190	6718
Small Municip	230	347	325	419	453	366	703	499	849	708	1087	832	1113	848	1163	902	1293	1423
Large Municip	16	2248	17	2416	22	2795	26	3502	31	4175	38	4466	42	4937	50	5752	57	6557
Total Municip	246	2595	342	2835	475	3161	729	4001	880	4883	1125	5298	1155	5785	1213	6654	1350	7980
Village	3	15	589	23	885	33	1545	60	2398	75	3324	127	3903	168	4937	272	5800	288
Miscellaneous	129	33	142	31	160	29	175	70	250	49	370	133	401	167	566	227	684	364
Total	309	4330	1272	4918	1996	5606	2943	7012	4140	8464	5510	9344	6185	10239	7762	12183	9024	15350

\* Temporary  
\*\* Figures are not available

Same as App. 763,  
Annex 6 & 13

14,640 (Annex 4)

Consumption of three largest municipalities in years  
from 1968 to 1976

kwh Sold by TEK

(Gwh)

	1968	1969	1970	1971	1972	1973	1974	1975	1976*
ISTANBUL	1207	1242	1480	1914	2147	2328	2407	2919	3050
ANKARA	442	500	532	569	692	724	702	745	850
IZMIR	273	276	289	391	499	541	562	639	680

Percentage of TEK's Sales

(%)

	1968	1969	1970	1971	1972	1973	1974	1975	1976*
ISTANBUL	27.98	25.25	26.40	27.30	25.37	24.91	23.51	23.96	19.89
ANKARA	10.21	10.17	9.49	8.11	8.18	7.75	6.86	6.12	5.53
IZMIR	6.30	5.61	5.38	5.58	5.90	5.79	5.49	5.25	4.42

Additional kwh generation by consumer's own plant  
(Gwh)

	1968	1969	1970	1971	1972	1973	1974	1975	1976*
ISTANBUL	258	420	371	-	-	-	-	-	-
ANKARA	31	25	28	33	32	40	40	34	35
IZMIR	108	139	150	87	37	-	-	-	-

\* Temporary



Is this the MD  
corresponding  
to p. 23

AVAILABLE POWER CAPACITY AND PEAK LOAD CAPACITY OF THE INTERCONNECTED SYSTEM

YEARS	AVAILABLE POWER CAPACITY OF THE INTERCONNECTED SYSTEM		AVAILABLE POWER CAPACITY OF THE ETIBANK-TEK		PEAK LOAD CAPACITY OF SYSTEM	AVAILABLE POWER CAPACITY IN THE POWER PLANTS NEWLY PUT IN SERVICE
	TOTALS	HYDRD	TOTALS	HYDRD		
1968	1221	469	950	450	978	—
1969	1222	469	950	450	1064	New Units: Bursa Municipality - 1.0 MW
1970	1515	497	1358	478	1248	New Units: Almus - 27 MW, Ambarlı (Unit II and V) - 260 MW, Durucasu - 1.0 MW, Giresun SEKA - 5 MW, Owner ship passed to TEK: Silahtar - 120 MW.
1971	1763	587	1646	586	1506	New Units: Ambarlı (Unit IV) - 150 MW, Doğan Kent - 20 MW, Kovada II - 50 MW, Kızıdere - 15 MW, Visera - 1.0 MW, Dinar - 1.0 MW, Kovada I - 6 MW, Çaycuma SEKA - 8 MW, Owner ship passed to TEK: İzmir (ESHOT) - 30 MW, Kayaköy - 2 MW, Denizli - 1.0 MW, Gökal - 11 MW, Sızır - 4 MW
1972	1888	611	1726	586	1656	New Units: Bornova - 40 MW, Seydişehir - 40 MW, Dalaman - 16 MW, Samsun A20T - 5 MW, Kepez - 24 MW
1973	2359	725	2197	700	1757	New Units: Hopa - 50 MW, Seyitömer - 280 MW, Seydişehir - 27 MW, Gökçekaya (Unit I) - 90 MW, Tortum - 24 MW.
1974	3106	1330	2693	1130	2366	New Units: Hazar G.T. - 26 MW, Seydişehir (Unit VI, VII, VIII) - 40 MW, Ceyhan - 3 MW, Çay-Çay - 10 MW, Gökçekaya (Unit II) - 90 MW, Keban - 300 MW, Hazar - I - II - 26 MW, Kernek - 1.0 MW, Gorum cement - 2 MW, Gaziantep cement - 4 MW, Pınarhisar cement - 3 MW, Ergani - 4 MW, Mersin - 100 MW, Kadıncık I. - 65 MW, Murgul - 3 MW, Kadıncık II - 50 MW, Seyhan - 60 MW, Yüreğir - 0 MW.
1975	3523	1642	3055	1442	2729	New Units: Aliağa - 50 MW, Keban (Unit IV-V) - 300 MW, Gıldır - 12 MW, İskemir - 45 MW, Batman - 10 MW
1976	3680	1737	3195	1532	3135	New Units: Aliağa (Unit III-IV) - 50 MW, Gökçekaya (Unit IV) - 90 MW, Akso - 10 MW, Derne - 5 MW, Defne - 2 MW.

Note: The available power capacity of the power plants is considered.

3.2.1977  
A. KADIR ÖZEN

(AK)

1968

A- Existing Plant owned by Etibank's Consumers:

	MW	Type	Capability (MW)
SILAHTAR (Istanbul)	122.3	Thermal	120.0
ESHOT (Izmir)	40.0	"	30.0
EGO (Ankara)	26.6	"	20.0
FREGLI (Steel)	20.0	"	20.0
KARABUK (Steel)	20.0	"	10.0
GÖRSCİ (Yerköprü)	10.6	Hydro	11.0
SEKA (Izmit)	11.0	Thermal	7.0
SIZIR	6.8	Hydro	4.0
KAYAKÖY (İller Bank)	3.8	"	2.0
BURSA (Sümerbank)	6.3	Thermal	5.0
DENİZLİ	1.6	Hydro	1.0
BÜNYAN	1.4	"	1.0
Miscellaneous	60.0	Thermal	40.0
<b>TOTAL:</b>	<b>330.4</b>		<b>271.0 (19.0 Hydro)</b>

B- Existing Plant owned by Etibank or leased from DSI:

SARIYAR	160.0	Hydro	160.0
HİRFANLI (DSİ)	96.0	"	96.0
ÇATALAÇZI (Coal fired)	129.0	Thermal	120.0
TUNÇBİLİK (Lignite fired)	129.0	"	120.0
AMBARLI (Oil fired)	220.0	"	220.0
SOMA (Lignite fired)	44.0	"	40.0
KEMER (DSİ)	48.0	Hydro	48.0
DEMİRKÖPRÜ (DSİ)	69.0	"	70.0
KESİKKÖPRÜ (DSİ)	76.0	"	76.0
<b>TOTAL:</b>	<b>971.0</b>		<b>950.0 (450.0 Hydro)</b>

1969

Actions to system (Megawatts)

BURSA MUNICIPALİTE	1.3	Thermal	1.0
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1970

AMBARLI (UNIT: III-V)	260.0	Thermal	260.0
SILAHTAR (Owner ship passed to TCK)	—	"	—
ALMUS	27.0	Hydro	27.0
DURUKASU	0.8	"	1.0
GİRELİN SEKA	8.0	Thermal	5.0
<b>TOTAL:</b>	<b>295.8</b>		<b>293.0 (27.0 Hydro)</b>

1971

Additions to system (Megawatts)

	MW	Type	Capability (MW)
AMBARLI (UNIT: IV)	150.0	Thermal	150.0
İMİR (Owner ship passed to TEK)	—	"	—
DOĞANKENT (New unit)	24.6	"	20.0
KOUADA II (New unit)	51.2	Hydro	50.0
KAYARCI (Owner ship passed to TEK)	—	"	—
İKİZDERE (New)	15.1	"	12.0
DENİZLİ (Owner ship passed to TEK)	—	"	—
VIŞVA (New)	1.0	"	1.0
DINAR (New)	1.1	"	1.0
KOUADA I (New)	6.3	"	6.0
GÖKSU (New)	—	"	—
SIZIR (New)	—	"	—
ŞAYGUNA SEKA (New)	9.5	Thermal	8.0
TOTAL:	260.8		248.0 (30.0 Hydro)

1972

BORNOVA	45.0	Thermal	40.0
SEYDİŞEHİR	45.0	"	40.0
DALAMAN SEKA	26.2	"	16.0
SAMSUN AZOT	7.2	"	5.0
KEPEZ	26.4	Hydro	24.0
TOTAL:	149.8		125.0 (24.0 Hydro)

1973

HÜPA	50.0	Thermal	50.0
SEYİTÖMER	300.0	"	280.0
SEYDİŞEHİR (UNIT: IV-V)	30.0	"	27.0
GÜÇEKAYA (UNIT: I)	92.8	Hydro	30.0
TURTUM	26.2	"	24.0
TOTAL:	405.0		411.0 (114.0 Hydro)

1974

HAZAR G.T	30.0	Thermal	26.0
SEYDİŞEHİR (UNIT: VI-VII-VIII)	45.0	"	40.0
LEYHAN	5.6	Hydro	5.0
ŞİĞ-ÇAĞ	14.4	"	10.0
GÜÇEKAYA (UNIT: II)	32.8	"	30.0
HAZAR I-II	30.2	"	26.0
KEBAN	3.5	"	300.0
KEÇİEK	8.8	"	1.0
GÖKUMCUMANI	5.3	Thermal	5.0
GARIP " "	1.5	"	1.0
PAZAR " "	1.0	"	1.0
ERGAZI	5.1	"	5.0
MURSA	100.0	"	100.0
MURGUL	5.5	"	5.0
KAĞIZCI I	10.0	Hydro	10.0
KAĞIZCI II	10.0	"	10.0
KAĞIZCI III	10.0	"	10.0
KAĞIZCI IV	5.0	"	5.0
TOTAL:	400.0		740.0 (100.0 Hydro)

1975

<u>Actions to system (Megawatts)</u>	<u>MW</u>	<u>Type</u>	<u>Capability (mw)</u>
ALIAGA G.T (UNIT: I-II)	60.0	Thermal	50.0
KEBAN (UNIT: IV-V)	315.0	Hydro	300.0
GILDIR	15.4	"	12.0
ISDEMIR	50.0	Thermal	45.0
BATMAN	15.0	"	10.0
TOTAL:	455.4		417.0 (312.0 Hydro)

1976

ALIAGA G.T (UNIT: III-IV)	60.0	Thermal	50.0
GÖRGEKAYA (UNIT: IV)	92.8	Hydro	90.0
AKSA	21.2	Thermal	10.0
DERME	7.7	Hydro+Thermal	5.0
DEFNE	3.0	Hydro	2.0
TOTAL:	184.7		157.0 (95.0 Hydro)

COMMONWEALTH ASSOCIATES, INC.

C/O T.E.K. ŞEBEKELER DAİRESİ BAŞKANLIĞI  
NECATİBEY CAD. NO. 5  
SİHİYE — ANKARA  
TURKEY

H.R.12

Tel : 12 84 67  
Cables : COMAS, ANKARA

December 9, 1974

T.E.K.  
General Management

SUBJECT: Gökçekaya and Keban 380 KV Transmission Projects  
Completion Report

Gentlemen:

Please refer to your letter Ref. 614/Keb-662/218 8635 dated October 8, 1974 and the I.B.R.D. letter dated September 25, 1974 attached thereto on the subject of a completion report for the above Projects.

We have prepared a preliminary version of a completion report and are attaching a copy of this hereto. If you wish you can use this as a basis for a completion report to be prepared by you, or alternatively you may prefer to give us comments on this preliminary report and we can incorporate these into a final completion report.

It would appear from the I.B.R.D. letter that the completion report is not required until the Gökçekaya - Ankara 380 KV line is complete, and consequently the final version would require to be prepared within the next nine months or so.

Sincerely,

*George D. Nicholson*

George D. Nicholson  
Field Project Manager

cc: Mr. H. P. Hulett  
Mr. R. E. Folsbee  
TEK, Şebekeler Dai. Bşk.

GDN:mk

TÜRKİYE ELEKTRİK KURUMU	
Şebekeler Dairesi Başkanlığı	
Tarih: 09/12/1974	
Durum: [ ]	
1	2
1	2

k k a g  
20/12

COMPLETION REPORT ON GÖKÇEKAYA AND KEBAN TRANSMISSION PROJECTS

GENERAL

The Projects comprised the planning, design, and construction of the Gökçekaya Transmission Project and the Keban Transmission Project.

Gökçekaya Transmission Project comprised:

- (1) 380 KV 50 cycle 3-phase single-circuit power transmission lines approximately 380 KM in length linking Gökçekaya hydro-electric power plant with Ankara and Istanbul cities.
- (2) Ankara step-down substation consisting of two 150 MVA auto-transformers stepping down from 380 KV to the Ankara city 154 KV network. The substation has two 380 KV transmission lines coming from Keban, one 380 KV line going to Istanbul and one 380 KV line from Gökçekaya.
- (3) Istanbul step-down substation consisting of two 150 MVA auto-transformers stepping down from 380 KV to the Istanbul city 154 KV network. The substation has one 380 KV transmission line coming from Gökçekaya.

Keban Transmission Project comprised:

- (1) 380 KV 50 cycle 3-phase single-circuit power transmission lines approximately 1450 KM in length with two lines linking Keban hydro-electric power plant with Ankara city including a series capacitor station at Kayseri and one line continuing from Ankara to Istanbul.

- (2) Extension to Istanbul step-down substation consisting of two more 150 MVA auto-transformers stepping down from 380 KV to the Istanbul city 154 KV network. The substation extension provided for one 380 KV transmission line coming from Ankara.

The concept and initial basic design of the Projects was organized under the sponsorship of Elektrik İşleri Etüd İdaresi (EIE), who retained as consulting engineers, Commonwealth Associates Inc. (CAI) Jackson, Michigan to make studies, design the Projects, train the Client's engineers and advise and assist in procurement and construction management. Subsequently all of EIE's functions with respect to the Projects was assumed by Etibank, and were later transferred from Etibank to Türkiye Elektrik Kurumu (TEK). The design, procurement, and contracting were under the direction of the TEK Şebekeler Dairesi Başkanlığı (Networks Department).

The initial survey and selection of line routes was carried out by the Client in Turkey, and the results were passed to the Consultant in Jackson, Michigan for tower spotting, selection of tower types and heights and preparation of construction lists, and sag tables for conductors and shield wire. The tender documents for line construction, including the supply of foundation material and tower steelwork, were prepared in Ankara jointly by the Client and Consultant, based on technical specifications provided by the Consultant in Jackson.

The tender documents for line insulators, conductors, fittings and construction equipment were also prepared in Ankara jointly by the Client and Consultant, based on technical specifications provided by the Consultant in Jackson. Evaluation of the bids and placing and handling of contracts for the procurement of line material and equipment and for line construction were also carried out jointly in Ankara.

The installation of foundations and supply and erection of towers on the Gökçekaya-Ankara and Gökçekaya-Istanbul lines were initially contracted to Madeni İnşaat İşleri T.A.Ş. (MITAŞ) of Turkey, but, since this company defaulted on their contractual obligations during the course of construction, the remaining work is being carried out by TEK Şebeke Tesis Dairesi (Construction Department), who have also been responsible from the outset for the erection of insulators and conductors for these lines.

What happened.

The installation of foundations, supply and erection of towers, and erection of Owner-furnished insulators and conductors on the two Keban-Ankara lines and on the Ankara-Istanbul line was initially contracted to Societa Anonima Elettificazione (SAE) of Italy, but, since this company also defaulted on their contractual obligations during the course of construction, the remaining work has been carried out by TEK Şebeke Tesis Dairesi.

ditto

610/DBK.II-901/381

Jan.28, 1977

Page 6

e) The 154-kV transmission lines and substations have been by our Organization and our technical staff, without the assistance of the consultants. However in order to retain trained staff in the Organization should be equipped with the facilities which could attract qualified and trained staff in adequate number, who would have access to foreign languages. This is a matter of status.

f) In the main financemement plan, any kind of problem has not been observed, with the exception of the price increase and changes in the plans. The material which was not provided through the Loan, have been obtained by our own resaurces.

g) A great development, industrialization and a great vitality and various benefits in the social life have been achieved by the transmission lines and substations installed through the 763-TU Loan. Moreover energy has been extended to many rural areas deprived of electrical energy.

h) In order to derive maximum benefit from the lines and substations installed through the Loan 763-TU, it is necessary to construct new lines and substations to be connected to those. For increasing the investments, the financemement should be obtained beforehand and the facilities should be provided in order to : recruit and retain technical staff. The training of the technical staff is also an important factor.

The personnel who would do the research, planning, project design and erection work should also be provided with adequate possibilities.

By our explanations we do hope that we have replied to your questions asked through your above referred letter and verbally. In case you should find some points in our report unsatisfactory please note that we shall be at your disposal to clarify such points.

We hope you will tolerate us for some missing points in report, if any.

Very Truly Yours,  
TURKISH ELECTRICITY AUTHORITY  
GENERAL MANAGEMENT

Encls (-Annex)

- Su station and Trans.  
Lines Schedule
- Material List.

LOAN NO. 763-TU

ANNEX 1

COMMENTS APPLICABLE TO LOAN NO. 763-TU

- 1) Sometimes the Bank effect payment to the suppliers very late which causes suppliers to write letters or send telex messages asking why the payment has not been effected although the shipment has been effected.

To avoid this the Bank can send a notification to the related supplier stating that they have received the payment application and the payment will be effected in the earliest convenience.

- 2) -The Bank should send a statement quarterly or half yearly showing the actual disbursements and the balance of the loan which will be useful to keep track of the loan simultaneously with the Bank so the over usage of the loan will be prevented

-Our withdrawal applications consist of three pages and on every page the same informations are repeated. To avoid these repetitions the information can be given on one page.

LOAN No. 763-TU

POWER TRANSFORMER ORDERS AND CAPACITIES FINANCED  
LOAN NO. 763- TU

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<u>Contract (Order No.)</u>	<u>Quantity</u>	<u>Unit Capacity</u>	<u>Total Capacity</u>
103-ST/192	6	25 MVA	150 MVA
103-ST/192 A	2	25 MVA	50 MVA
103-ST/192 B	21	25 MVA	525 MVA
103-ST/178	9	50 MVA	450 MVA
103-ST/178 A	1	100 MVA	100 MVA
103-ST/178 B	2	50 MVA	100 MVA
103-ST/129	4	100 MVA	400 MVA
103-ST/129 A	3	100 MVA	300 MVA
TOTAL	<hr/> 48		<hr/> 2075 MVA

THE LIST OF SUBSTATION VOLTAGE TRANSFORMERS LISTED

Project No.	Substation	Characteristics
+ 67.D.02.0294	Aliağa	154/6.3 kV, 25 MVA
+ 67.D.02.0520	Antalya	154/66 kV "
+ 68.D.02.3612	Murş	154/31.5 kV "
+ 68.D.02.3732	Telhamut	" "
+ 68.D.02.3301	İzmir II	154/34.5 kV, 100 MVA " 50 MVA
+ 68.D.02.3824	Malatya	154/31.5 kV 25 MVA
+ 69.D.02.0270	Adapazarı (Ext)	154/34.5 kV, 50 MVA
+ 69.D.02.0470	Erciurum	" 25 MVA
+ 69.D.02.0622	Bursa Sanayi (Ext)	" 50 MVA
- 70.D.02.0090	Aksaray	" 2x100 MVA
- 70.D.02.0100	Altıntepe	" 2x100 MVA
+ 70.D.02.0420	Mardin (Ext)	154/31.5 kV 25 MVA
+ 68.D.02.3642	Çinkir	154/15.8 kV 2x25 MVA 154/31.5 kV 25 MVA
+ 70.D.02.0160	Genlik II	154/34.5 kV " 154/6.3 kV "
+ 70.D.02.0240	Kamak	154/34.5 kV 100 MVA
+ 70.D.02.0250	İzmir III	" 50 MVA
+ 71.D.02.0310	Ferrokrom	" 2x50 MVA
+ 72.D.02.0180	İzmit II	154/34.5 kV 50 MVA
- 72.D.02.0180	Alköprü (Ext)	" 2x100 MVA
+ 72.D.02.0560	Erabzon (Ext)	154/31.5 kV 50 MVA
+ 72.D.02.0610	Yarıncı (Ext)	" 2x50 MVA
+ 72.080.76	İzmir Sanit.	31.5/10.5 kV 2x25 MVA
+ 72.750.76	Pugalar (Ext)	154/66 kV 25 MVA 154/34.5 kV "
+ 73.D.02.200	Çorlu (Ext)	" "
+ 71.D.02.0370	Balıkesir (Ext)	" "

- 8 -

<u>Project No.</u>	<u>Substation</u>	<u>Characteristics</u>
+ 73.490.76	Gerkezköy	154/34.5 IV 2x25 IVA
+ 72.290.76	Çirçip	" "
+ 73.D.02.0270	Edirne (Ext)	" 25 IVA
+ 71.D.02.0190	Manisa (Ext)	" "
+ 72.310.75	Seyitömer (Ext)	" "
+ 74.540.77	Orhangazi	" "
+ 74.590.76	Tunçbilek (Ext)	" "
+ 74.280.76	Denizli (Ext)	" "
+ 68.D.02.3790	Tuzla (Ext)	" 50 MVA

+ completed

- continued

170 kV CIRCUIT BREAKER ORDERS  
AND  
CAPACITIES FINANCED LOAN NO.763-TU

ORDER NO.	Q'ty	ORDER NO.	Q'ty	
103-ŞT/101	(77 each)	103-ŞT/187	170 kV	66 kV
+ Seyitömer	2	- Biga (Tv)	4	2
+ Yıldıztepe (Tv)	6	+ İsmit (Tv)	5	-
+ Davutpaşa (Tv)	5	- Sarıyar (Tv)	2	-
+ Ümraniye (Tv)	10	- Gelendost (Tv)	-	1
+ Ambarlı (Tv)	3	+ Çaycuma (Tv)	-	1
+ Akköprü (Tv)	4	+ Sarımsaklı	-	1
+ İzmir II	9	- Diliskelesi	4	-
+ Mamak	6	+ Gaziantep (Tv)	1	-
+ Kartal	6	- Urfa (Tv)	1	-
- Adapazarı (Tv)	7	- Orhangazi	4	-
+ Gölbasi	2	- Suruç	4	-
+ Yarıca (Tv)	1	- Alaçatı	1	-
+ Tunçbilek (Tv)	2	- Akçakale	1	-
		+ Çarçıp	6	-
		+ Hopa	1	3
		- Sinop	2	-
		- Konya (Tv)	-	1
		+ Sarayköy (Tv)	1	-

- 2 -

ORDER NO.	Q'ty	ORDER NO.	Q'ty
103-ŞT/187 A	(115 each)	103-ŞT/187 A	(115 each)
+ Çinkur	4	+ Diyarbakır (Tv)	2
+ İzmir III	1	+ Gaziantep (Tv)	1
- Akşehir	1	+ Edirne	1
+ Kars	3	+ Bursa Sanayi(Tv)	1
+ Babaeski (Tv)	3	+ Çerkezköy	1
+ Hadımköy (Tv)	2	+ Tunceli	3
+ Malatya	2	+ Paşalar (Tv)	1
+ Alağa	9	+ Pülümür	3
- Bingöl	3	+ Sivri (Tv)	3
+ Karumürsel	3	- Çakmaklı	1
- Sirt	3	- Horasan	4
- Afyon (Tv)	1	- Ardahan	3
+ Trabzon (Tv)	1	+ Tunçbilek (Tv)	6
+ Erzurum (Tv)	1	+ Kayseri (Tv)	1
+ Çarşakale (Tv)	1	- Doğubeyazıt	2
+ Kirka	1	- Kayseri II	6
+ Muğla (Tv)	1	- Bağışlı	1
+ Ferrokrom	6	- Engil	4
- Erdemir	2	- Çıldır	2
+ Elbistan	1		
+ Aşkale	3+1		
- Avanos (Tv)	1		
- Demirdağ	4		
+ Denizli (Tv)	4		
+ Adıyaman	3		
- Tosya (Tv)	2		
+ Mar'ın (Tv)	1		

Note .

+ completed

Tv= Extension

- continued

LOAN No. 763-TU

THE LIST OF SUBSTATIONS WHERE SHUNT CAPACITOR BANKS  
TO BE INSTALLED (PROJECT NO. 69. D. 02. 0740)

---

Yıldıztepe	35 kV	$2(2 \times 10.5) = 42$ MVar
Davutpaşa	"	" "
Bursa Sanayi	"	$2 \times 10.5 = 21$ MVar
Bursa	35 kV	$2 \times 6 = 12$ MVar
Edirne	"	5
Çerkezköy	"	6
Çanakkale	"	6
İzmit II	"	6
Babaeski	69 kV	5.8
Samsun II	6.3 kV	5
Genlik	6.3 kV	5

---

156 MVar

January 28, 1977

INTERNATIONAL BANK FOR  
RECONSTRUCTION AND DEVELOPMENT  
1818 H. Street N.W.  
Washington D.C. 20433

U.S.A.

Our Ref. : 610/DBK.I-901/  
Subject : Loan No. 568-TU  
FINAL REPORT

*Main suppliers  
of Equipment?*

Ref : a) Your letter dated 25th 9, 1974  
b) Your letter dated 12th 2, 1975

Our comments relating to the subjects referred in (a) and (b) above, have been submitted herewith.

As it is known, the Final Report dated 2 nd, December 1975- which is herewith attached - prepared on the works in the scope of the credit, which were accomplished by our Consultant Firm Commonwealth Inc (CAI), has been submitted to your Bank. At this Report, the activities carried through this work - from the initial stage to the end - and the critics on the work have been adequately explained by our Consultant. The Report had provided all the necessary information for your Bank, with the exception of the supply of the Gökçekaya-Ankara line, while the situation of this line on the time this Report was written, had been also explained. In any case, we deem it necessary to give explanations on the matters below.

As it is known, Keban-Ankara-Istanbul power transmission line and Ankara-Gökçekaya-Istanbul power transmission line and the substations connected to these lines have been the first 380-KV installations erected in our country. For this reason, some delays and faults have been experienced in the erection of the aforementioned substations and transmission lines. However, the major reasons of these delays are due to the various crises and circumstances faced in the World as well as in Turkey. In spite of this, due to the major delays occurred in the Gökçekaya and Keban power stations the termination dates have been extended for about 1,5-2 years to SAE and the substation investments have been slowed-down in the initial stage, with the aim to avoid unnecessary investments. In addition, due to the rapid increase in the prices in the world and Turkey markets no installation work other than Ankara-Gökçekaya line have caused delays in the utilization of the energy produced by the Keban and Gökçekaya power stations.

*due to  
SAE?*

*Some delay is deliberate?  
Yes*

*Is any of this line  
financed by Bank?  
./.. No*

For SAE, CAN gives  
reasons in Act IV, p. 8  
Was contract in TL?

Why termination?  
When terminated?

Upon the abolishment of the contracts (references H.50 and H.40) drawn with SAE and MITAS Companies, the installation of the Umraniye and Golbası substations and the Kayseri Capacitor stations as well as the erection of the Keban-Ankara line and the Gökçekaya-Ankara line through our Force Account and our own means, should be considered as a very big accomplishment. Through this, though limited, a team has been created which is qualified in separate project an erection work. By this team which was trained in these works, the 380-KV Seyitömer and Izmir substations, as well as the 380-KV Gökçekaya-Seyitömer-Izmir and Seyitömer-Seydişehir transmission lines have been installed by the initiative of our Organization.

The costs of the mentioned installations have been far beyond the estimated costs, due to the delays and the crisis faced in the world and Turkey markets, as well as the big price increases. The lack of experience of our Organization from the administrative and personnel point-of-view, which is a newly-created entity, is also attributable to these results. Moreover, the Laws, formalities, organization problems, impossibilities in recruiting and retaining technical staff and many other barriers, have effected this.

How much?

The major reasons for not being able to realize the afore-said installations in the desired level and time, in parallel to your requests in the above-said letters, could be summarized as follows. We would highly appreciate if you would accept our regrets and show consideration to us for not being able to prepare a report of such a largescale requested by you, due to the resignation of our trained and qualified staff during this period.

a) Due to the rapid changes in the prices, rate of exchange, circumstances in the world and Turkey and the skyrocketing price increase in the materials such as oil, steel etc, the main problem has been the disputes occurred with the contractors due to their delays which resulted with the cancellation of the MITAS and SAE contracts thus putting us in a position of completing the works by our Force Account, for which we were not equipped beforehand.

Great delays have taken place in the completion of the Protection projects of the Brown-Bovery (BBC) company. Delays of upto 2 years have been observed in the projects which were to be completed within 4 months following the date of bidding and due to this reason, the procurement of the protection material has been prolonged. However, through the big efforts of the TEK erection team, the control pannel production, erection, cabling, and testing works have been finalized and the substations have been brought to a position ready for operation, before the powerstation was ready for operation. In order to minimize the

various contracting / consulting  
companies

- 3 - What was problem? Very slow

prices and these effects, TEK, despite the shortage of its experience, has shown a great effort to eliminate the troubles and inefficiency of [SAE, MITAS, BBC and consultant firm CAI, and have finalized the works.]

b) The performance of [CAI], with the exception of the delays in the services carried on in U.S.A., could be deemed as successful. However, we believe that the consultants have not been able to give us the necessary assistance, due to the fact that, the Company has not sent qualified staff to Turkey during the erection phase, as well as the works in Turkey.

The plans, projects, profiles, charts, technical information and operation manuals which were to be supplied to us, under the contract drawn with [CAI] have not been submitted and the firm has left the Country. Moreover, they have not shown any interest when they were asked to give the reasons of deteriorations and have requested extra fee to examine the faults. On the other side, organizations like Electricité de France (EDF) and ASEA (Sweden) have made examinations in order to solve the problems and extended their assistance, without any fee. The Chas.T.Main and Stone-Webster companies which have previously carried on consultancy services for TEK, have submitted the complete reports and documents - which we are presently using - , at the end of the works.

Unfortunately the performance of the contractors in this work have been very low and none of them have met their obligations under the contracts. This has been a very serious problem for TEK.

The design of the poles used in the lines have been made according to very light assumptions and the meteorological conditions of the Country could not be estimated. For these reasons, by observing that 12 poles have fell down in the initial stage in Izmit during summer and the poles between Keban-Kayseri have fell down in the operation stage, it has been concluded that, the distribution of the poles have not been carried on in a proper manner. The falling down of the poles - in the erection stage - in the Keban line took place due to our fault in taking some measures.

c) No difficulties have occurred in the disbursements and procurements except the formalities and the credit has enabled us to have responsive bids and facilitated the payment procedure. Moreover, we have not faced any difficulties in transfer and financemant.

However, we would like to emphasize that, the requests made for reports on subjects with great coverage and beyond the scope of TEK, which we believe, do not have direct relation with

What sort of subjects? /.

C.S. Alt. 14, P. 7

Why? in contract?

Which?

- 4 -

the credit highly occupies our staff, who are in limited number and are already loaded with heavy work. This request causes further delays in our other activities. It would be much more easier for us to work, if information of less detailed nature could be requested.

d) The comments on the Bank transactions which cause to problems are herewith attached (Annex-1).

e) Owing to the Keban-Gökçekaya Project and the credits, our technical and administrative staff have been trained, both in Turkey and abroad, and have reached a level capable to construct the 380-KV lines and substations, without the assistance of consultancy. Therefore, from now on, the projects could be accomplished by TEK's technical staff, which is a very great improvement.

However, in order to attract and retain qualified and experienced technical staff our Organization needs to be equipped with the necessary means.

f) Any kind of deviation has not been observed in the main financment plan, except the price increase.

g) The energy capacity of Turkey has shown an increase about 40%, through the Keban-Gökçekaya Projects, which forms the main framework of our Interconnected System. This Project has made a great contribution to the development, industrialization and the flourishment of the social standart, as well as the extension of energy to our rural areas.

h) It is primarily essential that, in order to derive maximum benefit from the Project, the investments for the other transmission, distribution plants - which would used for the sale, transmission and distribution of the energy obtained from the Keban and Gökçekaya system - should be increased and with prior consideration to training facilities, all the measures should be taken in order to retain adequate number of technical staff - for the construction of projects, installations - , thus being able to reach to the level of industrialized nations.

with the exception of a few qualified specialists who would assist us in solving the problems - which are few - arise during the research, planning, project, design and erection works, we do not necessarily need specialists to such a great extent.

By our explanations we do hope that we have replied to your questions asked through your above referred letter and verbally. In case you should find some points in our report unsatisfactory please note that we shall be at your disposal to clarify such points.

We hope you will tolerate us for some missing points in report, if any.

Very Truly Yours  
TURKISH ELECTRICITY AUTHORITY  
GENERAL MANAGEMENT

Encls. - Final Report  
- Annex 1  
- CAI Completion report.

Explain

Only need a few consultants →

LOAN NO. 568-TU

ANNEX 1

COMMENTS APPLICABLE TO LOAN NO. 568-TU

- 1) Sometimes the Bank effect payment to the suppliers very late which causes suppliers to write letters or send telex messages asking why the payment has not been effected although the shipment has been effected.

Osten?  
Examples?

To avoid this the Bank can send a notification to the related supplier stating that they have received the payment application and the payment will be effected in the earliest convenience.

- 2)-The Bank should send a statement quarterly or half yearly showing the actual disbursements and the balance of the loan which will be useful to keep track of the loan simultaneously with the Bank so the over usage of the loan will be prevented.

Does it  
not do  
this?

-Our withdrawal applications consist of three pages and on every page the same informations are repeated. To avoid these repet the information can be given on one page.

Repeat

IBRD LOAN NO. 568-TU (25 Million \$.)  
ACTUAL DISBURSEMENTS

1969	1970	1971	1972	1973	1974
7.554.954,02	6.498.164,11	3.697.705,94	3.135.992,60	3.206.756,38	916.426,96
	Cumulative as end of 1970	Cumulative as end of 1971	Cumulative as end of 1972	Cumulative as end of 1973	Cumulative as end of 1974
	14.043.118,13	17.740.824,07	20.876.816,67	24.083.573,05	25.000.000

*Who financed cost increases?*

IBRD LOAN NO. 763-TU (24 Million \$)  
ACTUAL DISBURSEMENTS

1971	1972	1973	1974	1975	1976
2.016.288,40	2.962.137,72	6.060.284,65	6.948.046,51	6.373.989,53	993.514,19
	Cumulative as end of 1972	Cumulative as end of 1973	Cumulative as end of 1974	Cumulative as end of 1975	Cumulative as end of 1976
	4.978.426,12	11.038.710,77	17.986.757,28	24.360.746,81	25.354.261,00

NOTE: Difference is due to the variations  
in courses.

T E K

TÜRKİYE ELEKTRİK KURUMU

Ankara, Jan.28, 1977

INTERNATIONAL BANK FOR  
RECONSTRUCTION AND DEVELOPMENT

1818 H Street, N.W.,  
Washington, D.C. 20433

Our ref: 610/DBK.II-901/381

Subject: Loan No. 763-TU

U.S.A.

Final Report

Y.Ref: Your letter dated Jan.26, 1977

*Main supplier of equipment?*

As you know, the loan No.763-TU for US\$ 24.000.000 is not a project loan but is a credit granted to meet a part of our foreign exchange requirement that is necessary to finance the installation, revision and extension of 1330 MVA substations and 2800 km long 154 and 30 kV power transmission lines which will be connected to the interconnected system.

The substations and lines to be financed under this credit have been shown in our 1972 investment program. However due to our urgent needs that may occur in later years the program for 1972 has been changed and the funds have been transferred to the installations included in our program for 1973 and 1974. The names of substations and lines after the use of this credit have been shown on the attached lists.

The credit No.763-TU was intended to be used for the completion of the equipment necessary for the substations which have already been built and for the installation of new substations which have just been included in the program.

The equipment to be procured under this credit are used :

- 1) In the installation of new substations,
- 2) In the completion of equipment for the substations which have been built,
- 3) To increase the power of some substations which are in operation,

./..

610/DBK.II-901/381

Jan. 28, 1977

Page 2

- 4) For addition of feeders which **became** necessary as the result of growth in the networks,
- 5) As system spares.

Number of substations, the equipment for which is to be procured through 763-TU is 136,

- Number of substations in which the transformers will be installed : 114
- Number of transformers : 139
- Transformer power : 3405 MVA
- Transformer power expected by this credit : 1330 MVA
- Transformer power procured through credit : 2075 MVA
- Number of transformers procured through the credit : 48
- Number of substations in which transformers were installed : 34

*Financed?  
see p. 8 and p. 102*

*Difference?  
Initial estimate vs actual?*

As seen on the above table, in the 1973 investment program it was planned that 139 each 3405 MVA transformers were to be financed through this credit. In the credit agreement, however, credit has been granted for 1330 MVA transformers. On the other hand, due to our urgent need, 48 each 25, 50 and 100 MVA transformers which are not manufactured in Turkey have been financed under this loan. The remaining 91 each 1330 MVA transformers were obtained through the TEK's own means. The names of substations on which the transformers were installed are listed on the attached table.

*Financed by Bank?*

*1330?*

*./..*

G.10/TEK.11-90L/381

Page 3

Jan. 28, 1977

A list showing the names of substations where the power transformers, circuit breakers, capacitors that obtained under this loan and the names of transmission lines is also attached.

It must be considered normal that during the 4 years period between the validity date of loan agreement and the completion of foreign expenditures there had to be changes on some projects. For this is a program credit and using it for the urgent needs will be more advantageous for the Turkish economy.

*e.g. ?  
line locations  
substations  
sizes ?  
CPC 3.02*

The equipment that is financed through the 763-TU credit, has been ordered on the "stock order" basis. That is, instead of ordering the complete equipment for each substation, all the necessary equipment have been ordered on the whole for the overhead lines and substations which were decided beforehand, as separate items. Besides, this is the policy TEK has carried out for a long time in the obtainment of equipment.

The 30% of overhead lines and substations on which these equipment was used, has been completed by January 1977. It is expected that the remaining part will be completed within 6 months, that is the end of June 1977. This result can be considered as a good proof that the use of this credit has fulfilled the requirements.

*Did this happen ?*

In the scope of project, in section A (1) 380 kV equipment has been planned for Adapazari, Kayseri and Ümraniye substations and also for 380 kV Kayseri substation the capacity of serial capacitor banks were to be increased.

As the final study and planning in our 380 kV system during the validity of this credit has not been completed and the production installation to be connected to the 380 kV system was delayed, it was not possible to obtain equipment through this credit for the above mentioned substations. Besides, as you know the new credit No. 1194-TU has been granted for our 380 kV system.

*We money transferred to other equipment ?*

*./...*

610/DBK.II-901/381

Jan.28, 1977

Page 4

In the section A (1) of the project for Istanbul, 100 MVAR capacitors were planned. We have ordered a total of 156 MVAR capacitors to be used not only for Istanbul but for all places in our system which require capacitors. The 84 MVAR of these capacitors have been mounted in Istanbul. The remaining 72 MVAR have been mounted in the TIE interconnected system where required.

The general comments on the credit:

There has not been a big problem during the carrying out of the credit. However, the procedures such as before sending them to the firms sending of specifications to the Bank for approval as required by the credit agreement and obtaining the Bank's approval after the award is made, cause a certain amount of delay on the orders. Yet, both Bank and TEK did their best to complete the procedures in promptness.

Another point regarding this credit is that by our last order we exceeded the limitation of the credit. By covering this small amount through our own sources, however, this problem has been solved.

No consulting firm has been engaged for this credit. As it is known, conformity with the specifications and responsiveness have been the basic criterion for selection among the supplier firms and the firm has been chosen within this framework. Generally, the firms have not caused any delays in the delivery of material and no important trouble has been faced during the application term of the credit.

The costs of the above-said installations have been far beyond the estimations, due to the delays and the crisis faced in the World and Turkey markets, as well as the big price increases. The shortage of experience of our Organization from the administrative out personnel point-of-view, which is a newly-created body, is also attributable to these results. Moreover, the laws, formalities, organizational problems, and impossibilities in recruiting and retaining technical personnel and many other barriers have effected this.

How  
much?

./..

610/DBK.II-901/381

Jan.28, 1977

Page 5

The major reasons for not being able to realize the afore-said installations in the desired level and time, in parallel to your requests in the above-shown letters, could be summarized as follows. We would highly appreciate if you would accept our regrets and show consideration to us for not being able to prepare a report of such a magnitude, due to the resignation of our trained out qualified staff during this period.

a) Due to the rapid change in the prices, rates of exchange, circumstances in the world and Turkey as well as the skyrocketing price increases in the materials such as oil, steel, etc., the costs have shown a great increase.

As it is known, all the projects, specifications, material procurements and erections have been accomplished by TEK. The bureaucratic obstacles and excess of formalities have resulted in delays in the material procurements. e.g.?

b) There hasn't been any problems in the performance of the contractors and consultants during the utilization of this credit.

c) No difficulties have occurred in the disbursements and procurements except the formalities, bureaucratic barriers. The credit has enabled us to have responsive bids and facilitated the payment procedure. For this reason, there hasn't been any transfer and financing difficulties.

However, we would like to emphasize that, the requests made for reports on subjects with great coverage and beyond the scope of TEK, which we believe, do not have direct relation with the credit highly occupies our staff, who are in limited number and are already loaded with heavy work. These requests cause further delays in our other activities. It would be very useful for us, if information of less detailed nature could be requested.

d) Comments on Bank transactions which cause to problems is submitted herewith (Annex 1).

## TURKEY

### Loans 568-TU and 763-TU Completion Report

#### Keban and TEK Power Transmission Projects

#### 1. Introduction

1.01 Attached are completion reports for these two projects, prepared by the Turkish Electricity Authority (TEK), dated January 28, 1978, ~~and designated Attachments I and II respectively, some supplemental information sheets, (Attachment III), and a project completion report for the Keban Transmission Project (568-TU) dated December 9, 1974, prepared by the consultants, Commonwealth Associates, Inc. (U.S.), (Attachment IV)<sup>1/</sup>. A cost estimate for the Keban Transmission Project, comparative basic data sheets for the two projects, and a recalculation of the rate of return for the project financed under 763-TU are given in Annexes 1-4.~~ The following information supplements that contained in these reports.

#### Project Description

1.02 The Keban Transmission Project (Loan 568-TU) consists of approximately 1460 km of extra-high-voltage (380 kV) transmission lines linking Istanbul and Ankara with the 620-MW Keban hydroelectric project which was being constructed at the same time. The Second TEK Transmission Project consisted essentially of TEK's transmission construction program for 1971-1974, comprising about 4000 km of 154 and 30-kV lines and 1500 MVA of substations and other equipment. Although planned for completion in 1971 and 1974 respectively, the projects were completed only in 1976 and 1977. Since both projects formed part of TEK's investment program for the period, a combined completion report is appropriate. ~~Although TEK's reports are dated January 1977, further information required for the analysis was obtained only a year later hence the timing of this report.~~

*Probably 1975 (TEK)*

#### Project Objectives

1.03 Aside from the critical need for the physical facilities included in the Projects, a principal objective was to improve organization and financial responsibility in the government-controlled part of the sector. To this end, with the active assistance of the Bank and its special adviser, Lord Hinton of Bankside, the Turkiye Elektrik Kurumu (Turkish Electricity Authority - TEK) was established on October 25, 1970, under Law No. 1312 of July 1970 from the power group of ETIBANK, the original beneficiary under Loan 568-TU. This was the first step to integrate a very large number of independent power facilities into a coherent central electricity authority. The law drafted with the help of the Bank and Lord Hinton, incorporated agreements reached with the Government on the scope and functions of the national electricity authority and the areas within which the authority would have autonomy. The draft reflected the stated intention of Law 440 that State Economic Enterprises (SEE) (of which TEK is one) be run autonomously in accordance with commercial principles and as though they were

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<sup>1/</sup> The consultants completed their work on the project in 1974, and the project was then completed by TEK's own staff.

private stock companies. The TEK law as passed, fell short of this principally in the degree of autonomy accorded to the new organization and especially in the lack of freedom to set salaries and terms of service of non-unionized staff. Another change which has materially affected TEK's central role in power planning and operations is that, contrary to the agreement reached with the Government, the planning, design and construction of hydroelectric projects continued to be the responsibility of DSI, the Turkish Water Development Authority. The appointment of TEK's general manager and his assistants is also the prerogative of the Government, rather than a function of TEK's board.

1.04 Whilst the establishment of TEK brought generation and transmission facilities under one authority, distribution to the ultimate customers continues to remain in the hands of municipalities. Exceptions to this general statement exist. They are two relatively minor concession areas, large industrial and other consumers outside municipal areas of jurisdiction, and some autoproducers.

1.05 Prior to Loan 568-TU the Bank had made one loan (1952) for the Seyhan Dam in the Cukurova concession area, one credit (1963) to cover the foreign exchange cost of a third generator in the Seyhan power station and a credit (1964) for the Mersin thermal power station also in the Cukurova concession area. In 1965 the Bank, which led the financing consortium (EIB, KfW, USAID, France and Italy) for the main Keban hydropower project, participated by contributing to the finance of the associated transmission lines, on condition that the Government took steps to improve the efficiency of the power industry. A start on the implementation of the needed reorganization which had been identified by ETIBANK's consultants, Ebasco Services Inc., was made possible by the application of a portion of a 1965 Bank technical assistance grant of up to US\$1.95 million to cover the foreign exchange costs.

## 2. Project Preparation and Appraisal

2.01 The Keban transmission lines financed under Loan 568-TU were designed and supervised during construction by Commonwealth Associates Inc. who were themselves financed by USAID through their association with the Gökcekaya line forming part of the system connecting Keban and the Gökcekaya hydro plant with Istanbul. The works financed under Loan 763-TU were designed by TEK's own staff assisted by the Italian Electrical Research Center (CESI) for network studies.

2.02 The Power Group of ETIBANK, the forerunner of TEK, was considered at the time of appraisal of the Keban Transmission Line Project to be competently managed and staffed. By 1970 TEK had recognized the need for reorganization and approached Electricité de France (EdF) for assistance, and by the time Loan 763-TU was being considered, the appraisal report noted that Government was considering revisions to the personnel law which might hamper classification and retention of professional staff. Employment conditions as since imposed by the personnel law, have led to the steady flight of competent staff to the private sector and this had been a major factor in the generally poor performance of the Borrower and the consequent delays in the two projects being evaluated here.

2.03 Contrary to the intentions of Law 440, as described in the introduction, the public power industry has been traditionally tightly controlled particularly as to the charge it could levy for energy; thus, bulk electricity is sold at a price inadequate to generate adequate resources for investment. Loans 568-TU and 763-TU sought to achieve the objective of internally generating a reasonable portion of the capital expansion requirements by obtaining acceptance of a minimum 8% rate of return based on realistically valued average net fixed assets in service (a provision repeated in principle in the TEK law though without a specific requirement for periodic revaluation). Government's unwillingness ~~for political reasons~~ to increase power rates in step with high inflation and development needs is reflected in the repeated failure to reach the agreed financial targets.

2.04 Periodic revaluation being necessary for the realistic adjustment of tariffs and for appropriate cash generation under inflationary conditions, the loan documents reflect the agreements reached on asset revaluation based on consultants' recommendations. Briefly, the loan agreement under Loan 763-TU required TEK to establish revaluation principles and methods satisfactory to the Bank based on the recommendations of consultants for computing the return from 1973 onwards. *Acc to AY proposals.*

### 3. Project Implementation

3.01 The Keban transmission lines originally were planned to be completed in 1970, soon after the commissioning of the first Keban unit. In practice, essential parts of the lines were completed more than two years late, but still just in time for the first unit of Keban which was itself eventually commissioned in September 1974. Final completion was not until October 1976. Construction of the lines was initially contracted with an Italian firm which ran into financial difficulties due to prolongation of the construction period and devaluation of the Turkish lira. As a result of these difficulties, the contractor was forced to abandon the work and TEK completed the project by force account. Shortage of skilled staff and inexperience in management of such a large line construction project lay at the root of much of the subsequent delay. However, learning the hard way can be a good school provided the personnel stay with the organization to apply their experience, and indeed subsequently TEK has successfully managed a major expansion of the 380-kV system; nonetheless, TEK's completion report specifically complains of the inability to recruit and retain technical staff and cites recent resignation of trained personnel.

3.02 The TEK Transmission Project was a "time-slice" project comprising TEK's transmission program for the years 1971 through 1974. Due in part to the shortage of skilled staff mentioned above, many of the facilities included in the original project were not completed until 1977 although there were many minor changes in the scope of the project (principally line locations and substation sizes) over the project period to accommodate the needs of a dynamic and growing system. Even so, partly as a result of generation shortages (Keban delay), the sales target forecast in the appraisal report for 1974 was not reached until 1976.

3.03 Although the Keban transmission lines have carried the energy generated at Keban to the load centers in the West, some disturbing problems have been encountered. Although there had been ample experience in the country with steel-tower transmission lines at lower voltages, the Keban lines introduced several innovations including bundled conductors, tension stringing, and refined designs incorporating high-strength steel. Such lines require a high standard of field erection and installation practices and TEK experienced some initial difficulties in coping with these. In addition, the standard Turkish loading criteria proved inadequate for the unprecedented ice loading experienced on the Istanbul-Ankara portion of the line, and subsequent design changes were required. Also, ever since the generators were commissioned there has been a debate as to whether some unexplained oscillations in the power system originate from the alternators and their control, or are a function of the transmission line characteristics. No positive identification of the cause has been made although an improvement seems to have been experienced with the bringing into service of the Gökçekaya/Ankara section of the line in 1976 and TEK continues to work with their consultants (CESI) and the manufacturers to resolve the problem. c.f. Akt.  
IV,  
p. 6  
7

3.04 The Bank and its associates, particularly the staff of USAID, endeavored to assist project implementation by repeated representations to the government authorities to clear bureaucratic delays occasioned by such things as import licence problems, the supply of steel for transmission line towers and the like. The Bank also participated in discussions between TEK and the Keban transmission line contractor in an attempt to resolve the issue involving the transfer of Turkish lira to Italy, including direct approaches to the Italian Ministry of Finance to find ways to resolve the dispute. The Bank agreed to the completion of the Keban line by TEK force account only when all hope of success had faded at which point it assisted in the setting up of construction schedules, equipment requirements, etc.

#### 4. Tariffs

4.01 As a condition of effectiveness of Loan 763-TU, TEK's tariffs were raised on average 50% effective July 1, 1971 (from about 16 kurus per KWh to about 24 kurus per KWh). This was expected to place TEK's finances on a satisfactory footing and in fact during 1972, the first year for which the increased tariffs were effective for a whole year, TEK by and large achieved the agreed rate of return of 8% on revalued assets. It was only when TEK was beset by large inflationary cost increases with consequential effect on the manpower situation and the implementation of projects and by Government's reluctance to raise tariffs in its effort to hold down inflation that TEK's financial situation started to deteriorate.

4.02 Under Loan 763-TU, a fuel adjustment clause was introduced in TEK's tariffs at the Bank's urging whereby increases in fuel costs are automatically recovered from consumers without a general tariff revision. This proved to be of significant help to TEK in 1973 and 1974 since the clause helped TEK to pass on to customers, without Government approval, its soaring fuel costs as a result

of the surge in international oil prices. When the average tariff level was around 24 kurus per KWh, the fuel adjustment charge rose from 3.5 kurus per KWh in December 1973 to 15.1 kurus per KWh in January 1974 raising the price of electricity to the consumer 42% in just about two months. Without the automatic fuel adjustment clause it is certain that there would have been major lags in recovering the increased fuel costs from customers, which would have led to a further serious deterioration in TEK's financial condition.

## 5. Financial Aspects

5.01 Loan 763-TU required TEK to earn an 8% return on revalued net fixed assets and to continue to revalue assets in future as prices change. Any shortfall in a year is required to be made up within the next two years; an overrun could be applied to offset any shortfall in one or more of the next three years (Loan 568-TU had substantially the same provisions). Fulfillment of this covenant would have meant significant tariff increases from time to time. However, after a 50% tariff increase in July 1971, there was no effective action until June 1976 to raise tariffs except for increasing the fuel surcharge because of the circumstances detailed below, and TEK has not met the rate of return covenant (8% on revalued net fixed assets) by varying margins from 1970 to date (by 2.5% in 1970, 3.1% in 1971, marginally in 1972, 5.3% in 1973, 5.7 in 1974 and 1975 and 3.9 in 1976). The surge in oil prices in 1973-1974 (para 4.02) made the task of ensuring TEK's financial viability rather difficult. In connection with Loan 763-TU, in view of the time required for the economy to adjust itself to the rapid price escalation, the Bank agreed to a longer-term approach for TEK to meet the required 8% as follows:

- (a) Government would establish not later than March 15, 1975 a new basic tariff yielding TEK a net average revenue of 51 kurus/KWh; and
- (b) from 1976 onwards, TEK would earn an 8% return on a revalued asset base.

These targets were not fully realized. However taking into account Government's anti-inflationary and economic stabilization policies, agreement was subsequently reached with Government that TEK would earn an 8% return from 1977 on a revalued asset base as agreed and that for 1976, such action including tariff adjustments would be taken by January 1, 1976 as would enable TEK to earn a 6% return in that year. However in the difficult political conditions then prevailing and in the absence of a strong Government able to provide political leadership, tariff action was delayed until May 1976 when rates were raised an average of about 20% with effect from June 1, 1976. Government approved further marginal adjustments in TEK's tariffs effective April 1, 1977 in order to enable TEK to increase its earnings. Again TEK's tariffs were raised about 42% effective September 10, 1977 but the increased revenues were largely offset by increases in fuel prices and in wages and salaries with the result that TEK's rate of return in 1977 is estimated to be only about 6.5%.

5.02 The main reasons for TEK's failure to reach the agreed 8% return have been:

- (a) delayed commissioning of projects such as Keban resulting in lower availability of hydropower for meeting the demand;
- (b) less-than-expected load growth due in part to lack of adequate supply; *sales?*
- (c) staffing problems;
- (d) rising employment costs, mostly of unionized labor, (wages and salaries in 1976 were about 230% of the 1970 appraisal estimate); and
- (e) Government's unwillingness to approve tariff increases especially because of the unsettled political conditions in the country.

5.03 Another serious financial problem which has beset TEK for the past few years is the problem of liquidity caused mainly by slow collection of receivables from municipalities despite a 15% discount for payment within one month and a penalty of 1% per month for payments thereafter (until these conditions were changed in June 1976). Since 1971, receivables have been consistently around four months' revenue, which is a very high level. At the end of April 1977 receivables which were outstanding for more than three months amounted to LT 3.5 billion, which itself is over five months' revenues. A significant portion of these outstandings was 2-3 years old. Government's solution to this problem has been consolidation and payment of intra-public sector debts. This has proved to be ineffective. After the consolidation of such debts in May 1975 under a law passed by Parliament, Government has again assumed responsibility for payment of TEK's bills for supply of electricity to municipalities after offsetting amounts due by TEK to various governmental agencies such as TKI, the Turkish Coal Enterprises, TAPAO, the Turkish Petroleum Authority and tax authorities.

## 6. Justification of the Projects and Bank's Role

6.01 Over the period that has elapsed since the appraisal for Loan 568-TU, its completion and that of the works under Loan 763-TU, various factors have affected TEK. These are principally a) an unwillingness to price electrical energy at levels adequate to meet development needs, b) the salaries of non-unionized staff progressively fell 50% to 65% below the level of the private sector employing similar skills, c) the Government's policy of fuel price subsidy has kept coal and lignite prices below their economic worth, d) Government policy has led to excessive levels of staffing in the lower grades of TEK in many disciplines which serves to reduce productivity and inflate costs.

at Appraisal

6.02 No rate of return was calculated for the Keban Transmission Line Project since the lines were inseparable from the Keban Project itself; however, an internal financial rate of return calculation was made for the 1971-74 time-slice of the generation/transmission investment program as part of the 763-TU appraisal. The forecast rate of return was 13%. This was derived by using forecast revenues as a measure of benefits and therefore is not a true economic return, but can be used to assess the adequacy of long-run tariff policy. A similar calculation using actual investment, operating cost and revenue data for the period 1971-76 (since the forecast sales target was reached only in 1976) yields a return of only 8% (Annex 4). This result is not surprising in view of the two-year delay in completing the project and reaching the original sales forecast, and Government policy in holding down electricity prices. Average revenue per KWh in 1976 was 7% below forecast levels (in 1971 terms) despite a near-doubling of average fuel and operating cost (also in 1971 terms) compared with the appraisal estimate. The result was further depressed since, because of the delay in hydro project construction (principally Keban), TEK was forced to resort to expensive generation from oil-fueled gas turbines which were rushed into service in an attempt to meet the shortages.

6.03 The fact remains that both projects financed through these loans were essential for the power sector's development, and a judgement can be made as to their efficacy regarding the major reasons for lending identified in the appraisal reports which clearly lie in the institution-building field. At the non-political levels in Turkey, both in government ministries and productive enterprises, there is a positive acceptance of those institution-building objectives which were the main justification for the lending operations. These were: the establishment of an autonomous, national power authority; the introduction of financial management techniques and policies designed to support the autonomous nature of the SEE; strengthening the sector development planning methods in terms of the nationally most economic program; and the enhanced cooperation of the authorities concerned, especially those of TEK and the Water Development Authority (DSI). Considering the improvements brought about through the medium of Loans 568-TU and 763-TU, and the deficiencies still existing, the two loans should be considered as having partially succeeded in their objectives and therefore as moderately successful.

6.04 Despite the relatively unsatisfactory institutional and financial performance, credit must be given to TEK for coping with a growth in generation and sales of nearly three times in the decade 1968-1978, a 4000-MW system--large by any standards--and an investment program which saw asset values increase nearly ten times due to the rapid growth in a period of escalating international prices. Under these circumstances and given the types of project and long construction periods, the 100% cost overruns experienced on the projects were not unusual.

6.05 So far, although the Bank's aims have not been fully achieved, significant steps have been taken towards these goals. Mainly through the help of consultants financed by the technical assistance grant of US\$1.95 million and partly also

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through the impetus provided by the two loans in question, TEK has established an adequate accounting and reporting system. Key accounting staff have also been trained in selected utilities in the USA. The reporting system is however not being used properly for management purposes. However the establishment of the system itself is a significant achievement. As regards other institutional improvements, for basically political reasons, institutional autonomy of TEK does not exist. Its technical operations have suffered because it is unable to hold an adequate level of experienced and competent staff. Despite a general shortage of competent staff its system planning has remained satisfactory, but implementation has been adversely affected by these constraints. What success has been achieved is as a result of the efforts of a constantly reducing core of dedicated and competent people. The Bank was instrumental in introducing dynamic system planning methods through the development of computer programs, and the Turkish system was used to test a general linear planning model developed in the Bank. The development program, which indicated the need for rapid introduction of thermal plant to meet the demand in 1974-78, was not then adopted by Government despite the Bank's urgings and the severe shortages in these years are now a matter of history. TEK's skills in drafting bidding documents and operating procurement procedures have steadily improved as a result of the work of the consultants and by association with the Bank so that in many fields consultants are no longer essential. In the financial area, implementation of the principle of automatic recovery of increased fuel costs from customers is a significant step forward. So also is the general acceptance of the concept of working towards a specific financial goal of an 8% rate of return on revalued assets. Even in respect of a matter such as revaluation on which there is no agreement in developed countries as to principles and methods, principles and methods have been agreed and implemented.

Data?

are they TD "right" ones?

how much

6.06 Because of inadequate tariff levels and a large expansion program in a period of high inflation, TEK has been unable to generate an adequate level of cash to support the power sector investment needs, and internal and external borrowings to support the investment program contributed substantially to the economic crisis faced by the Government in 1977/78. TEK still has a critical liquidity problem and it is unable to apply such remedies as are provided in the law to secure the prompt payments of outstanding bills. The decline in quality of its professional staff is still a problem. These fundamental problems, which drained the vitality of TEK, are shared by other SEEs to substantially the same degree and their solution, requiring political willingness, does not seem possible through application of normal project lending methods which focus on only a single sector. Subsequently, the Bank has made a deliberate effort to deal with these problems on a country basis, although without tangible progress as yet, and this was reflected in subsequent loans for TEK (1023-TU of June 28, 1974 and 1194-TU of June 14, 1976) so the dialogue is continuing.

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**Attachments**

~~NGREEN/IMATHAI/JJFISH:mas~~

Europe, Middle East and North Africa Regional Office

June 28, 1978

TURKEY

Loan 763-TU: TEK Transmission Project

*Interconnected system.  
Same as Annex 2, p. 1 of  
Karakaya App - Also same  
as Att. II, p. 2 except for 1976  
which is provisional.*

Calculation of Rate of Return

	1970	1971	1972	1973	1974	1975	1976	1977-2005
1. TOTAL SALES, GWh	5,606	7,013	8,464	9,344	10,239	12,183	14,640	
2. SALES ATTRIBUTABLE PROJECT, GWh		1,407	2,858	3,738	4,633	6,577	9,034	9,034
<u>COSTS (Millions LT)</u>								
3. Total fuel costs		529	689	1,110	2,233	2,066	1,972	
4. Other operating costs		229	322	375	683	1,128	1,575	
5. Total operating costs		758	1,011	1,485	2,916	3,194	3,547	
6. Average operating cost/kWh sold, LT <sup>/1</sup>		0.1081	0.1194	0.1589	0.2848	0.2622	0.2423	
7. Operating costs attributable project <sup>/2</sup>		152	341	594	1,319	1,724	2,189	2,189
<u>Construction expenditures:</u>								
8. TEK		954	1,043	1,216	2,558	2,932	5,494	
9. DSI (hydropower)		752	931	1,543	1,027	1,612	2,580	
10. TOTAL COSTS ATTRIBUTABLE PROJECT		<u>1,858</u>	<u>2,315</u>	<u>3,353</u>	<u>4,904</u>	<u>6,268</u>	<u>10,263</u>	<u>2,189</u>
<u>BENEFITS (Millions LT)</u>								
11. Total electricity revenues		1,415	2,025	2,435	4,033	4,882	6,637	
12. Average revenue/kWh sold, LT <sup>/3</sup>		0.2018	0.2392	0.2606	0.3939	0.4007	0.4533	
13. REVENUES ATTRIBUTABLE PROJECT <sup>/4</sup>		<u>284</u>	<u>684</u>	<u>974</u>	<u>1,825</u>	<u>2,635</u>	<u>4,095</u>	<u>4,095</u>

RATE OF RETURN - 8%

- /1 Line 5 + Line 1.
- /2 Line 2 x Line 6.
- /3 Line 11 + Line 1.
- /4 Line 2 x Line 12.

June 1978

January 28, 1977

INTERNATIONAL BANK FOR  
RECONSTRUCTION AND DEVELOPMENT  
1818 H. Street N.W.  
Washington D.C. 20433

U.S.A.

Our Ref. : 610/DBK.I-901/  
Subject : Loan No. 568-TU  
FINAL REPORT

Ref : a) Your letter dated 25th 9, 1974  
b) Your letter dated 12th 2, 1975

Our comments relating to the subjects referred in (a) and (b) above, have been submitted herewith.

As it is known, the Final Report dated 2 nd, December 1975- which is herewith attached - prepared on the works in the scope of the credit, which were accomplished by our Consultant Firm Commonwealth Inc (CAI), has been submitted to your Bank. At this Report, the activities carried through this work - from the initial stage to the end - and the critics on the work have been adequately explained by our Consultant. The Report had provided all the necessary information for your Bank, with the exception of the supply of the Gökçekaya-Ankara line, while the situation of this line on the time this Report was written, had been also explained. In any case, we deem it necessary to give explanations on the matters below.

As it is known, Keban-Ankara-Istanbul power transmission line and Ankara-Gökçekaya-Istanbul power transmission line and the substations connected to these lines have been the first 380-KV installations erected in our country. For this reason, some delays and faults have been experienced in the erection of the aforementioned substations and transmission lines. However, the major reasons of these delays are due to the various crises and circumstances faced in the World as well as in Turkey. In spite of this, due to the major delays occurred in the Gökçekaya and Keban power stations the termination dates have been extended for about 1,5-2 years to SAE and the substation investments have been slowed-down in the initial stage, with the aim to avoid unnecessary investments. In addition, due to the rapid increase in the prices in the world and Turkey markets no installation work other than Ankara-Gökçekaya line have caused delays in the utilization of the energy produced by the Keban and Gökçekaya power stations.

- 2 -

Upon the abolishment of the contracts (references H.50 and H.40) drawn with SAE and MITAS Companies, the installation of the Ümraniye and Gölbaşı substations and the Kayseri Capacitor stations as well as the erection of the Keban-Ankara line and the Gökçekaya-Ankara line through our Force Account and our own means, should be considered as a very big accomplishment. Through this, though limited, a team has been created which is qualified in separate project an erection work. By this team which was trained in these works, the 380-KV Seyitömer and Izmir substations, as well as the 380-KV Gökçekaya-Seyitömer-Izmir and Seyitömer-Seydişehir transmission lines have been installed by the initiative of our Organization.

The costs of the mentioned installations have been far beyond the estimated costs, due to the delays and the crisis faced in the world and Turkey markets, as well as the big price increases. The lack of experience of our Organization from the administrative and personnel point-of-view, which is a newly-created entity, is also attributable to these results. Moreover, the Laws, formalities, organization problems, impossibilities in recruiting and retaining technical staff and many other barriers, have effected this.

The major reasons for not being able to realize the afore-said installations in the desired level and time, in parallel to your requests in the above-said letters, could be summarized as follows. We would highly appreciate if you would accept our regrets and show consideration to us for not being able to prepare a report of such a largescale requested by you, due to the resignation of our trained and qualified staff during this period.

a) Due to the rapid charges in the prices, rate of exchange, circumstances in the world and Turkey and the skyrocketing price increase in the materials such as oil, steel etc, the main problem has been the disputes occurred with the contractors due to their delays which resulted with the cancellation of the MITAS and SAE contracts thus putting us in a position of completing the works by our Force Account, for which we were not equipped beforhand.

Great delays have taken place in the completion of the Protection projects of the Brown-Bovery (BBC) company. Delays of upto 2 years have been observed in the projects which were to be completed within 4 months following the date of bidding and due to this reason, the procurement of the protection material has been prolonged. However, through the big efforts of the TEK erection team, the control panel production, erection, cabling, and testing works have been finalized and the substations have been brought to a position ready for operation, before the powerstation was ready for operation. In order to minimize the

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- 3 -

prices and these effects, TEK, despite the shortage of its experience, has shown a great effort to eliminate the troubles and inefficiency of SAE, MITAŞ, BBC and consultant firm CAI, and have finalized the works.

b) The performance of CAI, with the exception of the delays in the services carried on in U.S.A., could be deemed as successful. However, we believe that the consultants have not been able to give us the necessary assistance, due to the fact that, the Company has not sent qualified staff to Turkey during the erection phase, as well as the works in Turkey.

The plans, projects, profiles, charts, technical information and operation manuals which were to be supplied to us, under the contract drawn with CAI have not been submitted and the firm has left the Country. Moreover, they have not shown any interest when they were asked to give the reasons of deteriorations and have requested extra fee to examine the faults. On the other side, organizations like Electricité de France (EDF) and ASEA (Sweden) have made examinations in order to solve the problems and extended their assistance, without any fee. The Chas.T.Main and Stone-Webster companies which have previously carried on consultancy services for TEK, have submitted the complete reports and documents - which we are presently using - , at the end of the works.

Unfortunately the performance of the contractors in this work have been very low and none of them have met their obligations under the contracts. This has been a very serious problem for TEK.

The design of the poles used in the lines have been made according to very light assumptions and the meteorological conditions of the Country could not be estimated. For these reasons, by observing that 12 poles have fell down in the initial stage in Izmit during summer and the poles between Keban-Kayseri have fell down in the operation stage, it has been concluded that, the distribution of the poles have not been carried on in a proper manner. The falling down of the poles - in the erection stage - in the Keban line took place due to our fault in taking some measures.

c) No difficulties have occurred in the disbursements and procurements except the formalities and the credit has enabled us to have responsive bids and facilitated the payment procedure. Moreover, we have not faced any difficulties in transfer and financment.

However, we would like to emphasize that, the requests made for reports on subjects with great coverage and beyond the scope of TEK, which we believe, do not have direct relation with

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- 4 -

the credit highly occupies our staff, who are in limited number and are already loaded with heavy work. This request causes further delays in our other activities. It would be much more easier for us to work, if information of less detailed nature could be requested.

d) The comments on the Bank transactions which cause to problems are herewith attached (Annex-1).

e) Owing to the Keban-Gökçekaya Project and the credits, our technical and administrative staff have been trained, both in Turkey and abroad, and have reached a level capable to construct the 380-KV lines and substations, without the assistance of consultancy. Therefore, from now on, the projects could be accomplished by TEK's technical staff, which is a very great improvement.

However, in order to attract and retain qualified and experienced technical staff our Organization needs to be equipped with the necessary means.

f) Any kind of deviation has not been observed in the main financment plan, except the price increase.

g) The energy capacity of Turkey has shown an increase about 40%, through the Keban-Gökçekaya Projects, which forms the main framework of our Interconnected System. This Project has made a great contribution to the development, industrialization and the flourishment of the social standart, as well as the extension of energy to our rural areas.

h) It is primarily essential that, in order to derive maximum benefit from the Project, the investments for the other transmission, distribution plants - which would used for the sale, transmission and distribution of the energy obtained from the Keban and Gökçekaya system - should be increased and with prior consideration to training facilities, all the measures should be taken in order to retain adequate number of technical staff - for the construction of projects, installations - , thus being able to reach to the level of industrialized nations.

With the exception of a few qualified specialists who would assist us in solving the problems - which are few - arise during the research, planning, project, design and erection works, we do not necessarily need specialists to such a great extent.

By our explanations we do hope that we have replied to your questions asked through your above referred letter and verbally. In case you should find some points in our report unsatisfactory please note that we shall be at your disposal to clarify such points.

We hope you will tolerate us for some missing points in report, if any.

Very Truly Yours  
TURKISH ELECTRICITY AUTHORITY  
GENERAL MANAGEMENT

Encls. - Final Report  
- Annex 1  
- CAI Completion report.

LOAN NO. 568-TU

ANNEX 1

COMMENTS APPLICABLE TO LOAN NO. 568-TU

- 1) Sometimes the Bank effect payment to the suppliers very late which causes suppliers to write letters or send telex messages asking why the payment has not been effected although the shipment has been effected.

To avoid this the Bank can send a notification to the related supplier stating that they have received the payment application and the payment will be effected in the earliest convenience.

- 2)-The Bank should send a statement quarterly or half yearly showing the actual disbursements and the balance of the loan which will be useful to keep track of the loan simultaneously with the Bank so the over usage of the loan will be prevented.

-Our withdrawal applications consist of three pages and on every page the same informations are repeated. To avoid these repeats the information can be given on one page.

*Repeat*

IBRD LOAN NO. 568-TU (25 Million \$.)  
ACTUAL DISBURSEMENTS

1969	1970	1971	1972	1973	1974
7.554.954,02	6.498.164,11	3.697.705,94	3.135.992,60	3.206.756,38	916.426,96
Cumulative as end of 1970	Cumulative as end of 1971	Cumulative as end of 1972	Cumulative as end of 1973	Cumulative as end of 1974	Cumulative as end of 1974
14.043.118,13	17.740.824,07	20.876.816,67	24.083.573,05	25.000.000	

IBRD LOAN NO. 763-TU (24 Million \$)  
ACTUAL DISBURSEMENTS

1971	1972	1973	1974	1975	1976
2.016.288,40	2.962.137,72	6.060.284,65	6.948.046,51	6.373.989,53	993.514,19
Cumulative as end of 1972	Cumulative as end of 1973	Cumulative as end of 1974	Cumulative as end of 1975	Cumulative as end of 1976	Cumulative as end of 1976
4.978.426,12	11.038.710,77	17.986.757,28	24.360.746,81	25.354.261,00	

NOTE: Difference is due to the variations  
in courses.

T E K

TÜRKİYE ELEKTRİK KURUMU

Ankara, Jan.28, 1977

INTERNATIONAL BANK FOR  
RECONSTRUCTION AND DEVELOPMENT

1818 H Street, N.W.,  
Washington, D.C. 20433

U.S.A.

Our ref: 610/DBK.II-901/381

Subject: Loan No. 763-TU

Final Report

Y.Ref: Your letter dated Jan.26, 1977

As you know, the loan No.763-TU for US\$ 24.000.000 is not a project loan but is a credit granted to meet a part of our foreign exchange requirement that is necessary to finance the installation, revision and extension of 1330 MVA substations and 2800 km long 154 and 30 kV power transmission lines which will be connected to the interconnected system.

The substations and lines to be financed under this credit have been shown in our 1972 investment program. However due to our urgent needs that may occur in later years the program for 1972 has been changed and the funds have been transferred to the installations included in our program for 1973 and 1974. The names of substations and lines after the use of this credit have been shown on the attached lists.

The credit No.763-TU was intended to be used for the completion of the equipment necessary for the substations which have already been built and for the installation of new substations which have just been included in the program.

The equipment to be procured under this credit are used :

- 1) In the installation of new substations,
- 2) In the completion of equipment for the substations which have been built,
- 3) To increase the power of some substations which are in operation,

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610/DBK.II-901/381

Jan. 28, 1977

Page 2

- 4) For addition of feeders which **became** necessary as the result of growth in the networks,
- 5) As system spares.

Number of substations, the equipment for which is to be procured through 763-TU is 136,

- Number of substations in which the transformers will be installed : 114
- Number of transformers : 139
- Transformer power : 3405 MVA
- Transformer power expected by this credit : 1330 MVA
- Transformer power procured through credit : 2075 MVA
- Number of transformers procured through the credit : 48
- Number of substations in which transformers were installed : 34

As seen on the above table, in the 1973 investment program it was planned that 139 each 3405 MVA transformers were to be financed through this credit. In the credit agreement, however, credit has been granted for 1330 MVA transformers. On the other hand, due to our urgent need, 48 each 25, 50 and 100 MVA transformers which are not manufactured in Turkey have been financed under this loan. The remaining 91 each 1430 MVA transformers were obtained through the TEK's own means. The names of substations on which the transformers were installed are listed on the attached table.

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Page 3

Jan.28, 1977

A list showing the names of substations where the power transformers, circuit breakers, capacitors that obtained under this loan and the names of transmission lines is also attached.

It must be considered normal that during the 4 years period between the validity date of loan agreement and the completion of foreign expenditures there had to be changes on ~~some~~ projects. For this is a program credit and using it for the urgent needs will be more advantageous for the Turkish economy.

The equipment that is financed through the 763-TU credit, has been ordered on the "stock order" basis. That is, instead of ordering the complete equipment for each substation, all the necessary equipment have been ordered on the whole for the overhead lines and substations which were decided beforehand, as separate items. Besides, this is the policy TEK has carried out for a long time in the obtainment of equipment.

The 80% of overhead lines and substations on which ~~these~~ equipment was used, has been completed by January 1977. It is expected that the remaining part will be completed within 6 months, that is the end of June 1977. This result can be considered as a good proof that the use of this credit has fulfilled the requirements.

In the scope of project, in section A (1) 380 kV equipment has been planned for Adapazari, Kayseri and Ümraniye substations and also for 380 kV Kayseri substation the capacity of serial capacitor banks were to be increased.

As the final study and planning in our 380 kV system during the validity of this credit has not been completed and the production installation to be connected to the 380 kV system was delayed, it was not possible to obtain equipment through this credit for the above mentioned substations. Besides, as you know the new credit No. 1194-TU has been granted for our 380 kV system.

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610/DBK.II-901/381

Jan.28, 1977

Page 4

In the section A (1) of the project for Istanbul, 100 MVAR capacitors were planned. We have ordered a total of 156 MVAR capacitors to be used not only for Istanbul but for all places in our system which require capacitors. The 84 MVAR of these capacitors have been mounted in Istanbul. The remaining 72 MVAR have been mounted in the TIE interconnected system where required.

The general comments on the credit:

There has not been a big problem during the carrying out of the credit. However, the procedures such as before sending them to the firms sending of specifications to the Bank for approval as required by the credit agreement and obtaining the Bank's approval after the award is made, cause a certain amount of delay on the orders. Yet, both Bank and TEK did their best to complete the procedures in promptness.

Another point regarding this credit is that by our last order we exceeded the limitation of the credit. By covering this small amount through our own sources, however, this problem has been solved.

No consulting firm has been engaged for this credit. As it is known, conformity with the specifications and responsiveness have been the basic criterion for selection among the supplier firms and the firm has been chosen within this framework. Generally, the firms have not caused any delays in the delivery of material and no important trouble has been faced during the application term of the credit.

The costs of the above-said installations have been far beyond the estimations, due to the delays and the crisis faced in the World and Turkey markets, as well as the big price increases. The shortage of experience of our Organization from the administrative out personnel point-of-view, which is a newly-created body, is also attributable to these results. Moreover, the laws, formalities, organizational problems, and impossibilities in recruiting and retaining technical personnel and many other barriers have effected this.

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610/DBK.II-901/381

Jan.28, 1977

Page 5

The major reasons for not being able to realize the afore-said installations in the desired level and time, in parallel to your requests in the above-shown letters, could be summarized as follows. We would highly appreciate if you would accept our regrets and show consideration to us for not being able to prepare a report of such a magnitude, due to the resignation of our trained out qualified staff during this period.

a) Due to the rapid change in the prices, rates of exchange, circumstances in the world and Turkey as well as the skyrocketing price increases in the materials such as oil, steel, etc., the costs have shown a great increase.

As it is known, all the projects, specifications, material procurements and erections have been accomplished by TEK. The bureaucratic obstacles and excess of formalities have resulted in delays in the material procurements.

b) There hasn't been any problems in the performance of the contractors and consultants during the utilization of this credit.

c) No difficulties have occurred in the disbursements and procurements except the formalities, bureaucratic barriers. The credit has enabled us to have responsive bids and facilitated the payment procedure. For this reason, there hasn't been any transfer and financenment difficulties.

However, we would like to emphasize that, the requests made for reports on subjects with great coverafe and beyond the scope of TEK, which we believe, do not have direct relation with the credit highly occupies our staff, who are in limited number and are already loaded with heavy work. These requests cause further delays in our other activities. It would be very useful for us, if information of less detailed nature could be requested.

d) Comments on Bank transactions which cause to problems is submitted herewith (Annex 1).

610/DBK.II-901/381

Jan.28, 1977

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e) The 154-kV transmission lines and substations have been by our Organization and our technical staff, without the assistance of the consultants. However in order to retain trained staff in the Organization should be equipped with the facilities which could attract qualified and trained staff in adequate number, who would have access to foreign languages. This is a matter of status.

f) In the main financemnt plan, any kind of problem has not been observed, with the exception of the price increase and changes in the plans. The material which was not provided through the Loan, have been obtained by our own resaurces.

g) A great development, industrialization and a great vitality and various benefits in the social life have been achieved by the transmission lines and substations installed through the 763-TU Loan. Moreover energy has been extended to many rural areas deprived of electrical energy.

h) In order to derive maximum benefit from the lines and substations installed through the Loan 763-TU, it is necessary to construct new lines and substations to be connected to those. For increasing the investments, the financemnt should be obtained beforehand and the facilities should be provided in order to recruit and retain technical staff. The training of the technical staff is also an important factor.

The personnel who would do the research, planning, project design and erection work should also be provided with adequate possibilities.

By our explanations we do hope that we have replied to your questions asked through your above referred letter and verbally. In case you should find some points in our report unsatisfactory please note that we shall be at your disposal to clarify such points.

We hope you will tolerate us for some missing points in report, if any.

Very Truly Yours,  
TURKISH ELECTRICITY AUTHORITY  
GENERAL MANAGEMENT

Encls (-Annex)

- Su station and Trans.  
Lines Schedule
- Material List.

LOAN NO. 763-TU

ANNEX 1

COMMENTS APPLICABLE TO LOAN NO. 763-TU

- 1) Sometimes the Bank effect payment to the suppliers very late which causes suppliers to write letters or send telex messages asking why the payment has not been effected although the shipment has been effected.

To avoid this the Bank can send a notification to the related supplier stating that they have received the payment application and the payment will be effected in the earliest convenience.

- 2) -The Bank should send a statement quarterly or half yearly showing the actual disbursements and the balance of the loan which will be useful to keep track of the loan simultaneously with the bank so the over usage of the loan will be prevented.

-Our withdrawal applications consist of three pages and on every page the same informations are repeated. To avoid these repetitions the information can be given on one page.

LOAN No. 763-TU

POWER TRANSFORMER ORDERS AND CAPACITIES FINANCED  
LOAN NO. 763- TU

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<u>Contract (Order No.)</u>	<u>Quantity</u>	<u>Unit Capacity</u>	<u>Total Capacity</u>
103-ST/192	6	25 MVA	150 MVA
103-ST/192 A	2	25 MVA	50 MVA
103-ST/192 B	21	25 MVA	525 MVA
103-ST/178	9	50 MVA	450 MVA
103-ST/178 A	1	100 MVA	100 MVA
103-ST/178 B	2	50 MVA	100 MVA
103-ST/129	4	100 MVA	400 MVA
103-ST/129 A	3	100 MVA	300 MVA
TOTAL	48		2075 MVA

THE LIST OF SUBSTATION WHERE THE DISPOSITORS ARE INSTALLED

Project No.	Substation	Characteristics
+ 67.D.02.0294	Aliağa	154/6.3 kV, 25 MVA
+ 67.D.02.0520	Antalya	154/66 kV "
+ 68.D.02.3612	Maras	154/31.5 kV "
+ 68.D.02.3732	Telhamut	" "
+ 68.D.02.3301	İzmir II	154/34.5 kV, 100 MVA " 50 MVA
+ 68.D.02.3824	Malatya	154/31.5 kV 25 MVA
+ 69.D.02.0270	Adapazarı (Ext)	154/34.5 kV, 50 MVA
+ 69.D.02.0470	Ercurum	" 25 MVA
+ 69.D.02.0622	Bursa Sanayi (Ext)	" 50 MVA
- 70.D.02.0090	Aksaray	" 2x100 MVA
- 70.D.02.0100	Altintepe	" 2x100 MVA
+ 70.D.02.0420	Mardin (Ext)	154/31.5 kV 25 MVA
+ 68.D.02.3642	Çinkir	154/15.8 kV 2x25 MVA 154/31.5 kV 25 MVA
+ 70.D.02.0160	Genlik II	154/34.5 kV " 154/6.3 kV "
+ 70.D.02.0240	Kamak	154/34.5 kV 100 MVA
+ 70.D.02.0250	İzmir III	" 50 MVA
+ 71.D.02.0310	Ferrokrom	" 2x50 MVA
+ 72.D.02.0180	İzmit II	154/34.5 kV 50 MVA
- 72.D.02.0180	Akköprü (Ext)	" 2x100 MVA
+ 72.D.02.0560	Erabzon (Ext)	154/31.5 kV 50 MVA
+ 72.D.02.0610	Yarımece (Ext)	" 2x50 MVA
+ 72.080.76	İzmir Sanit.	31.5/10.5 kV 2x25 MVA
+ 72.750.76	Dugalar (Ext)	154/66 kV 25 MVA 154/34.5 kV "
+ 73.D.02.200	Çorlu (Ext)	" "
+ 71.D.02.0370	Balıkesir (Ext)	" "

- 2 -

<u>Project No.</u>	<u>Substation</u>	<u>Characteristics</u>
+ 73.490.76	Çerkezköy	251/34.5 IV 2x25 MVA
+ 72.290.76	Çirçip	" "
+ 73.D.02.0270	Edirne(Ext)	" 25 MVA
+ 71.D.02.0190	Manisa(Ext)	" "
+ 72.310.75	Seyitömer(Ext)	" "
+ 74.540.77	Orhangazi	" "
+ 74.590.76	Tunçbilek(Ext)	" "
+ 74.280.76	Denizli(Ext)	" "
+ 68.D.02.3790	Tuzla(Ext)	" 50 MVA

+ completed

- continued

170 kV CIRCUIT BREAKER ORDERS  
AND  
CAPACITIES FINANCED LOAN NO. 763-TU

ORDER NO.	Q'ty	ORDER NO.	Q'ty
<u>103-ŞT/101</u>	<u>(17 each)</u>	<u>103-ŞT/187</u>	<u>(70 each)</u>
			<u>170 kV</u>
+ Seyitömer	2	- Biga (Tv)	4
+ Yıldıztepe (Tv)	6	+ İzmit (Tv)	5
+ Davutpaşa (Tv)	5	- Sarıyar (Tv)	2
+ Ümraniye (Tv)	10	- Gelendost (Tv)	-
+ Ambarlı (Tv)	3	+ Çaycuma (Tv)	-
+ Akköprü (Tv)	4	+ Sarımsaklı	-
+ İzmir II	9	- Diliskelesi	4
+ Mamak	6	+ Gaziantep (Tv)	1
+ Kartal	6	- Urfa (Tv)	1
- Adapazarı (Tv)	7	- Orhangazi	4
+ Gölbaşı	2	- Sürüş	4
+ Yarıca (Tv)	1	- Alaçatı	1
+ Tunçbilek (Tv)	2	- Akçukale	1
		+ Çirçip	6
		+ Hopa	1
		- Sinop	2
		- Konya (Tv)	-
		+ Sarayköy (Tv)	1

- 2 -

ORDER NO.	Q'ty	ORDER NO.	Q'ty
103-ŞT/187 A	(115 each)	103-ŞT/187 A	(115 each)
+ Çinkur	4	+ Diyarbakır (Tv)	2
+ İzmir III	1	+ Gaziantep (Tv)	1
- Akşehir	1	+ Edirne	1
+ Kars	3	+ Bursa Sanayi(Tv)	1
+ Babaeski (Tv)	3	+ Çerkezköy	1
+ Hadımköy (Tv)	2	+ Tunceli	3
+ Malatya	2	+ Paşalar (Tv)	1
+ Alağa	9	+ Pülümür	3
- Bingöl	3	+ Sivri (Tv)	3
+ Karamürsel	3	- Çakıkköy	1
- Sirt	3	- Hınıs	4
- Afyon (Tv)	1	- Ardahan	3
+ Trabzon (Tv)	1	+ Tunçbilek (Tv)	6
+ Erzurum (Tv)	1	+ Kayseri (Tv)	1
+ Çankale (Tv)	1	- Doğubeyazıt	2
+ Kırka	1	- Kayseri II	6
+ Muğla (Tv)	1	- Bağışlı	1
+ Ferrokrom	6	- Engil	4
- Erdemir	2	- Çıldır	2
+ Elbistan	1		
+ Aşkale	3+1		
- Avanos (Tv)	1		
- Demirdağ	4		
+ Denizli (Tv)	4		
+ Adıyaman	3		
- Tosya (Tv)	2		
+ Mar'ın (Tv)	1		

Note.

+ completed

Tv= Extension

- continued

LOAN No. 763-TU

THE LIST OF SUBSTATIONS WHERE SHUNT CAPACITOR BANKS  
TO BE INSTALLED (PROJECT NO. F9. D. 02. 0740)

---

Yıldıztepe	35 kV	$2(2 \times 10.5) = 42$ MVAR
Davutpaşa	"	" "
Bursa Sanayi	"	$2 \times 10.5 = 21$ MVAR
Bursa	35 kV	$2 \times 6 = 12$ MVAR
Edirne	"	5
Çerkezköy	"	6
Çanakkale	"	6
İzmit II	"	6
Babaeski	69 kV	5.8
Samsun II	6.3 kV	5
Genlik	6.3 kV	5

---

156 MVAR

IBRD LOAN NO. 568-TU (25 Million \$.)  
ACTUAL DISBURSEMENTS

1969	1970	1971	1972	1973	1974
7.554.954,02	6.498.164,11	3.697.705,94	3.135.992,60	3.206.756,38	916.426,96
	Cumulative as end of 1970	Cumulative as end of 1971	Cumulative as end of 1972	Cumulative as end of 1973	Cumulative as end of 1974
	14.043.118,13	17.740.824,07	20.876.816,67	24.083.573,05	25.000.000

IBRD LOAN NO. 763-TU (24 Million \$)  
ACTUAL DISBURSEMENTS

1971	1972	1973	1974	1975	1976
2.016.288,40	2.962.137,72	6.060.284,65	6.948.046,51	6.373.989,53	993.514,19
	Cumulative as end of 1972	Cumulative as end of 1973	Cumulative as end of 1974	Cumulative as end of 1975	Cumulative as end of 1976
	4.978.426,12	11.038.710,77	17.986.757,28	24.360.746,81	25.354.261,00

NOTE: Difference is due to the variations  
in currencies.

TURKEYLoan 763-TU: TEK Transmission ProjectCalculation of Rate of Return

	<u>1970</u>	<u>1971</u>	<u>1972</u>	<u>1973</u>	<u>1974</u>	<u>1975</u>	<u>1976</u>	<u>1977-2005</u>
1. TOTAL SALES, GWh	5,606	7,013	8,464	9,344	10,239	12,183	14,640	
2. SALES ATTRIBUTABLE PROJECT, GWh		1,407	2,858	3,738	4,633	6,577	9,034	9,034
<u>COSTS (Millions LT)</u>								
3. Total fuel costs		529	689	1,110	2,233	2,066	1,972	
4. Other operating costs	—	229	322	375	683	1,128	1,575	—
5. Total operating costs		758	1,011	1,485	2,916	3,194	3,547	
6. Average operating cost/kWh sold, LT <sup>/1</sup>		0.1081	0.1194	0.1589	0.2848	0.2622	0.2423	
7. Operating costs attributable project <sup>/2</sup>		152	341	594	1,319	1,724	2,189	2,189
<u>Construction expenditures:</u>								
8. TEK		954	1,043	1,216	2,558	2,932	5,494	
9. DSI (hydropower)		752	931	1,543	1,027	1,612	2,580	
10. TOTAL COSTS ATTRIBUTABLE PROJECT	—	<u>1,858</u>	<u>2,315</u>	<u>3,353</u>	<u>4,904</u>	<u>6,268</u>	<u>10,263</u>	<u>2,189</u>
<u>BENEFITS (Millions LT)</u>								
11. Total electricity revenues		1,415	2,025	2,435	4,033	4,882	6,637	
12. Average revenue/kWh sold, LT <sup>/3</sup>		0.2018	0.2392	0.2606	0.3939	0.4007	0.4533	
13. REVENUES ATTRIBUTABLE PROJECT <sup>/4</sup>	—	<u>284</u>	<u>684</u>	<u>974</u>	<u>1,825</u>	<u>2,635</u>	<u>4,095</u>	<u>4,095</u>

RATE OF RETURN - 8%

- <sup>/1</sup> Line 5 + Line 1.  
<sup>/2</sup> Line 2 x Line 6.  
<sup>/3</sup> Line 11 ÷ Line 1.  
<sup>/4</sup> Line 2 x Line 12.

PROJECT PERFORMANCE AUDIT BASIC DATA SHEET

TURKEY: KEBAN TRANSMISSION PROJECT  
(LOAN 568-TU)

KEY PROJECT DATA

<u>Item</u>	<u>Original Plan</u>	<u>Actual or Current Estimate</u>
Total Project Cost (US\$ million)	35.9	73.0
Overrun (%)		+103%
Loan Amount (US\$ million)		25.0
Disbursed	-	25.0
Cancelled	-	Nil
Repaid to May 1977	-	3.2
Outstanding to May 1977	-	21.8
Date Physical Components Completed	June 1972	October 1976
Proportion Completed by Appraisal Target Date (%)	100	100
Proportion of Time Overrun (%)	-	+500%
(Incremental) Internal Rate of Return (%)		N/A
Financial Performance	8% ROR in 1970-72	Achieved in 1971 but not thereafter.

Cumulative Estimated and Actual Disbursements  
(US\$ million)

	<u>1969</u>	<u>1970</u>	<u>1971</u>	<u>1972</u>	<u>1973</u>	<u>1974</u>	<u>1975</u>
(i) Appraisal Estimate							
(ii) Actual							
(i) as % of (ii)							

OTHER PROJECT DATA

<u>Item</u>	<u>Original Plan</u>	<u>Revisions</u>	<u>Actual or Est. Actual</u>
First Mention in Files or Timetable	-	-	11.29.61
Government's Application	-	-	Not identified
Negotiations			10.9.68
Board Approval			10.29.68
Loan Agreement			10.31.68
Effectiveness	1.6.69		1.6.69
Closing Date	9.30.72	Four times	9.20.74
Borrower		Republic of Turkey	
Executing Agency		TEK as successor to ETIBANK	
Fiscal Year of Borrower		Calendar year	
Follow-on Project Name		TEK Transmission I	
Loan Number		763-TU	
Amount		US\$24.0 million	
Loan Agreement		June 22, 1971	

MISSION DATA

	<u>Month, Year</u>	<u>No. of Weeks</u>	<u>No. of Persons</u>	<u>Manweeks</u>	<u>Date of Report</u>
Identification					N/A
Preparation					N/A
Preappraisal					
Appraisal	Jan. 1968	<u>4</u>	<u>2</u>	<u>8</u>	10.14.68
Total		<u>4</u>	<u>2</u>	<u>8</u>	
Supervision I	Aug. 1969	2	1	2	9.9.69
Supervision II	Oct. 1969	2	1	2	10.21.69
Supervision III	Oct. 1970	4	3	12	12.29.70
Supervision IV	Sept 1971	1	2	2	10.22.71
Supervision V	Feb. 1972	1	1	1	2.16.72
Supervision VI	Oct. 1972	1	1	1	10.31.72
Supervision VII	Sept 1973	0	1	0	None
Supervision VIII	Nov. 1974	0	2	0	None
Supervision IX	Mar. 1976	1	3	3	4.7.76
Supervision X	Oct. 1976	1	2	2	11.24.76
Completion	Jan. 1977	<u>1</u>	<u>1</u>	<u>1</u>	N/A
Total		<u>14</u>	<u>18</u>	<u>26</u>	

COUNTRY EXCHANGE RATES

<u>Name of Currency (Abbreviation)</u>	<u>Lira (LT)</u>
Appraisal Year Average - 1968	US\$1 = LT 9.08
Intervening Years Average - 1969	US\$1 = LT 9.04
- 1970	US\$1 = LT 11.25
- 1971	US\$1 = LT 14.86
- 1972	US\$1 = LT 14.15
- 1973	US\$1 = LT 14.15
- 1974	US\$1 = LT 13.93
- 1975	US\$1 = LT 14.44
Completion Year Average - 1976	US\$1 = LT 16.05

PROJECT PERFORMANCE AUDIT BASIC DATA SHEET

TURKEY: TEK POWER TRANSMISSION I PROJECT  
(LOAN 763-TU)

KEY PROJECT DATA

	Original Plan	Actual or Current Estimate
Total Project Cost (US\$ million)	65.1 <sup>1/</sup>	Probably double original
Overrun (%)		Probably 100%
Loan Amount (US\$ million)		24.0
Disbursed	-	24.0
Cancelled	-	Nil
Repaid to May 1977	-	1.1
Outstanding to May 1977	-	22.9
Date Physical Components Completed	9/74	9/76
Proportion Completed by Appraisal Target Date (%)	100	100
Proportion of Time Overrun (%)		61
(Incremental) Internal Rate of Return (%)	13.4%	2/
Financial Performance	8% ROR in 1971	Achieved in 1972 but not thereafter
Institutional Performance		

Cumulative Estimated and Actual Disbursements  
(US\$ million)

	1969	1970	1971	1972	1973	1974	1975
(i) Appraisal Estimate							
(ii) Actual							
(i) as % of (ii)							

OTHER PROJECT DATA

	Original Plan	Revisions	Actual or Est. Actual
Appraisal			Sept/Oct 1970
Negotiations			5.5.71
Board Approval			6.15.71
Loan Agreement			6.22.71
Effectiveness	9.15.71	9.15.71	10.4.71
Closing Date	3.31.75	12.31.75	6.30.76
Borrower		Turkiye Elektrik Kurumu (TEK)	
Executing Agency		Turkiye Elektrik Kurumu (TEK)	
Fiscal Year of Borrower		-	-
Follow-on Project Name	Calendar Year	TEK II	
Loan Number		1194-TU	
Amount		US\$56.0 million	
Loan Agreement			

MISSION DATA

	Month, Year	No. of Weeks	No. of Persons	Manweeks	Date of Report
Identification					N/A
Preparation					N/A
Preappraisal					N/A
Appraisal		4		8	5.28.71
Total		4		8	
Supervision I	Aug. 1971	2	2	4	10.22.71
Supervision II	Feb. 1972	2	1	2	4.11.72
Supervision III	Sept 1973	2	1	2	
Supervision IV	Nov. 1974	0	2	0	-
Supervision V	Mar. 1976	1	3	3	4.7.76
Supervision VI	Oct. 1976	1	2	2	11.24.76
Completion	Jan. 1977	1	1	1	N/A
Total		9	12	14	

COUNTRY EXCHANGE RATES

Name of Currency (Abbreviation)	Lira (LT)
Appraisal Year Average - 1970	US\$1 = LT 15
Intervening Years Average - 1971	US\$1 = LT 14.86
- 1972	US\$1 = LT 14.15
- 1973	US\$1 = LT 14.15
- 1974	US\$1 = LT 13.93
- 1975	US\$1 = LT 14.44
Completion Year Average - 1976	US\$1 = LT 16.05

1/ To this figure could be added \$2 million in respect of interest during construction and \$3.9 million of foreign cost which was financed from other foreign credits in respect of imports of steel from Japan and medium voltage transformers from Romania.

2/ By the nature of the project an internal financial rate of return cannot be calculated but a rate of return based on the time slice 1971-1974 was attempted leading to the figure shown. Due to the substantial differences both in time of completion and assumed specific investment and operating costs and revenue levels a meaningful comparative figure is not possible to calculate and has not been attempted.

FILE

# OFFICE MEMORANDUM

TO: Mr. Robin Bates, OED

DATE: December 7, 1979

FROM: Nigel Green, EMPPE *NG*

SUBJECT: TURKEY - Completion Report for Loans 568-TU and 763-TU

Herewith are two sections of draft which you may consider for insertion in the text as appropriate.

In view of the spread of the goods financed under the loan over a transmission system development that covered seven years instead of the original five envisaged, and the fact that the project was not financed entirely by the Bank loan, makes it impossible to compare on a valid basis the estimated project cost with the actual as that cannot be identified.

It is difficult to know whether Turkey's economic plight which has been building up over many years, or whether the shortage of generating plant due to construction delays of new plants and leading to regular load shedding, has been the cause of the slowdown in its power system load growth. The probability is that both factors have contributed to some degree.

cc: Messrs. Carmignani, Mathai, Mastilovic, Rajagopalan  
EMENA, Div. & Chron Files

NGREEN:ml

FILE

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EMENA, Div. & Chron Files

NGREEN:ml

## OFFICE MEMORANDUM

1. Project File

2. cc: Mr. Perera

TO: Mr. James J Fish

DATE: February 7, 1977

FROM: N. Green *N. Green*SUBJECT: TURKEY - Loans 568 and 763-TU  
Keban Transmission Lines and TEK Transmission I Projects  
Completion Report Data Collection  
Back-to-Office Report

In accordance with terms of reference dated January 5, 1977 I attempted to collect data from the beneficiary, the Turkish Electricity Authority (TEK) relating to and including a Completion Report on these two projects. On my arrival in Turkey, January 11, I devoted the first day to assess the progress that had been made to provide the requisite reports and data. No work at all had been done that could be shown to me. I therefore urged the responsible officials to utilize the two-week period during which I should be engaged on other activities in Turkey, for the completion of the needed material. By January 24 still nothing had been done. At a meeting on January 25 I went through in detail a work scheme based on the respective annexes of the Appraisal Reports requesting comparison/actual data to be supplied by Friday, January 28. On Friday 28 some effort had been made but a great deal still remains to be supplied. I explained my predicament and pointed out that my work program in the next few months was very fully committed and that it was essential to the timely completion of reports that the material be supplied without delay and preferably forwarded to the Bank as and when each unit was completed so that processing could proceed.

The fact of the matter is that TEK is very shortstaffed and a large number of those involved in these projects have left TEK's employ taking with them background knowledge and making the work of research which is now required, a good deal more laborious. I hold out little hope that a useful Completion Report can be written.

In view of TEK's delays in providing data and other work commitments, Lebanon and CEAS V principally, I shall not be able to meet the scheduled date (March 31, 1977) for completion of the Bank's C.Rs on these two loans. Tentatively, April or May seem more realistic. With some assistance on the preparation of comparative data and annex type material, the Completion Reports may be completed sooner than later.

Distribution:

Messrs. Knox	van der Tak (2)	EMENA Files
Pollan	Rovani (5)	Division Files
Bart	Maffei	Chron File
Finzi	Perera	B.T.O. Report File
Davar (3)	Elliott	
Rajagopalan	Jeurling	
de Merode	Green	
Ken Jones	Mathai	
Fish	Ms. Evans	
Russell		

1673  
02/09

## OFFICE MEMORANDUM

*File Missions  
for Project Completion/  
Supervision*

DATE: February 7, 1977

TO: Mr. James J Fish

FROM: N. Green *Ng*

SUBJECT: TURKEY - Loans 568 and 763-TU  
Keban Transmission Lines and TEK Transmission I Projects  
Completion Report Data Collection  
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Rajagopalan	Jeurling	
de Merode	Green	
Ken Jones	Mathai	
Fish	Ms. Evans	
Russell		

# OFFICE MEMORANDUM

TO: Mr. N. Green

DATE: January 5, 1977

FROM: James J Fish 

SUBJECT: TURKEY - Loan 1023-TU, Elbistan Thermal Power - Supervision  
 - Loan 568-TU, Keban Transmission Line - Completion  
 - Loan 763-TU, TEK Transmission I - Completion  
 - CEAS V, Preappraisal

TERMS OF REFERENCE

1. You should go to Ankara to arrive on January 10, 1977 to spur TEK to finalize completion reports for Loans 568 and 763-TU, which reports you should examine at the latter end of your mission and collect necessary additional information for the preparation of a Bank completion report on your return to Washington.
2. In the period January 12 thru 15 you should accompany Messrs. Pollan, Davar and myself in discussions with the relevant Turkish authorities regarding their response to the letter of December 7, 1976, signed by the co-lenders, EIB, KfW and World Bank, dealing with the problems of the Elbistan Project, Loan 1023-TU. Representatives of the co-lenders will also be present.
3. Provided the Turkish Government indicates its wish to seek Bank finance through a loan to the Cukurova Elektrik A.S. (CEAS), you should join me in a visit to Adana in the period January 16 thru 23 to conduct a preappraisal of a hydropower project presented by CEAS, known as the Gezende and Mut hydro schemes and to be referred to as the CEAS V Project.
4. On your return to the Bank on or about January 30, 1977 you should
  - a) assist in the preparation of a report on the supervision of Loan 1023-TU,
  - b) prepare a full report on the preappraisal of the CEAS V Project and
  - c) prepare a combined Completion Report for the Loans 568 and 763-TU projects.

cc & cleared with Messrs. Rajagopalan and Pereira  
 cc: Messrs. Dubey, Pollan, Bart, de Merode, Davar, Marto,  
 Ken Jones, van der Tak (3), Rovani (5), Maffei, Elliott,  
 Mathai, Mastilovic, Hamlet, Ms. Evans  
 EMENA Files (4)  
 Terms of Reference File (original)  
 Division Files (4)  
 Chron File

NGREEN:mas

*Mr. Willoughby*  
→ *Bennis*  
→ *File Dept*

Mr. James J Fish  
N. Green and W. Hamlet

April 8, 1976.

*New file*

TURKEY - Loan 568-TU - Keban Transmission  
Loan 763-TU - TEK Power Transmission I  
Back-to-Office Report

In accordance with terms of reference dated February 20, 1976 we visited Ankara to collect data and make arrangements for the preparation of completion reports in respect of these two projects. The situation is briefly as follows:

1. Loan 568-TU Keban Transmission Project

- a) Physical completion of the last remaining section of the 380-kV line between Gökceyaka and Ankara will be by the end of July 1976 at the latest. At the time of the mission, one foundation was still missing, 17 towers were still to be erected and 18% of the stringing had been completed. Six construction teams were then ready to start work and all materials were available.
- b) TEK's personnel of all associated disciplines were present at a meeting at which the purpose of a completion report was explained and all were urged to start right away to compile the needed information: the nature of the information was explained and agreement was reached to do so. TEK's completion report was promised to be available to the Bank within 3 months of the final completion of the works and it should therefore be to hand by October 31, 1976.

2. Loan 763-TU, TEK Transmission I Project

- a) The last deliveries of materials ordered against this project are expected to be received by TEK during the first half of 1976 and their installation is expected to be completed by the end of 1976. There is no useful purpose served to try and identify the specific reasons for the long delay of completion. The general reason has been mentioned repeatedly i.e. lack of staff and incentives to perform.
- b) The TEK staff were requested to pay particular attention in the completion report to the analysis of the useful lessons learned during its execution. The success of the lending operation will very much depend on what eventually finds its way into the report supposing anyone is honest enough to tackle this aspect in a forthright manner. TEK's report would be ready by March of 1977.

1....

*36 45*  
*APR 12 1976*

3. Depending on the completeness of TEK's completion reports for these two projects so a decision will be necessary as to whether a mission should be mounted to amplify their content for the purpose of the Bank's report. Supposing that it were necessary to undertake such a visit to TEK, then it would seem that the Bank's reports could be prepared for 568-TU by December 31, 1976 and for 763-TU by May 31, 1977.

cc: Messrs. Willoughby, Pollan, Davar, Mathai, Hamlet

ENENA Files  
Division Files  
Chron. Files.

NGreen:ch



3. Depending on the completeness of TEK's completion reports for these two projects so a decision will be necessary as to whether a mission should be mounted to amplify their content for the purpose of the Bank's report. Supposing that it were necessary to undertake such a visit to TEK, then it would seem that the Bank's reports could be prepared for 568-TU by December 31, 1976 and for 763-TU by May 31, 1977.

cc: Messrs. Willoughby, Pollan, Davar, Mathai, Hamlet

ENENA Files  
Division Files  
Chron. Files.

NGreen:ch

DRAFT CABLE  
TWBerrie:ms  
March 16, 1976

*File*  
*Turkey Power*

TO: MR. TUREUT YEGENAGA  
CUKUROVA ELEKTRIK A.S.  
P.K. 239  
EYAN BARAGI  
ADANA  
TURKEY

WITH RESPECT TO MY LETTER OF FEBRUARY 23 I WOULD MUCH APPRECIATE  
CONFIRMATION <sup>by cable</sup> THAT THE <sup>mission</sup> DATES OF APRIL SIX TO ABOUT APRIL TEN ARE CONVENIENT  
TO YOU STOP AS I MENTIONED IN MY LETTER THE VISIT TO TURKEY IS ONLY PART  
OF A LARGER MISSION <sup>which has</sup> COMMA ~~LARGELY~~ ALREADY ARRANGED

*to several countries*

BERRIE

*Operations Evaluation Dept*  
*Wald Bank*

## OFFICE MEMORANDUM

*Fate*  
*Turkey Power*

TO: Mr. Gavin E. Wyatt

FROM: James J Fish *JF*

SUBJECT: TURKEY - Loan 568-TU - Keban Transmission Line  
Completion Report

DATE: November 12, 1975

You enquired why it was necessary to defer this report yet another two months e.g. was our September estimate a bad one?

In August (when the September report was prepared) we had expected to do a completion supervision of this Project in connection with the Karakaya appraisal then scheduled for November, and on the assumption that TEK would respond to our February 12 and August 22 letters by sending their completion report on the Project by October (we do not yet have, for instance, an updated cost estimate for the project). By letter of September 2 TEK replied that they would furnish the report within three months from "physical completion". The problem is that the Gokcekaya - Ankara portion of the Project, financed essentially by USAID but with some hardware and equipment from Bank funds, has been deferred for other work and now is not likely to be finished before June, 1976. Thus, although the Project is substantially complete and is no longer being actively supervised, it appears that the only way we will be able to obtain the raw material for a completion report is through mission effort. I now expect appraisal of Karakaya about February (we would need to supervise Elbistan around that time in any event) and would hope to obtain enough information for a completion report at that time, which implies another two months slippage.

I think this Project provides a good object lesson in the difficulties of scheduling completion reports -- there are three problems here, common to many of our Projects:

- a) completion of disbursements is a poor guideline as to the status of physical completion -- we should be allowed to schedule these reports at a time when there is substantive completion and a realistic opportunity to judge whether or not the Project has a chance of achieving its principal objectives;
- b) the completion report format requires substantial input from our borrowers (e.g. final cost, performance of consultants) and they are often reluctant to devote scarce manpower at this seemingly secondary (and sometimes painful) task -- in the absence of any legal obligation or other leverage we can only continue to urge our borrowers to comply with our request for information, as in this case; and

To: Mr. Gavin E. Wyatt

- 2 -

November 12, 1975

- c) completion missions have been scheduled in connection with other missions in this fiscal year since we did not budget any time or travel expenses in addition to our standard supervision allowance -- in view of the significance being attached to this issue and the apparent difficulties in doing completion reports as a desk exercise, we shall have to request additional resources in next year's budget for this specific purpose if we are required to adhere to the initially-established schedule.

cc: Messrs. Willoughby, Pollan, Davar, Green, Mathai, Mastilovic, Mrs. Sukkar  
EMENA, Div. & Chron. Files

JJFish:pww