

PD-AAJ-445

LSN 946

497-0231

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

CAPITAL ASSISTANCE PAPER

Proposal and Recommendations
For the Review of the
Development Loan Committee

INDONESIA: WEST JAVA INTERIM GENERATION
(AMENDMENT)

AID/DLC/P-1081/2

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

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AID-DLC/P-1081/2
October 5, 1973

MEMORANDUM FOR THE DEVELOPMENT LOAN COMMITTEE

SUBJECT: Indonesia - West Java Interim Generation- Amendment

Attached for your review are the recommendations for increasing by \$6.500,000 a loan (No. 497-H-030) made to the Government of Indonesia in an amount of \$6.800,000 to finance the procurement and installation of 40 MW of gas turbine interim capacity for West Java to meet an anticipated power shortage during the 1974 dry season.

This loan proposal is scheduled for consideration by the Development Loan Staff Committee at a meeting on Wednesday, October 17, 1973.

Development Loan Committee
Office of Development
Program Review

Attachments:
Summary and Recommendations
ANNEXES I - III

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LOAN AMENDMENT
INDONESIA - WEST JAVA INTERIM GENERATION

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G. Statutory Criteria

This loan meets all statutory criteria as presented in the original Capital Assistance Paper.

H. Mission and Embassy Views

USAID and the Country Team recommend that the loan amendment be made.

I. Recommendation

Authorization of an amendment to Loan 497-H-030 to increase the loan from U.S. \$6.8 million to U.S. \$13.3 million in accordance with the terms and conditions set forth in the draft authorization in Annex 1.

AID/W Capital Assistance Committee

Chairman	ASIA/CD, Alexander R. Love
Loan Officer	ASIA/CD, Peter Bloom/Tom Rishoi
Engineer	ENGR/OPNS, Earl Clark
Legal Advisor	GC/ASIA, Jay Burgess
Desk Officer	ASIA/EA/I, Alexis Rieffel

LOAN AMENDMENT

INDONESIA - WEST JAVA INTERIM GENERATION

UNCLASSIFIED
AID-DLC/P-1081/2
October 5, 1973

SUMMARY AND RECOMMENDATIONS

A. Borrower

Borrower is the Government of Indonesia (GOI); the beneficiary is Perusahaan Umum Listrik Negara (PLN), a wholly owned government enterprise, exclusively responsible for generation transmission and distribution of electric power in Indonesia.

B. Loan

1. Amount: U.S. \$6.5 million loan amendment increasing Loan 497-H-030 from \$6.8 million to U.S. \$13.3 million.

2. Terms: 40 years maturity including 10 year grace, with 2% interest during the grace period and 3% thereafter. GOI to reloan proceeds to PLN on terms and conditions agreeable to A.I.D.

C. Total Cost of Project

Total project cost (initial loan plus amendment) is estimated at U.S. \$14.5 million of which A.I.D. will finance foreign exchange costs of U.S. \$13.3 million and local currency cost of U.S. \$1.2 million equivalent will be provided from the GOI National Development Budget.

D. Purpose of Loan Amendment

The purpose of this project amendment is to provide additional interim generation capacity for Jakarta to insure firm power during the end of the 1974 dry season and contribute toward meeting the projected peak load demand in 1975 and beyond. The loan amendment will finance the foreign exchange costs of imported equipment, materials, engineering, installation and training services required to procure and install up to 52 MW of gas turbine generation capacity.

E. Alternative Financing

This project is part of the U.S. commitment under the Inter-Government Group on Indonesia. Other donors working in the Indonesia power sector include IBRD, Federal Republic of Germany, Japan, France, the Netherlands, the United Kingdom, Denmark and the Asian Development Bank. The Ex-Im Bank advised it was not interested in financing this project and has confirmed it has no interest in financing this amendment.

F. Issues

None

WEST JAVA INTERIM GENERATION

I. INTRODUCTION

A. Purpose and Amount of Loan Amendment

The purpose of this project is to provide additional interim generation capacity for Jakarta to insure firm power during the end of the 1974 dry season (October-December) and contribute toward meeting the projected peak load demand in 1975 and beyond.

This loan amendment will finance the foreign exchange costs of imported equipment, materials, engineering, installation and training services required to procure and install up to 52 MW of additional interim generating capacity at Jakarta, the largest load center in the West Java system. The loan amendment will provide additional U.S. \$6.5 million to finance two additional gas turbine generators. This loan amendment, together with \$6.8 million for the initial two generators, will bring the total foreign exchange cost of the project to \$13.3 million. Rupiah equivalent for the total project (4 generators) will total U.S. \$1.2 million and will be provided by the Government of Indonesia (GOI) to finance local currency costs of the project.

B. Background

On February 28, 1973, A.I.D. authorized a loan for \$6.8 million to assist in financing interim generation capacity of 40 MW for the Jakarta area to be installed in July 1974 at the start of the dry season. This is the beginning of the period when hydrogenerating capacity starts to decline because of reduced rainfall. Justification for the original two units was set forth in the A.I.D. Capital Assistance Paper entitled "Indonesia-West Java Interim Generation," (AID/DLC/P-1081).

In that paper, it was indicated that A.I.D. was also considering a request to provide an additional two gas turbine generating units for interim generating capacity needed to help meet projected peak demand throughout 1975. Combined capacity of the units in the initial loan was estimated to be 40 MW based on projected procurement of two General Electric 20 MW units on a proprietary basis. Subsequently, Westinghouse advised it would manufacture a gas turbine unit that would meet the U.S. source/origin requirements. The actual bid award was made to Westinghouse on a competitive bid basis for two 26 MW units. It was recognized that even with the additional generating capacity being provided by the first two units, there could be a deficit in firm power toward the end of the dry season under various conditions, e.g., a very dry season and hydro-out, loss of the largest thermal unit, etc. (An analysis of West Java generating capacity load and potential deficit under various assumptions is made in Section II of this paper.)

The GOI has now requested that installation of the two additional units take place by October 1974 in order to assure that firm power is provided throughout the 1974 dry season and to assist in meeting the projected deficit in 1975 and thereafter. In order to meet the GOI's expressed priority for the earlier installation date, A.I.D. agreed to seek a loan amendment to Loan No. 497-H-030, West Java Interim Generation, to permit the purchase of two additional gas turbine units.

C. Borrower and Beneficiary

The Borrower is the Government of Indonesia, the Beneficiary is Perusahaan Umum Listrik Negara (PLN), a wholly owned government enterprise. The organization, management, progress of reforms, personnel and training of PLN have been amply set out in the Capital Assistance Paper for the first two units (AID/DLC/P-1081) and for the West Java Transmission and Distribution, Phase II Project (AID/DLC/P-1078). There have been no major changes in status since the issuance of those papers. IDA has recently signed a third credit for the power sector with the GOI to provide the 2 x 100 MW oil fired generating station at Jakarta. PLN, as part of the credit agreement, will be required to rapidly implement a number of recommendations for reform which are being made by SOFRELEC, the IDA financed consultant examining the organization and management of PLN. These involve cost cutting and revenue increasing steps which should aid in a more effective operation directed at moving PLN toward financial self-sufficiency. IDA has targeted 1978-79 as the time when PLN is to reach a break even point, covering operation costs and depreciation, although not debt service.

II. Project Evaluation

A. Load and Generating Capacity Analysis

Load

The following load projections for electric power in West Java are based on a 1972 report prepared by the Charles T. Main Company titled "Electric Power and Economic Development Forecast for West Java."

Load Forecast/West Java
December each yr.
(Megawatts)

<u>Year</u>	<u>Jakarta</u>	<u>Region XI</u>	<u>Region XII</u>	<u>Total West Java</u>
1973	128	83	37	269
1974	149	95	42	311
1975	174	112	49	365
1976	204	137	60	434
1977	237	169	74	508
1978	265	208	91	596
1979	297	256	112	701
1980	333	316	138	827

(Region XI and XII are the two Western most of PLN's operating regions in Java)

Jakarta together with Regions XI and XII comprise the load areas which are served by generating capacity in West Java. These projections represent the expected load (most probable) taken from the minimum and maximum growth estimates. An analysis of the power load for West Java in June, 1973 indicates that it is running very close to the amount forecasted in the Main study. However, it is likely that there is a suppressed demand because of the limited amount of generating capacity available by PLN. This is evidenced by the large amount of captive generation operating in West Java.

A more detailed discussion of load growth in West Java is presented in the original loan paper Section VI.

Generating Capacity

The determination of available generating capacity requires that certain assumptions be made with regard to (1) probable generating units out of service, e.g., for maintenance and (2) the water year because of the critical dry season (September-November) and the heavy reliance on hydro power which is sensitive to fluctuating and non-predictable weather condition. Firm capacity in West Java during these months can be represented as the range between generating capacity available under the following assumptions:

(1) an average water year occurs and the largest thermal unit is out and

(2) a dry year occurs and the largest thermal unit is out.

In 1973 under assumption 1, there is 201 MW of firm generating capacity available; under assumption 2 above, this is reduced to 101 MW capacity. A comparison with the load forecast above indicates a substantial gap between capacity and demand.

To meet the deficit problem, PLN at the recommendation of its consulting engineer C. T. Main has embarked on a program to install up to 12 gas turbine units totaling approximately 230 MW for supplemental interim generation until the IDA financed 200 MW plant goes on line in 1977. For 1974, there is a firm commitment for five additional units including the two 26 MW units being financed under the original loan. The others include one UK (20 MW) and two French (2 x 20 MW). In 1974 this additional 112 MW of generating capacity would just provide adequate power given an average water year. Should a less than average water year occur a deficit of up to 98 MW could occur depending on how much hydro power is lost. In 1975, there would be a deficit ranging from 52 MW to 152 MW. An additional two units to be financed by A.I.D. totaling 40 to 52 MW will contribute to assuring firm power in 1974 and contribute toward meeting the increased demand in 1975 and beyond. As part of its program to meet West Java power needs, PLN is continuing discussions with other donors, particularly France and West Germany, as to timing of additional gas turbine units required until the 200 MW steam unit is in operation.

B. Economic Justification

The benefits to be obtained from this project are: (1) the provision of reliable/firm power particularly during the dry season; (2) use of the units for peaking and standby during the year and; (3) possible use of the units in other areas of Indonesia after the thermal plant financed by the IBRD comes on line in 1977. The economic analysis in the original loan paper assumed an installation date of these additional units in mid-1975. The October 1974 installation date requested by the GOI increases the ability of PLN to provide firm power for the 1974 dry season as well as contribute to meeting the projected short-falls in 1975 and beyond. Firm power during this period will provide substantial economic benefits to the economy. While these are not readily quantifiable, power outages have been seriously damaging to Jakarta in the past. From mid-September to mid-December 1972, the great majority of power consumers in West Java, including Jakarta, experienced power outages up to 50% of the time. This produced a substantial loss of production to the economy as well as considerable inconvenience to customers including health and safety hazards. The provision of this added generating capacity will reduce the possibility of such losses.

Capital costs for these units is about \$135 per KW of capacity. Operating cost will be about 24 mills U.S. per KWH of power sold, using a 7% interest rate. Effective June 12, 1973, PLN increased its average power rate from 19 mills U.S. per KWH to 26.6 mills U.S. per KWH an increase of about 40%. The new rate will allow PLN to cover the operating costs of the turbines and to amortize a portion of the capital investment.

C. Technical Analysis and Project Costs

The proposed gas turbines will be installed in Jakarta at the Pulo Gadung substation. An analysis of existing West Java generation, transmission and distribution facilities has been presented in the original loan paper and the loan paper for West Java Transmission and Distribution, Phase II.

Engineering Design and Supervision

Engineering design requirements for this project (essentially a procure/install activity) are limited. PLN has established the site at Pulo Gadung in an area immediately adjacent to the double circuit 70 KV transmission loop encircling Jakarta. Site layout drawings, complete with topography should be prepared. Soils testing must be accomplished as a basis for foundation design. Switchgear and connections must be specified. The Invitation for Bids (IFB) for the gas turbine generating plant at Tandjung Priok, with minor modifications, will be suitable for use on this project. It is considered highly advisable that supervisory engineering services be provided during the installation, testing and acceptance phases.

Procurement and Installation of Gas Turbine/Generators

The project consists of providing interim generating facilities in the Jakarta area. It includes related technical assistance and a training program for the operation and maintenance of the installation. The generating plant will consist essentially of two gas turbine/generators with an initial installed capacity of up to 52 MW. The units will be simple cycle machines of the industrial type equipped to operate at maximum design conditions when burning distillate oil (IDO) at site conditions of sea level and 98°F. The units will be complete with synchronous generator, exciter, turbine and generator control panels, metal clad switchgear, lubricating oil, fuel protection and compressed air systems, fuel handling and pumping equipment and black start capability. Installation will be at the Pulo Gadung site in the Jakarta metropolitan area. Tools for servicing and instruments for testing the equipment will also be provided to assure PLN capability for adequate operation and maintenance of the installation.

Environmental Considerations

This project consists, essentially, of a relatively small installation of generating capacity in an area already taken over exclusively for industrial estates. Alternative land use, protection of forest and grazing lands (none exist or are contiguous), noise pollution, etc., do not appear to be factors for consideration in this project. Aesthetics, apart from assuring a workmanlike and utilitarian installation, do not appear to be a factor.

Finding of Technical Soundness

The project scope has been defined, a suitable site has been selected, and a reasonable implementation plan has been developed as outlined above. Provision has been made for technical assistance, training and basic tools and equipment as required to assure a PLN capability to operate and maintain the facility to be constructed. The project, and the estimated basic costs thereof, reflect the findings of a well qualified U.S. consulting firm. The project is considered technically sound as presented.

Project Costs

Cost estimates are based on actual bid prices received for the first two units and the actual award made to Westinghouse (See Sec. III below). The dollar cost for the first two units and spare parts was \$6.2 million. While the cost of engineering services has not yet been finalized, it is estimated at \$100,000. Assuming that prices remain approximately the same, the estimated dollar cost for all four units would be about \$12.6 million as indicated in the table below. An additional 5% has been added for contingencies which include such items as escalation and bidding variation.

Additional total funding required is \$7.0 million consisting of U.S. dollar cost of \$6.5 million and the local currency equivalent of \$.5 million. A summary of total project costs including all four units, follow.

	<u>Amount Per Loan</u> <u>497-H-030</u>	<u>Increase</u>	<u>Total</u> <u>U.S. \$</u>	<u>Local Currency</u> <u>\$ Equivalent</u>	<u>Total</u>
<u>A. Equipment</u>					
1. Gas Turbine Gen. Capacity	4640	5940	10580		10580
2. Fuel Treatment Systems	225	250	475		475
3. Substation/Switch Station	620	180	800		800
4. Spare Parts	170	160	330		330
5. Special Test Equipment	30	-	30		30
6. Communication Equipment	50	10	60		60
7. Heavy Lift	-	-	-	30	30
Subtotal	5735	6540	12275	30	12305
<u>B. Services and Installation</u>					
1. Erection and Installation Supervision	260	(176)	84	12	96
2. Foundation	-	-	-	60	60
3. Installation Labor and Miscellaneous material	-	-	-	400	400
4. Fuel Storage and Line	-	-	-	500	500
5. Transmission Tie	-	-	-	10	10
6. Training in U.S.	30	30	60	-	60
7. Engineering Supervision	180	20	200	10	210
Subtotal	470	(126)	344	992	1336
Subtotal-Sections A & B	6205	6414	12619	1022	13641
C. Contingency	<u>595</u>	<u>31</u>	<u>681</u>	<u>178</u>	<u>859</u>
Total Cost	6800	6500	13300	1200	14500

* Pipeline and breakers not included in estimate and will be provided by PLN.

III. PROJECT IMPLEMENTATION AND PROCUREMENT

A. Implementation

To meet the PLN timetable the gas turbine generating capacity is intended to be installed by October 1974. We have contacted the two U.S. gas turbine suppliers, General Electric and Westinghouse, and they have stated that within 12 months after bid award they can have the units operational. The implementation schedule follows:

Bid Issuance	September 21, 1973
Bid Opening	October 12, 1973
Bid Award	November 9, 1973
L/C Opened	November 23, 1973
Gas Turbine Operational	October 1, 1974

It is anticipated that if the loan agreement is not signed and appropriate CP's are met by November 9, 1973, the GOI will open a Letter of Credit using its own funds in order to meet the procurement schedule outlined above. Reimbursement would then be made by A.I.D. to the GOI after A.I.D. terms and conditions are met. This is the procedure being used under the original loan for the two units at Priok.

B. Procurement

In the Capital Assistance Paper for the first two units, a section was included justifying sole source procurement from General Electric which, at that time, was the only supplier meeting the U.S. source origin requirements for the gas turbine package. Subsequent to the loan authorization, Westinghouse, the only other supplier of the industrial type gas turbine required to meet PLN's needs, advised A.I.D. that it could now meet the source origin requirements. An IFB was then prepared by Charles T. Main, the consulting engineer, and approved by PLN and A.I.D. This IFB, calling for generating capacity of up to 52 MW, was issued to GE and Westinghouse and bids open in Jakarta on April 30, 1973.

Neither the General Electric nor Westinghouse bid was considered responsive. A rebid was held and on this second bidding both firms submitted responsive bids. Westinghouse bid two 26 MW units with a unit cost of approximately \$120 per KW and the General Electric bid for two 19.9 MW units had a unit cost of \$139 per KW installed. Since GE and Westinghouse are the only two suppliers who can meet the technical requirements of PLN, the source and origin requirements of A.I.D. and the critical delivery time required, the bidding procedure used on the first two units will also be used on the two units proposed in this amendment. It is also anticipated that the same bidding documents with minor revisions can be used. Bids will be opened shortly after authorization of this loan amendment to allow for early award and installation in order to meet the demands of the 1974 dry season.

IV. Other D.L. Information

A. Alternative Source of Financing

This project has been agreed to as part of the U.S. commitment for assistance to Indonesia under the Inter-Government Group in Indonesia. It is part of a major effort by a number of donors to rehabilitate and develop the Indonesia power sector, with significant loan assistance being provided by the IBRD, Japan, France, the FRG and the ADB. The Ex-Im Bank advised on February 21, 1973 that it was not interested in financing the first two units and has further confirmed on April 27, 1973 that it has no interest in financing this increase to the original A.I.D. loan for two additional units.

B. Conditions Precedent and Covenants

CP's and covenants will remain the same as those authorized under the original loan authorization (see Section XI of AID/DLC/P-1081, CAP West Java Interim Generation Loan 497-H-030) except for the following covenant which applies only to the second two gas turbine units proposed under this amendment:

PLN covenants to make available necessary funds for the construction of a fuel pipe line from the port at the Priok power plant site to the Pulo Gadung site and procurement of required circuit breakers associated with the Pulo Gadung units.

C. Other

Other conditions as explained in the original CAP/Loan Authorization continue in effect for this amendment.

ANNEX I

CAPITAL ASSISTANCE LOAN AUTHORIZATION AMENDMENT

Provided from: Development Loan Funds
(Indonesia: West Java Interim Generation)

Pursuant to the authority vested in the Administrator of the Agency for International Development (hereinafter called "A.I.D.") by the Foreign Assistance Act of 1961, as amended, and the delegations of authority issued thereunder, I hereby authorize pursuant to Part I, Chapter 2, Title I, the Development Loan Fund, the amendment of A.I.D. Loan No. 497-H-03C to the Government of the Republic of Indonesia ("Borrower") for reloan to the Perusahaan Umum Listrik Negara ("Beneficiary") as follows:

(a) The amount of the loan is increased by \$6.5 million to a total amount not to exceed \$13.3 million.

(b) The loan shall be subject to such other terms and conditions as A.I.D. may deem advisable consistent with the terms and conditions of the original Loan Authorization signed February 28, 1973, as amended herein.

D. G. MacDonald
Bureau for Asia

Date

ANNEX II

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AID-DLC/P-1081/2
October 5, 1973

STATUTORY CHECKLIST

Please refer to Annex XIII (Statutory Checklist) of the Capital Assistance Paper for Indonesia, West Java Interim Generation. AID-DLC/P-1081.

The above checklist has been reviewed and the statements of fact and conclusions contained therein are still accurate and applicable as they relate to this amendment.