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PROJECT PERFORMANCE AUDIT REPORT

**YUGOSLAVIA: FIRST POWER TRANSMISSION PROJECT
(LOAN 836-YU)**

June 6, 1984

Operations Evaluation Department

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PROJECT PERFORMANCE AUDIT REPORTYUGOSLAVIA: FIRST POWER TRANSMISSION PROJECT
(LOAN 836-YU)TABLE OF CONTENTS

	<u>Page No.</u>
Preface	i
Basic Data Sheet	iii
Highlights	v
 <u>PROJECT PERFORMANCE AUDIT MEMORANDUM</u>	
I. PROJECT SUMMARY	1
II. SUPPLEMENTARY COMMENTS	3
Introduction	3
Planning	9
Consulting Services	10
III. CONCLUSIONS	10
<u>Appendix A: Comments from the Borrower</u>	12
 <u>PROJECT COMPLETION REPORT</u>	
I. Introduction	13
II. Project Preparation and Appraisal	14
III. Project Implementation and Cost	17
IV. Financial Performance	22
V. Institutional Performance and Development	27
VI. Justification of Project	30
VII. Bank Performance	32
VIII. Conclusions and Lessons to be Learned	33
 <u>ANNEXES</u>	
1. Allocation of Proceeds of Loan - Original and Final	35
2. Main Covenants of Loan Documents	37
3. Construction Schedule - Planned and Actual	40

TABLE OF CONTENTS (Continued)

	<u>Page No.</u>
4. Consultants Studies	42
5. Disbursements - Actual vs. Estimated	45
6. Detailed Cost Estimates - Actual vs. Estimated	47
7. Summary of GWh Generated Maximum Demand and Load Growth - Estimated and Actual	48
8. Sources and Applications of Construction Funds: FY72-FY78	49
9. Other Financial Statistics - 1970/1978	53

Map

PROJECT PERFORMANCE AUDIT REPORT

YUGOSLAVIA: FIRST POWER TRANSMISSION PROJECT
(LOAN 836-YU)

PREFACE

This report presents the results of a performance audit of the First Power Transmission Project in Yugoslavia for which the Bank provided a US\$75.0 million loan (836-YU) in 1972. The loan was fully disbursed on February 7, 1980. The 380 kV grid, which has greatly increased the national transmission capability, constituted the main component of the first and the second power transmission projects. The objective of the program has been to improve the reliability and the efficacy of the interconnected system.

The report 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 Region's Power and Energy Development Division.

The PCR has referred to sector coordination and consulting service as being problem areas. In addition, the audit has commented on the pricing and planning problems, which have influenced the efficacy of the interconnected system.

The first completion report was prepared by JUGEL^{1/} and other borrowers in June 1980. For the purpose of examining the report and finalizing the PCR the Power and Energy Development Division of the Bank sent a mission to Yugoslavia. In addition, an OED mission visited the country before drafting the audit memorandum. Further, in conducting the audit, Bank reports, records, and files^{2/} were consulted and Bank staff associated with the project interviewed.

JUGEL, and the regional agencies have assisted the two missions in the preparation of the report. Their courtesy and help is gratefully acknowledged.

Following normal OED procedures, a copy of the draft report was sent to the country for comments. Comments received from JUGEL have been reproduced as Appendix A to the report.

1/ Union of Yugoslav Electric Power Industry.

2/ Including the Appraisal Report (No. PU-87a) dated May 22, 1972; the President's Report (No. P-1081) of June 1, 1972; the Loan and Guarantee Agreements dated June 23, 1972; Accession and Amending Agreements, dated July 10, 1974, the Loan Assumption Agreement dated July 11, 1977; correspondence with the borrower; internal Bank memoranda on project issues contained in the Bank files; and the minutes of the Board Meeting at which the project were approved.

PROJECT PERFORMANCE AUDIT BASIC DATA SHEET

YUGOSLAVIA: FIRST POWER TRANSMISSION PROJECT
(LOAN 836-YU)

KEY PROJECT DATA

<u>Item</u>	<u>Appraisal Estimate</u>	<u>Actual</u>
Total Project Cost (US\$ million)	225	462
Cost Overrun (%)	-	105
Loan Amount (US\$ million)	75	75
Disbursed	75	75
Cancelled	-	-
Repaid to	-	-
Date for Completion of Physical Components	12/76	12/78
Proportion Completed by Appraisal		
Target Date (%)	100	60
Proportion of Time Overrun (%)	-	30
Economic Rate of Return (%)		
Financial Performance		
Institutional Performance		

Cumulative Estimated and Actual Disbursements
(US\$ millions)

<u>FY</u>	<u>1973</u>	<u>1974</u>	<u>1975</u>	<u>1976</u>	<u>1977</u>	<u>1978</u>	<u>1979</u>	<u>1980</u>
(i) Appraisal Estimate	10	32	58	71	75	-	-	-
(ii) Actual	-	6.6	35.5	55.4	64.2	70.1	74	75
(ii) As % of (i)	-	18.8	61.2	78	88.5	93.5	98.9	100

OTHER PROJECT DATA

<u>Item</u>	<u>Original</u>	<u>Revisions</u>	<u>Actual or Est. Actual</u>
First Mention in Files or Timetable	10/70		10/70
Government Application	03/71		03/71
Negotiations	04/72		04/72
Board Approval	06/13/72		06/13/72
Loan Agreement Date	06/23/72		06/23/72
Effectiveness Date	11/30/72		12/29/72
Closing Date	06/30/77		06/30/79
Borrower/Beneficiaries/ Executing Agencies	Elektroprenos Hidroelektrane Elektrocrnagora Elektroprivreda Elektroprenos Elektroprivreda Elektroslavonija Elektrostopantsvo Savske Elektranre Dravske Elektranre Soske Elektranre Elektroistok	- Sarajevo - Trebinje - Titograd- - Rijeka - - Split - Zagreb - - Osijek - Skopje - - Ljubljana - Maribor - Nova Govica - Beograd	succeeded by Elektroprenos succeeded by Elektroprenos (12th Borrower) succeeded by Elektroprenos
Guarantor	Socialist Federal Republic of Yugoslavia		
Fiscal Year of Borrowers	January 1 - December 31		
Follow-up Project Name	Second Power Transmission Project		
Loan Number	1469-YU		
Amount US\$ Million	80		
Loan Agreement Date	July 11, 1977		

MISSION DATA

	<u>Month/Year</u>	<u>No. of Weeks</u>	<u>No. of Persons</u>	<u>Manweeks</u>	<u>Date of Report</u>	
Appraisal	May/June 71	3	4	12	05/22/72	
Supervision I	October 72	1	1	1	10/26/72	
Supervision II	October 72	1	1	1	11/13/72	
Supervision III	March 73	1	1	1	03/30/73	
Supervision IV	March 73	1	1	1	04/03/73	
Supervision V	June 73	2	1	2	01/15/74	"Partial Reappraisal"
Supervision VI	October 73	1	1	1	12/10/73	
Supervision VII	May/June 74	2	2	4	06/28/74	
Supervision VIII	July 74	3	2	6	08/20/74	
Supervision IX	October 74	2	1	2	01/31/75	
Supervision X	January 75	2	1	2	05/23/75	
Supervision XI	November 75	2	2	4	02/12/76	
Supervision XII	May 76	1	1	1	06/30/76	
Supervision XIII	October 76	5	5	25	01/31/77	
Supervision XIV	June 77	2	2	4	09/26/77	
Supervision XV	October 77	1	2	2	11/16/77	
Supervision XVI	October 78	2	2	4	10/27/78	
Supervision XVII	April 79	3	3	9	09/14/79	
Total		<u>35</u>	<u>33</u>	<u>82</u>		

CURRENCY EXCHANGE RATE

Name of Currency

Dinar

Year:

Appraisal Year Average

US\$1 = 17 dinars

Intervening Years Average

US\$1 = 18 dinars

Completion Year Average

US\$1 = 19 dinars

PROJECT PERFORMANCE AUDIT REPORT

YUGOSLAVIA: FIRST POWER TRANSMISSION PROJECT
(LOAN 836-YU)

HIGHLIGHTS

In 1973 the primary transmission system in Yugoslavia consisted of 220 kV lines, which connected generation and load centers within valley regions. The grid had a pre-dominantly North-South orientation. East-West power transfers were constrained by the inadequacy of transmission capacity. These weaknesses limited interregional transfer of power, and possible supplies of additional electricity through improved and coordinated use of generation capacity. The First Power Transmission Project, designed to allay these weaknesses, consisted of 3,000 km of single-circuit and about 50 km of double-circuit 380 kV transmission lines, and 12 sub-stations of 7,900 MVA capacity. Actually, about 2,797 kms of 380 kV lines and 7,700 MVA of sub-station capacity were built (PCR, paras. 3.10-3.11).

The project included technical assistance and training programs. It required consultants to review management information systems, and assist in improving planning and operational techniques (PCR, paras. 2.08 and 3.12). Also key officers engaged in system management were to receive training abroad (PCR, para. 2.09).

The first power transmission project was substantially completed in December 1978, two years behind schedule (PCR, Annex 3). The slow-down was caused by the need for detailed field surveys and JUGEL's limited authority and experience (PPAM, para. 8). The delay did not hurt the economy since demand for power grew more slowly than forecast for the implementation period.

However, because of world wide inflation, currency devaluation and low initial estimate of the project cost, the actual cost amounted to \$462.2 million or over twice the original estimate of \$225.0 million (PCR, para. 3.23). Despite cost escalation and implementation delays, a high voltage transmission network as installed is essential for the efficient operation and expansion of the electricity supply industry in Yugoslavia.

The borrowers^{3/} almost achieved their financial objective, which was a 35% self-financing level (PCR, para. 8.2). However, in the context of an underpriced tariff system, a negative real interest rate, and rapid price escalations, the achievement of a 33% self-financing contribution has an uncertain significance (PPAM, para. 11). Given the impressive development of the electricity supply industry and the country's income level, the power sector in Yugoslavia is potentially capable of achieving financial self-reliance (PPAM, para. 36).

3/ Twelve borrowers, PCR, para. 4.06 provides the list.

Also the Bank's support has helped to strengthen JUGEL, to improve institutional arrangements between JUGEL and the borrowers, and to further institution-building under subsequent projects. The audit has also concluded that, despite borrowers' skepticism about the value of consulting services, consultants' work focused attention on the main issues affecting the electricity supply industry (PPAM, para. 37).

Other major points of interest concern reform measures for taking full advantage of the transmission network capability and securing greater efficiency in planning, operation, and energy consumption. The 380 kV grid has physically integrated the electricity supply industry into a single system. It has greatly improved the sector's capability to utilize its resources more effectively, and transmit large quantities of power from other countries (for example, Italy) to areas that experience electricity shortages. The potential benefit of the additional transmission capability is substantial, its realization depending, to a large measure, on the resolution of policy and institutional issues now recognized by the Government and reflected in the structural adjustment program.

The key issue is the least-cost expansion and operation of a unified system requiring that the demand for and the supply of electricity meet optimum conditions,^{4/} which are unlikely to be satisfied without the appropriate pricing of investment resources, fuels, and electricity and without an effective energy conservation program. Therefore, the audit supports policy changes concerning interest rates, lignite and gas prices, and the level and diversity of electricity tariffs (PPAM, paras. 23-28). Also the audit sees the need for power price parity with trading partners (PPAM, para. 27); for a stronger federal planning unit; an improved allocative mechanism (PPAM, paras. 31-35); and an effective energy conservation program (PPAM, paras. 29-30).

^{4/} In any optimization model, fuels are priced at their opportunity cost, and so is the cost of capital. Also, such models assume that consumers use energy efficiently, either by paying the long-run marginal cost of supply (LRMC), or can demonstrate, through energy audits, that the usage efficiency of electricity is satisfactory.

PROJECT PERFORMANCE AUDIT MEMORANDUM

YUGOSLAVIA: FIRST POWER TRANSMISSION PROJECT
(LOAN 836-YU)

PROJECT SUMMARY

1. Yugoslavia has achieved impressive progress in the power sector in post-war years. The supply of electrical energy increased 24 times from about 2.5 TWh in 1950 to 60 TWh in 1981.

2. The power sector organization reflects the decentralized political structure of the country. All regional apex enterprises in the sector (about 100 in number) are required to be members of the Union of Yugoslav Power Industry (JUGEL), with JUGEL having no executive power over member organizations. However, the country's self-managed decentralized system has been innovative, flexible, pragmatic, but complex. To strengthen further the many advantages of the system, some of its weaknesses need to be remedied. This is particularly true of the electricity supply industry which is a natural monopoly both because of the limited supply options available to consumers and because the efficacy of the system improves with centralization in areas of planning, operation and price determination.

3. The 380 kV lines, nearing completion, have physically integrated the industry into a single system. They have also been the only means of transmitting large quantities of power from Italy to some republics, especially Croatia and Bosnia-Herzegovina, which in the recent past experienced severe electricity shortfalls because of dry hydro conditions.

4. Before 1975 the main transmission network consisted of 220 kV lines. However, the rapid growth of power consumption has required additional transmission capability, intended to improve the reliability of power supply and promote sector efficiency by diminishing the need for reserve margin, by directing investment into nationally least-cost programs and by curtailing costs through merit-order ranking and operation of the generating capacity throughout the nation. A single grid also means a progressively unified tariff system. Progress has, however, been slow in implementing institutional and policy reforms.

5. The transmission program has been designed for three stage implementation. The First Power Transmission Project, which erected a part of the 380 kV ring around Yugoslavia, has linked the system with supply centers in and out of the country. The Second Power Transmission Project, which was scheduled for completion at the end of 1983, has closed the ring and strengthened the European interconnection. The Third Power Transmission Project,^{1/} for which a \$120 million loan was approved in July 1983, provided

^{1/} Staff Appraisal Report, Third Power Transmission Project (Energy Management System) - Yugoslavia, April 29, 1983 - Report No. 4193-YU.

for the installation of a federally coordinated and computerized Energy Management System (EMS) by constructing nine dispatch centers, one at the federal level and the remaining eight at the republican/ provincial capitals

6. The work on the First Power Transmission Project was substantially completed in December, 1978, (PCR, Annex 3) two years behind schedule. The slow-down resulted partly from the need for detailed field surveys (PCR, para. 3.08). JUGEL's unfamiliarity with Bank procedures, and its lack of authority to act on behalf of some twelve borrowers also retarded progress (PCR, paras. 3.02 and 3.17) Since power consumption increased much less than was projected over the implementation period, the delay did not hurt economic development or production (PCR, para. 6.03).

7. Despite the implementation lag, the project proceeded as planned and according to sound engineering practice. The borrowers and JUGEL also gained considerable experience in the planning and construction of these lines. The know-how has proved useful in undertaking the second and preparing the third transmission projects.

8. But, the slow-down increased costs. The project investment, amounting to US\$462.2 million, was more than twice the original estimate of US\$225.0 million. The cost overrun was chiefly caused by sharp price upturn, following the 1973 energy crisis; currency devaluations; and inaccurate cost estimates because of inexperience and a desire to negotiate with suppliers, starting from a low price base (PCR, para. 3.23).

9. Although the project could possibly have been postponed by two or three years, the Extra High Voltage (EHV) grid is needed for reasons of economy and reliability. Already studies had demonstrated that a 380 kV grid has cost advantages over a 220 kV system. Moreover, in Yugoslavia electricity is increasingly generated from local sources of hydropower and lignite. But hydrological conditions vary greatly from river to river. Further, because of the high cost of transporting and handling low-grade ores, thermal plants tend to cluster around lignite mining sites. Therefore, the most advantageous investment in, and the use of hydro-thermal mix depends on the establishment of a well-managed EHV grid.

10. The first two transmission projects have built the backbone of an integrated industry, with the EMS providing the optimization capability. Although EMS has a good chance of curtailing operational costs, its success in promoting a nationally least-cost investment program depends on policy and institutional reforms (PPAM, Supplementary Comments).

11. Financially the borrowers came close to the project objective. They had agreed on a 35% self-financing level, and achieved a 33% level (PCR, para. 8.02). Considering the persistence of a negative real interest rate (i.e., capital subsidy) in the 1970s, and the fact that electricity tariffs have continued to remain substantially below the long-run marginal cost (LRMC) of power supply, the 33% self-financing contribution has an uncertain significance. As discussed elsewhere (PPAM, para. 28), borrowers have now agreed to gradually raise tariffs so that by December 31, 1987, prices recover fully the LRMC of power supply.

12. In most republics/provinces the financial management is weak, but the need for improvement is being increasingly recognized. Therefore, in the coming years the power entities are expected to follow JUGEL's lead in overcoming the weakness.^{2/} The PCR has suggested the need for shifting the emphasis from the engagement of consultants to the engagement and training of "in-house" financial managers (Yugoslav nationals) - PCR, para. 4.11. This advice is being followed.

13. In addition, the project has been a catalyst in obtaining finance from other sources and in planning the project on a country-wide, rather than parochial basis. The Bank's involvement has also led to the strengthening of JUGEL, the federal coordinating agency; to improved institutional arrangement between JUGEL and the borrowers; to the training of a number of engineers in higher technology for the construction and operation of a 380 kV grid (PCR, para. 8.03); and to efforts at further institution-building under subsequent projects.

14. Further, during the loan negotiation it was agreed that consultants would be appointed to undertake wide-ranging studies for determining possible improvements in borrowers' and JUGEL's management information system, and system planning and operational practices and procedures. Despite the borrowers' skepticism about the value of consulting services to Yugoslavia, and judging from the constraints under which the consultants worked, their performance has been considered satisfactory (PCR, para. 3.14). However, the PCR adds that apart from "implementation of recommendations arising from the studies on 380-kV system operation and organization... it is questionable whether the limited benefits derived from the remaining studies justify the cost involved" (PCR, para. 8.06). Moreover, the completion report suggests that the borrowers were unhappy with the results (PCR, paras. 3.12-3.16). Nonetheless to assist in transferring state-of-the art technology to Yugoslavia the latest project contains a significant training and engineering service component.^{3/}

II. SUPPLEMENTARY COMMENTS

Introduction

15. The additional transmission capability has facilitated a sectoral development approach to the operation and expansion of the electricity supply industry. But, an overall sector plan is constrained by the eight separately managed power systems. The republics/provinces determine local investment strategies. JUGEL, at the federal level, provides advice and arbitrates in disputes. Power expansion programs, optimized at the republican/provincial

^{2/} Report No. 4193-YU, para. 5.09.

^{3/} Report No. 4193-YU, paras. 3.10 and 3.17.

levels, cannot necessarily be a least-cost^{4/} national plan. Hence PCR's emphasis has been on the need for a strong JUGEL.

16. JUGEL is expected to coordinate the operation and the development of power sector through two self-management agreements concerning: (a) joint operation^{5/} of the system, and (b) coordination of development plans.^{6/} The first agreement provides for power dispatch to be managed by the eight dispatch centers, subject to coordination by a JUGEL-operated federal unit. In contrast, the federal coordinating agency currently controls frequency regulation, international exchanges, and the integrity of the interconnected system.

17. Under the second agreement, JUGEL is responsible for preparing annual generation plans, and short- and long-term electric power balances. The agency has also to harmonize investment plans of the republics/provinces, and present them to higher authorities. Decisions must be either unanimous or based on a complicated system of voting.

18. Apart from the need for a strong JUGEL, the PCR maintains that, "major changes, if any, are likely to come through the proposed Third Power Transmission Project". Although a stronger JUGEL and a physically integrated industry are necessary for improved coordination, these measures have to be supplemented by the application of key economic yardsticks and parameters^{7/} (particularly a positive real interest rate-reflecting the scarcity of capital - and suitable prices for fuel and electricity) to the decision-making process. The absence of an adequate economic pricing system and of improved planning at the federal level could restrict least-cost programming of system operation and system expansion. The findings of this audit are strongly supported by the recent report on the Structural Adjustment Loan (June 2, 1983).

4/ Report No. 4193-YU, paras. 1.31-1.32.

5/ The original version of the agreement, made in 1971, was revised in 1981.

6/ Law on Association in the Union of Yugoslav Electric Power Industry, 1978.

7/ Report No. 4193-YU recognizes the advantages of applying economic yardsticks. The report states: "It is hoped that this coordinated operation would also lead to better coordinated planning of power generation expansion programs through the sheer weight of economic advantages gained by joint load dispatching" - para. 5. The PPAM in reviewing the pricing and incentive package, has sought to make the "weight of economic advantages" reasonably large so that coordinated operation and system expansion could be achieved.

19. In line with the Government's structural adjustment program, PPAM maintains that the resolution of policy and institutional issues greatly influence the development of a least-cost national plan in the electricity supply industry. These issues are:

- (a) the persistence of negative real interest rates,
- (b) the low price of domestic lignite for power generation,
- (c) the low level of electricity tariffs which have yet to be unified,
- (d) the need for an electricity conservation program,
- (e) the need for a strong planning agency in the power sector,
- (f) the lack of uniformity in resource and project evaluation works, and
- (g) the weakness of allocative mechanism.

In addition to these questions, the audit has also reviewed the need for consulting services.

20. Pricing System. In Yugoslavia prices have undergone various degrees of liberalization and control; the primary purpose being the elimination of excess supply or demand for goods and services. As part of the 1965 reform package domestic prices were realigned to reflect international costs. Subsequently, however, the prices of many goods and services remained under various degrees of social control.^{8/} Electricity and lignite have been among such goods and services. Currently, consumers pay for only a part of the electricity cost. Moreover, lignite, the main indigenous fuel, has been underpriced for purposes of power generation; the objective being the financial viability of the various utility enterprises.

^{8/} The Law on the Bases of the Price System and Public Price Control of 1980 has provided the legal framework for price determination. According to this law, some prices are regulated at the federal level, some at the republican/provincial levels, while others are determined by the basic organizations of associated labor (BOALs), which set the prices of their products, subject to compliance with certain specified criteria. On July 31, 1982 a price freeze went into effect, and the authority for price regulation was transferred to the Federal Community, which is required to determine price ceilings for goods and services. During the first quarter of 1983 some price ceilings were raised 25-35 percent, including the prices of electricity, coal, and petroleum. According to the SAL report, the policy objective is, once again, emphasizing the progressive liberalization of prices so that by the end of 1985 only a few items would be subject to review by price communities.

21. In addition, factor costs are regulated; the scarce resources, chiefly investment funds, being directly rationed rather than apportioned by market forces. The resource allocation problem has been caused by the excessive demand for capital, and the weakness of the allocative mechanism (PPAM, para. 34, reviews the allocative mechanism). Among the main causes of a high demand for investment resources are: a negative real interest rate, and the expectation in the past that the rate would be maintained; a low aversion to risk, reinforced by the absence of severe penalties such as widespread bankruptcies^{9/} or loss of jobs; and the enterprise objective which aims at maximizing wage income.

22. As evidence of the need for reforms, one can refer to the swollen pipeline of incomplete projects, the deteriorating ICORs,^{10/} and the rising reserve margin. The 1976-80 Social Plan aimed, for example, at completing 9,267 MW of generation capacity. Instead, about half or 4,705 MW of capacity were completed by the year 1980. In contrast, the 1981-85 Social Plan has restricted additional installed capacity to 5,900 MW, of which only 1,340 MW represent new projects.

23. Real Rate of Interest. The subsidy on loanable funds has, however, contributed greatly to the excessive demand for capital. After adjusting for inflation, interest rates in Yugoslavia have been negative in the 1970s. This is shown below:

	<u>1970-76</u>	<u>1977-80</u>	<u>1981</u>	<u>1982</u>
Annual changes in GDP deflator (%)	17	21	39	28
Average annual rate of interest on medium- and long-term credits (%)	7	9	12	20
Real interest rate, /a per annum (%)	(-)8	(-)10	(-)19	(-) 6

Source: JUGEL.

/a Real interest rate (r) = nominal interest rate (i), divided by inflation rate (p): $r = \frac{1+i}{1+p} - 1$.

^{9/} SAL Report (P-3606-YU), paras. 52-54, reviews the financial accountability of enterprises and the Letter of Intent to IMF for improving the system.

^{10/} Incremental capital-output ratio (ICOR) which was 13.3:1 during 1971-1975 Social Plan increased to 19.9:1 in the 1976-1980 Social Plan.

24. The background paper to World Development Report^{11/} 1983 considers Yugoslavia's negative real interest rate to be on the high side. 14 out of 31 countries, reviewed in the paper, have experienced a highly negative real interest rate, in the 1970s. These nations have also had a lower growth performance than the other 17 countries in their GDP, industry, agriculture and exports, although it cannot be conclusively established that a distorted rate has been the principal cause of this divergent economic performance.

25. In the power sector the persistence of the negative real interest rate has been accompanied by an increase in reserve margin, and a poor record of completing projects on time. The demand pressure for loanable resources has in certain cases caused the late delivery of supplies. Similarly, it is possible that the increase in reserve margin can partly be attributed to financial gains from investment in real resources. A power company which could borrow, for example, 100 mn. dinars in the year 1970 would have been committed to repay, at interest rates prevailing during the 1970s, 208 mn. dinars by the year 1979. In contrast, the financial value of assets created by such an investment could have been about 530 mn. dinars. Already, the government has recognized the importance of the issue. According to the recent SAL Report, the objective is now to introduce a structure of positive rates by adjusting them gradually, in nominal terms, while lowering inflation. Therefore, beginning January 1, 1984 floor lending rates were to be established for all new credits of commercial banks; the overall goal being positive real interest rates within two years for non-economic^{12/} sectors, and within three years for most economic sectors.

26. Lignite prices. Coal-mining enterprises have also their coordinating body - AYCME,^{13/} which reviews coal supply cost. Lignite prices to the power sector reflect, however, the generating enterprises' strong bargaining position. This is because lignite is mostly used to produce power, although the European interconnection through the 380 kV grid converts lignite - generated electricity into a tradeable commodity. Given the European linkage, it can be argued that lignite prices should reflect the commercial value of electricity. According to agreements reached under the recent SAL, the transfer prices of lignite to the power sector, which are set to ensure that the operation of power stations remains viable, will be adjusted to equal the average long-run marginal cost of supply by 1987. Similarly, the price of domestic gas, which is significantly below that of imported gas, will be raised to achieve parity with the imported price by January 1987.

27. Power Rates. Increase in the transmission capability should have helped to narrow rate differences among republics/provinces, and also between

^{11/} Price Distortions and Growth in Developing Countries, World Bank Staff Working Paper No. 575, July 1983.

^{12/} Comprising social sectors such as health, education, culture, and government administration.

^{13/} Association of Yugoslav Coal Mining Enterprises.

Western Europe and Yugoslavia. A review of rates, illustrated in the following table, shows that the additional transmission capability has yet to unify the tariff system.

SELECTED TARIFFS
(US c/kWh)

<u>Republics/provinces</u>	<u>Average Retail Rates</u>			<u>Wholesale Rates Charged to Power Distributions Organization</u>		
	<u>1973</u>	<u>1978</u>	<u>1981</u>	<u>1973</u>	<u>1978</u>	<u>1981</u>
Bosnia-Herzegovina	2.5	4.6	4.5	1.3	2.8	2.7
Croatia	2.5	4.9	5.0	1.1	2.7	3.3
Macedonia	2.3	4.5	4.2	1.1	2.8	2.8
Montenegro	2.7	5.5	...	1.1	2.7	1.8
Serbia	2.3	4.1	3.9	1.1	2.7	2.7
Slovenia	2.1	4.4	4.5	1.0	2.8	3.5
Kosovo	...	...	4.2	...	...	2.9
Vojvodine	...	...	4.6	...	...	2.8
Yugoslavia	2.3	4.5	4.6	1.2	2.7	2.9

... Not available

Source: JUGEL

28. Moreover, significant spread among rates might complicate the least-cost operation of generating capacity and could prevent the best use of resources. Further, the table shows that the tariffs are modest. Despite a 25% increase in rates in 1983, prices would continue to remain substantially below the West European level. According to agreements reached under the recent third power transmission project, the average electricity tariffs will, however, be moved towards parity with the long-run marginal cost of supply over a 4-5 year period, implying, on average, a 100% increase in real terms.

29. Electricity Conservation. The low cost of electricity to consumers has discouraged conservation efforts. This is because financial gains from investment in conservation schemes understate economic benefits. The manufacturing sector, for example, has little incentive to retrofit plants and modify production processes or output so as to improve the usage efficiency of energy. This conclusion is borne out by SAL's findings: "The industrial sector, which accounted for 66% of total energy consumption in 1982, has been slow in formulating and implementing industrial restructuring programs involving energy conservation, rehabilitation of technologies and substitution of domestic for imported energy" (para. 57).

30. Given the low cost of lignite and power supply, electricity has been replacing other fuels in, for example, space heating. The low thermal efficiency of electricity compared to that from the direct use of fuel, as a source of heat, illustrates the scope for a greater conservation effort. The government has already indicated that it will shortly seek a technical assistance loan from the Bank to undertake studies for the preparation of energy conservation schemes in major industrial sub-sectors.

31. Planning. Yugoslavia has been de-emphasizing central planning since the early 1950s. Therefore, neither the federal planning agency nor JUGEL has been equipped to guide the preparation of a least-cost expansion program for the electricity supply industry. This means that the self-management agreement on the coordination of development plans (PPAM, para. 16) could remain ineffective without a strong planning unit within JUGEL. Currently, the eight republics/provinces evaluate separately their energy resource base, chiefly lignite and hydro, and prepare their power expansion programs. Although these schemes might be individually least-cost their sum is unlikely to be so. This is because of the diversity of economic criteria applied in assessing local resource base and investment programs, and of the negative cost of capital.

32. Consequently, because of the negative real interest rate, projects with low economic rates of return could be financially attractive. It is not, therefore, surprising that the republics/provinces have been emphasizing the importance of the local resource base and their own expansion schemes.

33. Some republics/provinces, with poor energy resources, have also participated in the construction of generating facilities in other parts of Yugoslavia. Their insistence to obtain a fixed share of the generated power from these facilities for local use could, however, hamper the optimal operation of an integrated system.

34. The planning problems could also be allayed by strengthening the allocative mechanism - the investment banks. Currently these institutions operate as agents of their founders, which are various enterprises. The banks had access to cheap sources of finance in the 1970s, and until recently paid little by way of interest to private depositors.^{14/} Further, republics/provinces, and national banks channel tax funds and credits to business banks to finance specific projects. Considering their subordinate status and the availability of cheap money, banks were not applying rigorous economic tests to the scrutiny of development schemes.

35. These institutional arrangements are now being reformed. Thus the SAL program includes several measures, either in place or in preparatory stage, so as to improve the institutional and legal framework of investment decision-making. For example, investors are now required to: (a) demonstrate assured sources of finance for their projects; (b) provide a minimum

^{14/} Interest rates on long-term deposits were raised 10-18% in the past 12 months to a range of 13-28 percent; the inflation rate in 1982 being 32%.

contribution from internal savings; (c) register all projects above 100 mn. dinars with the Chambers of Economy; and (d) comply with a number of minimum national criteria which are being incorporated into a social compact. The new criteria for assessing investment will include an economic rate of return for projects in the economic sector. Since the result of these reforms will depend on having trained staff, a phased program is being prepared so that by December 1984 the Chambers of Economy and the banks will have acquired the requisite skills.

36. Further, given the size of electricity supply industry and the country's income level, the power sector in Yugoslavia is potentially capable of achieving financial self-reliance. A comparison of the financial position of the power sector in Thailand and Yugoslavia illustrates the scope of resource mobilization in the latter country. Notwithstanding Thailand's relative poverty, EGAT^{15/} has achieved a large measure of financial self-reliance.

37. Consulting Services. Given the complexity of Yugoslav development problems, the issues chosen for study by consultants were quite appropriate. They comprised: management information systems, least-cost expansion programs, and electricity tariffs. The borrowers have participated in defining and modifying the consultants' scope of work. Because of the involvement of many entities, differences of opinion were bound to persist. Further, considering the decentralized approach at planning and rate determination, consultants' recommendations were unlikely to be popular. Moreover, no borrower has suggested that the consultants were either unqualified or tardy. Some borrowers' dissatisfaction has probably been due to the lack of interest in issues unrelated to their immediate tasks. All borrowers were, however, obligated to pay for such services.

III. CONCLUSIONS

38. The project under review, the first part of a three-stage transmission development program, has been completed according to sound

15/ Electricity Generating Authority of Thailand. In comparing the expected financial position of the power sector in Thailand and Yugoslavia for the year 1983 the following picture emerges:

	Net Income	
	<u>(mn \$)</u>	
Yugoslavia	(-) 82	(Report No.4193-YU, Annex 5.1, p.26)
Thailand	95	(Report No. 4201-TH, May 83, Annex 12, Table 10).

Moreover, because of EGAT's strong financial position very little equity contribution is required for its massive investment program in the 1980s (Annex 12, Table 5).

engineering practice. The second stage of the program, which has closed the transmission ring around Yugoslavia, is almost complete. The third stage, the Energy Management System now under implementation, will greatly improve the system's optimization capability. The full benefit of additional transmission capability and EMS depends, however, on the resolution of policy and institutional issues, recognized by the government and reflected in its structural adjustment program.

39. During the implementation of the first project the borrowers and JUGEL gained considerable experience in planning and construction of transmission line the know-how proving useful in the implementation of the subsequent stages of the program. Also, the borrowers came close to achieving their financial objectives; they had agreed on a 35% self-financing level, and achieved a 33% level (PPAM, para. 11).

40. Major policy reforms include the pricing policy which is needed for improving investment, operational, and power usage efficiencies. The reform measures relate to interest rates, lignite and indigenous gas prices, the level and diversity of electricity tariffs, and power price parity with the trading partners (PPAM, paras. 23-28).

41. Further, without strengthening the planning unit at the federal level, JUGEL will have difficulty in supporting planning efforts at the local levels, or in implementing the terms of self-management agreement on the coordination of development plans (PPAM, paras. 31-35).

42. Moreover, major adjustments are required in the country's allocative mechanism. Reforms include: raising the cost of capital to investment banks; providing additional rewards for financial savings; applying uniform criteria in the evaluation of energy resources, and of development schemes; and enabling power entities to rely entirely on internally generated savings, supplemented by borrowings at positive real interest rates (PPAM, para. 36).

43. Besides, impediments to internal and external trade have to be removed. Thus, divergent tariff systems, and energy/capacity commitments of joint projects to specific republics/provinces are obstructive to trade and to the improved use of transmission capability (PPAM, para. 33).

44. Finally, given the complexity of the electricity sector, JUGEL and other power entities will continue to benefit from the services of consultants (PPAM, para. 37). The emphasis must shift, however, to the development of "in-house" capability.

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COMMENTS FROM THE BORROWER

RCA5988
248423 WORLD BANK AWP KUPPO JUGEL YU
BELGRADE, MAY 11, 1984
TELEX NO 379

INTBAFRAD
WASHINGTON DC

FOR MR SHIV S. KAPUR, DIRECTOR OPERATIONS EVALUATION DEPARTMENT

RE: PROJECT PERFORMANCE AUDIT REPORT ON YUGOSLAVIA:
FIRST POWER TRANSMISSION PROJECT (LOAN 836-YU)

IN THE DRAFT OF THE PROJECT PERFORMANCE AUDIT REPORT ON YUGOSLAVIA FIRST POWER TRANSMISSION PROJECT WHICH HAS BEEN ENCLOSED TO YOUR LETTER DATED MARCH 8, 1984, IN ANNEX 1, PAGES 23 AND 24, THE STATED FINAL AMOUNTS DISBURSED OUT OF LOAN 836-YU BY ALL CATEGORIES ARE NOT IN ACCORDANCE WITH OUR RECORDS AND DEBITED AMOUNTS TO THE BORROWERS. ACCORDING TO OUR RECORDS THE FINAL AMOUNTS DISBURSED OUT OF LOAN 836-YU ARE AS FOLLOWS:

CATEGORY	(A)	(B)	USDOLLARS
	MATERIAL AND EQUIPMENT	CONSULTANTS' SERVICES AND TRAINING	T O T A L
I. SARAJEVO'S EXPENDITURES	16,100,539.66	300,000.00	16,400,539.66
II. TREBINJE'S EXPENDITURES	2,199,999.61	100,000.00	2,299,999.61
III. RIJEKA'S EXPENDITURES	3,599,999.35	100,000.00	3,699,999.35
IV. SPLIT'S EXPENDITURES	2,700,000.32	100,000.00	2,800,000.32
V. ZAGREB'S EXPENDITURES	3,980,988.12	135,000.00	4,115,988.12
VI. SKOPJE'S EXPENDITURES	5,799,999.59	100,000.00	5,899,999.59
VII. TITOGRAJSS EXPENDITURES	4,999,999.27	100,000.00	5,099,999.27
VIII. BEOGRAD'S EXPENDITURES	21,523,140.14	600,000.00	22,123,140.14
IX. LJUBLJANA'S EXPENDITURES	2,712,032.06	100,000.00	2,812,032.06
X. MARIBOR'S EXPENDITURES	3,172,094.21	100,000.00	3,272,094.21
XI. NOVA GORICA'S EXPENDITUR	1,291,205.65	100,000.00	1,391,205.65
XII. OSIJEK'S EXPENDITURES	4,920,002.02	165,000.00	5,085,002.02
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TOTAL USDOLLARS	73,000,000.00	2000,00000	75,000,000.00
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WOULD KINDLY ASK YOU TO CHECK AND RECONCILE YOUR RECORDS.

REGARDS
ZAJEDNICA JUGOSLOVENSKE
ELEKROPRIVREDE (JUGEL)
CEDOMIR BOSNIC
SENIOR ECONOMIC AND
FINANCE ADVISOR

248423 WORLD BANK AWP KUPPO JUGEL YU

=05110738

YUGOSLAVIA

PROJECT COMPLETION REPORT

FIRST POWER TRANSMISSION PROJECT (LOAN 836-YU)

I. INTRODUCTION

The Power Sector at the Time of Appraisal

1.01 Yugoslavia comprises six republics and two autonomous provinces. Until 1965 the power sector was highly centralized and federally controlled, but, following economic reform in that year, a continuing policy of decentralization had led to fragmentation and had an adverse effect on planning of electric generation and transmission development. At the time of appraisal, the power sector was characterized by inadequate and uneven availability of electric power, poor planning and serious financial problems. A major consequence of the lessened governmental role had been the growing difficulty since 1965 of coordinating the allocation of investments and finance among sectors and regions. Governmental subsidies and budgetary contributions were largely eliminated. The 1971 Constitution had defined the broad areas of responsibility of the Federal and Republican governments and of the various economic organizations, but a multitude of specific issues, such as prices of essential commodities and public services, remained to be settled.

1.02 In accordance with the Electricity Act of 1965, which superseded a system of Centralized Federal Control, the power industry was decentralized and broadly separated into a distribution sector and a generation and transmission sector. All of the twenty independent power enterprises comprising the generation and transmission sector were members of the Union of Yugoslav Electric Power Industry (JUGEL), responsible for overall coordination in interconnected system planning and operation. However, with no executive authority over its members, JUGEL had never been fully effective as a coordinating authority with the result that since 1965 there had been practically no coordinated planning of construction in the power sector. This was one of the problems addressed in the Project. The further reorganization of the power sector following the constitutional changes of 1974 is described in Chapter 5.

1.03 The limited transmission capacity and integration of the system before the Project imposed limits on the transfer of power from surplus regions to deficiency areas and thus limited efficient utilization of generating capacity with the resultant costs to the economy. The situation was recognized by JUGEL and studies showed that a nationwide primary transmission system would be needed to meet the developing load and improve the utilization of facilities. An operating voltage of 380 kV was selected as the optimum voltage for such a system and it is also an appropriate voltage for interconnection with neighboring countries.

1.04 A Bank review of the electric power sector in October 1970 confirmed that the development of the proposed 380-kV network, which had already been started with the construction of 380-kV lines to convey power from Djerdap hydroelectric plant on the Danube River to Belgrade, was of the highest priority.

Previous Bank Involvement in the Power Sector

1.05 At the time of the First Power Transmission Project, the Bank had made two previous loans for power to Yugoslavia in 1961 and 1962, each in the amount of US\$30 million, to help finance two hydroelectric plants and associated 220-kV transmission. The plants and transmission systems have been in successful operation since 1969. In addition, the Bank had, at that time, made three other loans for projects with a power component.

II. PROJECT PREPARATION AND APPRAISAL

Origin

2.01 As previously mentioned, it had become a matter of first priority to strengthen the Yugoslav transmission system with the planned construction of a 380-kV network to enable optimum use of the existing and planned generating facilities to meet the forecast load growth. The Project under review formed the first of a series of projects to complete the planned 380-kV system. The Second Power Transmission Project was the subject of a loan in July 1977 and the third is to be appraised in 1981. A feasibility study, prepared by JUGEL with the assistance of Yugoslav consultants and its members, was submitted to the Bank in March 1971.

Preparation and Appraisal

2.02 Because of the complexity of the financing arrangements and the extent to which these and other factors were affected by continuing changes in the institutional, financial and legal arrangements in the power sector, several missions to Yugoslavia were required for appraisal of the Project. The appraisal mission visited Yugoslavia in May/June 1971 and this was followed by a further mission in July/August 1971 to obtain additional financial information with a final updating mission in November 1971.

2.03 The Project is complex because it is spread over twelve 1/ power enterprises (all of which constitute the borrowers) operating in the six republics and two autonomous provinces of Yugoslavia. The estimated total cost of the Project was US\$225 million, of which US\$75 million was to be

1/ There were originally eleven borrowers, see para. 5.14.

financed by the Bank, (\$65 million to cover the total foreign costs and \$10 million for local expenditures for material and equipment), and the balance of the costs (US\$150 million) was to be financed in about equal proportions through local bank loans, and from funds internally generated by the twelve borrowers. The distribution of the Bank loan is shown in Annex 1.

Project Description

2.04 The Project, at the time of appraisal, was described as the construction of nearly 3,000 km of single circuit and about 50 km of double circuit 380-kV transmission lines and 12 substations having an aggregate capacity of 7,900 MVA; five substations would be equipped with one or two 300 MVA transformers and the remaining seven with one or two 400 MVA transformers each. Preliminary works only would be undertaken at six other substations with connecting lines operating mainly at 220 kV initially. The Project also included technical assistance and training in the areas described in paragraphs 2.08 and 2.09 below.

Negotiations and Approval

2.05 Because of the large number of institutions involved in the Project on the Yugoslav side, negotiations were held in Yugoslavia in April 1972. The complexity of the Project required the attendance of a strong Bank team in Yugoslavia and negotiations lasted some four weeks principally because of:

- (i) the number of borrowers and financing institutions all of which had representatives in attendance;
- (ii) the time taken to discuss and agree on all the financing details; and
- (iii) the major changes in the Project after issue of the Green Cover Report all of which had to be discussed and agreed at negotiations.

The Board approved the loan of \$75 million on June 13, 1972 and the loan was signed on June 23, 1972.

Loan Effectiveness

2.06 The following were prescribed as loan effectiveness conditions:

- (a) the submission to the Bank of a study of the power market through 1980 and the investment program with projects clearly identified and their priorities determined;
- (b) the submission to the Bank of a training program for key officers of the borrowers and JUGEL in management methods of interconnected power systems;

- (c) the employment of engineering consultants;
- (d) the execution and effectiveness of:
 - (i) the loan agreements between the local banks and the borrowers;
 - (ii) the agreements on cost overruns between two borrowers and the regional power associations;
 - (iii) the agreement between the Federation and the Republics and Provinces regarding the establishing and maintaining of tariffs; and
- (e) the implementation of the agreed initial measures designed to provide the revenues specified by the loan agreement.

2.07 The execution by the borrowers of appropriate agreements with local banks (local loan agreements) and (in the case of two borrowers) other power sector organizations and the implementation of certain initial financial measures (listed in (a) through (f) of para. 4.02) as conditions of effectiveness were intended to ensure the provision of adequate funds for the Project, covering both the original Project costs and any cost overruns. Furthermore, each one of the borrowers was required, under Section 5.04 ^{1/} of the Loan Agreement, to establish and maintain rates for the sale of power at such levels as shall provide revenues sufficient after all other charges (operating expenses including depreciation, interest, debt amortization exceeding depreciation, taxes, etc.) to finance an average of not less than 35% of the cost of investment in power facilities during each plan period of the Guarantor (Federal Government of Yugoslavia).

2.08 Requiring the borrowers to employ consultants acceptable to the Bank to assist them in the preparation of plans and detailed design of the Project as a condition of effectiveness was a reflection of the Bank's concern with the need to upgrade the Borrowers' management and planning expertise.

2.09 The introduction of a program acceptable to the Bank designed to train selected key officers of each of the borrowers and of JUGEL in management methods for interconnected electricity systems, as a condition of effectiveness, as well as the requirement to employ management consultants (see para. 3.12), indicated the Bank's desire to secure improvement in the management and operations of the borrowers.

2.10 By December 1972 all the prescribed effectiveness conditions were fulfilled except for the execution of satisfactory local loan agreements in the case of Rijeka, Split and Zagreb (the three borrowers in Croatia) and

^{1/} Effective January 1, 1978, Section 5.04 was deleted and replaced by the provisions of Section 5.04 of the Second Loan Agreement (see para. 4.03).

the introduction of an adequate connection charge in the case of Rijeka and Zagreb. The loan was, therefore, made effective on December 29, 1972 with two conditions:

- (a) disbursements for Rijeka, Split and Zagreb would be made only on execution of satisfactory local loan agreements (condition fulfilled by mid-February 1973); and
- (b) disbursements for Rijeka and Zagreb would be further subject to the introduction of an adequate connection charge.

In the event, disbursements were authorized for Split on February 14, 1973 with the execution of local loan agreements, and for Rijeka and Zagreb on July 10, 1973 with the introduction of an adequate connection charge.

Covenants

2.11 The principal issues during negotiations were financial and institutional. These are dealt with in the following paragraphs, and in more detail together with extent of compliance in Annex 2.

III. PROJECT IMPLEMENTATION AND COSTS

Project Schedule

3.01 At the time of appraisal in 1971 it was planned that the Project would be constructed over varying periods by each of the borrowers, with the earliest commencement early 1971 and with completion of all construction by the end of 1976. The original loan closing date was June 30, 1977 but in the event implementation of the Project was delayed, mainly for reasons described in paragraphs 3.02 through 3.04 and after two postponements the loan was finally closed June 30, 1979. The originally planned and actual construction schedule is shown in Annex 3.

3.02 The Project was beset with problems from the outset, most of them stemming from (i) JUGEL's initial lack of familiarity with bank procedures; (ii) its lack of authority to act on behalf of the borrowers and the resulting need to reach consensus amongst the twelve borrowers on every issue affecting Project implementation (see para. 3.04); and (iii) JUGEL's lack of experienced staff to deal with its coordinating duties which resulted in delays in the preparation of bidding documents and award of contracts. As a result of these deficiencies the Project fell rapidly behind schedule.

3.03 Other contributing factors were: (i) delays in obtaining the required approvals from the affected organizations and authorities for the determination of transmission line routes and difficulties in obtaining land rights; and (ii) limited design and construction capacities of the borrowers together with lack of, and/or late delivery of, construction equipment.

3.04 Because of inability to reach agreement on the terms of reference for the management consultants to be hired for Parts II A and B of the Project (see para. 3.12 below) the engagement of these consultants was delayed until June 1976, about three years late.

3.05 Project costs escalated rapidly. ^{1/} This, together with a reorganization of the power sector in 1973 during which two (Trebinje and Sarajevo) of the original eleven borrowers (later increased to twelve) were replaced by new entities without reference to the Bank and thus in contravention of Sections 4.06 and 6.02 of the Loan Agreement, led to the Project being categorized a problem project for a short period. As a result of the latter problem JUGEL was required not to submit withdrawal requests on account of the new borrowers pending an agreed solution to the problem. This embargo on withdrawals lasted for about two months. Introduction of a twelfth borrower (see para. 5.14) led to a need for partial reappraisal in 1973.

3.06 By November 1977 a supervision mission reported that works, although delayed by nearly two years due to the foregoing problems and lack of efficient coordination by JUGEL, would be substantially completed by mid-1978. As explained in paras. 6.01-6.03, little adverse effect resulted from this delay.

3.07 JUGEL's reports during progress of the Project were consistently received late and, initially, they were far too cumbersome, providing a wealth of unnecessary detail but omitting essential information. JUGEL's Project Completion Report was well prepared but its quality was dependent upon information provided by the borrowers. In some instances this was less than satisfactory and lack of background information hampered detailed discussion on some points, e.g., cost estimates (see para. 3.22).

Revisions to Scope of Project

3.08 At the time of appraisal the Project had been established in outline, but detailed planning and preparation had still to be carried out. For instance, provisional transmission line routes had been established, but these had not been surveyed, land acquisition had still to be carried out and technical parameters had still to be established. The result was that whilst the construction work carried out under the Project was broadly as planned at the time of appraisal, the lack of detailed planning at that time, and the "firming-up" of land acquisition resulted in many variations of more than usual magnitude in the lengths of some of the transmission lines from those originally planned, with consequential changes in the number of towers and associated insulators and hardware.

1/ Project costs are dealt later in this chapter (paras. 3.23-3.26).

2/ This is dealt with in detail under "Institutional Changes" paras. 5.04 through 5.07.

3.09 Whilst it is only fair to stress that it is not usual to progress too far with the time-consuming process and expense of detailed planning before the finance for the Project has been established, inadequate project preparation at the time of appraisal was one of the factors in poor initial Project implementation.

3.10 The only change in the transformer stations was the installation of two 300 MVA 380/110 kV transformers at Skopje in place of two 400 MVA 380/220 kV units as originally planned.

3.11 The Project, as erected, comprises 2796.9 kms of 380 kV transmission lines and 7700 MVA of transformer capacity in place of about 3000 km of 380-kV transmission lines and 7900 MVA of transformer capacity as originally planned.

Consultants' Services and Training

3.12 Bearing in mind the institutional objectives and the industry's lack of expertise in the construction and operation of a 380 kV interconnected system at the time of appraisal, it was agreed at negotiations for the loan that consultants would be appointed to carry out wide-ranging studies for the purpose of determining possible improvements in the borrowers' and JUGEL's management information systems (MIS) and system planning and operational practices and procedures (Parts II A and B of the Project).

3.13 It would seem from discussions with JUGEL and the borrowers that there was a reluctance to engage specialist consultants for these functions from the outset due, inter alia, to a lack of understanding on the part of some of the borrowers of the need for such studies and a feeling that, in any case, they already had the necessary expertise within the country and within their own organizations. It was also felt that the studies would be for the benefit of the power sector as a whole and that it was inequitable that the costs should be borne exclusively by the transmission organizations. This reluctance to employ consultants together with the need for JUGEL and the borrowers to agree on the terms of reference and the amount of services and responsibilities of local subcontracting firms, and for the borrowers to agree with their subordinated organizations, led to the consultants being appointed about three years late (June 1976) and to their recommendations being delayed likewise.

3.14 Systems Control Inc. of the USA in association with Systems Control S.A. of Belgium were the principal consultants. They were assisted by various local institutes and consultants in the technical studies and by Arthur Andersen and Co. of the USA in association with various local institutes in the MIS studies. The studies were divided into eight technical and four Management Information Systems tasks and, additionally, some personnel training functions. The separate tasks are shown in Annex 4. The consultants reported in July 1977, after a review phase which covered the period July 1, 1976 to June 30, 1977. The "review phase" report was of

a somewhat general nature, because the consultants had to work through committees of experts rather than directly with the borrowers, and thus limit themselves in some respects to a theoretical approach. Considering the constraints under which they had to work, the performance of the consultants was satisfactory. The report of the consultants envisaged a subsequent implementation phase, for which further funds were provided under the Second Power Transmission loan (1469-YU), signed in July 1977. The latter loan specifically envisaged further work in the areas of management organization, accounting, financial planning, as well as a least-cost development study, a tariff study and studies for the preparation of bid documents for dispatch facilities.

3.15 While reviewing the impact of the studies in the context of this Project, it should be remembered that the loan only provided that JUGEL and the borrowers shall submit to the Bank their plans to implement the recommendations and that it did not prescribe any time limit for completing the implementation. This was apparently because of the immensity of the tasks and the time required to complete them, extending even beyond the Project completion. Discussion with JUGEL and the borrowers, as well as the borrowers' Project completion report, gives the impression of a positive impact of the studies, although there was little implementation during the Project period. With the exception of task T6, work on the "implementation phase" has, so far, progressed only slowly or not at all. JUGEL has taken some actions in the preparation of long term planning manuals and the acquisition of appropriate software, which is being examined for adaption to Yugoslav needs, but little positive results have been obtained to date. Consultants for further work under the Second Project in the areas of management organization, accounting and financial planning, who were to report by December 31, 1978, have yet to be engaged; the least-cost development study which was to be finalized by June 30, 1978 is now expected to be completed in 1981; the tariff study was received in 1979 but was of a theoretical nature; the Bank has been informed that work is underway to revise the tariff structure. Finally, it is to be noted that the borrowers remain highly critical on the subject of consulting work, as indicated in their completion report which states that the insistence of the Bank that a portion of the Loan be used for hiring consultants is not always acceptable and that the hiring of consultants "is like a tribute which has to be paid" (in order to get the Bank loan).

3.16 The general opinion of JUGEL and the borrowers was that much useful experience had been gained from the initial personnel training program which involved, inter alia, visits to organizations in the USA and Europe for up to 150 technical and senior management personnel. However, since none of these visits extended beyond 15 days, they were probably too short to have provided any significant training benefits.

Procurement and Disbursements

3.17 With eleven borrowers at the time of loan signing, and the consequential need for JUGEL to coordinate the requirements of each of the

borrowers, difficulties were anticipated when prescribing the procurement and cooperation procedures. Because of JUGEL's lack of experience with Bank procedures combined with its own cumbersome procedures and the unwillingness of borrowers to cooperate effectively with JUGEL, procurement got off to a bad start and rapidly fell behind schedule.

3.18 The situation later improved as JUGEL gained experience with the Bank's procurement procedures and its Coordinating Committee settled down to the problems of coordinating the requirements of the various borrowers. By the end of 1973 the Bank had agreed with JUGEL's proposals for the award of contracts representing some 50% of the loan amount. All main contracts were awarded by July 1974, some twelve months behind schedule. Disbursements at this time were only some 19% of the appraisal estimate.

3.19 Despite some relatively confident predictions in subsequent supervision reports, construction tended to slip further behind schedule and the project was substantially completed by the end of 1978, some two years later than forecast at the time of appraisal.

3.20 The estimated schedule of disbursements and the actual rate of disbursements are shown in Annex 5. The loan was fully disbursed as of February 7, 1980.

Cost of Project

3.21 Details of the original allocation of proceeds and the allocation of expenditures as finally disbursed are shown in Annex 1 and the original estimate of costs compared with the final breakdown of costs incurred by each of the borrowers is shown in Annex 6.

3.22 A direct comparison of final costs with original costs is difficult because of currency revaluations since the loan was made and also because of the limited detailed information which could be supplied by JUGEL. The cost estimates shown in Annex 5 of JUGEL's completion report were prepared from information supplied by the twelve borrowers and whilst JUGEL expressed confidence that the aggregate costs in each case are a reasonably accurate reflection of final project costs, the information provided by the borrowers was insufficient to provide a detailed breakdown for comparison purposes. Direct foreign expenditures amounting to US\$47.646 million covered the purchase of imported equipment and the foreign currency component included in agreements with local suppliers. Insufficient information was available to allocate these costs between borrowers and, for comparison purposes, an arbitrary allocation has been made in the proportion of the total loan allocated to each borrower. Also, a detailed breakdown of costs between the different components of the project (i.e., transmission lines, substations, etc.) was not possible, because JUGEL was unable to provide the necessary information. The comparisons on the basis of a cost distribution between enterprises are shown in Yugoslav dinars and US dollars. For the purpose of the comparison, the actual project costs in US dollars were obtained by converting annual costs in

Yugoslav dinars at the prevailing exchange rate during each year of the construction period.

3.23 The final cost of the project amounting to US\$462.2 million equivalent is more than twice the appraisal estimate of US\$225 million equivalent. This large escalation in costs during the course of construction was mainly due to the inadequate allowance made for inflation during construction at appraisal. The price contingency was estimated at 15 1/2% for the total period at 5% p.a. from mid-1971 as was common at the time, whereas as a concomitant of the 1973/74 oil price increases, prices increased between 10% and 30% p.a. during the period 1973-1975 during which 80% of the costs were incurred. Other contributory causes were:

- (a) the implementation delays which are discussed in paragraphs 3.01 through 3.04;
- (b) exchange rate fluctuations against the Yugoslav dinar during the construction period; and
- (c) inaccurate estimating at the outset because of JUGEL's lack of experience in costs of 380 kV equipment and construction and subjective errors influenced by a desire to negotiate prices with suppliers by starting from a low cost base.

3.24 The question of how the additional Project costs were financed is discussed in the following chapter.

Environmental Impact

3.25 Much of the transmission line construction and attendant right-of-way is over rough country and whilst it is difficult to assess the actual effect on cultivable land, JUGEL states that very little land has been taken out of production and that care has been taken to ensure the minimum adverse impact on areas of scenic beauty. This was the expectation at appraisal.

IV. FINANCIAL PERFORMANCE

Financing of Capital Expenditure

4.01 At the time of appraisal of the Project, one of the major concerns of the Bank was to ensure that there would be concrete financing plans and adequate measures to secure the financing needed to cover the cost of the Project (including any overruns), as well as of the borrowers' expansion programs in general.

4.02 Accordingly, the agreements subsequently reached with the borrowers (see para. 2.07) provided for the execution of local loan

agreements, and included an undertaking that, through appropriate tariffs or other measures satisfactory to the Bank, the revenues of each borrower would be maintained at a level sufficient to ensure that the borrowers' net cash generation would be not less than 35% of the cost of their respective investments in power facilities during any plan period of the guarantor (Section 5.04 of Loan Agreement). At appraisal a combination of the following steps were proposed to generate the required internal funds in each of the six Republics:

- (a) Tariff increases, resulting in an increase in average revenue per kWh of 15% as a first step in 1972 followed by further increases as required to fulfill the terms of the rate covenant;
- (b) Surcharges and electricity taxes on new industrial investments, to be used only for financing capital expenditures of the power enterprises, would be levied in the Republic of Slovenia;
- (c) A 10% tax on the profits of all local banks and export companies, for the exclusive use of the power enterprises, would be levied in the Republic of Croatia;
- (d) A surcharge on electricity consumption would be levied by the enterprises in the Republics of Slovenia and Croatia;
- (e) A connection charge based on electricity demand to be levied by the Republic of Croatia; and
- (f) Rechannelling of common internal funds of associated power enterprises by way of long term, low interest credits or grants in Slovenia, Serbia and the Region of Dalmatia.

4.03 Under a Loan assumption agreement signed on July 11, 1977, in connection with the Second Power Transmission Loan (1469-YU), the financial reporting and cash generation obligations of the Borrowers under the First Power Transmission Loan (Sections 5.02 and 5.04) were, effective January 1, 1978, replaced by covenants providing for financial reports and a 30% cash generation requirements applicable to the composite power sector organization in each republic ("Composite Organizations of Associated Labor").

4.04 However, since the execution of the First Power Transmission Project extended beyond January 1, 1978, the following table has been prepared on the basis of the original borrowers' financial statements for the years 1972-1978 (see para. 4.08 below) to show the sources and applications of their construction funds and their actual cash generation during the period of execution of the project, compared with estimates made at appraisal.

	Appraisal Estimate 1972-1976		Actual 1972-1978	
	Million Dinars	%	Million Dinars	%
<u>Sources of Funds</u>				
Net cash generation:				
1971 tariffs	1,973	15.6		
Tariff increases	<u>1,551</u>	<u>12.3</u>		
	3,524	27.9	6,890	17.3
Special measures <u>/1</u> (Surcharges, levies, grants)				
	<u>1,207</u>	<u>9.5</u>	<u>6,268</u>	<u>15.7</u>
	4,731	37.4	13,158	33.0
IBRD Loan (\$75 million)	1,275	10.1	1,330	3.3
Other borrowings	<u>6,580</u>	<u>52.0</u>	<u>29,499</u>	<u>73.9</u>
	12,586	99.5	43,987	110.2
Add (deduct) Working Capital Adjustments				
	<u>57</u>	<u>.5</u>	<u>(4,065)</u>	<u>(10.2)</u>
	<u>12,643</u>	<u>100.0</u>	<u>39,922</u>	<u>100.0</u>
<u>Applications of Funds</u>				
380 kV Network	3,825	30.3	8,319	20.8
Other Capital expenditure	<u>8,818</u>	<u>69.7</u>	<u>31,603</u>	<u>79.2</u>
Total	<u>12,643</u>	<u>100.0</u>	<u>39,922</u>	<u>100.0</u>

4.05 The above table shows that, expressed as a percentage of capital expenditure, the total of net cash generation 2/ and funds from special measures 1/ during the construction period for the borrowers taken as a whole (33.0%) was fairly close to the appraisal estimate (37.4%) and covenanted rate (35%) 2/, although funds from special measures represented a greater proportion of this total (approximately 50%) than envisaged at appraisal (25%).

1/ Construction surcharges billed in addition to ordinary tariff, connection charges, and non-tariff measures such as construction levies on industry and special grants.

2/ For the purpose of this report, as for the appraisal report, net cash generation has been defined in the Bank's usual manner as operating income (after depreciation) plus depreciation, less interest and debt amortization. The definition in Section 5.04 of the Loan Agreement [operating income (after depreciation) less interest and less debt amortization exceeding depreciation], if strictly interpreted, is more stringent if depreciation exceeds debt service.

4.06 Details for each borrower are given in Annex 8. The following is a summary on a borrower-by-borrower basis, for the project construction period.

<u>Borrower</u>	1972-1978		
	Percentage Contribution to		
	Capital Expenditure		
	From Operating		
	Revenues Arising	Special	Total
	From Tariff	Measures	%
	Increases		
	(% of Total)	(% of Total)	
<u>Bosnia-Herzegovina</u>			
Elektroprenos Sarajevo	86	14	41.0
HE na Trebisnjici-Trebinje	100	-	24.4
<u>Croatia</u>			
Elektroprivreda Rijeka	63	37	17.4
Elektroprenos Split	46	54	32.6
Elektroprivreda Zagreb	7	93	9.1
Elektroslavonija Osijek	-44	144	12.0
<u>Macedonia</u>			
Elektrostopantsvo-Skopje	90	10	44.0
<u>Montenegro</u>			
Elektroprenos (ex Elektro-Crnagora) Titograd	100	-	40.5
<u>Serbia</u>			
Elektroistok Belgrade	74	26	45.7
<u>Slovenia</u>			
Savske Elektrarne Ljubljana	17	83	127.1
Dravske Elektrarne Maribor	25	75	80.2
Soske Elektrarne Nova Gorica	63	37	86.0

As shown above, on a borrower-by-borrower basis, the percentage contribution to capital expenditure from net cash generation including special measures varied widely (from 127% for Savske Elektrarne Ljubljana to 9% for Elektroprivreda Zagreb) and five of the twelve borrowers (including all four borrowers in Croatia) had a lower cash generation during the construction period than the 35% expected at appraisal. However, as mentioned in para. 4.03 above, the 35% cash generation covenant was no longer applicable at the time of completion of the project.

4.07 With regard to the question of how the borrowers managed to finance the difference between the original project cost estimate (Dinars 3825/\$225 million) and the final cost (Dinars 8319/\$462.2 million), JUGEL confirmed supervision mission reports that this was done with the help of

a DM 700 million credit facility granted to Yugoslavia by the Federal Republic of Germany under an agreement signed at the end of 1974. However, JUGEL did not have any information on the amounts involved or the form in which the funds in question were made available to some or all of the borrowers; details concerning the use of the credit facility were stated by JUGEL as confidential. The only information which could be obtained from the Federal Secretariat for Finance on this matter was the text of the 1974 agreement as published in the official gazette of Yugoslavia. This text mentions that the credit facility would be used in the form of a number of 30 year loans (with a grace period of 10 years and carrying interest at 2% per annum) the purposes of which would be determined by special agreements to be concluded between the Central Bank of Yugoslavia (Narodna Banka Jugoslavije) and Kreditanstalt fur Wiederaufbau. It remains unclear whether and to what extent the funds were on-lent by the Central Bank to the Republics and the Republics to the borrowers, or whether some or all of the borrowers benefited from this facility in any other form, for example an increase of special grants or a reduction of their tax liabilities.

Other Financial Statistics

4.08 As a supplement to its Completion Report, JUGEL submitted (uncommented) comparative financial statements for the years 1971 to 1978 for each of the original borrowers (Income Statements, Balance Sheets, Sources and Applications of Funds Statements). Additional statements, drawn up to correct errors and omissions, were obtained during the completion report mission. As mentioned in para. 4.06, the Sources and Applications of Construction Funds of the individual borrowers are shown in Annex 8. Because of the large number of documents involved, and in view of the fact that in accordance with the Second Transmission loan agreements most of the twelve borrowers under the first loan no longer report to the Bank, their balance sheets and income statements are not reproduced in this report; however, a summary of key statistics (debt/equity ratios, debt service coverage) based on these documents is shown in Annex 9.

Auditing and Consulting Work

4.09 Section 5.02 of the Loan Agreement and Supplemental Letter No. 2 provided for annual audits of the accounts and financial statements of the borrowers to be carried out by the Social Accounting Service (SAS) or another competent auditing organization acceptable to the Bank. In practice, except in the most unusual circumstances, all Yugoslav audits are carried out by SAS. Until a few years ago, SAS did not have the competence to carry out audits in conformity with generally accepted auditing standards and its certifications were based on reviews of very limited scope. However, at the instance of the Bank, and with its full support and encouragement, SAS established a Special Audit Group to audit enterprises in receipt of Bank Group financing. This Group, which has been under training and developing since 1974, now carries out audits for a large number of project enterprises to international standards. However, since its resources are still limited, it has only recently begun work in the

power sector. This began in 1977 with a balance sheet audit of Hidroelektrane na Neretvi - Jablanica. For 1978 the Social Accounting Service submitted for the first time appropriately reclassified but unaudited financial statements for the Republican Power Organizations and for 1979, in addition, audited statements for one of the Republics (Bosnia-Herzegovina). Since there are more than 200 separate power enterprises, the establishment of full audit arrangements will be a lengthy process.

4.10 The involvement of the SAS Special Audit Group has revealed some significant differences of principle in the reclassification and presentation of the financial statements prepared for the Bank by the borrowers and those prepared by the SAS. An investigation of these differences by JUGEL and the SAS during the last six months should, in due course, lead to their elimination and an improvement in the quality of financial information presented by the power sector borrowers to the Bank.

4.11 As mentioned in paras. 3.14 and 3.15 above, despite great emphasis by the Bank in the First and Second Power Transmission Projects on the need for improvements, with the help of consultants, in the areas of accounting, financial planning and controls, and for the establishment of adequate Management Information Systems, little has been accomplished so far. It would seem that this is a problem which transcends the power sector and that international consulting firms which have carried out work in this area in other sectors, have apparently also had only limited success in introducing improvements. It also appears that there is a lack of local consulting firms experienced in carrying out such work. Two obstacles to successful modern financial and accounting consulting work seem to be that in Yugoslavia financial management and accounting in general are considered "unproductive" activities, to be restricted to compliance with the minimum (and minimal) requirements of the law, and that the Composite Republican Organizations do not have the authority for effective control of the finances of the Basic Organizations. The only workable approach would seem to be, therefore, to shift the emphasis in future projects from the engagement of consultants to the engagement and training of "in-house" financial managers (Yugoslav nationals) who have had exposure to, and an interest in, modern and generally accepted international systems of financial planning and controls.

V. INSTITUTIONAL PERFORMANCE AND DEVELOPMENT

5.01 As mentioned in Chapter 1, at the time of appraisal the policy of decentralization had fragmented the power sector into autonomous organizations causing a retardation in the construction of new generating facilities and a deterioration in the reliability of the systems. The need for a wider approach to planning, development and the financing of capital expenditure than was possible in these circumstances had been recognized by the Government and processes of reorganization with the object of improving coordination, which had been in progress since 1970, were finalized through legal changes in the 1974 Constitution.

5.02 Dealing briefly with the organization as it has emerged following this reorganization, the basic decision-making units are called "Basic Organizations of Associated Labor." In principle, these are the smallest technically identifiable units that can function independently. They can be integrated into "Work Organizations of Associated Labor" through a revocable self-management agreement and may include similar organizations concerned with generating plants as well as transmission, research and development and the supporting services. Distribution entities are organized separately but along similar lines. The generation and transmission organizations in each republic have, subsequent to appraisal, organized themselves into single organizations referred to as "Composite Organizations of Associated Labor" which are now the top organizations in the sector.

5.03 Each of the above described organizations has its own workers council elected by its members in accordance with a self-management agreement, which acts as a top policy-making body. The workers council approves major investment plans, decides on the disposition of income and appoints the general manager, who is the chief executive of the enterprise.

5.04 All generation and transmission organizations are required by law to be members of JUGEL. Distribution organizations have their own association; nevertheless, a majority of these have voluntarily joined JUGEL. Additionally a number of power institutes and energy consulting firms have voluntarily joined JUGEL.

5.05 The distribution enterprises, which through their own association are represented in a "Federal Committee for Coordination", together with bulk consumers, buy power from the generation and transmission enterprises.

5.06 JUGEL acts through an Assembly, a Board of Management and a Director General who is appointed by the Assembly subject to approval by the Federal Government. The Assembly consists of representatives of member enterprises and of representatives of JUGEL.

5.07 While JUGEL coordinates the major aspects of power generation and transmission in the country it has no executive power over its member organizations (see para. 1.02). The power organizations and their customers form the power sector's "Communities of Interest". These are organizational forms which have evolved subsequent to appraisal and which emanated from the 1974 Constitution. The "Communities of Interest" coordinate sectoral activities with the distribution organizations at the local level and with generation and transmission enterprises at the level of republic. They are responsible for determining long-term development programs and their financing and the level and structure of the tariffs. The Communities are governed by an assembly in which the power organizations and the consumers have representation, and matters on which there is failure to reach agreement are turned over to the republican assembly for final agreement. The relationships and transactions between the various parties involved in matters concerning the power sectors are governed by extremely complex legal arrangements.

5.08 Bearing in mind the Yugoslav policy of decentralized economic control and workers self-management, one of the main objectives of the Project other than the technical and financial objectives, was to promote institutional development through a greater degree of coordination between JUGEL and the borrowers on investment priorities. This, in turn, through the Project would lead to more efficient planning on a federal basis and to the optimum utilization of plant with attendant improvements in efficiency and resultant savings and improvements in management and accounting techniques.

5.09 The Bank, through its involvement in the First Power Transmission Project did play a role in stimulating coordination and in giving JUGEL some leverage in dealing with the Republics. There is now involvement in planning at the Republic level and a degree of more centralized involvement in the power sector through the JUGEL Coordinating Committee, although not through JUGEL as such. This is particularly evident in such matters as improved coordination of planning on a country-wide basis and some progress towards standardization of transmission equipment throughout the country. The electrical industry has also gained technical expertise through association with foreign manufacturers supplying equipment for the Project.

5.10 However, estimates of the time required to accomplish major structural changes in the sector proved to be unrealistic; the Bank attempted to encourage the development of a strong national power sector coordinating institution that would exert a strong influence in technical matters on the various borrowers in the republics, but such a development, however desirable from a technical point of view, is difficult to achieve within the framework of Yugoslavia's decentralized constitutional and socio-economic system. Major changes, if any, are likely to come only through the proposed Third Power Transmission Project with the fully integrated operation of the 380-kV system and load dispatch on a federal basis.

5.11 Specific institutional changes which occurred and to which some reference has already been made in paragraph 3.05, are described in paragraphs 5.12 through 5.15. Yugoslav statutory amendments had an impact on the legal status of the two borrowers Trebinje and Sarajevo. The former was divided into five basic organizations of associated labor and the latter into two.

5.12 In the case of Trebinje, the five basic organizations have, under a self-management agreement, established a "Work Organization" which became the successor to Trebinje under the Loan Agreement.

5.13 In the case of Sarajevo, the two basic organizations comprised one for transmission and the other for generation. The one for transmission (Elektroprenos) became the successor to Sarajevo under the Loan Agreement.

5.14 Another institutional change was the agreement to transfer responsibility for the transmission network in the territories of Slavonija and Baranja, originally the responsibility of Elektroprivreda Zagreb, to Elektroslovanija Osijek which thus became an additional borrower.

5.15 Under a Loan Assumption Agreement dated July 11, 1977, Elektroprenos Rijeka, Elektroprenos Zagreb, Elektroprenos Titograd and Elektroprenos Skopje replaced the original borrowers following promulgation of a new constitution of the guarantor and alignment of the relevant self-management agreements and statutes with this new constitution.

VI. JUSTIFICATION OF PROJECT

Load Growth

6.01 Yugoslavia's domestic consumption of electricity had been growing at an annual rate of 18% and the overall annual rate of growth of electricity consumption (for all categories of consumers combined) had been around 12% for some years prior to appraisal. Nevertheless, annual per capita consumption of 1,426 kWh in 1971 was one of the lowest in countries at a comparable stage of development, and it was reasonable to suppose at that time that the average annual growth rate would continue at around 12% for several years. JUGEL's forecast which was based on this assumption in 1971 was revised downwards in 1972 with an average annual forecast growth rate of around 10%. In the event, due mainly to the several factors described below, growth of load proceeded at a slower rate than forecast and the average annual load growth during the period 1972-1980 was just over 7%. Production in 1980 was 59,726 GWh compared with just under 73,000 GWh estimated by JUGEL in its 1972 forecast. Forecast and actual production of electricity by region for the period 1972-1980 are shown in Annex 7.

6.02 Industrial demand for electricity slowed down between 1973 and 1980 because of the failure of the Yugoslav industrial exports to increase as forecast at the time of appraisal. This is primarily attributable to:

- (i) the world wide recession following the increase in the price of oil products and the consequential increase in the prices of raw materials and equipment which decreased the demand for Yugoslav exports with resultant delays in Yugoslavia's plans for the development of its industry;
- (ii) the Yugoslav policy for conservation and demand management during the period which have reduced the demand for energy by industry.

The above factors, together with the introduction of a law restricting the use of oil and gas for power generation after 1975 and delays in investment in the development of alternative coal resources, led to a slow-down in the generation development program.

6.03 Taking into consideration the lower load growth than forecast, it can be said, with hindsight, that, with the original construction schedule, maybe the Project was planned two or three years too early. On this hypothesis, little adverse effect should have resulted from the two years

delay in completion of construction. In point of fact, such was the case although in certain areas, shortages did arise.

Technical Justification

6.04 The decentralization of the Yugoslav power sector and the initial adverse effect this had on development of the power system in the country has already been discussed in this report. To develop the country's full potential and meet the growing demand effectively and efficiently a national EHV grid was recognized to be an urgent necessity of high priority.

6.05 From a technical point of view, the principal objectives of the Project were to meet the developing load by the most economical means possible through interconnection of the various systems by means of a 380 kV EHV grid, to improve supplies to permit bulk transfers of power from surplus regions to deficiency areas and to permit optimum utilization of thermal and hydro facilities according to their different operating regimes with resultant savings in operating and capital costs (mainly fuel and standby capacity) and to effect interconnection with neighboring countries.

6.06 The Project which is the first phase of the proposed 380-kV national grid which will ultimately cover the whole of the country, goes some way towards achieving these objectives and is therefore justified on technical grounds.

Rate of Return

6.07 At the time of appraisal it did not prove feasible to quantify the benefits attributable to the Project because of the difficulty of assessing the economic benefits in isolation from other investments in the power sector. This consideration still applies. The alternative of calculating a rate of return on the total investment in the Yugoslav power sector during the construction period of the project was also not feasible because the distribution entities in Yugoslavia are not integrated with the generation and transmission enterprises and detailed data on distribution investments and on retail tariffs were not available. In any case, since investments in the Project were less than 15% of total investments in transmission and generation alone (excluding distribution) such a calculation would be meaningless in relation to the Project.

6.08 The economic justification must rest upon the unquantifiable benefits detailed in paragraph 6.05. Insufficient time has elapsed since completion of construction of the Project to form any firm conclusions on the extent to which these benefits have been realized but it must be borne in mind that the Project is the first of three projects to complete the 380 kV grid and load dispatch system and full realization of all the benefits of an integrated EHV grid can only be expected when construction is complete and the system is fully operative. Nevertheless, following discussions with some of the borrowers it appears that some of the benefits are already becoming apparent. For instance, difficulties in meeting demand in some

areas, which were due more to lack of transmission facilities than shortage of generating capacity, have been alleviated. Also with the interconnection of power enterprises, through the Project, fuel savings, savings in standby capacity, etc., must already be apparent.

VII. BANK PERFORMANCE

7.01 Although strains did occur between the Bank and JUGEL during the course of the Project over some of the issues referred to in this report, relationships between the Bank and borrowers in an extremely complex environment have been satisfactory. JUGEL's initial performance in procurement and with preparation of progress reports was less than satisfactory due, principally, to lack of experience with the Bank's procedures. Even though a special procurement supervision mission in October 1972 reviewed with JUGEL and the borrowers the Bank's procurement procedures, it can be said, with hindsight, that more such missions would have proved beneficial in further instructing JUGEL and the borrowers in procurement and other procedures. Likewise in regard to submission of progress reports, although the Bank supervision missions regularly instructed the Yugoslavs in the preparation of these reports, the first reports were given to the Bank only in July 1974. To improve matters, the Bank offered in September 1974 to help arrange a seminar of all concerned financial and accounting staff of JUGEL and the borrowers in Belgrade, which, however, was not acted upon. The situation gradually improved as a result of discussions during supervision missions, and the experience gained by JUGEL and the borrowers is reflected in improved performance under the Second Power Transmission Project.

7.02 Supervising a project spread over 12 regions of the country inevitably gave rise to difficulties. These difficulties were aggravated initially by the unavoidable assignment of totally new Bank staff, unfamiliar with the country or the Project, for supervision of the Project as a result of the Bank's reorganization in 1972. After the reorganization, there was continuity of the Bank's supervising staff inasmuch as the same engineer was responsible for supervision from October 1972 through June 1977 and two financial analysts, by turns from October 1972 through 1978.

7.03 Important areas where the Bank hoped to have some influence through the loan was in the financial operations of the borrowers and institutional arrangements. Although the actual achievements fell short of expectations, the Project laid the foundations on which further institution building efforts were to be mounted under the Second Transmission Project. The Bank was flexible enough to realize that in this lending operation, as in most other operations, the achievement of all the lending objectives was dependent on a variety of factors, some outside the control of the borrowers. It is to be hoped that further results from the Bank's efforts will emerge with the implementation of the fully integrated operation of the 380-kV system and load dispatch on a federal basis.

VIII. CONCLUSIONS AND LESSONS TO BE LEARNED

8.01 This has been a complex Project, chiefly, because of the number of borrowers and the need both to coordinate the requirements of each of the borrowers to ensure standardization and efficient procurement, and to reach consensus amongst them on all Project-related matters.

8.02 Broadly speaking, it can be said that achievements in institution building fell short of expectations. However, with some exceptions, the objectives of the Project as regards improved coordination and financial operations were fulfilled to a significant extent (see paras. 4.06 and 5.09). Beginning with an average tariff increase of 15% in 1972, a series of initial measures were implemented before loan effectiveness to enable the borrowers to reach the agreed self-financing level of 35%. In the event, they achieved a level of 33% during the Project period, which was only marginally lower than the covenanted level. There was progress towards the coordination objectives, although admittedly they were not fully attained. Consultants who were to make recommendations on improved planning, management and financial operations were engaged some three years later than planned. Action to date on their recommendations has been limited, but this did not constitute a case of failure to achieve an agreed objective because the covenant did not envisage implementation of the recommendations during the Project period.

8.03 In spite of the foregoing comments, it is generally accepted by JUGEL and the borrowers that Bank participation in the Project was a catalyst in:

- (a) obtaining financing from other sources, thus enabling the construction to get off to an earlier start than would otherwise have been the case; and
- (b) planning the project on a country-wide basis as opposed to separate planning by each of the republics which would have led to delays, probably a much less comprehensive system and likely problems with compatibility. The Bank's involvement has resulted in a higher degree of coordination between enterprises and republics and the introduction of a greater number of engineers to higher technology in the construction and operation of a 380-kV EHV grid and dispatch system than would otherwise have been the case.

8.04 The principal lesson to be learned from the Project is the familiar one that arrangements for project implementation should be adequately advanced by the time of appraisal or at least by the time of Board presentation. More timely design and costing studies would have produced

improved Project cost estimates, and the construction delay might have been minimized if the following matters had received earlier and, as necessary, continuing attention:

- (a) firm agreement on transmission line routes, land acquisition, equipment and design and standardization;
- (b) staffing of JUGEL and detailed instruction of JUGEL staff in Bank's procurement procedures on a continuing basis; and
- (c) preparation of outline terms of reference for the management consultants, and close follow-up to ensure that the borrowers would take appropriate actions to meet their covenanted obligations.

8.05 On the engineering side, although the Project was two years late in completion, it was completed roughly as planned and in accordance with sound engineering practices. In the process, a great deal of basic standardization has been achieved and a great deal of technical expertise has been gained in 380-kV planning and construction, which should prove useful in implementation of the Second Power Transmission Project.

8.06 Apart from implementation of recommendations arising from the studies on 380-kV system operation and organization, which will be ongoing through the proposed Third Power Transmission Project, it is questionable whether the limited benefits derived from the remaining studies justify the costs involved. For the reasons given in para. 4.11, the emphasis concerning financial management information system improvements should in future projects be shifted from the engagement of consultants to the engagement and training of "in-house" financial managers.

8.07 As mentioned in para. 5.10, one of the reasons why the Bank has not been fully successful in its institution-building efforts is that it attempted to encourage the emergence of a strong national coordinating institution in the sector which, while desirable from a technical point of view, was difficult to achieve within the framework of Yugoslavia's decentralized constitutional and socio-economic system. Major changes, if any, are likely to come only with the fully integrated operation of the 380-kV system and load dispatch on a federal basis.

May 29, 1981

YUGOSLAVIA

FIRST POWER TRANSMISSION PROJECT (LOAN 836-YU)

Allocation of Proceeds of Loan - Original and Final

<u>Category</u>	<u>Amounts Disbursed</u>	
	<u>Original</u>	<u>Final</u>
I. <u>Sarajevo's Expenditures</u>		
(a) Material & Equipment	16,100,000	16,138,117 /a
(b) Consultants' Services & Training	300,000	300,000
II. <u>Trebinje's Expenditures</u>		
(a) Material & Equipment	2,200,000	2,200,000
(b) Consultants' Services & Training	100,000	100,000
III. <u>Rijeka's Expenditures</u>		
(a) Material & Equipment	3,600,000	3,600,000
(b) Consultants' Services & Training	100,000	100,000
IV. <u>Split's Expenditures</u>		
(a) Material & Equipment	2,700,000	2,700,000
(b) Consultants' Services & Training	100,000	100,000
V. <u>Zagreb's Expenditure</u> /b		
(a) Material & Equipment	8,900,000	3,980,997 /a
(b) Consultants' Services & Training	300,000	135,000
VI. <u>Skopje's Expenditures</u>		
(a) Material & Equipment	5,800,000	5,800,000
(b) Consultants' Services & Training	100,000	100,000
VII. <u>Titograd's Expenditures</u>		
(a) Material & Equipment	5,000,000	5,000,000
(b) Consultants' Services & Training	100,000	100,000
VIII. <u>Beograd's Expenditures</u>		
(a) Material & Equipment	21,500,000	21,523,132 /a
(b) Consultants' Services & Training	600,000	600,000

<u>Category</u>	<u>Amounts Disbursed</u>	
	<u>Original</u>	<u>Final</u>
IX. <u>Ljubljana's Expenditures</u>		
(a) Material & Equipment	2,700,000	2,700,000 /a
(b) Consultants' Services & Training	100,000	100,000
X. <u>Maribor's Expenditures</u>		
(a) Material & Equipment	3,200,000	3,262,587 /a
(b) Consultants' Services & Training	100,000	100,000
XI. <u>Nova Gorica's Expenditures</u>		
(a) Material & Equipment	1,300,000	1,175,167 /a
(b) Consultants' Services & Training	100,000	100,000
XII. <u>Osijek's Expenditures</u>		
(a) Material & Equipment	-	4,920,000
(b) Consultants' Services & Training	-	165,000
TOTAL	<u>75,000,000</u>	<u>75,000,000</u>

/a OED Note: There is a minor discrepancy between JUGEL records and Bank records on final allocation to this category. See Appendix A.

/b OED Note: The original allocations to this category were revised to \$3,980,000 and \$135,000 when Category XII was added under the Accession and Amending Agreement dated July 10, 1974.

YUGOSLAVIA

FIRST POWER TRANSMISSION PROJECT (LOAN 836-YU)

Main Covenants of Loan Documents

<u>Loan Agreement</u>	<u>Substance of Covenant</u>	<u>Extent of Compliance</u>
Section 3.02	The Borrowers shall employ consultants acceptable to the Bank upon terms and conditions satisfactory to the Bank as follows:	
Section 3.02(a)	The Borrowers (acting through JUGEL) shall employ engineering consultants to assist them in the preparation of plans and detailed design of Part I of the Report; and	Satisfactory action was taken.
Section 3.02(b)	The Borrowers (acting through JUGEL) shall employ qualified and experienced consultants to assist them in carrying out Part II A and B of the Project.	Consultants appointed see below.
Section 3.06	The Borrowers and JUGEL shall submit to the Bank for its comments, not later than 12 months after the effective date or by such later date as the Bank may otherwise agree (a) the report of the consultants employed in accordance with the provisions of Section 3.02(b) of this Agreement and (b) such Borrowers and JUGEL's plans to implement the recommendations contained in such report.	Substantial delays due to failure to agree on terms of reference between borrowers and reluctance to act on the obligation. Submission dates were successively postponed. Consultants were finally appointed in June 1976 and reports submitted July 1977.
Section 5.04(a)	Each of the Borrowers shall establish and maintain rates for the sale of power at such levels as shall provide revenues sufficient for the purposes set forth in para. (b) below, except that, if the Bank shall so agree, such revenues through other measures satisfactory to the Bank.	Such actions as could be taken by each of the borrowers resulted in seven meeting their covenanted obligation under 5.04(b) and five failing to meet it. See below.

Loan Agreement

Substance of Covenant

Extent of Compliance

Section 5.04(b)

The revenues in para. (a) above shall be sufficient:

- (i) to cover in any give year all operating expenses including employee compensations, depreciation and interest;
- (ii) to cover in any given year debt amortization insofar as it exceeds depreciation;
- (iii) to finance after payment of provided by law, if any, an average of not less than 35% of the cost of investment in power facilities during each plan period of the Guarantor.

The percentage contribution to capital expenditure varied widely, from 127% for Elektrarne Ljubljana to 9% for Electroprivreda Zagreb. Five of the borrowers failed to achieve the 35% contribution.

Section 5.04(c)

For purposes of the foregoing and as part of such information as may be requested under para. (b) of Section 6.01 of this Agreement, each of the borrowers shall, through JUGEL within the first six months of each fiscal year:

- (i) prepare and furnish annually to the Bank an updated cash flow analysis covering in every case all years of any current plan period of the Guarantor; and
- (ii) prepare and furnish to the Bank all other relevant information concerning the steps taken or planned to be taken by such borrowers in order to comply with its obligations under para. (a) and (b) of this section.

This information was routinely included in reporting requirements.

Section 9.01

The following events are specified as additional conditions of effectiveness of the Loan Agreement within the meaning of Section 11.01 (a) of the General Conditions.

Loan Agreement

Substance of Covenant

Extent of Compliance

Section 9.01(a)	The engineering consultants should have been employed as required by para. (a) of Section 3.02 of the Agreement.	Refers to consultants to assist in engineering and design. Essentially complied with.
Section 9.01(b)	All agreements referred to in Recitals (C), (D) and (E) to this Agreement and all agreements referred to in para. (b)(ii) of Section 3.02 of the Guarantee Agreement in form and substance satisfactory to the Bank shall have been duly executed and authorized or ratified by all necessary governmental and corporate action and shall be in full force and effect.	Refers to other sources of finance to be raised by borrowers. Complied with.
Section 9.01(c)	The draft of the program included in Part II(C) of the Project in form and substance satisfactory to the Bank, shall have been submitted to the Bank.	This refers to staff training. Essentially complied with.
Section 9.01(d)	A study prepared by the Borrowers and JUGEL of the market for electric power in Yugoslavia for the period through 1980 including an investment plan covering investments in power generation and transmission facilities to meet expected demand in such period indicating inter alia the order of priorities of such investments, shall have been submitted to the Bank.	Complied with.
Section 9.01(e)	Each of the Borrowers shall have taken initial measures satisfactory to the Bank to comply with the provisions set forth and referred to in Section 5.04 of this Agreement	Essentially complied with.

May 1981

**YUGOSLAVIA
FIRST POWER TRANSMISSION PROJECT (LOAN 836-YU)
CONSTRUCTION SCHEDULE - PLANNED AND ACTUAL**

Location of Transmission Lines and Substations	Length of Transmission (km)	Capacity of Substation (MVA)	1971				1972				1973				1974				1975				1976				1977				1978						
			I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV			
Elektroenergijske - Sarajevo																																					
Tuzla - Djetovo	a	70	-																																		
	b	82.2	-																																		
Mostar - Split	a	80	-																																		
	b	47	-																																		
Tuzgrad - Trebinje - Mostar	a	70	-																																		
	b	70	-																																		
Tuzla - Mostar	a	208	-																																		
	b	182	-																																		
Sarajevo - Buk Bijela	a	100	-																																		
	b	80	-																																		
Tuzla (Substation)	a	-	2x400																																		
	b	-	2x400																																		
Mostar (Substation)	a	-	2x400																																		
	b	-	2x400																																		
Hydroelektrane na Travnici Trebinje																																					
Tuzgrad - Trebinje - Mostar	a	100	-																																		
	b	87.1	-																																		
Trebinje (Substation)	a	-	-																																		
	b	-	-																																		
Elektroenergijske - Tuzgrad																																					
Tuzgrad - Trebinje - Mostar	a	78	-																																		
	b	61	-																																		
Tuzgrad - Kosovo	a	144	-																																		
	b	134	-																																		
Tuzgrad (Substation)	a	-	-																																		
	b	-	-																																		
Elektroenergijske - Rijeka																																					
Rijeka - Divaca	a	27	-																																		
	b	25.7	-																																		
Rijeka Split	a	194	-																																		
	b	180.8	-																																		
Rijeka (Substation)	a	-	-																																		
	b	-	-																																		
Elektroenergijske - Split																																					
Mostar - Split	a	70	-																																		
	b	68.6	-																																		
Rijeka - Split	a	96	-																																		
	b	89.8	-																																		
Split (Substation)	a	-	-																																		
	b	-	-																																		
Elektroenergijske - Zagreb																																					
Zagreb - Djetovo	a	140	-																																		
	b	135	-																																		
Zagreb - Krsko - Maribor	a	35	-																																		
	b	32	-																																		
Zagreb (Substation)	a	-	2x300																																		
	b	-	2x300																																		
Elektroenergijske - Osijek																																					
Tuzla - Djetovo	a	60	-																																		
	b	52.6	-																																		
Djetovo - Orenovac	a	60	-																																		
	b	51.5	-																																		
Zagreb - Kjekovo	a	105	-																																		
	b	98	-																																		
Djetovo (Ernestinova) Substation	a	-	2x300																																		
	b	-	2x300																																		

a - Planned
b - Actual

YUGOSLAVIA

FIRST POWER TRANSMISSION PROJECT (LOAN 836-YU)

Consultants Studies

1. The objectives of the studies were:
 - (a) the implementation of improved interconnected operation and system planning through the appointment of consultants for reporting on the needs and providing technical assistance and facilities for training abroad of key officers engaged in interconnected system management; and
 - (b) engagement of consultants to determine improvements needed in the organization and maintenance of accounting records.
2. The studies were divided into 12 tasks which are described briefly below. Twelve task report volumes were produced under the respective headings.

Task 1 - Load Forecasting

Existing methods and procedures for prospective capacity and energy planning are studied and evaluated and appropriate recommendations are made to improve such methods, taking into account short, medium and long term needs, annual and seasonal load variations, etc.

Task 2 - Utilization of the National Power Potential of Yugoslavia

This study reviews the current methods of investigations for development of the country's natural power resources and methods of utilizing these resources. It recommends guidelines for a national power policy aimed at securing optimum development and utilization of the country's power resources.

Task 3 - Planning the Generation System

Examines current development planning methods and procedures and recommends improvements with regard to selection and operation of generating capacity, type, size, location, character phenomena, etc., taking separately hydro, thermal and nuclear power plants, gas fired, pumped-storage, etc.

Task 4 - Planning the Transmission System

Examines present planning methods and puts up proposals for improving methods and procedures for planning, construction and operation of the transmission network including specific studies of load flows, stability criteria, short-circuit and transient overvoltage calculations, preparations of procurement procedures, construction, erection, commissioning and quality control.

Task 5 - Transmission Operation and Progressive Establishment of the 380-kV Network

Review and evaluation of the technical services engaged in the operation and maintenance of the transmission facilities. Evaluation of adequacy of existing technical services to handle the progressive establishment of a 380-kV network; review situations leading to unsafe or undesirable operating conditions and identify eliminating procedures.

Task 6 - System Operation and Energy Management

Review and evaluation of present procedures and facilities for system operation and energy management. Based on the identification of present and future needs, guidelines and recommendations are prepared for implementing new procedures and facilities for improving system operation and dispatch control and a plan is defined for their implementation.

Task 7 - 380 kV System Engineering

This study investigates transient overvoltages, analyses the influence of the power network on telecommunication and T.V. lines and verifies selected parameters of network development.

Task 8 - Interconnection and Parallel Operation with Neighboring Countries

This study investigates the problems and proposes solutions for operating the Yugoslav system with 220-kV and 380-kV ties to the systems of neighboring which are in operation in the East European pool. The task includes a study of the technical and operational problems and the economic justification of using ACDC-DCAC convertor stations for interconnection and simultaneous operation of the Yugoslav system with both large neighboring European power pools.

Task M1 - Organization

Reviews existing operational organization of the Yugoslav electric power industry and recommends a model organization which respects the present self managing and decentralized approach and which is based upon nationwide coordination to achieve maximum benefits.

Task M2 - Management Information Service Development

The present accounting and management information systems are reviewed and recommendations are made for improvements and the development of new models covering all main areas of an efficient financial management system for a power utility.

Task M3 - Tariff Structures, Commercial Policies

Reviews present tariff structures and policies; studies and recommends tariff policies and structures for all classes of consumer which will stimulate national utilization of the power capacities. Also studies and recommends tariff policies for energy exchange between power enterprises taking into account their existing cost structures and the benefits of joint operation.

Task M4 - Transmission Network Construction

Reviews present situations, identifying problems being encountered in managing the construction activities of the 380-kV project, and makes recommendations for improved management techniques and procedures at all stages for eliminating these problems and ensuring efficient project management.

YUGOSLAVIAFIRST POWER TRANSMISSION PROJECT (LOAN 836-YUDisbursements - Actual vs. Estimated
(US\$ Million)

<u>IBRD Fiscal Year</u>	<u>Appraisal Estimate</u>	<u>Actual Disbursements</u>	<u>Actual as % of Appraisal Estimate</u>
<u>1972/73</u>			
December 31, 1972	2.0	-	-
March 31, 1973	6.0	-	-
June 30, 1973	10.0	-	-
<u>1973/74</u>			
September 30, 1973	15.0	-	-
December 31, 1973	20.0	-	-
March 31, 1974	26.0	0.6	2.3
June 30, 1974	32.0	6.0	18.8
<u>1974/75</u>			
September 30, 1974	38.0	9.9	26.0
December 31, 1974	45.0	15.3	34.0
March 31, 1975	52.0	21.0	40.4
June 30, 1975	58.0	35.5	61.2
<u>1975/76</u>			
September 30, 1975	63.0	39.6	62.8
December 31, 1975	66.0	45.6	69.1
March 31, 1976	69.0	51.9	75.2
June 30, 1976	71.0	55.4	78.0
<u>1976/77</u>			
September 30, 1976	73.0	58.9	80.7
December 31, 1976	75.0	60.2	80.3
March 31, 1977	-	62.0	82.7
June 30, 1977	-	64.2	85.6

<u>IBRD Fiscal Year</u>	<u>Appraisal Estimate</u>	<u>Actual Disbursements</u>	<u>Actual as % of Appraisal Estimate</u>
<u>1977/78</u>			
September 30, 1977	-	65.9	87.9
December 31, 1977	-	67.2	89.6
March 31, 1978	-	68.7	91.6
June 30, 1978	-	70.1	93.5
<u>1978/79</u>			
September 30, 1978	-	71.6	95.5
December 31, 1978	-	72.8	97.1
March 31, 1979	-	73.6	98.1
June 30, 1978	-	74.0	98.7
<u>1979/80</u>			
September 30, 1979	-	74.8	99.7
December 31, 1979	-	75.0 <u>/1</u>	100.0

/1 Rounded figure. The actual disbursements as of December 31, 1979 came to \$74.99 million. The loan was fully disbursed as of February 7, 1980.

YUGOSLAVIA

FIRST POWER TRANSMISSION PROJECT (LOAN 836-YU)

Detailed Cost Estimates - Actual vs. Estimated
(Expressed in Yugoslav Dinars and US\$)

Distribution Among Enterprises

<u>Enterprise</u>	<u>Dinar (Millions)</u>						<u>US\$ (Millions)</u>					
	<u>Estimated at Time of Appraisal.</u>			<u>Actual on Completion of Project</u>			<u>Estimated at Time of Appraisal</u>			<u>Actual on Completion of Project</u>		
	<u>Local</u>	<u>Foreign</u>	<u>Total</u>	<u>Local</u>	<u>Foreign</u>	<u>Total</u>	<u>Local</u>	<u>Foreign</u>	<u>Total</u>	<u>Local</u>	<u>Foreign</u>	<u>Total</u>
Sarajevo	461	231	692	1,006	189	1,195	27.1	13.6	40.7	55.9	10.5	66.4
Trebinje	68	31	99	178	25	203	4.0	1.8	5.8	9.9	1.4	11.3
Rijeka	160	58	218	756	41	797	9.4	3.4	12.8	42.0	2.3	44.3
Split	122	43	165	561	33	594	7.2	2.5	9.7	31.2	1.8	33.0
Zagreb	400	144	544	593	47	640	23.5	8.5	32.0	33.0	2.6	35.6
Skopje	173	80	253	402	67	469	10.2	4.7	14.9	22.3	3.7	26.0
Titograd	146	68	214	342	59	401	8.6	4.0	12.6	19.0	3.3	22.3
Belgrade	862	333	1,195	1,696	254	1,950	50.7	19.6	70.3	94.2	14.1	108.3
Ljubljana	122	44	166	334	32	366	7.2	2.6	9.8	18.6	1.8	20.4
Maribor	143	51	194	635	38	673	8.4	3.0	11.4	35.3	2.1	37.4
Nova Gorica	63	22	85	413	14	427	3.7	1.3	5.0	22.9	0.8	23.7
Osijek	-	-	-	546	58	604	-	-	-	30.3	3.2	33.5
TOTAL	2,720	1,105	3,825	7,462	857	8,319	160.0	65.0	225.0	414.6	47.6	462.2

Note: Exchange Rate at time of appraisal was US\$1 = 17 Dinars.
Average Exchange Rates over period of Project for purpose of expressing final costs in US\$ were:

1972 - US\$1 = Y Din. 17	1976 - US\$1 = Y Din. 18
1973 - US\$1 = Y Din. 17	1977 - US\$1 = Y Din. 18.5
1974 - US\$1 = Y Din. 17	1978 - US\$1 = Y Din. 19
1975 - US\$1 = Y Din. 17.5	

YUGOSLAVIA

FIRST POWER TRANSMISSION PROJECT (LOAN 836-YU)

Summary of GWh Generated, Maximum Demand and Load Growth - Estimated and Actual

<u>Year</u>	<u>Estimated by JUGEL at Time of Appraisal</u>				<u>Actual</u>		
	<u>GWh Generated 1971 Forecast</u>	<u>GWh Generated 1972 Forecast</u>	<u>% Annual Increase 1972 Forecast</u>	<u>Maximum Demand (MW) 1972 Forecast</u>	<u>GWh Generated</u>	<u>% Annual Increase</u>	<u>Maximum Demand (MW)</u>
1972	31,580	31,168		5,030	33,231		4,988
1973	35,090	33,094	6.2	N.A.	35,063	5.5	5,182
1974	40,490	37,343	12.8	N.A.	39,456	12.5	6,000
1975	48,960	44,365	18.8	7,130	40,040	1.5	6,144
1976	52,570	46,917	5.8	N.A.	43,573	8.8	6,639
1977	56,850	52,629	12.2	N.A.	48,581	11.5	7,339
1978	63,840	58,483	11.1	N.A.	51,755	6.5	7,779
1979	69,410	63,722	9.0	N.A.	54,966	6.2	8,255
1980	75,050	72,963	14.5	11,887	59,726	8.7	9,200

N.A. = Not Available

May 1981

YUGOSLAVIA

FIRST POWER TRANSMISSION PROJECT (LOAN 816-YU)

Sources and Applications of Construction Funds: 1972-1978

Summary

(Millions of Dinars)

Sources	Sarajevo	Trebinje	Rijeka	Split	Zagreb	Osijek	Skopje	Titograd	Beograd	Ljubljana	Maribor	Nova Gorica	Total	%
Gross internal cash generation	1,366.3	1,283.3	1,394.0	455.3	1,947.5	944.5	1,803.5	376.9	2,748.0	339.0	1,467.0	454.7	14,599.6	36.4
Less: - Debt Service	(292.1)	(123.6)	(853.0)	(270.4)	(1,836.1)	(1,124.6)	(946.2)	(71.0)	(1,442.0)	(78.0)	(353.0)	(49.3)	(7,049.3)	(17.6)
- Transfers to other enterprises	-	-	(64.0)	-	(55.8)	(16.0)	-	-	-	(66.5)	(300.0)	(97.6)	(599.9)	(1.5)
Special measures	174.8	-	256.0	217.2	852.6	636.1	148.8	-	458.0	918.2	8423.0	177.2	6,267.6	15.7
Net cash generation and special measures	1,249.0	1,159.7	693.0	402.1	911.2	440.0	1,406.1	305.9	1,764.0	1,112.7	3,239.0	475.7	13,190.0	33.0
IBRD loan	291.4	40.0	66.0	49.9	74.1	90.6	109.6	89.7	389.5	20.0	59.5	25.5	1,310.8	3.3
Other borrowings	1,836.6	3,004.9	812.2	647.9	9,222.9	3,098.5	2,171.3	494.2	2,972.1	3,981.6	817.1	369.4	29,498.7	73.9
Add (Deduct): Working capital adjustments	(227.2)	264.3	2,407.8	131.5	(321.4)	33.0	(426.7)	(132.1)	(1,267.6)	(4,268.2)	(78.6)	(317.4)	(4,065.0)	(10.2)
TOTAL	3,049.1	4,768.9	3,979.0	1,233.4	9,956.2	3,662.1	3,196.3	753.3	3,858.0	875.4	4,037.0	553.2	39,922.5	100.0
Applications														
330 kV Network	1,195.5	203.1	797.3	594.1	639.8	603.8	469.2	401.1	1,990.0	366.3	672.2	427.1	8,319.5	20.8
Other capital expenditures	1,853.6	4,565.8	3,181.7	639.3	9,317.0	3,058.3	2,727.1	352.2	1,908.0	509.1	3,364.8	126.1	31,603.0	79.2
TOTAL	3,049.1	4,768.9	3,979.0	1,233.4	9,956.8	3,662.1	3,196.3	753.3	3,858.0	875.4	4,037.0	553.2	39,922.5	100.0

1978

ROMANIA
FIRST FOUR TRANSFORMER PROJECT (LOW 036-III)
Sources of Construction Funds: 1972-1978
(Millions of New Lei)

	1972	1973	1974	1975	1976	1977	1978	1979/80	Total	%
Subtotal										
State-owned - State	109.6	125.4	128.5	167.6	155.4	271.3	374.5	-	1,366.3	44.8
from internal cash generation	(34.2)	(13.1)	-	(17.0)	(33.8)	(92.9)	(107.2)	-	(692.1)	(9.5)
transfers to other enterprises	-	-	-	-	-	-	-	-	-	-
special measures	143.8	138.5	128.5	184.6	189.2	364.2	481.7	11.4	1,366.3	57.7
1970 loan	69.1	92.3	114.5	130.6	67.5	73.1	92.2	-	599.0	17.0
other borrowings	16.6	22.6	69.7	84.8	61.4	35.2	20.9	-	291.4	9.5
working capital adjustments	(37.2)	(26.7)	(84.3)	268.0	422.4	344.7	699.2	(171.7)	1,895.6	60.2
TOTAL	109.6	125.4	128.5	167.6	155.4	271.3	374.5	(11.4)	1,366.3	(10.7)
from the Transilvania - Timok										
from internal cash generation	139.2	149.3	127.5	183.5	168.0	261.0	300.8	-	1,289.3	26.9
transfers to other enterprises	-	-	-	(10.8)	(3.0)	(7.6)	(17.5)	-	(23.6)	(2.5)
special measures	109.7	76.2	101.4	172.7	159.0	233.4	283.3	-	1,139.7	26.4
1970 loan	-	-	15.3	22.8	-	-	1.9	-	40.0	1.8
other borrowings	2.2	16.5	88.0	101.1	97.0	182.7	1,290.4	-	3,104.9	69.0
working capital adjustments	(14.8)	(11.7)	(108.7)	(109.9)	(130.0)	(97.2)	(70.0)	-	(604.3)	(11.8)
TOTAL	107.1	78.2	111.4	222.7	156.0	283.4	1,057.8	-	2,785.3	27.3
State-owned - State										
from internal cash generation	156.0	166.0	213.0	182.0	182.0	160.0	187.0	-	1,364.0	34.0
transfers to other enterprises	(127.0)	(63.0)	(93.0)	(80.0)	(111.0)	(142.0)	(229.0)	-	(973.0)	(21.4)
special measures	28.0	21.0	20.0	46.0	71.0	32.0	40.0	-	256.0	(6.0)
1970 loan	-	-	33.0	20.0	67.0	32.0	2.0	-	256.0	6.4
other borrowings	28.0	21.0	3.7	26.0	4.0	5.5	5.7	-	69.2	1.7
working capital adjustments	(91.0)	(61.0)	(118.0)	216.5	34.4	209.5	324.0	(3.8)	812.2	20.4
TOTAL	85.0	103.0	92.0	284.5	208.6	235.7	365.0	(3.8)	1,497.8	60.5
Other Transilvania - State										
from internal cash generation	39.3	35.2	67.9	47.5	73.5	90.0	109.5	-	495.3	36.9
transfers to other enterprises	(8.6)	(17.2)	(24.5)	(27.5)	(30.3)	(6.6)	(68.7)	-	(270.4)	(21.9)
special measures	7.4	6.3	16.1	17.5	11.1	53.5	49.1	-	217.2	17.6
1970 loan	-	-	99.7	109.6	110.8	78.9	7.6	-	492.1	37.6
other borrowings	68.6	6.5	19.2	17.5	74.9	55.6	340.9	1.9	497.9	4.1
working capital adjustments	(15.1)	(22.9)	(46.2)	57.9	84.3	83.8	9.6	(1.9)	174.8	10.8
TOTAL	100.2	65.7	106.5	138.7	123.1	201.2	220.0	(1.9)	1,224.2	100.0
State-owned - State										
from internal cash generation	80.1	111.5	114.3	139.9	209.2	274.3	362.0	-	1,497.5	39.5
transfers to other enterprises	(127.6)	(75.3)	(80.5)	(137.0)	(155.5)	(84.7)	(677.5)	-	(1,096.1)	(28.4)
special measures	14.9	6.4	10.0	16.0	30.4	10.7	8.1	-	92.5	(3.5)
1970 loan	-	-	109.0	129.6	110.2	107.7	9.1	-	576.6	14.5
other borrowings	227.7	141.0	232.6	249.3	23.4	14.8	9.5	2.9	912.2	23.6
working capital adjustments	(86.9)	(81.4)	(66.7)	1,619.3	1,880.6	3,122.6	1,704.1	(1.9)	9,292.9	241.1
TOTAL	228.2	155.8	160.5	1,995.7	2,277.2	2,710.5	1,695.3	(1.9)	9,292.8	(91.3)
State-owned - State										
from internal cash generation	42.4	66.0	86.8	67.5	167.6	253.4	220.8	-	944.5	22.7
transfers to other enterprises	(11.0)	(7.4)	(9.8)	(36.2)	(16.0)	(67.6)	(316.2)	-	(1,124.6)	(30.7)
special measures	12.6	60.3	92.3	71.6	122.8	138.7	114.8	-	695.1	(16.0)
1970 loan	-	-	112.3	102.9	76.0	87.2	5.7	-	467.6	12.0
other borrowings	43.9	21.5	116.9	31.5	27.0	12.9	5.7	1.9	90.6	2.5
working capital adjustments	(12.6)	(60.2)	(95.3)	814.3	1,061.1	1,238.4	841.5	(1.9)	3,098.5	84.6
TOTAL	100.5	200.6	186.1	1,608.5	2,291.1	2,791.3	1,615.6	(1.9)	3,668.1	100.0

NICOSIAYA
FIRST POWER TRANSMISSION PROJECT (LOAN 896-10)
Summary of Construction Profile: 1972-1978
(Millions of Dollars)

	1972	1973	1974	1975	1976	1977	1978	1979/80	Total	%
<u>Electricity - Domestic</u>										
<u>Gross Internal cash generation</u>	81.9	129.4	272.1	341.0	247.2	387.1	391.2	-	1,809.5	95.4
<u>Debt service</u>	(50.6)	(56.9)	(60.2)	(59.9)	(71.1)	(109.6)	(137.6)	-	(546.2)	(17.0)
<u>Transfers to other enterprises</u>	-	-	-	-	-	-	-	-	-	-
<u>Special measures</u>	21.3	113.5	232.2	192.1	175.8	277.2	148.2	-	1,488.8	1.6
<u>Temp Loan</u>	-	-	8.5	16.3	19.8	14.8	105.2	-	178.1	4.0
<u>Other borrowings</u>	81.9	99.0	82.5	16.0	231.9	342.7	1,380.2	1.9	2,117.6	3.3
<u>Working capital adjustments</u>	19.7	(21.5)	(22.2)	2.6	(0.5)	(221.8)	(69.1)	(1.9)	2,117.3	(106.7)
<u>TOTAL</u>	113.3	180.0	300.3	300.0	277.0	413.5	1,175.3	-	1,196.3	(100.0)
<u>Electricity - Foreign</u>										
<u>Gross Internal cash generation</u>	37.1	31.8	32.3	49.1	37.0	79.0	99.5	-	376.5	49.9
<u>Debt service</u>	(4.2)	(1.5)	(5.0)	(4.2)	(4.1)	(15.1)	(2.6)	-	(71.0)	(9.1)
<u>Transfers to other enterprises</u>	-	-	-	-	-	-	-	-	-	-
<u>Special measures</u>	32.9	26.9	47.3	31.6	32.6	63.5	63.3	-	305.5	40.5
<u>Temp Loan</u>	-	-	20.3	9.3	3.6	112.3	1.9	-	88.7	11.8
<u>Other borrowings</u>	36.2	15.2	32.3	21.8	150.6	(24.0)	95.8	-	494.2	65.6
<u>Working capital adjustments</u>	(29.9)	(4.5)	(51.7)	(28.1)	(131.1)	(35.2)	(11.7)	-	(135.1)	(17.9)
<u>TOTAL</u>	16.2	37.6	22.8	20.1	103.1	(35.2)	(13.3)	-	73.3	(100.0)
<u>Electricity - Imported</u>										
<u>Gross Internal cash generation</u>	165.0	207.1	265.0	333.0	461.0	613.0	74.0	-	2,748.6	71.2
<u>Debt service</u>	(117.0)	(121.0)	(129.0)	(181.0)	(221.0)	(321.0)	(371.0)	-	(1,442.0)	(37.1)
<u>Transfers to other enterprises</u>	-	-	-	-	-	-	-	-	-	-
<u>Special measures</u>	8.0	49.0	106.0	155.0	140.0	230.0	333.0	-	1,481.0	11.9
<u>Temp Loan</u>	-	-	263.7	377.0	390.0	590.0	1,765.0	-	1,765.0	(57.7)
<u>Other borrowings</u>	8.0	49.0	106.0	155.0	99.1	22.2	89.3	7.6	389.5	10.1
<u>Working capital adjustments</u>	(38.0)	(68.0)	(176.0)	(284.6)	(384.0)	(822.0)	(231.0)	(32.8)	(2,972.1)	(77.0)
<u>TOTAL</u>	(30.0)	(155.0)	(350.0)	(574.2)	(721.0)	(1,455.0)	(1,204.7)	(7.6)	(3,958.0)	(32.8)
<u>Variable Electricity - Industrial</u>										
<u>Gross Internal cash generation</u>	35.0	41.5	51.7	36.3	44.8	55.9	76.8	-	336.0	31.7
<u>Debt service</u>	(11.8)	(4.0)	(9.0)	(4.3)	(5.0)	(11.7)	(25.2)	-	(78.0)	(8.9)
<u>Transfers to other enterprises</u>	(26.9)	(21.8)	(17.4)	(17.4)	(14.1)	(10.2)	(8.2)	-	(66.5)	(7.6)
<u>Special measures</u>	-	32.6	45.0	254.1	422.3	80.2	91.2	-	918.2	104.9
<u>Temp Loan</u>	(3.7)	40.3	45.0	254.1	422.3	80.2	91.2	-	1,112.7	137.1
<u>Other borrowings</u>	-	-	-	-	-	-	-	-	90.0	5.7
<u>Working capital adjustments</u>	10.1	(26.2)	1.7	24.5	14.1	3.7	1.9	3.8	3,981.6	494.8
<u>TOTAL</u>	15.5	(22.1)	(60.5)	(207.3)	(1,263.1)	(1,204.2)	(1,259.1)	(3.8)	(4,259.9)	(487.6)
<u>Domestic Electricity - Method</u>										
<u>Gross Internal cash generation</u>	164.0	177.0	299.0	349.0	295.0	217.0	236.5	-	1,467.0	36.3
<u>Debt service</u>	(53.0)	(49.0)	(48.0)	(42.0)	(61.0)	(28.0)	(40.9)	-	(351.0)	(8.7)
<u>Transfers to other enterprises</u>	(113.0)	(99.0)	(82.0)	(81.0)	(122.0)	(127.0)	(102.0)	-	(508.0)	(71.6)
<u>Special measures</u>	-	15.0	162.0	11.0	1,132.0	93.0	367.0	-	2,429.0	60.0
<u>Temp Loan</u>	(21.0)	-	127.9	13.5	124.4	12.9	82.3	7.6	3,239.0	2.5
<u>Other borrowings</u>	23.0	-	5.1	53.4	126.6	21.1	50.3	-	217.1	20.2
<u>Working capital adjustments</u>	13.0	(21.0)	(122.0)	(81.0)	(103.0)	(100.0)	(20.3)	(7.6)	(171.1)	(12.9)
<u>TOTAL</u>	39.0	(27.0)	(69.0)	(107.5)	(205.3)	(284.0)	(108.0)	(7.6)	(5,737.0)	(100.0)
<u>Domestic Electricity - Non-GenCo</u>										
<u>Gross Internal cash generation</u>	41.5	58.8	69.8	82.1	66.5	54.5	96.5	-	494.7	82.2
<u>Debt service</u>	(4.2)	(2.6)	(8.1)	(11.1)	(9.8)	(10.0)	(13.5)	-	(59.3)	(10.7)
<u>Transfers to other enterprises</u>	(23.9)	(34.7)	(21.3)	(14.7)	(65.3)	(71.5)	(90.2)	-	(177.9)	(17.6)
<u>Special measures</u>	-	22.3	37.3	21.5	7.2	131.0	7.2	-	177.9	22.1
<u>Temp Loan</u>	-	-	3.4	1.7	2.2	5.6	5.7	1.9	45.7	4.6
<u>Other borrowings</u>	19.3	17.1	14.8	41.0	122.2	34.1	120.9	-	369.4	66.7
<u>Working capital adjustments</u>	(12.3)	(9.5)	(21.5)	(31.6)	(76.9)	(20.6)	(120.9)	(1.9)	(317.4)	(57.3)
<u>TOTAL</u>	(12.3)	(29.2)	(30.3)	(75.5)	(175.5)	(191.3)	(32.3)	(1.9)	(532.2)	(100.0)

YUGOSLAVIA

FIRST POWER TRANSMISSION PROJECT (LOAN 836-YU)

Applications of Construction Funds: 1972-1978
(Millions of Dinars)

Borrower	Capital Expenditures	1972	1973	1974	1975	1976	1977	1978	Total
Elektroprenos - Sarajevo	380 kV	-	59.7	139.3	279.1	298.9	298.9	119.6	1,195.5
	Other	50.8	38.5	3.8	145.9	474.1	322.2	818.3	1,873.6
	Total	50.8	98.2	143.1	425.0	773.0	621.1	937.9	3,069.1
HE na Trebisnjici - Trebinje	380 kV	-	-	13.3	75.7	59.0	14.6	40.5	203.1
	Other	67.1	76.4	500.1	528.0	875.0	914.1	1,605.1	4,565.8
	Total	67.1	76.4	513.4	603.7	934.0	928.7	1,645.6	4,768.9
Elektroprivreda - Rijeka	380 kV	-	-	28.1	195.2	198.3	150.8	224.9	797.3
	Other	86.0	185.0	56.9	192.8	479.7	1,886.2	295.1	3,181.7
	Total	86.0	185.0	85.0	388.0	678.0	2,037.0	520.0	3,979.0
Elektroprenos - Split	380 kV	29.7	59.4	53.1	118.8	118.8	154.8	59.5	594.1
	Other	71.9	7.3	3.8	19.9	76.5	75.4	388.5	692.3
	Total	101.6	66.7	56.9	138.7	195.3	230.2	448.0	1,286.4
Elektroprivreda - Zagreb	380 kV	7.2	28.0	83.5	181.2	103.6	159.3	76.9	639.8
	Other	291.0	278.0	658.0	1,775.2	2,175.8	2,559.2	1,579.6	9,317.0
	Total	298.2	306.0	741.5	1,956.4	2,279.4	2,718.5	1,656.5	9,956.8
Elektroslavonija - Osijek	380 kV	1.8	3.4	94.5	208.3	144.5	117.0	34.3	603.8
	Other	98.7	197.2	301.6	1,470.6	94.6	515.3	380.3	3,088.3
	Total	100.5	200.6	396.1	1,678.9	239.1	632.3	414.6	3,692.1
Elektrostanstvo - Skopje	380 kV	-	-	-	141.1	147.6	137.4	43.1	469.2
	Other	156.0	160.0	80.0	102.9	279.4	276.1	1,672.7	2,727.1
	Total	156.0	160.0	80.0	244.0	427.0	413.5	1,715.8	3,196.3
Elektroprenos - Titograd	380 kV	-	23.8	31.9	57.6	86.0	101.9	99.8	401.1
	Other	19.2	13.8	20.9	144.5	57.1	53.3	43.5	322.2
	Total	19.2	37.6	52.8	202.1	143.1	155.2	143.3	723.3
Elektroistok - Beograd	380 kV	4.8	120.9	187.7	465.5	493.3	441.2	236.5	1,950.0
	Other	146.2	34.1	135.3	138.5	207.7	4.8	1,241.5	1,908.0
	Total	151.0	155.0	323.0	604.0	701.0	446.0	1,478.0	3,858.0
Savske Elektrarne - Ljubljana	380 kV	-	3.0	5.9	124.7	109.9	72.9	50.0	366.3
	Other	22.3	19.1	7.6	21.2	131.0	50.9	256.9	509.1
	Total	22.3	22.1	13.5	145.9	240.9	123.8	306.9	875.4
Dravske Elektrarne - Maribor	380 kV	27.8	24.4	134.4	168.1	217.2	67.2	33.7	672.2
	Other	6.2	4.6	31.6	465.9	289.8	896.8	970.3	3,364.8
	Total	34.0	29.0	166.0	634.0	1,207.0	964.0	1,004.0	4,037.0
Soske Elektrarne - Nova Gorica	380 kV	11.4	22.7	26.8	66.8	164.0	114.0	21.4	427.1
	Other	3.0	6.5	7.2	9.1	11.5	77.3	11.5	126.1
	Total	14.4	29.2	34.0	75.9	175.5	191.3	32.9	553.2
TOTAL	380 kV								8,319.5
	Other								31,603.0
	Total								39,922.5

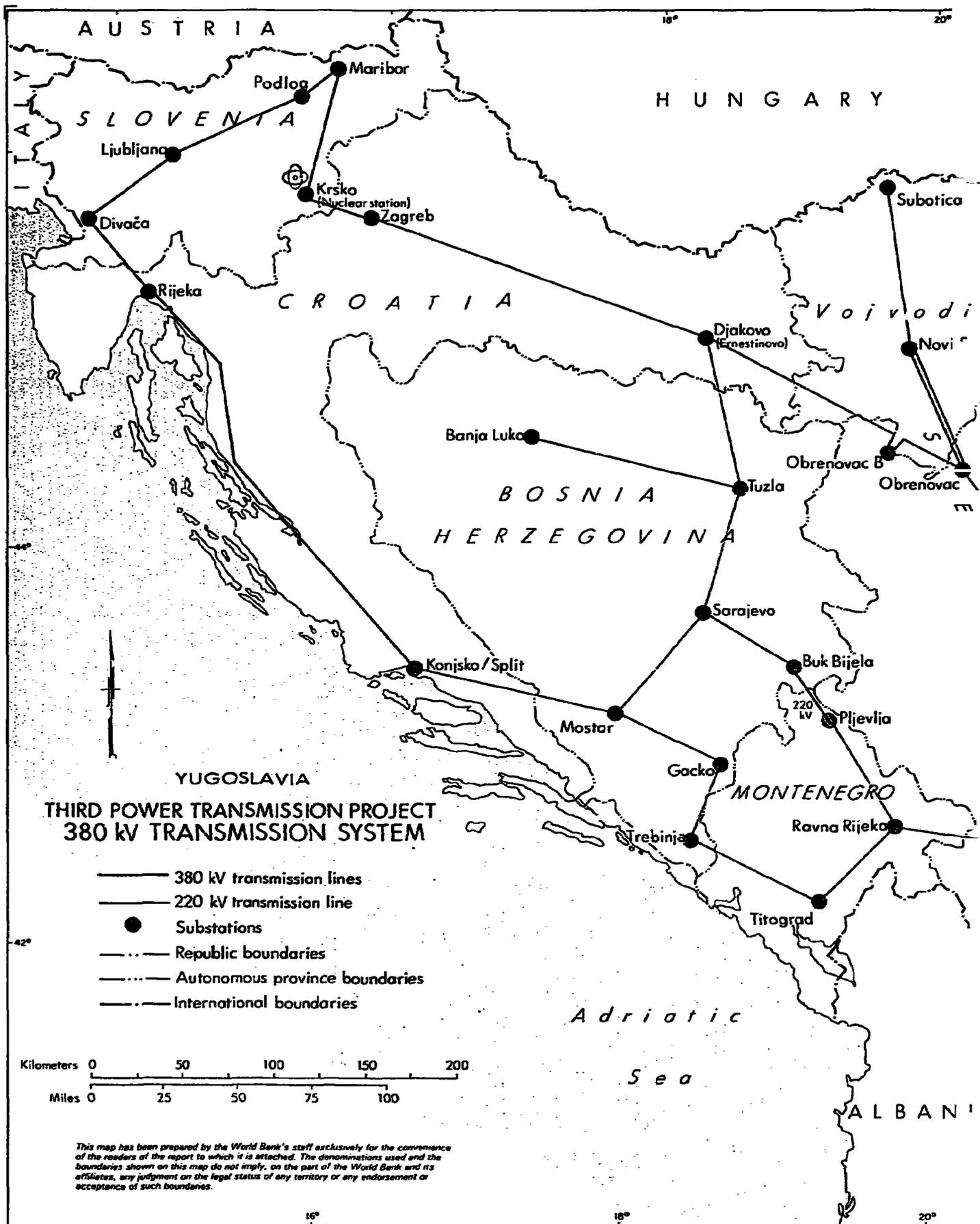
YUGOSLAVIA

FIRST POWER TRANSMISSION PROJECT (LOAN 836-YU)

Other Financial Statistics - 1970/1978

	<u>Long-Term Debt</u>		<u>Equity Capital</u>		<u>Debt/Equity Ratio</u>		<u>Debt Service Coverage</u>	
	<u>(Millions of Dinars)</u> <u>1970 (a)</u>	<u>1978</u>	<u>(Millions of Dinars)</u> <u>1970 (a)</u>	<u>1978</u>	<u>1970 (a)</u>	<u>1978</u>	<u>1970 (a)</u>	<u>1978 (b)</u>
<u>Bosnia Herzegovina</u>								
Elektroprivreda Sarajevo	295	2,632	225	3,173	57/43	45/55	3.4	3.8
HE na Trebisnjici Trebinje	702	3,306	165	4,221	81/19	44/56	2.2	17.2
<u>Croatia</u>								
Elektroslavonija Osijek	60 (a)	2,931	391 (a)	2,679	13/87 (a)	52/48	2.8 (a)	1.3
Elektroprivreda Rijeka	1,376	1,761	396	4,000	78/22	31/69	2.0	1.0
Elektroprivreda Split	105	867	215	1,312	33/67	40/60	3.0	2.3
Elektroprivreda Zagreb	835	5,565	387	5,606	68/32	50/50	3.6	.9
<u>Macedonia</u>								
Elektrostopanstvo Skopje	1,003	3,244	351	6,706	74/26	33/67	2.3	3.9
<u>Montenegro</u>								
Elektroprivreda (ex Elektrocrnogora) Titograd	74	626	73	924	50/50	40/60	5.1	2.9
<u>Serbia</u>								
Elektroistok Begrade	910	4,027	250	5,775	78/22	41/59	1.4	1.9
<u>Slovenia</u>								
Savske Elektrarne Ljubljana	74	5,669	177	1,466	23/71	79/21	1.3	6.4
Dravske Elektrarne Maribor	719	3,710	515	5,162	58/42	42/58	1.4	16.6
Soske Elektrarne Nova Gorica	55	563	191	1,434	22/78	28/72	3.2	7.7

(a) Except for Elektroslavonija Osijek, where figures are for 1971.
 (b) Including income from special measures (surcharges, levies, grants).



A U S T R I A

H U N G A R Y

S L O V E N I A

C R O A T I A

B O S N I A
H E R Z E G O V I N A

Y U G O S L A V I A

M O N T E N E G R O

A d r i a t i c
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A L B A N I A

I T A L Y

V o i v o d i

42°

16°

18°

20°

