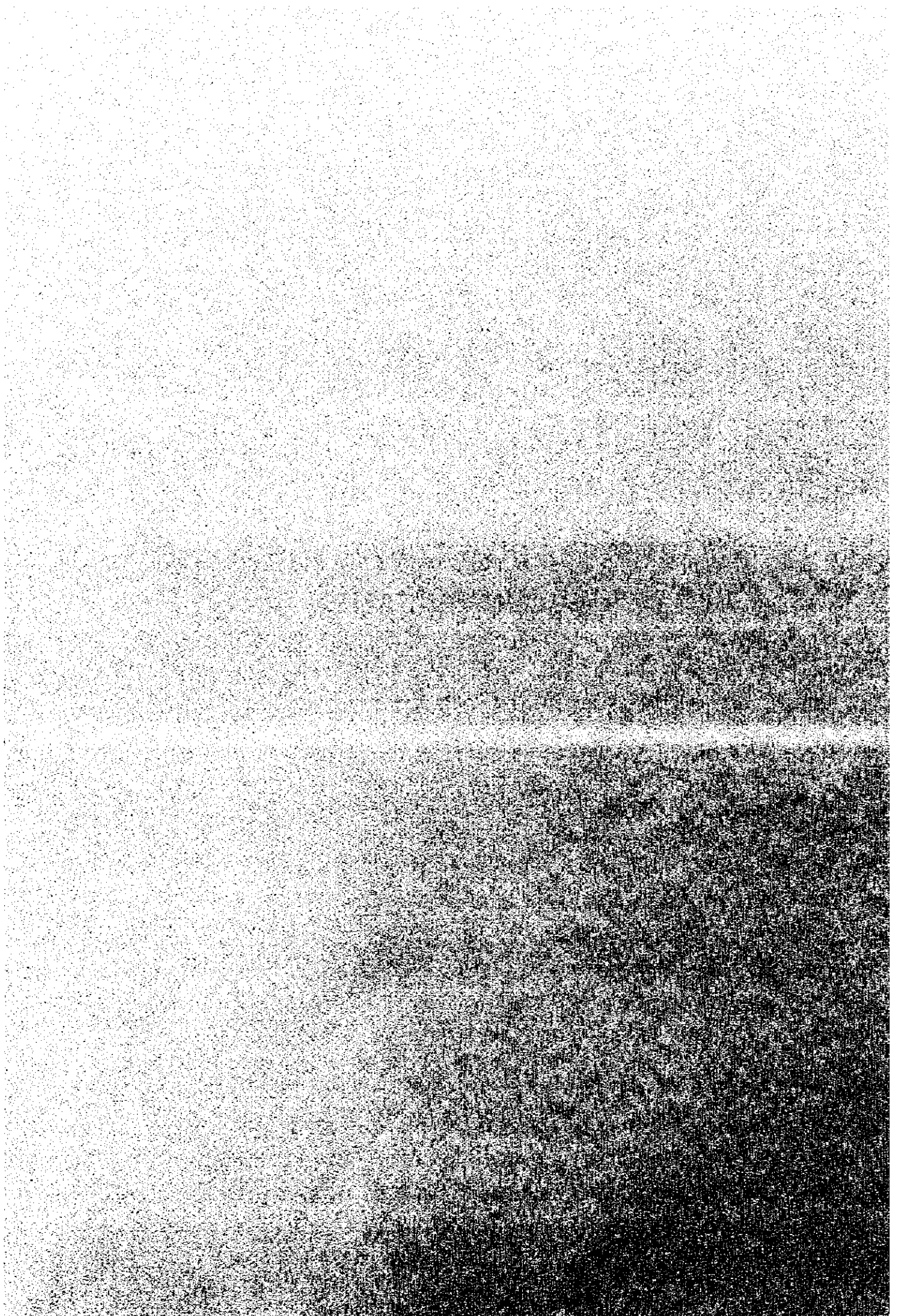


CHAPTER 4 PROJECT EVALUATION AND RECOMMENDATION



CHAPTER 4 PROJECT EVALUATION AND RECOMMENDATIONS

4-1 Project Effect

The implementation of the Project will mean the installation of a new generating unit (4.2 MW) at the Lungga Power Station which is the main power station in Honiara, the capital of the Solomon Islands. With the addition of this new generating unit, base load power supply in Honiara will be assured up to the target year of the Project, i.e. 2001, achieving improvement of the tight power supply situation in Honiara which is a priority issue in the energy sector in the Solomon Islands and also enabling stable socioeconomic activities as well as social life.

The operation and maintenance of the new generating unit after the completion of the Project will be conducted by the SIEA under the supervision of the MME. The SIEA is the sole power service sector in the Solomon Islands and operates 11 power stations nationwide. With the revision of the electricity tariff in 1993, the annual financial balance of the SIEA is now showing a surplus but the overall financial situation of the electricity sector is still far from ideal as the government is subsidising the SIEA's deficit originating from the electrification of local areas. The SIEA appears to be trying to improve its financial status as it prepared a future plan to review the electricity tariff immediately after the above-mentioned revision together with the introduction of a meter rate charge system. In the technical aspect, although the SIEA's operation and maintenance system requires improvement, particularly in regard to the lack of accurate instrumentation of the generating unit operation due to the ageing of measuring instruments and other relevant apparatus, most of the existing generating units have been overhauled, suggesting basic technical ability. In short, there are no foreseeable problems regarding the implementation of the Project from the viewpoint of the operation and maintenance of the planned generating unit.

In regard to the operating cost of the new generating unit to be procured and installed under the Project after its commissioning, it is believed that the operating balance will produce a profit with an annual operating rate of the new generating unit of 63% or higher based on the household electricity cost of SI\$ 0.375/kWh currently charged by the SIEA. At this operating rate, the future cost of equipment replacement, i.e. depreciation cost, can be met, making proper operation of the new generating unit possible. Among the equipment to be procured and installed under the Project, the diesel engine is expected to mostly affect the environment. However, the possible adverse impacts on people living near the Lungga Power Station can be minimized by the series of measures to deal with waste oil and exhaust, etc. to be adopted under the Project.

The implementation of the Project will consolidate an important component of the social infrastructure in Honiara (total population benefitting from the Project: 37,160 according to 1995 statistics) on Guadalcanal Island, the capital and centre of socioeconomic activities in the Solomon Islands, leading to the vitalisation of industrial and other economic activities, preservation of the capital's functions and improvement of the local standard of living.

The above assessment of the Project suggests that the Project can be implemented without any difficulty and that the Project is highly suitable vis-a-vis the grant aid system of the Government of Japan in view of the wide ranging benefits it will have in the Solomon Islands in general and Honiara in particular.

Current Situation and Problems	Improvement Measures Under the Project	Project Effects and Degree of Improvement
<p>1. While the electricity demand in the five year period from 1992 to 1997 has shown an annual increase rate of 7.7%, no additional generating unit to cater for the base load has been commissioned. The resulting supply shortage has necessitated supply restrictions, such as delayed new connection and planned power cuts, impeding stable social life and economic activities.</p>	<p>Installation of a new generating unit (4.2 MW) to provide the base load at the Lungga Power Station which supplies the base load for Honiara</p>	<p>Establishment of a stable base load generation capacity and reliable power supply system upto the year 2001, the target year of the Project</p>
<p>2. The total current output of all of the generating units in Honiara in 1997 is almost equivalent to the maximum load (9.7 MW), creating an extremely tight power supply and demand situation without any reserve supply capacity to meet a generating unit breakdown. Any breakdown, therefore, necessitates a planned power cut, leading to wide black-outs throughout the city. The lack of a reserve supply capacity makes it impossible to stop operation of the existing generating units for overhaul purposes, causing them to over-work.</p>	<p>As above</p>	<p>The estimated power supply and demand balance in the Project's target year of 2001 is 16.3 MW for the maximum load and some 20.9 MW for the total current output, securing a reserve supply capacity of some 4.6 MW. Stable power supply to meet the demand will be possible during the suspended operation of a generating unit(s) due to breakdown or overhaul.</p>
<p>3. Most of the generating units in operation at the Lungga Power Station, which provides the base load for Honiara, are some 10 years old and the excessive workload and ageing have reduced their current output to some 67% of the rated output, resulting in a poor fuel consumption rate (0.266 litres/kWh).</p>	<p>As above</p>	<p>The estimated fuel consumption rate of the new generating unit is 0.235 litres/kWh, an improvement of some 13% on the existing units. The use of the new unit as a base load generating unit promises the efficient and economical operation of the Lungga Power Station.</p>
<p>4. The current measure employed by the Lungga Power Station to deal with waste oil is inadequate and some waste oil escapes to the nearby mountain area, polluting the environment.</p>	<p>Procurement of an oil separator and an incinerator to treat the waste oil produced by the operation of the new generating unit and existing units</p>	<p>Environmental pollution caused by waste oil produced by the new generating unit as well as existing units will be alleviated.</p>
<p>5. The operation and maintenance staff of the Lungga Power Station have basic technical skills but lack systematic learning of the latest technologies.</p>	<p>Provision of O & M manuals and technical guidance on operation and maintenance by engineers dispatched by equipment manufacturers during the generating unit installation work and within the period specified by the E/N after commissioning of the unit</p>	<p>The provision of O & M manuals and OJT by engineers of through new generating facilities (if conducted) will enable the systematic transfer of technologies/techniques.</p>

4-2 Recommendation

The suitability of the Project for grant aid provided by the Government of Japan is confirmed by its wide-ranging benefits described earlier and also by its contribution to improving BHN in the Solomon Islands. In addition, as the Solomon Islands side has sufficient manpower and funds, no specific problems are anticipated in terms of the operation and management of the Project. Further improvement of the following points will, however, ensure the smooth and truly effective implementation of the Project.

- (1) The operation and maintenance staff of the existing power stations in the Solomon Islands have basic technique expertise regarding DEGs but require training on the latest technologies. It is, therefore, necessary for the SIEA to appoint operation and maintenance staff to be responsible for the new generating unit so that they can participate in the OJT which is recommended to be conducted as part of the Project.
- (2) The SIEA currently receives a government subsidy for its operation. It must consider the appropriate revision of its tariff to generate sufficient income to cover the operation and maintenance cost and the unit replacement cost in the future in order to ensure its self-financed development as an electricity generator and supply. The introduction of a gradually increasing tariff system under which a higher level of consumption faces a higher unit charge should be considered to encourage large consumers to reduce their power consumption while protecting low income families with a lower rate.
- (3) According to the SIEA, ordinary households properly pay the electricity charge while government users tend to be slow to pay, constituting one factor in the worsening financial condition of the SIEA. As reliable electricity charge collection is essential for the healthy management of power supply operation, the electricity charge owned by government organizations, which account for some 14% (1996) of the total sales, should be promptly collected without fail.
- (4) The environmental protection measures currently employed for the existing generating units at the Lungga Power Station in terms of waste oil, noise, etc. are insufficient, causing adverse impacts on the surrounding area. Maximum efforts must be made to improve this situation.

- (5) Accurate measurement data on the operation of the existing generating units at the Lungga Power Station is unavailable because of the absence or deterioration of such main measuring instruments as a fuel flowmeter, watt-hour meter, power factor meter, etc. The SIEA should make efforts to urgently improve this situation as the use of these measuring instruments is essential not only for analysis of the operating status of the power station but also for the efficient operation of the total power supply system.
- (6) The fuel tank (55 m³) included in the original request made by the Government of the Solomon Islands has been removed from the scope of procurement under the Project because of the fact that the existing fuel tanks belong to the private sector and other reasons.

While the fuel tank capacity of a power station operating in an island country like the Solomon Islands is required to meet at least two weeks operation or one month's operation if possible in view of the possible delay of fuel delivery by an oil tanker due to bad weather, etc., the requested addition of one 55 m³ tank would, together with the existing tanks, meet only up to 4.2 days fuel consumption. Accordingly, the SIEA should thoroughly examine the future management system of the Lungga Power Station as a whole and should formulate and implement a plant and equipment investment plan to ensure the long-term, efficient use of the facilities instead of adopting a temporary measure.

- (7) The implementation of the Project will result in a reserve supply capacity of 4.6 MW in the year 2001, ensuring stable power supply operation. However, the power demand is expected to exceed the supply capacity in 2004, three years after the target year of the Project. The Government of the Solomon Islands and the SIEA should, therefore, urgently prepare a plan to further increase the power supply capacity in the post-Project period.

APPENDIX

Appendix 1 List of the Survey Team

Appendix 1 List of the Survey Team

1. Member of the Basic Design Study Team

Name	The business for which he is responsible	The present post
Mr. Kenji MATSUMOTO	Team Leader	Deputy Director of Coordination and Appraisal Division Grant Aid Project Study Department JICA
Mr. Tsutomu TANAKA	Coordinator	First Project Study Division Grant Aid Project Study Department JICA
Mr. Masatsugu KOMIYA	Chief Consultant / Operation and Maintenance Planner	Yachiyo Engineering Co., Ltd.
Mr. Hirohito SETO	Power Plant Planner	Yachiyo Engineering Co., Ltd.
Mr. Noritsune CHIBA	Facility Planner / Procurement Planner	Yachiyo Engineering Co., Ltd.

2. Members of the Explanation Team for the Draft Basic Design

Name	The business for which he is responsible	The present post
Mr. Norihiro IKEDA	Team Leader	First Project Management Division Grant Aid Project Management Department JICA
Mr. Masatsugu KOMIYA	Chief Consultant / Operation and Maintenance Planner	Yachiyo Engineering Co., Ltd.
Mr. Hirohito SETO	Power Plant Planner	Yachiyo Engineering Co., Ltd.

Appendix 2 Survey Schedule

Appendix 2 Survey Schedule

1. Itinerary of the Basic Design Study

Date (Day of the week)	Activity	Details	Stay at
Nov. 16 (Sun.)	Traveling	Departure from Narita by JL761 (21:40)	Airplane
Nov. 17 (Mon.)	Traveling	Arrive at Brisbane (07:25) Trip from Brisbane to Honiara by IE701 (16:15 -20:15)	Honiara
Nov. 18 (Tue.)	Courtesy Call	Courtesy call to the Embassy of Japan, JOCV office	Honiara
	Discussion on IC/R	Courtesy call to The Ministry of Mines & Energy (MME) and The Solomon Islands Electricity Authority (SIEA), Submission and Explanation of the Inception Report	
Nov. 19 (Wed.)	Discussion on IC/R	Discussion with MME and SIEA on the Inception Report	Honiara
	Courtesy Call	Courtesy call on the Minister of MME	
	Field Survey	Field Survey on the Lungga Power Station	
	Preparation of M/D	Preparation of the Draft Minutes of Discussions (M/D)	
Nov. 20 (Thu.)	Field Survey	Field survey on the Honiara Power Station	Honiara
	Discussion on M/D	Presentation, explanation and discussion on M/D (draft)	
Nov. 21 (Fri.)	Field Survey	Field Survey on the Lungga Power Station	Honiara
	Discussion on M/D	Discussion on M/D (draft)	
Nov. 22 (Sat.)	Data Sorting	Sorting of data collected	Honiara
Nov. 23 (Sun.)	Data Sorting	Sorting of data collected	Honiara
Nov. 24 (Mon.)	Data Sorting	Collection of data on Market Survey and Power Operation	Honiara
	Signing of M/D	Signing of M/D	
Nov. 25 (Tue.)	Courtesy Call (official members)	Courtesy call to the Embassy of Japan and JOCV office	Brisbane
	Traveling (official members)	Trip from Honiara to Brisbane by QF372 (17:40-19:40)	
	Field Survey (Consultant)	Field survey on the Lungga Power Station	Honiara
Nov. 26 (Wed.)	Collection of data	Collection of SIEA operation data and general information on electric power	Honiara
Nov. 27 (Thu.)	Field Survey	Field Survey on the Lungga Power Station	Honiara
Nov. 28 (Fri.)	Collection of Data	Collection of data on Power Demand and Power Operation	Honiara
Nov. 29 (Sat.)	Sorting of Data	Sorting of data collected	Honiara
	Preparing of F/R	Preparing of draft field report (F/R)	
Nov. 30 (Sun)	Sorting of Data	Sorting of data collected	Honiara
	Preparing F/R	Preparing of draft field report	

Date (Day of the week)	Activity	Details	Stay at
Dec. 1 (Mon.)	Collection of Data	Collection of data on Market Survey and Power Operation	Honiara
	Preparing F/R	Preparing of Field Report	
Dec. 2 (Tue.)	Field Survey	Field Survey on the Lungga Power Station	Honiara
	Collection of Data	Collection of data on Population statistics and Power operation	
	Traveling (Mr. Chiba)	Trip from Honiara to Brisbane by QF372 (17:40-19:40)	Brisbane
Dec. 3 (Wed.)	Field Survey	Field Survey on the Lungga Power Station	Honiara
	Collection of Data	Collection of data on Population Statistics and Power Operation	
	Submission of F/R	Submission of Field report (draft)	
Dec. 4 (Thu.)	Discussion on F/R	Discussion on the draft field report	Honiara
Dec. 5 (Fri.)	Acquisition of approval to F/R	Acquisition of approval to the field report	Honiara
	Collection of data	Market Survey	Honiara
Dec. 6 (Sat.)	Collection of data	Sorting of data collected	Honiara
Dec. 7 (Sun.)	Collection of data	Sorting of data collected	Honiara
Dec. 8 (Mon.)	Collection of data	Market Survey	Honiara
	Courtesy Call	Courtesy call to the Embassy of Japan and JICA office	
Dec. 9 (Tue.)	Traveling (Mr. Komiya and Mr. Seto)	Trip from Honiara to Brisbane by IE700 (17:40 - 19:40)	Brisbane
Dec. 10 (Wed.)	Traveling (Mr. Komiya and Mr. Seto)	Trip from Brisbane to Narita by JL762 (09:30 - 17:15)	Return to Japan

2. Itinerary of Draft Report Explanation

Date (Day of the week)	Activity	Details	Stay at
Feb. 15 (Sun.)	Travelling	Departure from Narita by JL761 (21:40)	Airplane
Feb. 16 (Mon.)	Travelling	Arrival Brisbane (07:25) Trip from Brisbane to Honiara by IE701 (16:15 - 20:15)	Honiara
Feb. 17 (Tue.)	Courtesy Call	Courtesy call to the Embassy of Japan, JOCV Office	Honiara
	Discussion on DF/R	Courtesy call to MME, SIEA. Submission and Explanation of Draft Report (DF/R)	
Feb. 18 (Wed.)	Field Survey	Lungga and Honiara Power Stations	Honiara
	Discussion on DF/R	Discussion with SIEA on DF/R	
	Preparation of M/D	Preparation of Draft Minutes of Discussions (M/D)	
Feb. 19 (Thu.)	Courtesy Call	Courtesy call to Ministry of Development and Planning	Honiara
	Discussion on M/D	Discussion with MME and SIEA on M/D	
	Field Survey	Lungga Power Station	
	Signing of M/D	Signing of M/D	
Feb. 20 (Fri.)	Courtesy Call (official member)	Courtesy call to SIEA, the Embassy of Japan and JOCV Office.	Honiara
	Field Survey	Natural conditions	
Feb. 21 (Sat.)	Travelling (official member)	Trip from Honiara to Apia	Honiara
	Sorting of Data	Sorting of data collected	Honiara
Feb. 22 (Sun.)	Sorting of Data	Sorting of data collected	Honiara
Feb. 23 (Mon.)	Field Survey	Lungga and Honiara Power Stations, Natural conditions	Honiara
	Courtesy Call	Courtesy call to MME, SIEA, the Embassy of Japan, JOCV office	
Feb. 24 (Tue.)	Travelling	Travelling from Honiara to Brisbane by QF372 (17:40 - 19:40)	Brisbane
Feb. 25 (Wed.)	Travelling	Travelling from Brisbane to Narita by JL762 (09:30 - 17:15)	Return to Japan

**Appendix 3 List of Party Concerned in
the Recipient Country**

Appendix 3 List of Party Concerned in The Recipient Country

The Ministry of Development and Planning

Under Secretary Mr. Shadrach Fanege

The Ministry of Mines & Energy (MME)

Minister of Mines & Energy Hon. Walton Naezon

Permanent Secretary, Board Member of SIEA Mr. Stephen Danitofea
(former Board Member of SIEA, Permanent Secretary of Ministry of Agriculture & Fisheries)

Permanent Secretary of Ministry of Health and Medical Services
Mr. Samson Gaviro
(former Permanent Secretary of Ministry of Forest Environment and Conservation)

Director of Energy Mr. John Gorosi

Solomon Islands Electricity Authority (SIEA)

Chairman, Board of Directors Mr. Stephen Tonafalea

Board Member, Chairman of Finance & Planning Committee

Mr. George Kuper

Board Member Mr. Edward Kingmele

Board Member Mr. Waeta Ben Tabusasi

Board Member Mr. Francis Orodani

General Manager Mr. Bobby Kwanairara

Project Service Engineer Mr. Vincent Fiuta

Generation Engineer Mr. Dudley Posala

Distribution Engineer Mr. Martin Rasu

Customer Service Engineer Mr. Eddie Gaza

Mechanical Engineer Mr. Gregory Sisifo

Administration Manager Mr. Nelson Ne'e

Senior Personnel Officer Mr. John Lee Hatimoana

Mechanical Supervisor Mr. Vilive Solokai

Electrical Supervisor Mr. Ramo Reni

Assistant Electrical Supervisor Mr. Francis Joe

Draftsman, Drawing Office Mr. Lino Hanaipao

Embassy of Japan in Solomon Islands

Chargé d'Affairs ad interim

Mr. Hideo Nomoto

First Secretary, Council

Mr. Seijiro Shirahama

Envoy

Mr. Akira Ichioka

Japan Overseas Cooperation Volunteers (JOCV) Solomon Office

Resident Representative

Mr. Kyosuke Takaoka

Coordinator

Mr. Makoto Nonobe

Appendix 4 Minutes of Discussion

MINUTES OF DISCUSSIONS

**BASIC DESIGN STUDY ON THE PROJECT
FOR
LUNGGA POWER GENERATION DEVELOPMENT
IN
SOLOMON ISLANDS**

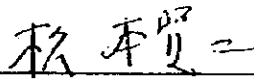
In response to a request from the Government of Solomon Islands, the Government of Japan decided to conduct a basic design study on the Project for Lungga Power Development in Solomon Islands (hereinafter referred to as "the Project") and entrusted the study to Japan International Cooperation Agency (JICA).

JICA has sent to Solomon Islands a study team, which is headed by Mr. Kenji Matsumoto, Deputy Director, Coordination and Appraisal Division, Grant Aid Project Study Department, JICA, and is scheduled to stay in the country from November 17 to December 9, 1997.


The team held discussions with the officials concerned of the Government of Solomon Islands and conducted a field survey at the study area.

In the course of the discussions and field survey, both parties have confirmed the main items described on the attached sheets. The team will proceed to further works and prepare the Basic Design Study report.


Honiara, November 24, 1997



Mr. Kenji Matsumoto
Leader
Basic Design Study Team
JICA



Mr. Stephen Danitofea
Permanent Secretary
Ministry of Mines & Energy (MME)
Solomon Islands



Mr. Bobby Kwanairara
General Manager
The Solomon Islands Electricity Authority (SIEA)
Solomon Islands

ATTACHMENT

1. Objective

The objective of the Project is to relieve the current shortage of electric power supply in Honiara and its surroundings and to restore the dependability of electric power supply, in order to stabilize the life of people and to improve economic activities in the city.

2. Project Site

The Project site is Lungga power station in Honiara city. The location of the Project site is shown in Annex-I.

3. Responsible and Implementing Agencies

The Ministry of Mines & Energy (MME) is responsible for the execution of the Project, and the Solomon Islands Electricity Authority (SIEA) is the implementing agency for the Project. The organization charts for MME and SIEA are shown in Annex-II.

4. Items requested by the Solomon Islands

After discussion with the Basic Study Team, the following items were finally confirmed as requested by the Solomon Islands side.

Supply and installation of a diesel engine generator set (4.2MW) at Lungga power station, east Honiara, comprising the following equipment.

- | | |
|--------------------|----------------------|
| (1) Diesel engine | 1 unit |
| - Speed : | 750 rpm |
| - Capacity : | 5630 Hp |
| - Kilowatts : | 4230 kW |
| - Cooling : | Water-cooled |
| (2) Generator | 1 unit |
| - kVA : | 5300 kVA |
| - Voltage : | 11000 V |
| - Frequency : | 50 Hz |
| - Cooling : | Open Ventilation |
| (3) Transformer | 1 set |
| - Feature : | Outdoor installation |
| - Cooling method : | ONAN/ONAF |
| - Phase : | Three(3) - phase |
| - Capacity : | 10/12.5 MVA |
| - Voltage : | 11000/33000 V |
| - Connection : | Ynd11 |

- (4) Control Panel 2 units
- (5) Indoor Protection Panels 2 units (1 unit : generator, 1 unit : transformer)
- (6) Switchboards
- | | | |
|---------------------------------|-----------|-----------|
| | 11kV | 33kV |
| Quantity : | 3 | 1 |
| Short Circuit Capacity : | 16kA | 6.3kA |
| Circuit Breaker Type : | SF6 | SF6 |
| Rated Current : | 1250A | 1250A |
| Short Time Rating : | 3 seconds | 3 seconds |
| Highest System Voltage : | 12kV | 36kV |
| Basic Impulse Insulation Level: | 75kV | 170kV |
| No. of phases : | 3 | 3 |
- (7) Fuel tank 1 unit (55,000 lit)

However, final items to be constructed and procured under Japan's Grant Aid will be decided after further studies in Japan, taking account of:

- existing conditions of power supply network in Honiara
- power demand forecast
- operation and maintenance capability of the executing authority (MME and SIEA)
- economic and administrative viability of the Project

5. Japan's Grant Aid System

- (1) The Government of Solomon Islands and its implementing agency have understood the system of Japan's Grant Aid explained by the Team, as described in Annex-III.
- (2) The Government of Solomon Islands and its implementing agency will take necessary measures, as described in Annex-IV, for smooth implementation of the Project, on condition that the Grant Aid Assistance by the Government of Japan is extended to the Project.

6. Schedule of the Study

- (1) The consultants will proceed to further studies in Solomon Islands until December 9, 1997.
- (2) Based on the Minutes of Discussions and technical examination of the study results, JICA will prepare a draft report and dispatch a mission to Solomon Islands in order to explain its contents to Solomon Islands side in February, 1998.
- (3) In case that the contents of the draft report are accepted in principal by the Government of Solomon Islands, JICA will complete the final report and send it to the Government of Solomon Islands by the end of April, 1998.

A-11
GMP

8. Other relevant issues

(1) Installation Works for the New Equipment

After discussions, both parties confirmed that a new diesel engine generator (DEG) set (4.2MW) will be installed in the existing power house building at Lungga power station, and the installation work for the new diesel engine generator set will be done by Japanese side under the Project.

(2) Power Demand Forecast and the Capacity of New DEG set for the Project

Both parties confirmed that the required capacity of the new DEG for the Project will be estimated based on power demand forecast and power supply situations of Honiara city envisaged at the time of the year 2001. In the forecast of power supply situation, the capacity of three (3) diesel engine generator sets (1.5 MW x 3 units), which are currently planned by SIEA to install at Honiara power station and to commence operation in 1998, will be taken into consideration.

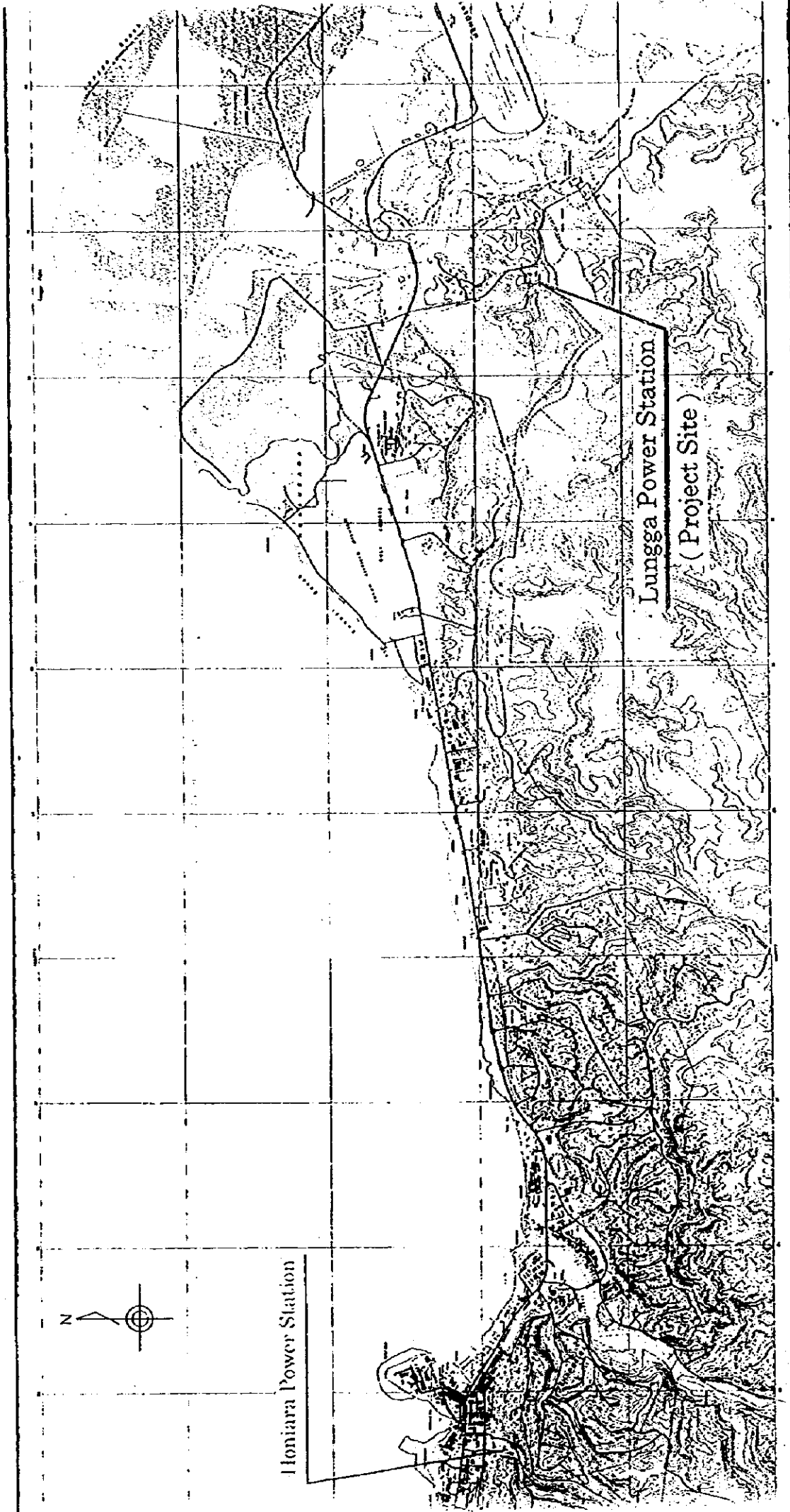
(3) Operation and Maintenance

Solomon Islands side agreed to secure and allocate necessary budget for operation and maintenance for the new DEG set to be provided under the Project, in order to maintain the proper function of the new DEG set.

(4) Technical Cooperation

Solomon Islands side pointed out a necessity of dispatching manufacturer's experts to Solomon Islands and acceptance of trainees in Japan for obtaining operation and maintenance know-how. Solomon Islands side also understood that another official requests should be submitted through diplomatic channels.

Annex-I Project Site

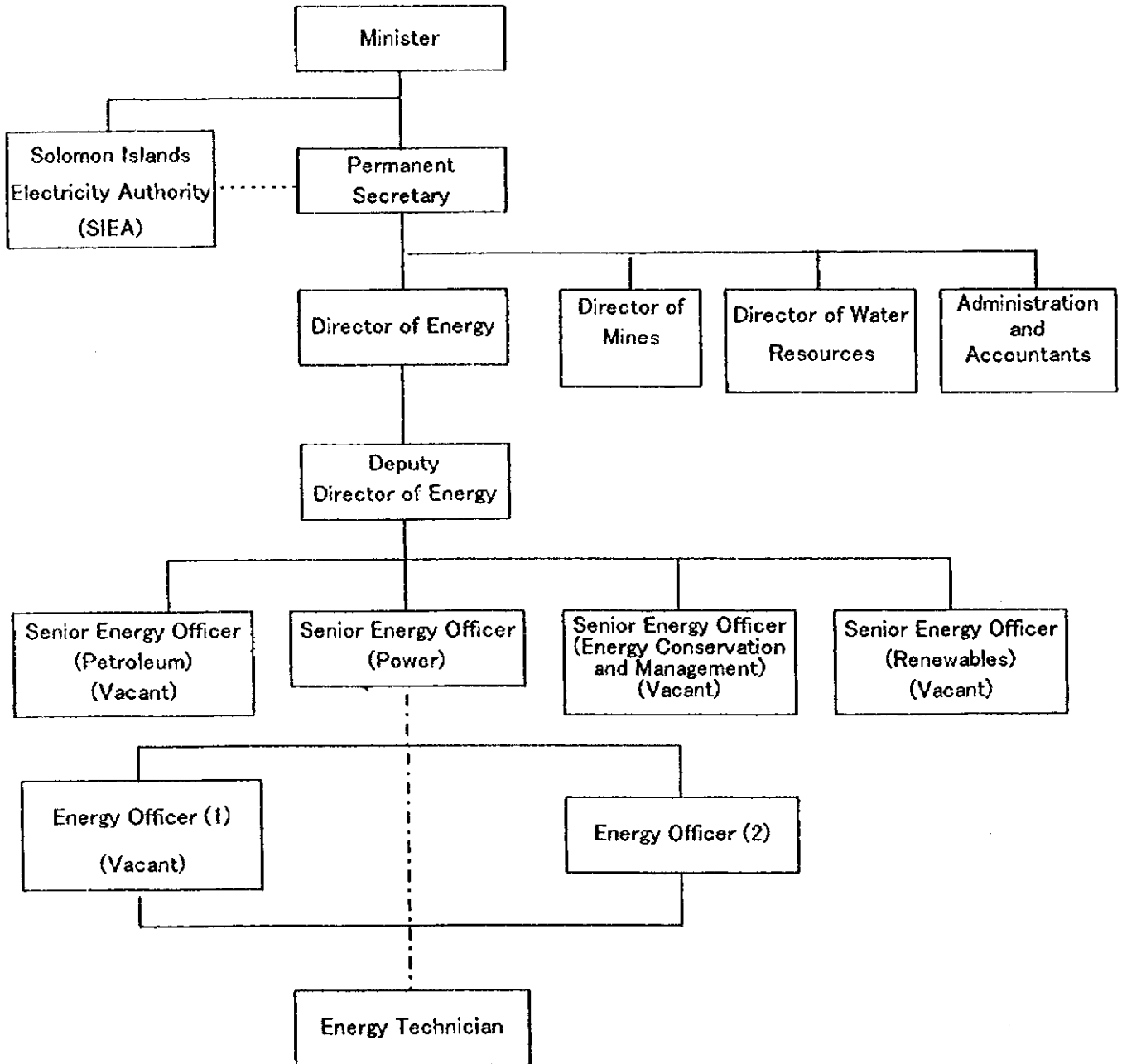


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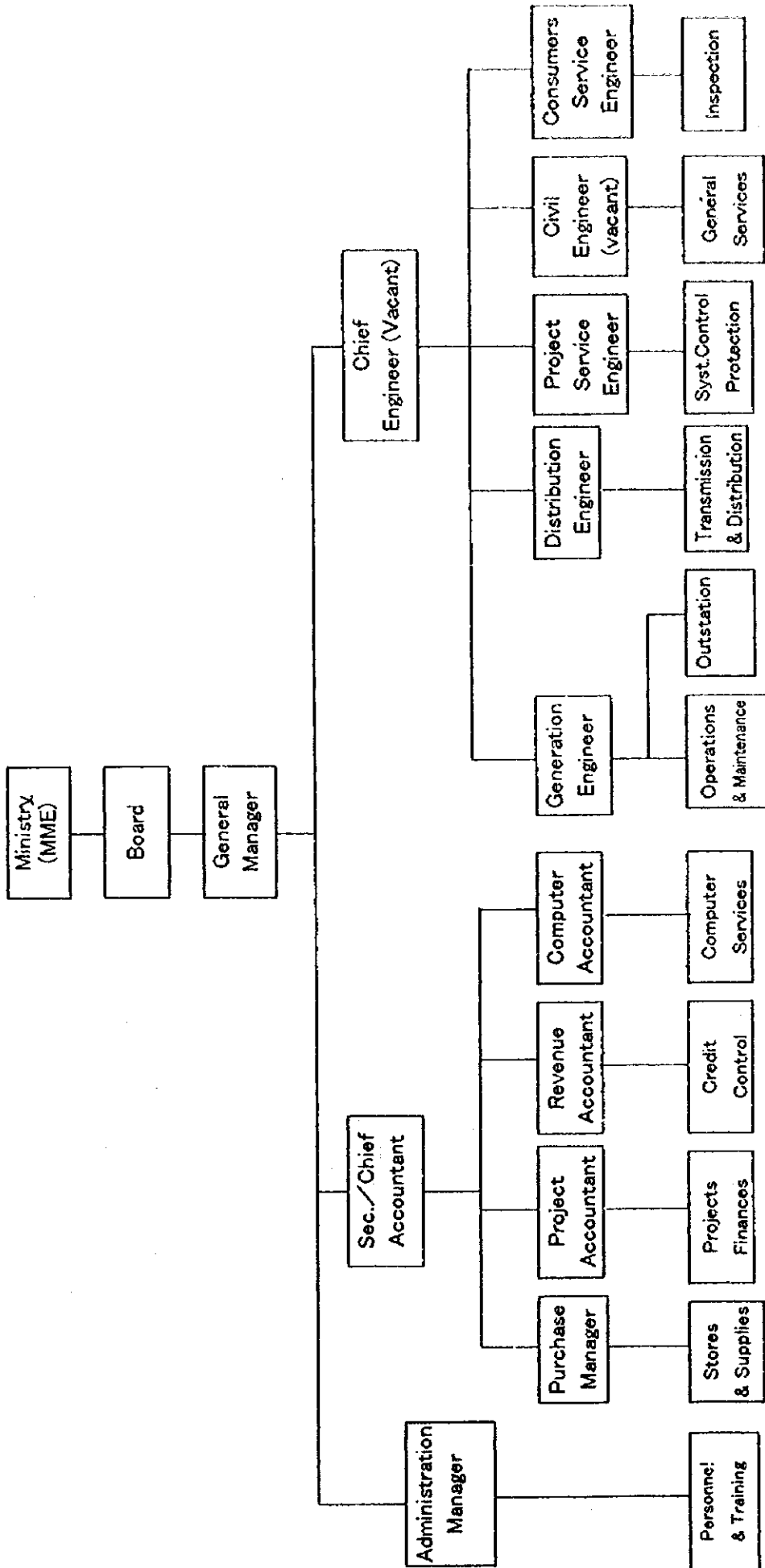
Annex-II The Organization chart of MME and SIEA

**Ministry of Mines & Energy (MME)
(Energy Section)
Organization Chart**



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SOLOMON ISLANDS ELECTRICITY AUTHORITY (SIEA)
ORGANIZATION CHART

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Annex-III Japan's Grant Aid Scheme

Japan's Grant Aid Scheme

1. Grant Aid Procedures

- (1) Japan's Grant Aid Program is executed through the following procedures.
- | | |
|---------------------------------|--|
| Application | (Request made by a recipient country) |
| Study | (Basic Design Study conducted by JICA) |
| Appraisal & Approval | (Appraisal by the Government of Japan and Approval by Cabinet) |
| Determination of Implementation | (The Notes exchanged between the Governments of Japan and the recipient country) |
- (2) Firstly, the application or request for a Grant Aid project submitted by a recipient country is examined by the Government of Japan (the Ministry of Foreign Affairs) to determine whether or not it is eligible for Grant Aid. If the request is deemed appropriate, the Government of Japan assigns JICA (Japan International Cooperation Agency) to conduct a study on the request. Secondly, JICA conducts the study (Basic Design Study), using (a) Japanese consulting firm(s). Thirdly, the Government of Japan appraises the project to see whether or not it is suitable for Japan's Grant Aid Program, based on the Basic Design Study report prepared by JICA, and the results are then submitted to the Cabinet for approval. Fourthly, the project, once approved by the Cabinet, becomes official with the Exchange of Notes signed by the Governments of Japan and the recipient country. Finally, for the implementation of the project, JICA assists the recipient country in such matters as preparing tenders, contracts and so on.

2. Basic Design Study

- (1) Contents of the Study
- The aim of the Basic Design Study (hereinafter referred to as "the Study"), conducted by JICA on a requested project (hereinafter referred to as "the Project") is to provide a basic document necessary for the appraisal of the Project by the Japanese Government. The contents of the Study are as follows:
- Confirmation of the background, objectives, and benefits of the requested project and also institutional capacity of agencies concerned of the recipient country necessary for the Project's implementation.
 - Evaluation of the appropriateness of the Project to be implemented under the Grant Aid Scheme from a technical, social and economic point of view.
 - Confirmation of items agreed on by both parties concerning the basic concept of the Project.
 - Preparation of a basic design of the Project
 - Estimation of costs of the Project

The contents of the original request are not necessarily approved in their initial form as the contents of the Grant Aid project. The Basic Design of the Project is confirmed considering the guidelines of Japan's Grant Aid Scheme.

The Government of Japan requests the Government of the recipient country to take whatever measures are necessary to ensure its self-reliance in the implementation of the Project. Such measures must be guaranteed even though they may fall outside of the jurisdiction of the organization in the recipient country actually implementing the Project. Therefore, the implementation of the Project is confirmed by all relevant organizations of the recipient country through the Minutes of Discussions.

(2) Selection of Consultants

For smooth implementation of the Study, JICA uses (a) registered consultant firm(s). JICA selects (a) firm(s) based on proposals submitted by interested firms. The firm(s) selected carry(ies) out a Basic Design Study and write(s) a report, based upon terms of reference set by JICA.

The consulting firm(s) used for the Study is(are) recommended by JICA to the recipient country to also work on the Project's implementation after the Exchange of Notes, in order to maintain technical consistency and also to avoid any undue delay in implementation should the selection process be repeated.

3. Japan's Grant Aid Scheme

(1) What is Grant Aid?

The Grant Aid Program provides a recipient country with non-reimbursable funds to procure the facilities, equipment and services (engineering services and transportation of the products, etc.) for economic and social development of the country under principles in accordance with the relevant laws and regulations of Japan. Grant Aid is not supplied through the donation of materials as such.

(2) Exchange of Notes (E/N)

Japan's Grant Aid is extended in accordance with the Notes exchanged by the two Governments concerned, in which the objectives of the Project, period of execution, conditions and amount of the Grant Aid, etc., are confirmed.

(3) "The period of the Grant Aid" means the one fiscal year which the Cabinet approves the Project for. Within the fiscal year, all procedures such as exchanging of the Notes, concluding contracts with (a) consultant firm(s) and (a) contractor(s) and final payment to them must be completed.

However in case of delays in delivery, installation or construction due to unforeseen factors such as weather, the period of the Grant Aid can be further extended for a maximum of one fiscal year at most by mutual agreement between the two Governments.

(4) Under the Grant Aid, in principle, Japanese products and services including transport or those of the recipient country are to be purchased.

When the two Governments deem it necessary, the Grant Aid may be used for the purchase of the products or services of a third country.

However the prime contractors, namely, consulting, contracting and procurement firms, are limited to "Japanese nationals". (The term "Japanese nationals" means persons of Japanese nationality or Japanese corporations controlled by persons of Japanese nationality.)

(5) Necessity of "Verification"

The Government of recipient country or its designated authority will conclude contracts denominated in Japanese yen with Japanese nationals. Those contracts shall be verified by the Government of Japan. This "Verification" is deemed necessary to secure accountability to Japanese taxpayers.

(6) Undertakings required of the Government of the Recipient Country

In the implementation of the Grant Aid project, the recipient country is required to undertake such necessary measures as the following:

- 1) To secure land necessary for the sites of the Project and to clear, level and reclaim the land prior to commencement of the construction.
- 2) To provide facilities for the distribution of electricity, water supply and drainage and other incidental facilities in and around the sites.
- 3) To secure buildings prior to the procurement in case the installation of the equipment.

- 4) To ensure all the expenses and prompt execution for unloading, customs clearance at the port of disembarkation and internal transportation of the products purchased under the Grant Aid.
 - 5) To exempt Japanese nationals from customs duties, internal taxes and other fiscal levies which will be imposed in the recipient country with respect to the supply of the products and services under the Verified Contracts.
 - 6) To accord Japanese nationals whose services may be required in connection with the supply of the products and services under the Verified Contracts, such facilities as may be necessary for their entry into the recipient country and stay therein for the performance of their work.
- (7) "Proper Use"
The recipient country is required to maintain and use the facilities constructed and equipment purchased under the Grant Aid properly and effectively and to assign staff necessary for this operation and maintenance as well as to bear all the expenses other than those covered by the Grant Aid.
- (8) "Re-export"
The products purchased under the Grant Aid should not be re-exported from the recipient country.
- (9) Banking Arrangements (B/A)
- 1) The Government of the recipient country or its designated authority should open an account in the name of the Government of the recipient country in an authorized foreign exchange bank in Japan (hereinafter referred to as "the Bank"). The Government of Japan will execute the Grant Aid by making payments in Japanese yen to cover the obligations incurred by the Government of the recipient country or its designated authority under the Verified Contracts.
 - 2) The payments will be made when payment requests are presented by the Bank to the Government of Japan under an authorization to pay issued by the Government of the recipient country or its designated authority.

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Annex-IV Necessary measures to be taken by the Government of Solomon Islands and its Implementing Agency on condition that Japan's Grant Aid is extended.

1. To provide necessary data and information for the Project.
2. To ensure speedy unloading and customs clearance of the goods for the Project at port and /or of disembarkation in Solomon Islands.
3. To accord Japanese nationals whose services may be required in connection with the supply of products and services under the verified contracts such facilities as may be necessary for their entry into Solomon Islands and stay therein for the performance of their work.
4. To exempt Japanese nationals from custom duties, internal taxes and other fiscal levies which may be imposed in Solomon Islands with respect to the supply of the products and services under the verified contracts. And to take necessary measures for such tax exemption.
5. To bear commissions to the Japanese foreign exchange bank for the banking services based upon the banking arrangement.
6. To bear all the expenses other than those to be borne by the Grant Aid necessary for the execution of the Project.
7. To assign exclusive counterpart engineers and technicians to the Project in order to transfer the operation and maintenance technique for the Project and to witness and confirm construction works and qualities of equipment and materials when inspection is carried out.
8. To use and maintain properly and effectively all the facilities constructed and equipment and materials purchased under the Japan's Grant Aid.
9. To secure and provide cleared areas for new equipment for the Project in the Lungga power station, prior to the commencement of the construction for the Project.
10. To construct incidental outdoor facilities, boundary fence and entrance gate at Lungga power station by the completion of the construction for the Project.
11. To take necessary measure for the prevention of the environment pollution such as disposal of oil sludge, etc.
12. To provide proper disposal places of excavated soil, waste water and oil discharged during the implementation period.

MINUTES OF DISCUSSIONS
BASIC DESIGN STUDY
ON
THE PROJECT
FOR
LUNGA POWER GENERATION DEVELOPMENT
IN
SOLOMON ISLANDS
(CONSULTATION ON DRAFT REPORT)

In November 1997, the Japan International Cooperation Agency (JICA) dispatched a Basic Design Study Team on the Project for Lungga Power Development in Solomon Islands (hereinafter referred to as "the Project") to Solomon Islands, and through discussions with Solomon Islands side, field survey, and technical examination of the results in Japan, has prepared the draft report of the Study.

In order to explain and to consult the Solomon Islands side on components of the draft report, JICA sent to Solomon Islands a study team, which is headed by Mr. Norihiro IKEDA, First Project Management Division, Grant Aid Project Management Department, Japan International Cooperation Agency (JICA), and is scheduled to stay in the country from February 16 to 24, 1998.

As a result of discussions, both parties confirmed the main items described on the attached sheets.

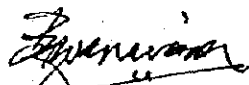
Honiara, February 19, 1998

池田 副 長

Mr. Norihiro Ikeda
Leader
Basic Design Study Team
JICA



Mr. Stephen Danitofea
Permanent Secretary
Ministry of Mines & Energy (MME)
Solomon Islands



Mr. Bobby Kwanairara
General Manager
The Solomon Islands Electricity Authority (SIEA)
Solomon Islands

ATTACHMENT

1. Components of the Draft Report

The Government of Solomon Islands has agreed and accepted in principle the components of the Draft Report proposed by the Team.

2. Japan's Grant Aid System

- (1) The Government of Solomon Islands has understood the system of Japan's Grant Aid explained by the Team, as described in Annex-I.
- (2) The Government of Solomon Islands will take necessary measures, as described in Annex-II, for smooth implementation of the Project, on condition that the Grant Aid assistance by the Government of Japan is extended to the Project.

3. Further schedule

The Team will make the final report in accordance with the confirmed items, and send it to the Government of Solomon Islands by the end of April, 1998.

4. Other relevant issues

- (1) The Solomon Islands side agreed that a new main fuel oil tank (55m³) which was additionally requested by the Solomon Islands side at the time of field survey has been removed from the Project components as stipulated in the Draft Report.
- (2) The Solomon Islands side agreed that a sludge treatment system including an incinerator shall be provided under the Project, in order to prevent the environmental pollution by the waste oil which will be produced during the new DEG operating.
- (3) The Solomon Islands side agreed that a Japanese Contractor will dispatch manufacturer's engineers to assist the operation and maintenance works to be done by Solomon Islands side, including training, after the completion of the installation works as mentioned in the Draft Report.

Annex-I Japan's Grant Aid Scheme

Japan's Grant Aid Scheme

1. Grant Aid Procedures

- (1) Japan's Grant Aid Program is executed through the following procedures.
- | | |
|---------------------------------|--|
| Application | (Request made by a recipient country) |
| Study | (Basic Design Study conducted by JICA) |
| Appraisal & Approval | (Appraisal by the Government of Japan and Approval by Cabinet) |
| Determination of Implementation | (The Notes exchanged between the Governments of Japan and the recipient country) |
- (2) Firstly, the application or request for a Grant Aid project submitted by a recipient country is examined by the Government of Japan (the Ministry of Foreign Affairs) to determine whether or not it is eligible for Grant Aid. If the request is deemed appropriate, the Government of Japan assigns JICA (Japan International Cooperation Agency) to conduct a study on the request. Secondly, JICA conducts the study (Basic Design Study), using (a) Japanese consulting firm(s). Thirdly, the Government of Japan appraises the project to see whether or not it is suitable for Japan's Grant Aid Program, based on the Basic Design Study report prepared by JICA, and the results are then submitted to the Cabinet for approval. Fourthly, the project, once approved by the Cabinet, becomes official with the Exchange of Notes signed by the Governments of Japan and the recipient country. Finally, for the implementation of the project, JICA assists the recipient country in such matters as preparing tenders, contracts and so on.

2. Basic Design Study

- (1) Contents of the Study
- The aim of the Basic Design Study (hereinafter referred to as "the Study"), conducted by JICA on a requested project (hereinafter referred to as "the Project") is to provide a basic document necessary for the appraisal of the Project by the Japanese Government. The contents of the Study are as follows:
- Confirmation of the background, objectives, and benefits of the requested project and also institutional capacity of agencies concerned of the recipient country necessary for the Project's implementation.
 - Evaluation of the appropriateness of the Project to be implemented under the Grant Aid Scheme from a technical, social and economic point of view.
 - Confirmation of items agreed on by both parties concerning the basic concept of the Project.
 - Preparation of a basic design of the Project
 - Estimation of costs of the Project

The contents of the original request are not necessarily approved in their initial form as the contents of the Grant Aid project. The Basic Design of the Project is confirmed considering the guidelines of Japan's Grant Aid Scheme.

The Government of Japan requests the Government of the recipient country to take whatever measures are necessary to ensure its self-reliance in the implementation of the Project. Such measures must be guaranteed even though they may fall outside of the jurisdiction of the organization in the recipient country actually implementing the Project. Therefore, the implementation of the Project is confirmed by all relevant organizations of the recipient country through the Minutes of Discussions.

(2) Selection of Consultants

For smooth implementation of the Study, JICA uses (a) registered consultant firm(s). JICA selects (a) firms(s) based on proposals submitted by interested firms. The firm(s) selected carry(ies) out a Basic Design Study and write(s) a report, based upon terms of reference set by JICA.

The consulting firm(s) used for the Study is(are) recommended by JICA to the recipient country to also work on the Project's implementation after the Exchange of Notes, in order to maintain technical consistency.

3. Japan's Grant Aid Scheme

(1) What is Grant Aid?

The Grant Aid Program provides a recipient country with non-reimbursable funds to procure the facilities, equipment and services (engineering services and transportation of the products, etc.) for economic and social development of the country under principles in accordance with the relevant laws and regulations of Japan. Grant Aid is not supplied through the donation of materials as such.

(2) Exchange of Notes (E/N)

Japan's Grant Aid is extended in accordance with the Notes exchanged by the two Governments concerned, in which the objectives of the Project, period of execution, conditions and amount of the Grant Aid, etc., are confirmed.

(3) "The period of the Grant Aid" means the one fiscal year (April to March) which the Cabinet approves the Project for. Within the fiscal year, all procedures such as exchanging of the Notes, concluding contracts with (a) consultant firm(s) and (a) contractor(s) and final payment to them must be completed.

However in case of delays in delivery, installation or construction due to unforeseen factors such as weather, the period of the Grant Aid can be further extended for a maximum of one fiscal year at most by mutual agreement between the two Governments.

(4) Under the Grant Aid, in principle, Japanese products and services including transport or those of the recipient country are to be purchased.

When the two Governments deem it necessary, the Grant Aid may be used for the purchase of the products or services of a third country.

However the prime contractors, namely, consulting, contracting and procurement firms, are limited to "Japanese nationals". (The term "Japanese nationals" means persons of Japanese nationality or Japanese corporations controlled by persons of Japanese nationality.)

(5) Necessity of "Verification"

The Government of recipient country or its designated authority will conclude contracts denominated in Japanese yen with Japanese nationals. Those contracts shall be verified by the Government of Japan. This "Verification" is deemed necessary to secure accountability to Japanese taxpayers.

(6) Undertakings required of the Government of the Recipient Country

In the implementation of the Grant Aid project, the recipient country is required to undertake such necessary measures as the following:

- 1) To secure land necessary for the sites of the Project and to clear, level and reclaim the land prior to commencement of the construction.
- 2) To provide facilities for the distribution of electricity, water supply and drainage and other incidental facilities in and around the sites.
- 3) To secure buildings prior to the procurement in case the installation of the equipment.

- 4) To ensure all the expenses and prompt execution for unloading, customs clearance at the port of disembarkation and internal transportation of the products purchased under the Grant Aid.
 - 5) To exempt Japanese nationals from customs duties, internal taxes and other fiscal levies which will be imposed in the recipient country with respect to the supply of the products and services under the Verified Contracts.
 - 6) To accord Japanese nationals whose services may be required in connection with the supply of the products and services under the Verified Contracts, such facilities as may be necessary for their entry into the recipient country and stay therein for the performance of their work.
- (7) "Proper Use"
The recipient country is required to maintain and use the facilities constructed and equipment purchased under the Grant Aid properly and effectively and to assign staff necessary for this operation and maintenance as well as to bear all the expenses other than those covered by the Grant Aid.
- (8) "Re-export"
The products purchased under the Grant Aid should not be re-exported from the recipient country.
- (9) Banking Arrangements (B/A)
- 1) The Government of the recipient country or its designated authority should open an account in the name of the Government of the recipient country in an authorized foreign exchange bank in Japan (hereinafter referred to as "the Bank"). The Government of Japan will execute the Grant Aid by making payments in Japanese yen to cover the obligations incurred by the Government of the recipient country or its designated authority under the Verified Contracts.
 - 2) The payments will be made when payment requests are presented by the Bank to the Government of Japan under an authorization to pay issued by the Government of the recipient country or its designated authority.

Annex-II Necessary measures to be taken by the Government of Solomon Islands on condition that Japan's Grant Aid is extended.

1. To provide necessary data and information for the Project.
2. To ensure speedy unloading and customs clearance of the goods for the Project at port and /or the airport of disembarkation in Solomon Islands.
3. To accord Japanese nationals whose services may be required in connection with the supply of products and services under the verified contracts such facilities as may be necessary for their entry into the Solomon Islands and stay therein for the performance of their work.
4. To exempt Japanese nationals from custom duties, internal taxes and other fiscal levies which may be imposed in the Solomon Islands with respect to the supply of the products and services under the verified contracts. And to take necessary measures for such tax exemption.
5. To bear commissions to the Japanese foreign exchange bank for the banking services based upon the banking arrangement.
6. To bear all the expenses other than those to be borne by the Grant Aid necessary for the execution of the Project.
7. To assign exclusive counterpart engineers and technicians to the Project in order to transfer the operation and maintenance technique for the Project and to witness and to confirm installation works and qualities of equipment and materials when inspection is carried out.
8. To use and maintain properly and effectively all the facilities constructed and equipment and materials purchased and installed under the Japan's Grant Aid.
9. To secure and provide cleared areas for new equipment for the Project in the Lungga power station, prior to the commencement of the construction for the Project.
10. To construct incidental outdoor facilities, boundary fence and entrance gate at Lungga power station by the completion of the construction for the Project, if necessary.
11. To take necessary measure for the prevention of the environment pollution such as disposal of oil sludge, etc.
12. To provide proper disposal places of excavated soil, waste water and oil discharged during the implementation period.
13. To provide temporary yard for the contractor's office, the consultant's office, equipment and materials storage yard, etc., with approx. 600 m² in the Lungga power station.
14. To provide load for test operation during the implementation period.

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15. To rehabilitate and/or to reinforce the existing access road to the Lungga power station necessary for the inland transportation of the heavy cargo, before the commencement of the construction work by Japanese side.
16. To secure the stoppage of power supply when new facilities is required to connect with the existing facilities such as switchgears, transformers, fuel piping, etc.
17. To replace the existing No.2 station transformer in order to reutilize for auxiliary supply to No. 4, 5, 6 & 7 DEG units, before the installation of new No.2 station transformer by Japanese side.
18. To provide necessary fuel oil and lubrication oil for the initial charge and site tests for the new DEG unit.

**Appendix 5 Cost Estimation Borne by
the Recipient Country**

Appendix 5 Cost Estimation Borne by the Recipient Country

Main items of the construction cost to be borne by SOLOMON ISLANDS side are as follows:

1. Improvement of the existing approach road to the Lugga Power Station.

Asphalt Pavement Work

$200 \text{ m}^2 \times 20 \text{ US\$/m}^2 = 4,000 \text{ US\$}$

2. Relocation of Existing No.2 Station Transformer

(including removal of neutral disconnecting switch and 600 V low voltage cables)

$500 \text{ kVA transformer} \times 3,000 \text{ US\$/set} = 3,000 \text{ US\$}$

3. Fuel oil and Lubrication oil for site test (38,700 US\$)

(1) Fuel oil $113,674 \text{ } \ell \times 0.206 \text{ US\$/}\ell \doteq 23,420 \text{ US\$}$

Initial change	2,700 ℓ
Load test	10,058 ℓ
Commissioning test	100,916 ℓ
<u>Total</u>	<u>113,674 ℓ</u>

(2) Lubrication oil $7,276 \times 2.11 \text{ US\$/}\ell \doteq 15,350 \text{ US\$}$

Initial change	6,500 ℓ
Load test	68 ℓ
Commissioning test	708 ℓ
<u>Total</u>	<u>7,276 ℓ</u>

Appendix 6 Power Demand Forecast

Appendix 6 Power Demand Forecast

ANNEX-1 Power Demand Forecast

Descriptions	Unit	Recorded 1993	Recorded 1994	Recorded 1995	Recorded 1996	Forecast 1997	Forecast 1998	Forecast 1999	Forecast 2000	Forecast 2001	Forecast 2002	Forecast 2003	Forecast 2004	Forecast 2005	Forecast 2006	Forecast 2007	Forecast 2008	Forecast 2009	Forecast 2010	Remarks
1. Power Demand																				
1.1 Domestic use																				
(1) Consumer Increase Ratio		1.008	1.052	1.040	1.007	1.007	1.007	1.007	1.038	1.038	1.038	1.038	1.038	1.038	1.038	1.038	1.038	1.038	1.038	1.038
(2) No. of consumers		4,105	4,137	4,357	4,531	4,563	4,595	4,789	4,960	5,139	5,314	5,497	5,677	5,857	6,037	6,217	6,397	6,577	6,757	6,937
(3) Unit Demand (kW/consumer)		1.030	1.050	1.063	1.063	1.063	1.063	1.063	1.063	1.063	1.063	1.063	1.063	1.063	1.063	1.063	1.063	1.063	1.063	1.063
(4) Unit Demand (kW/consumer)		0.42	0.45	0.47	0.50	0.50	0.50	0.56	0.60	0.70	0.73	0.77	0.81	0.85	0.89	0.93	0.98	1.03	1.08	1.13
(5) Total Demand (kW)		1,740.5	1,841.8	2,036.7	2,251.3	2,264.3	2,968.3	3,187.5	3,453.3	3,762.7	4,108.9	4,669.5	4,871.4	5,209.3	5,786.7	6,206.5	6,773.9	7,491.8	8,181.8	
1.2 Commercial use																				
(1) Consumer Increase Ratio		1.152	1.144	1.037	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
(2) No. of consumers		706	813	930	964	977	988	1,028	1,069	1,112	1,156	1,200	1,250	1,300	1,352	1,407	1,463	1,521	1,581	1,641
(3) Unit Demand (kW/consumer)		1.028	1.028	1.028	1.028	1.028	1.028	1.028	1.028	1.028	1.028	1.028	1.028	1.028	1.028	1.028	1.028	1.028	1.028	1.028
(4) Unit Demand (kW/consumer)		4.85	4.99	5.13	5.27	5.27	5.27	5.66	6.06	6.46	6.86	7.26	7.66	8.06	8.46	8.86	9.26	9.66	10.06	10.46
(5) Total Demand (kW)		3,424.1	4,053.5	4,766.6	5,079.2	5,079.2	5,079.2	5,854.2	6,586.4	7,272.4	7,958.4	8,644.4	9,330.4	10,016.4	10,702.4	11,388.4	12,074.4	12,760.4	13,446.4	14,132.4
1.3 Industrial use																				
(1) Consumer Increase Ratio		1.015	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
(2) No. of consumers		137	139	108	135	135	135	141	147	152	157	162	167	172	177	182	187	192	197	202
(3) Unit Demand (kW/consumer)		1.018	1.018	1.018	1.018	1.018	1.018	1.018	1.018	1.018	1.018	1.018	1.018	1.018	1.018	1.018	1.018	1.018	1.018	1.018
(4) Unit Demand (kW/consumer)		7.86	8.00	8.13	8.26	8.26	8.26	8.66	9.06	9.46	9.86	10.26	10.66	11.06	11.46	11.86	12.26	12.66	13.06	13.46
(5) Total Demand (kW)		1,076.8	1,112.2	879.7	1,369.4	1,369.4	1,369.4	1,369.4	1,369.4	1,369.4	1,369.4	1,369.4	1,369.4	1,369.4	1,369.4	1,369.4	1,369.4	1,369.4	1,369.4	1,369.4
1.4 Government use																				
(1) Consumer Increase Ratio		1.027	1.047	1.047	1.047	1.047	1.047	1.047	1.047	1.047	1.047	1.047	1.047	1.047	1.047	1.047	1.047	1.047	1.047	1.047
(2) No. of consumers		103	75	75	94	94	94	94	102	106	110	114	118	122	127	132	137	142	147	152
(3) Unit Demand (kW/consumer)		1.027	1.027	1.027	1.027	1.027	1.027	1.027	1.027	1.027	1.027	1.027	1.027	1.027	1.027	1.027	1.027	1.027	1.027	1.027
(4) Unit Demand (kW/consumer)		4.85	5.64	6.35	7.07	7.07	7.07	7.46	7.86	8.26	8.66	9.06	9.46	9.86	10.26	10.66	11.06	11.46	11.86	12.26
(5) Total Demand (kW)		499.6	422.7	481.2	664.8	664.8	664.8	664.8	664.8	664.8	664.8	664.8	664.8	664.8	664.8	664.8	664.8	664.8	664.8	664.8
1.5 Others																				
(1) Consumer Increase Ratio		1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
(2) No. of consumers		73	75	86	71	71	71	71	71	71	71	71	71	71	71	71	71	71	71	71
(3) Unit Demand (kW/consumer)		14.50	14.99	14.25	8.81	8.81	8.81	8.81	8.81	8.81	8.81	8.81	8.81	8.81	8.81	8.81	8.81	8.81	8.81	8.81
(4) Unit Demand (kW/consumer)		1,038.5	1,119.8	1,225.8	625.8	625.8	625.8	625.8	625.8	625.8	625.8	625.8	625.8	625.8	625.8	625.8	625.8	625.8	625.8	625.8
(5) Total Demand (kW)		7,799.5	8,350.0	9,400.0	5,400.0	5,400.0	5,400.0	5,400.0	5,400.0	5,400.0	5,400.0	5,400.0	5,400.0	5,400.0	5,400.0	5,400.0	5,400.0	5,400.0	5,400.0	5,400.0
TOTAL POWER DEMAND																				
Demand Increase																				
Annual Increase Rate of Total Power Demand																				

Notes:
1. Waiting consumers (as of 1997) shall be connected in 1998 and 1999. Required load for waiting consumers is as follows:
Required Load for Waiting Consumers (as of 1997)

	1998	1999
(1) Domestic	315.0	340.0
(2) Commercial	1,900.0	1,250.0
(3) Government	300.0	
Total	2,515.0	1,590.0

2. Power limited consumers shall be supplied all the demand in 1999. Required load for waiting consumers is as follows:
Required Load for Power Limited Consumers

	1999
(1) Commercial	325.0

3. New industrial consumers shall be connected in 1999. Required load for waiting consumers is as follows:
Required Load for new industrial consumers

	1998	1999
(1) Industrial (Plywood factory)	2,215.0	2,415.0
(Total)	4,930.0	

Power Balance

ANNEX-2 Power Balance

Descriptions (Installed Year)	Installed Capacity(kW)	Recorded 1983	Recorded 1984	Recorded 1995	Recorded 1996	Forecast 1997	Forecast 1998	Forecast 1999	Forecast 2000	Forecast 2001	Forecast 2002	Forecast 2003	Forecast 2004	Forecast 2005	Forecast 2006	Forecast 2007	Forecast 2008	Forecast 2009	Forecast 2010	Remarks
1. TOTAL POWER DEMAND		7,791.5	8,850.0	9,400.0	9,740.6	9,740.6	12,255.6	14,670.5	15,439.5	16,255.2	17,120.8	18,040.0	19,016.5	20,054.3	21,158.0	22,332.2	23,582.2	24,913.5	26,332.1	
2. POWER SUPPLY CONDITION																				
2.1 Homiara Power Station																				
No.5 (1985)	900	(stand-by)	(stand-by)	(stand-by)	650	650	650	600	600	600	600	600	600	600	600	600	600	600	600	600
No.6 (1985)	900	(stand-by)	(stand-by)	(stand-by)	650	650	650	600	600	600	600	600	600	600	600	600	600	600	600	600
No.7 (1998)	1,500						1,500	1,500	1,500	1,500	1,400	1,400	1,400	1,300	1,300	1,300	1,300	1,200	1,200	1,200
No.8 (1998)	1,500						1,500	1,500	1,500	1,500	1,400	1,400	1,400	1,300	1,300	1,300	1,300	1,200	1,200	1,200
No.9 (1998)	1,500				1,300	1,300	5,800	5,700	5,700	5,700	5,400	5,400	5,400	5,100	5,100	5,100	5,100	4,800	4,800	4,800
<i>(Total Available capacity)</i>																				
2.2 Lungga Power Station																				
No. 1 (1981)	600	600	600	600	600	600	600	600	600	600	600	600	600	600	600	600	600	600	600	600
No. 2 (1981)	600	600	600	600	600	600	600	600	600	600	600	600	600	600	600	600	600	600	600	600
No. 3 (1981)	600	600	600	600	600	600	600	600	600	600	600	600	600	600	600	600	600	600	600	600
No. 4 (1971)	1,500	1,300	1,300	1,100	1,100	1,100	1,000	1,000	1,000	1,000	1,000 (retired)	2,700	2,700	2,700	2,600	2,600	2,600	2,600	2,600	2,600
No. 5 (1971)	1,500	1,300	1,300	1,100	1,100	1,100	1,000	1,000	1,000	1,000	1,000 (retired)	2,700	2,700	2,700	2,600	2,600	2,600	2,600	2,600	2,600
No. 6 (1987)	2,800	2,600	2,500	2,500	2,400	2,400	2,400	2,400	2,400	2,400	2,300	2,300	2,300	2,300	2,300	2,300	2,300	2,300	2,300	2,300
No. 7 (1987)	2,800	2,600	2,500	2,500	2,400	2,400	2,400	2,400	2,400	2,400	2,300	2,300	2,300	2,300	2,300	2,300	2,300	2,300	2,300	2,300
No. 8 (1993)	4,500	4,200	4,000	4,000	4,200	4,200	4,000	4,000	4,200	4,200	4,200	4,100	4,100	4,000	4,000	4,000	4,000	4,000	4,000	4,000
No. 9 (1999)	4,200	9,600	13,600	11,200	8,800	8,800	11,200	15,300	15,300	15,200	13,100	13,000	13,000	12,800	12,700	12,700	12,700	12,700	12,700	12,700
<i>(Total Available capacity)</i>																				
2.3 AVAILABLE CAPACITY (kW)		9,600	13,600	11,200	10,100	10,100	17,000	21,100	21,000	20,900	18,500	18,400	18,400	17,900	17,800	17,800	17,800	17,800	17,600	
3. POWER BALANCE (2.3 - 1.) (kW)		1,801	4,750	1,800	359	359	4,744	6,479	5,561	4,645	1,379	360	-616	-2,154	-3,358	-4,532	-5,782	-7,414	-8,832	
4. MAXIMUM UNIT CAPACITY (kW)		2,600	4,200	4,000	4,200	4,200	4,000	4,200	4,200	4,200	4,200	4,100	4,100	4,000	4,000	4,000	4,000	4,000	4,000	
5. STABLE CAPACITY (2.3 - 4.) (kW)		7,000	9,400	7,200	5,900	5,900	13,000	16,900	16,800	16,700	14,300	14,300	14,300	13,900	13,800	13,800	13,800	13,800	13,600	
6. POWER BALANCE (STABLE) (5 - 1.) (kW)		-799	550	-2,200	-3,841	-3,841	744	2,229	1,361	445	-2,821	-3,740	-4,716	-6,154	-7,358	-8,532	-9,782	-11,414	-12,832	

Notes:

- Homiara No.6,7 & 8 units shall be commenced to operate in 1998.
- Lungga No.6 unit shall be re-operated in 1998.
- Lungga No.8 unit shall be rehabilitated and re-operated in 1997.

**Appendix 7 Details of On-Site Guidance by
Dispatched Engineers**

Appendix 7 Details of On-Site Guidance by Dispatched Engineers

Table 1 Work Schedule for Dispatched Engineers

Step	Training Level (Duration)	Main Training Targets	Mechanical Engineer	Electrical Engineer
1	Basic Practical Skills (six weeks)	Learning of daily operation and maintenance skills	<ul style="list-style-type: none"> - Guidance on and record-keeping of daily operation and inspection of general mechanical equipment - Guidance on preventive maintenance by means of analysing operation records of general mechanical equipment - Guidance on trouble-shooting on initial problems of general mechanical equipment 	<ul style="list-style-type: none"> - Guidance on record-keeping of daily operation and inspection of general electrical equipment - Guidance on preventive maintenance by means of analysing work operation records of general electrical equipment - Guidance on trouble-shooting on initial problems of general electrical equipment
2	Intermediate Practical Skills (four weeks)	Preparation and implementation of regular inspection plan after 1,000 hours of operation	<p>Guidance on implementation of following regular inspection work for general mechanical equipment and also on preventive maintenance by means of analysing regular inspection records</p> <ul style="list-style-type: none"> - Cleaning of fuel and lubricant oil filters - Checking or proper clamping of nuts and bolts 	<p>Guidance on implementation of following regular inspection work for general electrical equipment and also on preventive maintenance by means of analysing regular inspection records</p> <ul style="list-style-type: none"> - Checking of abnormal vibration - Checking of proper lubricant oil flow and oil leakage from bearings - Cleaning of components
3	Applied Techniques (six weeks)	Learning of techniques applicable to existing units	<p>Guidance on application of following operation and maintenance techniques to existing mechanical equipment</p> <ul style="list-style-type: none"> - Learning of daily operation and maintenance techniques - Implementation of regular inspection after 1,000 hours of operation 	<p>Guidance on application of following operation and maintenance techniques to existing electrical equipment</p> <ul style="list-style-type: none"> - Learning of daily operation and maintenance techniques - Implementation of regular inspection after 1,000 hours of operation
4	Advanced Techniques (two weeks)	Preparation of overhaul plans	<p>Guidance on preparation of following plans related to 3,000 hour overhaul for mechanical equipment</p> <ul style="list-style-type: none"> - Inventory and order placement control plan for spare parts - Spare parts replacement plan - Worker assignment plan 	<p>Guidance on preparation of following plans related to 3,000 hour overhaul for electrical equipment</p> <ul style="list-style-type: none"> - Inventory and order placement control plan for spare parts - Spare parts replacement plan - Worker assignment plan - Power cut response plan - Coordinated operation plan with Honiara Power Station
5	Advanced Practical Skills (four weeks)	Implementation of 3,000 hour overhaul	<p>Guidance on implementation of 3,000 hour overhaul for mechanical equipment</p> <ul style="list-style-type: none"> - Practical guidance on overhaul - Guidance on analysis and evaluation of operating status - Guidance on preparation of future overhaul plans 	<p>Guidance on implementation of 3,000 hour overhaul for electrical equipment</p> <ul style="list-style-type: none"> - Practical guidance on overhaul - Guidance on analysis and evaluation of operating status - Guidance on preparation of future overhaul plans - Guidance on system operation control, including confirmation of operating status of Honiara Power Station

(Total: 22 weeks)

Table 2 Technical Guidance Schedule

Item \ Month	1	2	3	4	5	6
Training Step		(Step 1)				
			(Step 2)			
				(Step 3)		
					(Step 4)	
						(Step 5)

