2.2.4 Implementation/Procurement Plan

2.2.4.1 Implementation/Procurement Policy

The Project will be implemented in accordance with the framework of the grant aid scheme by the Government of Japan. Accordingly, the Project will only be implemented after it's approval by the Government of Japan and the formal Exchange of Notes (E/N) between the Government of Japan and the Government of Kiribati. The basic issues and special points of consideration for the implementation of the Project are described below.

(1) Project Implementation Body

The organization responsible for the implementation of the Project on the Kiribati side is the Ministry of Public Works and Utilities (MPWU) while the Public Utilities Board (PUB) of Kiribati will be in charge of the actual implementation of the Project. The PUB is responsible for all aspects of power supply services in Kiribati, ranging from studies and planning to construction, operation and maintenance.

The Kiribati side should appoint a person in the PUB to be responsible for the Project through close communications and consultations with the Japanese Consultant and the Contractor to ensure the smooth implementation of the Project. The selected person will be required to explain the contents of the Project to staff of the Bikenibeu Power Station and related government officials in Kiribati. He will also fully explain the contents of the Project to local residents who live around the Project site to obtain their understanding and will provide guidance for local people in view of their safety during the construction period and their cooperation with the Project to ensure its smooth implementation.

(2) Consultant

In order to construct the necessary facilities and to procure and install the necessary equipment for the Project, the Japanese Consultant will conclude a consultant services agreement with the Government of Kiribati and will conduct the detailed design and supervision of the site work for the Project. The Consultant will also prepare the tender documents and will execute the prequalification and tender on behalf of PUB, i.e. the project implementation body.

(3) Contractor

The Contractor, which will be (a) Japanese company(ies) selected by the Government of Kiribati by means of open tender in accordance with Japan's grant aid scheme, will

conduct the construction of the planned powerhouse building, etc. and the procurement and installation of the new equipment, etc. As it is necessary for the Contractor to provide after-care in terms of the supply of spare parts and the repair of breakdowns in regard to the new equipment, the Contractor must give proper consideration to the establishment of a post-Project liaison system.

(4) Necessity to Dispatch Japanese Engineers

The planned generating facility construction work and distribution line upgrading work are a combination of building work and installation work for generating and distribution equipment, both of which will be simultaneously conducted. This complexity will make it necessary to dispatch a site manager from Japan to provide consistent management and guidance on schedule control, quality control and work safety. In regard to the power house construction work, including the foundation work, the local shortage of skilled engineers in this field will make it essential for the Contractor to dispatch Japanese engineers to Kiribati to ensure proper quality control and schedule control. Moreover, the planned installation of the generating and distribution equipment will demand wide-ranging knowledge and expertise in regard to the equipment functions and configuration. Accordingly, the equipment manufacturers will be required to dispatch experts at appropriate times to supervise the installation, test operation and adjustment of the generation and distribution equipment.

In general, the possibility of system fault can be illustrated by the bathtub curve which is classified into three periods, i.e. initial fault period, accidental fault period and aged breakdown period. A proper response to necessary repairs in the initial breakdown period during which the number of breakdowns is comparatively high is very important to ensure the long life of equipment. Accordingly, the dispatch of electrical and mechanical engineers will be considered within the period of the E/N to provide technical guidance (OJT) to assist engineers and technicians to learn the skills required to deal with initial breakdowns.

2.2.4.2 Implementation/Procurement Conditions

(1) Conditions of Construction Industry in Kiribati

1) While it is possible to employ laborers in Kiribati for construction work, there are not many skilled workers or engineers with special knowledge and technical expertise regarding schedule, quality and safety control, etc. This will make it necessary for the Japanese Contractor to dispatch engineers and/or skilled workers to Kiribati when deemed appropriate.

2) As it will be difficult to recruit local engineers with experience of installing and tuning the medium size generating unit to be provided under the Project, the dispatch of Japanese engineers is planned to supervise such works as well as the schedule control as referred to in 2.2.4.1-(4).

3) As the minimum construction equipment and other machinery required for the site construction work and inland transportation and installation of equipment under the Project are available in Kiribati, they will be hired locally.

(2) Special Points to Note for Construction Planning

1) The rainy season in Tarawa lasts from November to April. Appropriate measures, including the planning of shelter from rain and rainwater drainage, should be introduced for the excavation work and the 11 kV high voltage cable installation work during this period. In addition, it will be necessary for the construction schedule to take the rainy season into consideration.

2) The installation of the generating unit should commence as soon as the main construction work of powerhouse has been completed and the mechanical and electrical equipment work should be simultaneously conducted to make the work period as short as possible.

3) The schedule of the implementation of the existing 11 kV distribution line upgrading work should include measures to minimize any adverse impacts on the lives of local residents due to power interruption and traffic restrictions, etc.

4) The excavation work for the existing 11 kV cables should be carefully conducted to avoid any damage to the existing underground water supply, sewerage and telephone lines. The schedule should be planned so as to avoid overlapping with the extension work for telephone lines, etc. and the SAPHE Project.

5) The generator installation work and finishing work for the powerhouse will be simultaneously conducted to strictly meet the contracted completion date and, therefore, special attention must be paid to work safety because of the likelihood of the simultaneous implementation of the construction and installation work on different levels with some workers working above others.

6) In the case of any additional work, such as the cutting of existing trees, being found necessary, the scope of the required work and its timing, etc. must be agreed by PUB

in advance. In addition, such work must be approved by the relevant ministry or agency as well as fully understood by local people to avoid any environmental destruction or disputes with local people.

7) In case groundwater is used for concrete, of the use of groundwater being found necessary as water for concrete, the water quality in terms of the salt content and other aspects must be controlled to ensure the required quality of the concrete and other relevant items.

2.2.4.3 Scope of Work

The division of work between the Japanese side and the Kiribati side under the Project is shown in Table 2-2-10.

Table 2-2-10 Division of Work between Japanese Side and Kiribati Side

Work Item	Japanese Side	Kiribati Side
1. Generating Facilities		
1) Diesel Engine Generator (DEG)	Supply and installation	-
2) Auxiliary Mechanical Equipment for DEGs	Supply and installation	-
3) Auxiliary Electrical Equipment for DEGs	Supply and installation	-
4) Fuel Tank, Cooling Water and Compressed Air Systems	Supply and installation	-
5) Grounding System	Supply and installation	
6) Maintenance Tools	Supply only	Storage
7) Repair Equipment	Supply only	Storage
8) Spare Parts	Supply only	Storage
9) O&M Manuals	Supply and explanation	Study and Storege
10) OJT	Implementation	Attendance
11) Cleaning of Construction Site, etc.	Implementation	Implementation
2. Distribution Facilities		
1) New 11 kV Ring Main Units (RMUs 13, 31, 63 and 64) and Distribution Transformer (T31)	Supply and installation	-
2) Existing 11 kV Ring Main Units (RMUs 13, 31 and 33B) and Distribution Transformer (T31)	Removal	Storage and disposal
3) New Distribution Circuit Breaker Panel (CB1)	Supply and installation	-
4) Building for the Above	-	Procurement and Construction
5) Existing Circuit Breaker Panels (CB1 and CB2)	-	Removal and storage
6) New 11 kV Cables (including Connecting and Terminal Treatment Materials)	Supply and installation	-
7) Replacement of Existing 11 kV Cables	Removal	Storage and disposal
8) Low Voltage Cables (including Accessories)	-	Procurement and installation
9) Grounding System and Fence	Supply and installation	-
10) Maintenance Tools	Supply only	Storage
11) Spare parts	Supply only	Storage
12) O&M Manuals	Supply and explanation	Study and Storage
13) OJT	Implementation	Attendance
14) Preparation and Cleaning of Construction Site	-	Implementation
15) Removal of Trees and Other Obstacles	-	Implementation
3. Powerhouse and Temporary Work		
1) Powerhouse Building	Design and construction	-
2) Rainwater Supply System for Powerhouse Building	Design and construction	-
3) Fuel Tank Foundations and Oil Retaining Wall	Design and construction	-
4) Rainwater Drainage System	Design and construction	-
5) Furniture and Curtains	-	Procurement and installation
6) Materials for Temporary Electrical, Water Supply and Telephone Work	Installation on premises only	Extension of service lines to the site
7) Charges for Temporary Electrical, Water Supply and Telephone Services	Payment	Extension of service lines to the site
8) Fuel Oil and Lubricating Oil up to No-Load Test of Generating Unit	Supply	-
9) Fuel Oil and Lubricating Oil after Load Test of Generating Unit	-	Procurement

2.2.4.4 Work Supervision/Procurement Supervision Plan

The Consultant will organize a project team in accordance with Japan's grant aid scheme and the concept and principles of the basic design in order to smoothly proceed with the implementation of the Project. The Consultant will also appoint at least one full-time on-site engineer to supervise the schedule control, quality control and safety control and will dispatch other relevant expert engineers in accordance with the progress of the installation, test operation and adjustment and acceptance test, etc. to supervise the work assigned to the Contractor. Furthermore, the Consultant will arrange Japanese experts to attend the inspection of equipment manufactured in Japan or a third country at the manufacturing and/or pre-shipment stages if necessary to prevent any equipment problems after delivery to Kiribati.

(1) Supervision Principles

The Consultant will supervise the work progress to ensure punctual completion within the planned period and will supervise and guide the Contractor in order to achieve the work quality and to observe the delivery schedules for the equipment, etc. indicated in the contract without accidents or other problems at the site. The main points to be noted for the supervisory work are described as below.

1) Schedule Control

The Consultant will make weekly and monthly comparisons between the actual work progress and the contract schedule submitted by the Contractor at the time of signing the contract on the following items. If the Consultant foresees any delay of the work, he will issue a warning to the Contractor, to request the Contractor to submit remedial plans to ensure the completion of the construction work and equipment delivery within the planned work period.

① Confirmation of the working progress (including the volume of manufactured equipment by the manufacturers)
② Confirmation of the date of delivery of the equipment
③ Confirmation of the temporary work and preparations for the construction machinery
④ Quantity of the equipment and materials delivered (for generation/distribution equipment and construction facilities)
⑤ Work efficiency and actual record of engineers, technicians and workers at site

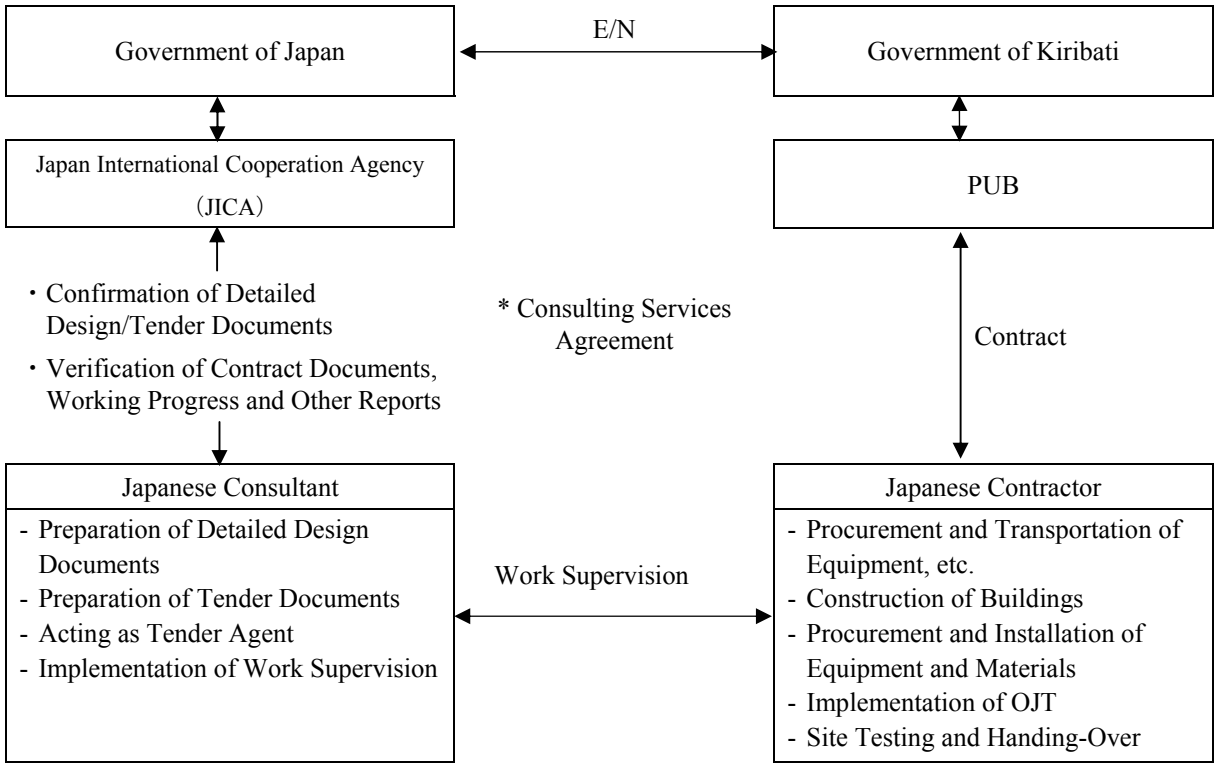
2) Safety Control

The Consultant will discuss and cooperate with the representative of the Contractor with a view to supervising the on-site construction and installation work to prevent any accidents to workers with due attention paid to the following safety control principles.

① Establishment of safety control rules and appointment of a person responsible for work safety
② Enforcement of the safety control rules and regular checking
③ Prevention of accidents to workers by means of the regular inspection of the construction machinery
④ Introduction of traveling routes for work vehicles and construction machinery, etc. and the thorough enforcement of slow driving at site
⑤ Enforcement of welfare measures and days-off for workers

(2) Project Implementation Regime

The project implementation regime, i.e. relationship between the parties involved in the implementation of the Project, including at the work supervision stage, is shown in Fig. 2-2-1.



* The Consulting Services Agreement and the contract must be verified by the Government of Japan.

Fig. 2-2-1 Project Implementation Regime

(3) Work Supervisors

The Contractor must have sufficient experience to make a proper judgement on all aspects of the work and must be capable of providing appropriate technical guidance in view of the smooth implementation of the construction work and equipment procurement and installation work as described in the detailed design documents within the planned work period. It is desirable, therefore, that the Contractor dispatches a site supervisor to Kiribati with previous experience of similar projects to ensure the high quality of the work to be conducted. Given the size and contents of the Project, the appointment of the following full-time on-site supervisor by the Contractor is deemed essential.

Site Manager	(1) :	general management of on-site work (civil engineering, construction, mechanical and electrical work)

In addition to the above, further dispatch of engineers will be required in accordance with the work progress. The subject areas for expert supervision will include equipment installation and test operation/adjustment.

2.2.4.5 Quality Control Plan

The Consultant will supervise the Contractor in regard to the following items so as to ensure the quality of the facilities and equipment indicated in the contract documents by the Consultant (technical specifications and detailed design drawings, etc.) If the Consultant believes that the quality does not meet the requirements, he will request the Contractor to correct, change or modify the situation.

① Checking of the shop drawings and specifications for equipment

② Checking of the factory inspection results for equipment or attendance at the shop inspection

③ Checking of the packaging, transportation and temporary on-site storage methods

④ Checking of the installation drawings and installation manuals for the equipment and materials

⑤ Checking of the test operation, adjustment and inspection manuals for the equipment at the manufacturing factories and on-site

⑥ Supervision of the site installation of the equipment and materials, and attendance at the test operation, adjustment and inspection

⑦ Checking of the construction drawings and working progress

⑧ Checking of the as-built drawings

2.2.4.6 Procurement Plan

Most of the construction materials to be used and the equipment to be procured under the Project are not manufactured in Kiribati. Although some imported items (cement and forms, etc.) are available in the local market, it will be difficult to guarantee the punctual delivery or quality of other items which will, therefore, be procured in Japan and/or a third country.

Among those equipment to be procured under the Project for distribution system, ring main unit and 11 kV cables, etc. made in third countries (ASEAN Countries and New Zealand, etc.) are commonly employed in Kiribati. These have been well maintained by the maintenance staff of PUB who are quite familiar with the operation and maintenance of the said equipment. Accordingly, the procurement of these types of equipment and materials from ASEAN countries and/or DAC countries will be considered.

The planned equipment and material supply sources for the Project are shown in Table 2-2-11 based on a comparative analysis of possible sources from the viewpoints of (i) reliability in terms of standards, specifications, quality, production and supply, (ii) ease of operation and maintenance and (iii) availability of spare parts supply, after-sale services in case of fault , etc.

Table 2-2-11 Equipment and Material Supply Sources

Equipment/Materials	Supply Source		
	Kiribati	Japan	Third Country
Diesel Fuel Oil, Lubricating Oil, Cooling Water	○	○	-
Sand	○	-	-
Cement	○	-	-
Gravel	-	-	○
Structural Steel	-	○	○
Steel Frame	-	○	○
Building Finishing Materials	-	○	○
DEG Unit (Diesel Engine, Generator and Electrical/Mechanical Equipment, Plumbing Materials and Power Cables, etc.)	-	○	-
Spare Parts for the Above	-	○	-
Maintenance Tools for the Above	-	○	-
Distribution Equipment			
• 11kV Power Cable	-	○	○
• Distribution Transformer	-	○	○
• Circuit Breaker Panel	-	○	○
• Ring Main Unit	-	○	○
• Construction Materials for Distribution System	-	○	○
Construction Machinery (Backhoe, Dump Truck, Generator, Water Pump and Others)	○	○	-
Truck with Crane	-	○	○

2.2.4.7 Implementation Schedule

According to Japan's grant aid scheme, the Project will be implemented in accordance with the following schedule.

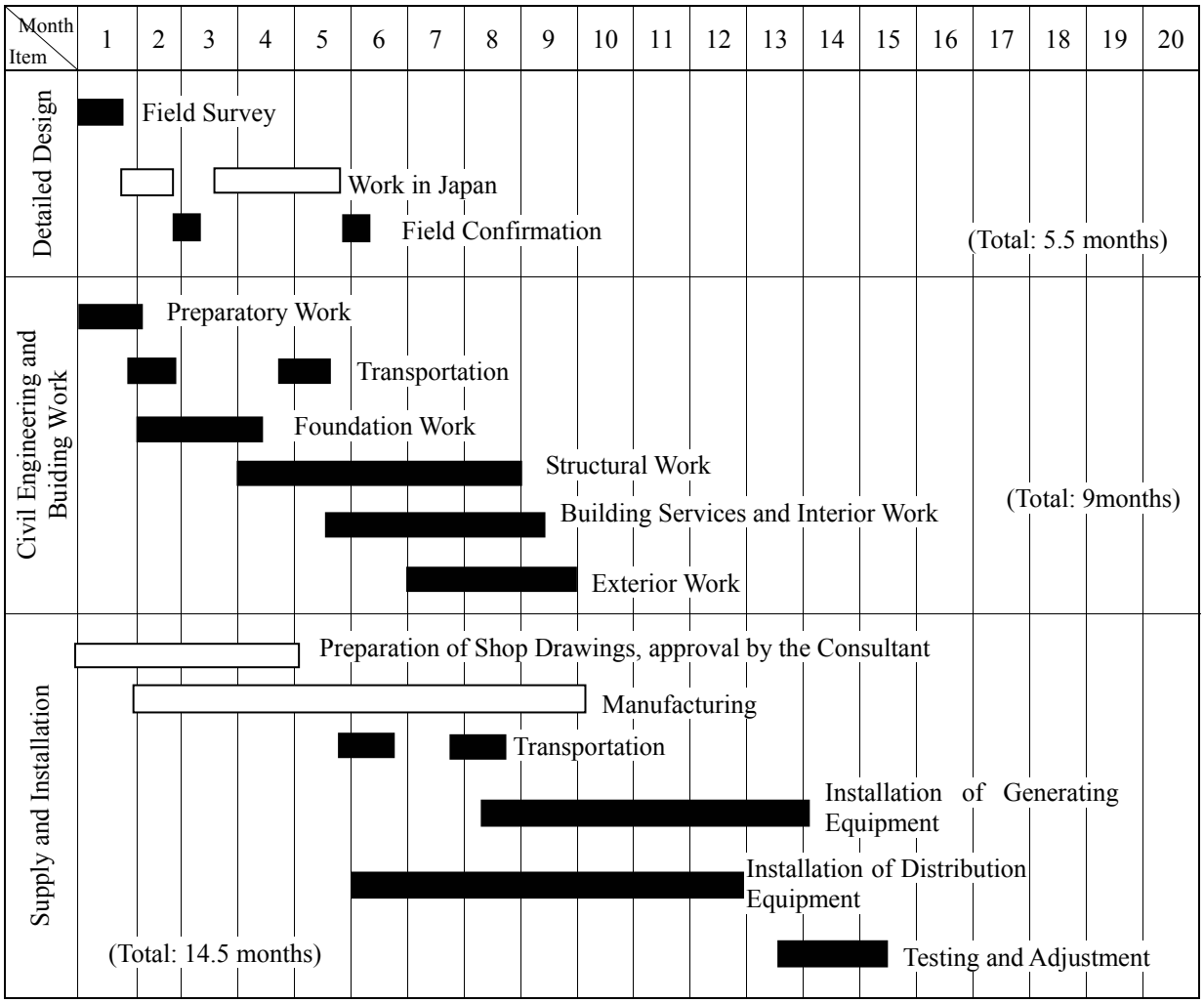


Fig. 2-2-2 Project Implementation Schedule

2.3 Obligations of Recipient Country

In the course of the implementation of the Project, the Government of Kiribati will be responsible for conducting the following works or providing the following items in addition to the scope of work by the Kiribati side described in item "2.2.4.3 Scope of Works".

(1) To provide necessary data and information for the Project.

(2) To secure or obtain and clear land for the extended powerhouse and distribution equipment prior to the commencement of the construction work under the Project.

(3) To ensure prompt unloading, customs clearance and tax exemption of the goods for the Project at the port and/or airport of disembarkation in Kiribati.

(4) To accord Japanese nationals whose services may be required with regard to the supply of products and services under the verified contracts for their entry into Kiribati and stay therein for the performance of their work.

(5) To exempt Japanese nationals from customs duties, internal taxes and other fiscal levies which may be imposed in Kiribati with respect to the supply of the products and services under the verified contracts.

(6) To bear commissions to a Japanese bank for opening bank account based on the banking arrangement.

(7) To bear all expenses other than those to be borne under the grant aid scheme necessary for the implementation of the Project.

(8) To attend delivery inspection for equipment and materials at the port and/or airport of disembarkation in Kiribati, and to select engineers and/or technicians as counterparts in order to transfer operation and maintenance skills.

(9) To take necessary measures and responsibility for the power interruption during the construction/installation period.

(10) To use and maintain properly and effectively all equipment and materials provided under Japan's grant aid.

(11) To procure and install the 415 V distribution equipment and materials in accordance with the implementation schedule which meets the relevant requirements of Japan's grant aid scheme.

(12) To implement Environmental Impact Statement (EIS) by the end of April, 2004.

(13) To provide proper disposal sites for the excavated soil, waste water and waste oil discharged during the construction period and also for removed equipment and materials.

(14) To remove all obstacles on the planned distribution line routes.

(15) To remove the existing warehouse and elevated water tank at the Bikenibeu Power Station prior to the commencement of the work by the Japanese side.

(16) To take necessary measures and coordination regarding the installation of the new 11 kV distribution lines and to coordinate with other projects.

(17) To secure the plot for the planned distribution line route and new substation area.

(18) To remove and store the existing old distribution transformer (T31) for disposal.

(19) To store and dispose existing old 11 kV cables after their removal.

2.4 Operation and Maintenance Plan

2.4.1 Maintenance Plan

(1) Maintenance System

Among the equipment to be provided under the Project, the generating unit is the most crucial equipment in terms of proper maintenance. The appropriate operation and maintenance of the unit and the preservation of the surrounding environment will be essential to enable a stable power supply which responds to daily demand fluctuations. In order to maintain the proper performance and functions of the planned generating unit to ensure a stable supply of power, the establishment of a maintenance system enabling appropriate preventive maintenance designed to improve the reliability, safety and efficiency of the generation and distribution facilities is highly required. Fig. 2-4-1 shows the basic concept of such maintenance.

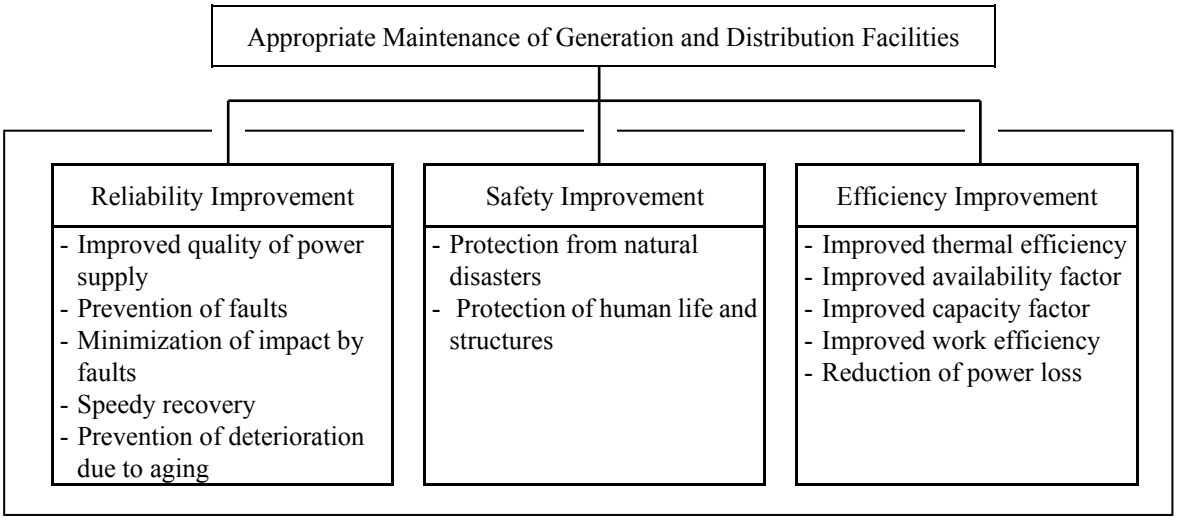


Fig. 2-4-1 Basic Concept of Maintenance of Generation and Distribution Facilities

It will be necessary for PUB to prepare the operation schedule for the Bikenibeu and Betio Power Stations in accordance with their respective load characteristics to ensure economical operation of the power system.

(2) Personnel Training Plan

For the successful outcome of the Project, it will be necessary for the Kiribati side to conduct adequate operation and maintenance of all of the equipment using the O&M

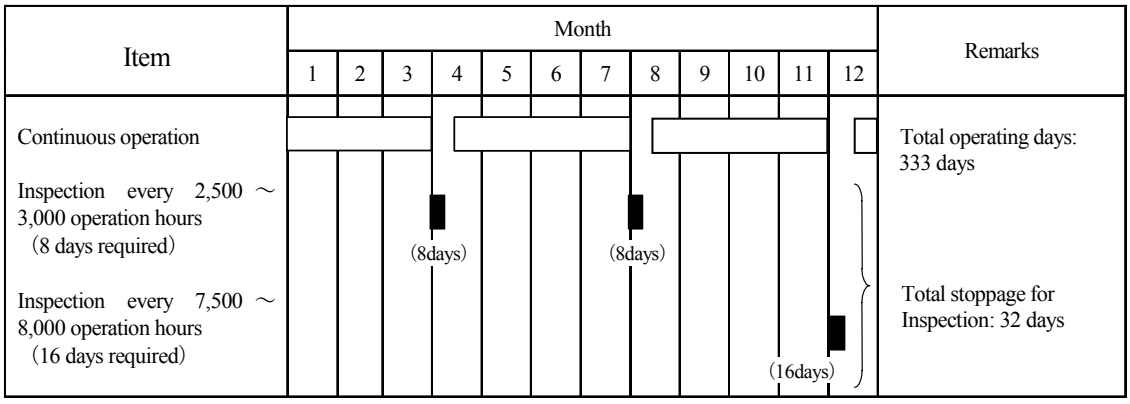
techniques transferred to the Kiribati side through OJT to be provided by the engineers dispatched by the Contractor during the installation work and the test operation and adjustment period and also in accordance with the O&M manuals provided by the Contractor which include the concept of preventive maintenance. The subject persons of OJT will be engineers and technicians. A total of 10 persons, i.e. five mechanical and five electrical engineers/technicians, are planned to receive OJT.

2.4.2 Operating Plan for New Generating Facility

The planned new generating facility will provide for the base load operation as described in 2.3.2 and the adoption of the following operating conditions is deemed appropriate in view of its purpose and specifications

- Annual availability factor : 90% or higher (approx. 7,900 hours)
- Annual capacity factor : not less than 55%

Table 2-4-1 shows the periodical inspection items required for the proper operation of the new generating facility while Fig. 2-4-2 shows the annual operation programme for the same facility for the first year based on the operating conditions mentioned above, taking the periodical inspection items into consideration. It is expected that the operation of the new generating facility will be suspended for approximately 32 days/year as shown in Fig. 2-4-2. The Nos. 1, 2, 3 and 4 Unit of the Bikenibeu Power Station and the No. 6 and 9 Unit of the Betio Power Station should be used during this period to compensate for the loss of supply capacity by the new generating unit.



Note: Based on an annual availability factor of 90%.

Fig. 2-4-2 Annual Operation Programme for New Generating Facility

2.4.3 Periodic Inspection Items

(1) Generating Facility

The standard items for the periodical inspection of the planned generating facility are shown in Table 2-4-1. The Kiribati side will be required to prepare an operation and maintenance plan for the planned generating unit in accordance with the O&M manuals to be submitted by the manufacturers with a view to establishing an economical operation programme for the unit in line with the actual power demand. The following number of days will be required to complete the standard inspections listed in the table.

- 2,500 – 3,000 hours inspection : 7 – 8 days/inspection
- 7,500 – 8,000 hours inspection : 15 – 18 days/inspection
- 16,000 hours inspection : 20 – 25 days/inspection

Table 2-4-1 Standard Periodical inspection Items of Generating Facility

Item	Type of Inspection	Main Inspection Item/Work
Diesel Engine	Daily Inspection	- Checking of fuel oil level of fuel oil tank and lubricating oil level of sump tank - Checking of jacket cooling water level - Checking of starting-up air receiver pressure - Visual checking of various sections
	1,000 Hours Inspection	- Checking of proper tightening of bolts and nuts - Cleaning of fuel and lubricating oil filters
	2,500 – 3,000 Hours Inspection	- Checking of proper working of and oil leakage from intake and exhaust valves, starting valve, fuel valve, fuel pump, piston and liner, etc. - Analysis of lubricating oil in sump tank
	7,500 – 8,000 Hours Inspection	- Checking of proper working of and oil leakage from fuel oil pump, piston, cylinder liner and replacement of gasket - Replacement of piston ring and O-ring - Overhauling of cylinder head and replacement of gasket and O-ring - Inspection of intake and exhaust valves and replacement of exhaust valve O-ring - Inspection of fuel injection valve and replacement of nozzle - Inspection of crank pin bearings and replacement if necessary - Overhauling and inspection of turbo charger and replacement of bearings, etc. - Analysis of lubricating oil of sump tank and oil replacement if necessary
	16,000 Hours Inspection	- All items under "7,500 – 8,000 Hours Inspection" - Inspection and replacement of main bearings if necessary - Inspection and replacement of exhaust valve rotor if necessary - Overhauling, inspection and replacement of lubricating oil pump attached to engine if necessary
Generator	Daily Inspection	- Visual inspection of all sections and checking of abnormal sound and temperature
	Monthly Inspection	- Checking of abnormal vibration - Checking of lubricating oil flow and oil leakage from bearings - Necessary cleaning of components
	Annual Inspection	- Measurement of insulation resistance and inspection of lead wires and terminals - Visual inspection of accessories, including space heater - Visual inspection of bearings and cleaning if necessary

(2) Distribution Facility

1) Periodic Inspection of Distribution Equipment

The standard periodical inspection items for the distribution equipment to be procured and installed under the Project are shown in Table 2-4-2. As the table shows, the inspection of the distribution equipment is classified into the following three categories.

(a) "patrolling inspection" which is conducted daily using human senses to check any abnormal heating and sound, etc. of the equipment

(b) "standard inspection" to check energized sections beyond the daily patrolling inspection, including the fastening conditions of bolts, etc. of the equipment and the cleanliness of or damage to the surface of insulated items, etc.

(c) "detailed inspection" to check the proper functioning of the interlocking mechanism between equipment and the accuracy of instruments, etc.

Standard inspections are conducted every one or two years while detailed inspections are conducted approximately every four years.

The regular replacement of certain parts at the time of either standard inspection or detailed inspection is desirable based on confirmation of the characteristics as well as frequency of use of such parts. These include the fuses, measuring instruments and relays, etc. installed inside the distribution panels and others which are subject to performance deterioration, including the insulation performance, abrasion of the contact points and changes of the characteristics.

Table 2-4-2 Standard Periodical inspection Items for Distribution Facility

Subject	Inspection Item (Method)	Patrolling Inspection	Standard Inspection	Detailed Inspection
Equipment Outlook	Condition of indicators and indication lamps	○	○	
	Abnormal sound or odor	○	○	
	Thermal discoloration of terminals	○	○	
	Cracks, damage or contamination of bushing and insulator	○	○	
	Rust on casings and frames for installation	○	○	
	Abnormal temperature (thermometer)	○	○	
	Fastening of bushing terminals (mechanical check)	○	○	
Operating Apparatus and Control Panels	Correct indication by various instruments	○	○	○
	Reading of operation counters		○	○
	Condensation, rust and damage inside console and panels		○	○
	Status of oil supply and cleaning		○	○
	Fastening of cable terminals	○	○	○
	Status of Open-Close indications		○	○
	Air leakage and oil leakage		○	○
	Pressure before and after operation (air pressure, etc.)		○	○
	Working of instruments		○	○
	Rust, deformation and/or damage to springs (maintenance)	○	○	○
	Abnormality of fastening pins		○	○
	Auxiliary contactors and relays (maintenance)		○	○
	Checking of DC control power source	○		
Measurement/ Testing	Measurement of insulation resistance		○	○
	Measurement of contact resistance			○
	Breaking of heater cable		○	○
	Operation check of protection relays		○	○

2) Periodical Inspection of Distribution Lines

One of the most important consumer services is the maintenance of distribution lines by means of detecting breakdowns and damage through regular patrolling and immediate restoration. The major check items for patrolling inspection are listed below.

(a) Contact between distribution equipment and trees, etc.

(b) State of fencing and locks

(c) Operating status of circuit breaker panels and ring main units

2.4.4 Fuel Oil Procurement Plan

The estimated fuel (diesel oil) consumption to operate the Bikenibeu Power Station, including the new generating unit to be installed under the Project, is 466 m^3/month as described in

2.2.2-(4). The PUB will be required to prepare and implement a practical fuel oil procurement plan to ensure the steady operation of the said station.

2.4.5 Spare Parts Procurement Plan

The spare parts for the generating and distribution facilities consist of those to replace aged parts (consumables) and emergency spare parts, which are required at the time of a breakdown, etc. Accordingly, the PUB should procure and prepare these spare parts in advance in line with the periodical inspection cycle (see Table 2-4-1).

Two years spare parts to cover 16,000 hours of operation during which the periodical inspection cycle will be completed is planned under the Project. The main procurement items based on the periodical inspection items are shown in Table 2-4-3. In order to ensure the continuous operation of the generating unit and distribution equipment to be installed under the Project after the initial two years' operation, the Kiribati side will be responsible for appropriating necessary budget to cover the procurement cost of consumables, spare parts (amounting to approximately 6% of the cost of the generating unit in two years) required for the operation and periodical maintenance of the said unit and also the cost of emergency spare parts within two years of the commissioning of the new generating unit.

Table 2-4-3 Spare Parts and Maintenance Tools to be Provided Under the Project

I-1. Spare parts for Generating Facility

Item	Q'ty
1. Diesel Engine and Auxiliary equipment	
(1) Consumable spare parts	
1) Fuel oil filter element	1 set
2) Lubricating oil filter element	1 set
3) Cylinder cover packing (for all cylinders)	2 sets
4) Air cooler packing	2 sets
5) Exhaust gas valve complete (for all cylinders)	1 set
6) Intake air valve complete (for all cylinders)	1 set
7) Turbo charger bearing	2 sets
8) Piston ring (for all cylinders)	2 sets
9) Fuel oil injection pump sleeve, deflector (for all cylinders)	2 sets
10) Fuel oil injection nozzle tip (for all cylinders)	1 set
11) Packing, O-ring, etc.	1 set
12) Blower filter (1 m^2)	1 set
13) Water softener filter, ion exchange resin	1 set
(2) Emergency's pare parts	2 sets
1) Fuel oil injection block complete	1 set
2) Cylinder cover complete	1 set
3) Fuel oil injection nozzle complete	1 set
4) Fuel oil injection pump and valve	1 set
5) Jacket cooling water pump	1 set
6) Lubricating oil filter for turbo charger	1 set
7) Lubricating oil by-pass filter element	1 set
8) Pre-filter for turbo charger	1 set
9) Suction and exhaust valve complete	1 set
10) Starting valve complete	1 set
11) Spare parts for auxiliary pump	100 %
12) Instruments (pressure gauge and thermometer, etc.)	One of each kind
2. Electrical Equipments and Auxiliaries	
(1) Consumable spare parts for normal operation	
1) Fuse elements for control circuits	200% for each type
2) Lamps or bulbs for indicators (excluding LEDs)	200% for each type
3) On-off indicator covers	100% for each type
4) Fluorescent lamps for inside panels	200% for each type
(2) Emergency spare parts	
1) Printed circuit board for AVR (for exciter)	1 set
2) High voltage circuit breaker (VCB)	1 set
3) Auxiliary relay and timer	1 pc for each type
4) Various MCCBs and ELBs	1 pc for each type
5) Electro-magnetic Contactors	1 pc for each type
6) Electrical meter for panels (voltage and ampere, etc.)	1 pc for each type
7) Thermal relay	1 pc for each type
8) Fuse for voltage transformer	1 pc for each type
9) Fuse for high voltage equipment	1 pc for each type
10) Tripping and closing coil for circuit breaker	1 set each

I-2. Spare Parts for Distribution Facilities

Item	Q'ty
(1) Consumable Spare Parts for normal operation	
1) Fuse elements for control circuit	200% for each type
2) Lamps or bulbs for indicators (excluding LEDs)	200% for each type
3) On-off indicator covers	100%
4) Auxiliary relays, timers and MCCBs	1 pc for each type
5) Fluorescent lamps for panels	200%
6) Power fuse element for Ring Main Unit	3

II. Maintenance Tools and Instruments

Item	Q'ty
1. For Diesel Engine	
(1) Tool set for mechanical equipment	1 set
(2) Remover for cylinder liner	1 set
(3) Ladder	1 set
(4) Ear protectors	10 sets
(5) Simplified Intake/Exhaust valves and seat grinder	1 set
(6) Measuring device	1 set
2. For distribution equipment	
(1) 5 ton cable drum jack	2 sets
(2) 3 ton cable drum jack	2 sets
3. Common use for generator and distribution system equipments	
(1) Circuit tester (analog meter)	2
(2) Tool set for electrical maintenance	2 sets
(3) Voltage meter (50 mV)	1
(4) Insulation tester by dry cell (500 V, 1000 MΩ)	2
(5) Insulation tester by dry cell (2,500 V, 100 GΩ)	2
(6) Portable earth resistance tester (0～100Ω, 0～30V)	2
(7) Phase rotation meter for low voltage circuit	2
(8) Voltage detector for low voltage circuit	2
(9) Voltage detector for 11kV circuit	1
(10) Digital multimeter	2
(11) AC/DC clamp meter	2
(12) Grounding tool for maintenance work (for 3 phase)	1 set
(13) VCB checker	1 set

III. Vehicle

Item	Q'ty
4 ton truck with a 3 ton crane, 4-Wheel Drive	1 set

2.5 Estimated Project Cost

2.5.1 Estimated Project Cost

This cost estimate is provisional and would be further examined by the government of Japan for the approval of the Grant. In the case of the Project's implementation under the Japan's grant aid Scheme, the total project cost is estimated to be approximately ¥815 million (Japanese side 797 million, Kiribati side 18 million). The financial undertaking by each side is estimated below based on the work share described earlier and the estimation conditions shown below.

(1) Cost to be borne by Japanese Side

Cost Estimation 797 million

Cost Item		Cost (¥ million)	
Facility	Extension of Powerhouse	145	725
Equipment	Diesel Generator (1,400kW 1 unit) Auxiliary Equipment (Fuel oil, Lubricating oil, Cooling water, Air intake and exhaust system) High (11kV) and Low (415V) Voltage Panel, Generator Neutral Panel, Generator Control Desk	580	
	Ring Main Unit, Distribution Transformer, High Voltage (11kV) Cable Crane Truck for Maintenance Work		
Detailed Design, Work Supervision and Technical Guidance		72	

However, it should be noted that this estimated project cost does not limit the amount of E/N in case it is formally exchanged between both Governments.

(2) Estimation Conditions

1) Date of Estimation : April, 2004

2) Foreign Exchange Rate : A$1 = ¥82.09 (average TTS from October, 2003 to March, 2004)

US$ 1 = ¥108.07 (average TTS from October, 2003 to March, 2004)

3) Work Period : Work to be completed in a single fiscal year; the detailed design, construction and equipment procurement periods are shown in the Implementation Schedule (Fig. 2-2-2)

4) Others : Project to be implemented in accordance with the grant aid scheme of the Government of Japan

2.5.2 Cost to be borne by Kiribati Side

Main items of the construction costs to be borne by Kiribati side are as follows:

① Removal of existing Workshop and Elevated Water Tank:	Some	9,000 A$
② Removal of existing Ring Main Unit:	Some	5,000 A$
③ Construction of Circuit Breaker Panel Building:	Some	3,000 A$
④ Procurement and Installation of 415/240V Distribution Lines:	Some	213,000 A$
⑤ Preparation of the Environmental Impact Statement (EIS):	Some	4,000 A$
Total:	Some	234,000 A$
		(Approx. ¥18,252,000)

2.5.3 Operation and Maintenance Cost

The electricity tariff currently applied by PUB is A$ 0.37/kWh for residential use and A$ 0.47/kWh for public, commercial and industrial use, averaging A$ 0.43/kWh based on the 2002 results. Table 2-5-1 shows the assumed operating income and expenditure for the new generating unit when the above tariff is applied.

As the table shows, when the annual capacity factor of the said unit (1,400kW) reaches 54% or higher, the operating balance is expected to produce a profit. Accordingly, the Kiribati side should prepare an annual maintenance plan to achieve the said capacity factor and should also prepare and implement an optimal operation plan for all generating units based on the load situation.

Although it varies from one manufacturer to another, a generating unit requires overhauling every 8,000 – 12,000 hours of operation and the cost of overhauling should be considered in the planning of the maintenance cost.

Table 2-5-1 Expected Operating Income and Expenditure for Bikenibeu Power Station

No.	Item	Unit	Annual Capacity Factor			
			50%	53%	54%	60%
I	Conditions					
1	Installed capacity (1,400 kW x 1)	kW	1,400	1,400	1,400	1,400
2	Annual operating hours	hr	4,380	4,643	4,730	5,256
3	Electric energy generated	MWh	5,519	5,850	5,960	6,623
4	House consumption	MWh	55	58	60	66
5	Distribution loss	MWh	883	936	954	1,060
6	Electric energy sold (3-4-5)	MWh	4,581	4,855	4,947	5,497
II	Income					
	Income from power sales	A$	1,969,660	2,087,839	2,127,232	2,363,592
III	Expenditure					
1	Fuel oil cost (I-3) x (3) x (6)	A$	1,119,213	1,186,365	1,208,750	1,343,055
2	Lubricating oil cost (I-3) x (4) x (6)	A$	20,282	21,498	21,904	24,338
3	Personnel cost	A$	165,000	165,000	165,000	165,000
4	Spare parts procurement cost	A$	314,108	314,103	314,103	314,103
5	Office expenses	A$	196,966	208,784	212,723	236,359
6	Depreciation cost	A$	193,162	193,162	193,162	193,162
7	Expenditure total	A$	2,008,725	2,088,913	2,115,642	2,276,017
IV	Operating balance	A$	-39,065	-1,073	11,591	87,574
V	Unit cost of generation	A$/KWh	0.364	0.357	0.355	0.344

Estimation Conditions

(1) The unit power sales price is assumed to be A$ 0.43/KWh based on the PUB's 2002 results.
(2) The house consumption and distribution loss are assumed to be 1% of the electric energy generated and 16% of the electric energy distributed respectively.
(3) The unit cost of the fuel oil used is A$ 0.78/litre as of the end of 2003.
(4) The unit cost of the lubricating oil used is A$ 2.45/litre as of the end of 2003.
(5) The unit cost of the cooling water used is A$ 5/m^3 as of the end of 2003.
(6) The consumption volumes of fuel oil, etc. are assumed as follows.
- Fuel oil : 0.26 litres/KWh
- Lubricating oil : 0.0015 litres/KWh
- Cooling water : ignored because of its low consumption volume (0.002 litres/KWh) and low unit cost

(7) The personnel cost covers the wages of all 24 employees at the Power Station, including the operation and maintenance staff for the generating units and the average unit personnel cost of the PUB in 2002 is used.
(8) The spare parts procurement cost is calculated to be 3% of the new generating and distribution equipment, etc.
(9) Office expenses are calculated to be 10% of the income.
(10) The depreciation cost is calculated using the straight line method with an expected life of the generating and distribution equipment of 15 years with nil residual value.
(11) The exchange rate used is A$1 = ¥78.

CHAPTER 3

PROJECT EVALUATION AND RECOMMENDATIONS

CHAPTER 3

PROJECT EVALUATION AND RECOMMENDATIONS

3.1 Project Effects

The implementation of the Project is expected to achieve the following effects.

(1) Direct Effects

Current Situation and Problems	Counter Measures Under the Project (Grant Aid Portion)	Project Effects and Degree of Improvement
1. All of the existing generating units are nearly 30 years old except for two 1,400kW units provided under the previous project. The decline of the generating capacity due to the deterioration of equipment and short operating hours due to the spare parts shortage have resulted in an insufficient power supply.	Addition of a new generating unit (1,400kW) at the existing Bikenibeu Power Station	The increased output will provide a stable power supply and the establishment of a positive power balance up to 2011 will make proper maintenance work possible.
2. Many of the existing distribution lines are 20 – 30 years old except for those replaced under the previous project. Their deterioration and small cable size causes a large voltage drop and a large distribution loss of more than 16%.	Rehabilitation of some 18 km of the 62 km long existing 11 kV trunk distribution network	The improved power supply reliability of the distribution network will establish a power supply system with few breakdowns and the distribution loss will improve to some 10%.
3. There are some 400 waiting consumers in South Tarawa.	Addition of one generating unit (1,400kW) at the existing Bikenibeu Power Station and rehabilitation of some 18 km of the 11 kV distribution lines	Some 400 waiting consumers can be connected to the grid.

(2) Indirect Effects

Current Situation and Problems	Counter Measures Under the Project (Grant Aid Portion)	Project Effects and Degree of Improvement
1. Power facilities in South Tarawa are unreliable due to the lack of a stable power supply capacity, causing adverse impacts on the lives of local people, the operation of public facilities and the vitalisation of industries.	Addition of one new generating unit (1,400kW) at the existing Bikenibeu Power Station and rehabilitation of the 11 kV distribution lines.	The stable and reliable operation of public facilities (hospitals, schools, public offices and churches, etc.) serving some 38,000 people on Tarawa Island will become a reality. The expanded hours for the activities of local people will stimulate economic activities.
2. While many users currently have their own independent generators, the lack of expert involvement in the operation and maintenance of such generators is creating a hazardous situation in terms of personal accidents and environmental pollution, etc.	Installation of one new generator (1,400kW) at the Bikenibeu Power Station	The operation and maintenance of the power generating facilities will be centralized to the PUB, reducing the likelihood of personal accidents and environmental pollution involving independent generators.

3.2 Recommendations

It will be necessary for the Kiribati side to conduct the following tasks to ensure the realization and continuation of the effects of the Project.

(1) It will be necessary for the Kiribati side to fully note new infrastructure development projects of which the work periods overlap with that of the planned upgrading of the existing distribution lines and to regularly check the progress and schedules of these projects, including the situation of underground structures and any relevant future plan.

(2) While the reserve power supply capacity up to the year 2008 will be secured with the completion of the Project, it will be necessary for the Government of Kiribati to annually review the likelihood of a further increase of the power demand after 2008 and to formulate a plan to increase the power supply capacity accordingly. In addition, it will also be necessary for the Government of Kiribati to secure the necessary budget for the procurement of new equipment.

(3) Periodic inspections recommended by the manufacturer should be conducted without fail to ensure the effective operation and long life of the new generating unit as well as the distribution equipment to be newly installed or upgraded under the Project.

(4) The new generating unit should be used for base operation and an operating programme to achieve an annual capacity factor of not less than 55% should be formulated. In addition, the maintenance budget for the new generating unit should be secured.

(5) The Kiribati side should urgently formulate a rehabilitation plan for those 11 kV lines of which the rehabilitation is not included in the Project in order to further reduce the distribution loss and to improve the power supply reliability. At the same time, appropriate energy conservation measures should be prepared and implemented.

(6) It will be necessary for the PUB to record the generating efficiency and other performance of each of the new and existing generating units to assist the formulation of an economical operation programme. The PUB should also record the actual load for each Distribution Transformer to select the proper capacity of transformers and low voltage distribution cables to serve the load.

(7) A step-up electricity tariff where the unit charge increases with a higher level of consumption should be introduced to provide an incentive for large consumers to reduce their power consumption while providing a low rate for poor households.

(8) The introduction of a subsidy scheme or preferential measures for poor households and social welfare facilities should be considered in regard to the sharing of the distribution line installation cost by consumers to facilitate electrification as soon as possible.

(9) The optimal tap value for Distribution Transformers should be selected for each installation site to improve the quality of the power supply and to reduce the distribution loss.

The Project will be implemented more smoothly and its effects will be further enhanced if the above tasks are achieved by the Kiribati side.

APPENDICES

1. MEMBER LIST OF THE STUDY TEAM

Member List of the Study Team

(1) Members for Basic Design Study

Name	Work Assignment	Position
Mr. Kenshiro TANAKA	Team Leader	Officer, Third Project Management Division, Grant Aid Management Department, JICA
Mr. Mitsuhisa NISHIKAWA	Chief Consultant/ Facility Management Planner	Yachiyo Engineering Co., Ltd.
Mr. Hirohito SETO	Power Generation Planner	Yachiyo Engineering Co., Ltd.
Mr. Tadayuki OGAWA	Power Distribution Planner	Yachiyo Engineering Co., Ltd.
Mr. Hisayuki YAMAMOTO	Facilities Planner	Yachiyo Engineering Co., Ltd.
Mr. Akihiro SHIMOMURA	Environmental and Social Analyst	Yachiyo Engineering Co., Ltd.
Mr. Tatsuya KOBAYASHI	Procurement Planner / Cost Estimator	Yachiyo Engineering Co., Ltd.

(2) Members for Explanation of Draft Final Report

Name	Work Assignment	Position
Mr. Mitsuhisa NISHIKAWA	Chief Consultant/ Facility Management Planner	Yachiyo Engineering Co., Ltd.
Mr. Hirohito SETO	Power Generation Planner	Yachiyo Engineering Co., Ltd.
Mr. Tadayuki OGAWA	Power Distribution Planner	Yachiyo Engineering Co., Ltd.

2. SURVEY SCHEDULE

Survey Schedule –Itinerary of the Basic Design Study–

No.	Day		Official Members	Consultant Members		Stay at
			Mr. Tanaka	Mr. Nishikawa, Mr. Seto, Mr. Ogawa	Mr. Yamamoto, Mr. Shimomura, Mr. Kobayashi	
1	23Nov.	Sun.		-Trip[Tokyo(21:00)～JL771～]		Air
2	24Nov.	Mon.		-Trip[～(08:30)Sydney(13:20)～FJ910～(18:10)Nadi]		Nadi
3	25Nov.	Tue.		-Trip[Nadi(07:00)～ON222～(10:00)Tarawa] -PM: Courtesy Call to Ministry of Public Works and Utilities (MPWU) and Public Utilities Board (PUB) -Explanation of Japan's Grant Aid Scheme to MPWU and PUB including actual cases experienced by the Team - Reconfirmation of the field Survey Schedule and Collection of General Information		Tarawa
4	26Nov.	Wed.		-Discussion on the IC/R, Questionnaire with MPWU and PUB about contents, schedule, etc. -Discussion on Main Project Components and Statistics related to Power supply situation with MPWU and PUB - Survey of Statistics of Socio-economic information at Related Organizations - Market Survey, collection of data for cost estimation		Tarawa
5	27Nov.	Thu.		-Survey of existing Bikenibeu Power Station (P/S), Betio P/S and 11 kV Distribution Lines - Rough topographic survey of Bikenibeu (P/S)		Tarawa
6	28Nov.	Fri.		-Survey of existing 11 kV Distribution Lines, waiting consumers, isolated generating plants and actual consumer(s) - Survey of Statistics of Socio-economic information at Related Organizations - Market Survey, collection of data for cost estimation -Discussion and Collection of related information on EIA at MELAD, MPWU and PUB		Tarawa
7	29Nov.	Sat.		-Detailed survey of existing 11 kV Distribution Lines, waiting consumers, isolated generating plants, etc.		Tarawa
8	30Nov.	Sun.		-Sorting and Analysis of Collected Data and Information, Internal Meeting		Tarawa
9	01Dec.	Mon.		-Survey of existing Bikenibeu Power Station (P/S), 11 kV Distribution Lines, waiting consumers, isolated generating plants and actual consumer(s) - Survey of Statistics of Socio-economic information at Related Organizations - Market Survey, collection of data for cost estimation -Discussion and Collection of related information on EIA at MELAD, MPWU and PUB		Tarawa
10	02Dec.	Tue.	-Trip[Nadi(07:00)～ON222～(10:00)Tarawa] -PM: Courtesy Call to Ministry of Public Works and Utilities (MPWU) and Public Utilities Board (PUB) -PM:Submission and Explanation of Minutes of Discussions (M/D) to MPWU and PUB	-Survey of existing Bikenibeu Power Station (P/S), 11 kV Distribution Lines, waiting consumers, isolated generating plants and actual consumer(s)		Tarawa
11	03Dec.	Wed.	-Survey of existing Bikenibeu Power Station (P/S), Besio P/S, 11 kV Distribution Lines -Submission and Explanation of Minutes of Discussions (M/D) to MPWU and PUB	- Same as left		Tarawa
12	04Dec.	Thu.	- Discussion on M/D ***- Signing of M/D with MPWU and PUB***	- Same as left		Tarawa

No.	Day		Official Members	Consultant Members		Stay at
			Mr. Tanaka	Mr. Nishikawa, Mr. Seto, Mr. Ogawa	Mr. Yamamoto, Mr. Shimomura, Mr. Kobayashi	
13	05Dec.	Fri.	-Assigned for the Project for Rehabilitation of Betio port -Assigned for the Project for Rehabilitation of Betio port	- Market Survey, collection of data for cost estimation - Survey and confirmation of remaining data & information with PUB	- Three Consultants will depart from Tarawa via Brisbane	Tarawa
14	06Dec.	Sat.	-Assigned for the Project for Rehabilitation of Betio port	- Survey of budgetary and labor appropriation by Kiribati side - Survey and confirmation of operation & maintenance by PUB		Tarawa
15	07Dec.	Sun.	-Assigned for the Project for Rehabilitation of Betio port.	- Sorting and Analysis of Collected Data		Tarawa
16	08Dec.	Mon.	-Assigned for the Project for Rehabilitation of Betio port	- Detail Survey of Power Generation Facilities for Bikenibeu Power Station and 11 kV Distribution System		Tarawa
17	09Dec.	Tue.	-Assigned for the Project for Rehabilitation of Betio port	- Detail Survey of Power Generation Facilities for Bikenibeu Power Station and 11 kV Distribution System - Survey and confirmation of remaining data & information with PUB		Tarawa
18	10Dec.	Wed.	-Assigned for the Project for Rehabilitation of Betio port	- Explanation and Discussion of F/R - Survey and confirmation of remaining data & information with PUB		Tarawa
19	11Dec.	Thu.	-Courtesy Call to MPWU and PUB -Trip[Tarawa(14:15)～ON141～(17:15)Nadi]	- Explanation and Discussion of F/R - Detail Survey of Power Generation Facilities for Bikenibeu Power Station and 11 kV Distribution System		Official: Suva Consultant: Tarawa
20	12Dec.	Fri.	-Trip[From Nadi to Suva by Car] -Courtesy Call to Embassy of Japan and JICA Fiji office in Suva	- Obtaining of approval for the Field Report from MPWU and PUB - Survey and confirmation of remaining data & information with PUB		Official: Suva Consultant: Tarawa
21	13Dec.	Sat.	-Trip[Nadi(10:30)～FJ302～(17:00)Tokyo]	- Market Survey, collection of data for cost estimation - Survey and confirmation of remaining data & information with PUB		Tarawa
22	14Dec.	Sun.		- Sorting and Analysis of Collected Data		Tarawa
23	15Dec.	Mon.		-Courtesy Call to MPWU and PUB - Trip[Tarawa(14:15)～ON111～(17:15)Nadi]		Nadi
24	16Dec.	Tue.		- Courtesy Call to Embassy of Japan and JICA Fiji office in Suva		Nadi
25	17Dec.	Wed.		- Trip[Nadi(20:40)～QF398～(22:40)Brisbane]		Brisbane
26	18Dec.	Thu.		- Trip[Brisbane(09:30)～JL762～(17:20)Tokyo]		Tokyo

Survey Schedule –Itinerary of the Basic Design Study–

No.	Day		Consultant Members Mr. Nishikawa, Mr. Seto, Mr. Ogawa	Stay at
1	29 Feb.	Sun.	- Trip from Tokyo(21:00) to Sydney(08:30+1) by JL-771	On Flight
2	01 Mar.	Mon.	- Trip from Sydney(13:20) to Nadi(18:10) by QF-391	Nadi
3	02 Mar.	Tue.	- Trip Nadi (07:00) to Tarawa (10:00) by ON-222 - Courtesy call to Ministry of Public Works and Utilities (MPWU), and Public Utilities Board (PUB) - Submission of Draft Report and Equipment Specifications	Tarawa
4	03 Mar.	Wed.	- Explanation of and Discussion on Draft Report	Tarawa
5	04 Mar.	Thu.	- Explanation of and Discussion on Draft Report - Submission of Discussion on Minutes of Discussions(MD)	Tarawa
6	05 Mar.	Fri.	- Corrections /modifications of MD - Signing of MD by both parties	Tarawa
7	06 Mar	Sat.	- Site survey of Bikenibeu PS, Batio PS and 11kV Power Distribution Lines	Tarawa
8	07 Mar.	Sun.	- Site survey of Bikenibeu PS, Batio PS and 11kV Power Distribution Lines	Tarawa
9	08 Mar.	Mon.	- Internal meeting	Tarawa
10	09 Mar.	Tue.	- Explanation of and Discussion on EQMT Specifications	Tarawa
11	10 Mar.	Wed.	- Courtesy call to Ministry of Foreign Affairs & Immigration (MFAI), Ministry of Public Works and Utilities (MPWU), and Public Utilities Board (PUB) - Explanation of and Discussion on EQMT Specifications	Tarawa
12	11 Mar.	Thu.	- Trip from Tarawa(13:30) to Nadi(16:30) by ON-141	Nadi
13	12 Mar.	Fri.	- Courtesy call to Embassy of Japan and JICA office in Fiji (Trip from Nadi to Suva by Car)	Nadi
14	13 Mar.	Sat.	- Trip from Nadi(12:45) to Brisbane(14:45) by FJ-921	Brisbane
15	14 Mar.	Sun.	- Trip from Brisbane(09:30) to Tokyo(17:20) by JL-762	Tokyo

3.LIST OF PARTIES CONCERNED IN THE RECIPIENT COUNTRY

List of Parties Concerned in the Recipient Country

Ministry of Public Works and Utilities (MPWU)

Hon. James Taom Redfern	Minister
Mr. Taakei Taoaba	Permanent Secretary
Mr. Teekabu Tikai	Former Permanent Secretary

Ministry of Foreign Affairs & Immigration (MFAI)

Mr. Taam Biribo	Permanent Secretary

Public Utilities Board (PUB)

Mr. Tokia Greig	Chief Executive Officer
Mr. Buibui Tiweri	Engineering Manager
Mr. Teriaki Ukeaba	Mechanical Engineer: Betio P/S
Mr. Takabwere Arinoko	Mechanical Engineer: Bikenibeu P/S
Mr. Baikia Nauoko	Electrician: Distribution
Ms. Melemele Hauma	CEO Assistance
Mr. Teburea Maio	Finance Manager
Mr. Toani Naateke	Electrical Draught man
Mr. Ereata Terubea	Personnel Manager
Mr. Tiaon Bauntai	Counterpart: personnel Officer

Ministry of Environment, Lands and Agricultural Development (MELAD)

Ms. Taouea Titaake	EIA Officer

Ministry of Finance & Economic Development (MFED)

Mr. Atanteora Beiatau	Chief Economist: NEP Office

Public Prosecutor Attorney General Office

Mr. Daniel Gorman	Senior Advisor

Embassy of Japan in Fiji

Mr. Takerou Iino	Ambassador
Mr. Kenji Miyata	Minister-Counsellor
Mr. Shigeki Takaya	First Secretary

JICA Fiji Office

Mr. Hideki Tomobe	Resident Representative
Mr. Shumon Yoshiara	Deputy Resident Representative
Mr. Hisashi Suzuki	Assistant Resident Representative
Mr. Masayoshi Ono	Project Formulation Advisor
Mr. Takashi Toyama	Former Assistant Resident Representative

4. MINUTES OF DISCUSSIONS

Minutes of Discussions
on the Basic Design Study
on the Project for Upgrading of Electric Power Supply in Tarawa Atoll (Phase-II)
in the Republic of Kiribati

In response to a request from the Government of the Republic of Kiribati (hereinafter referred to as "Kiribati"), the Government of Japan decided to conduct a Basic Design Study on the Project for Upgrading of Electric Power Supply in Tarawa Atoll (Phase-II) (hereinafter referred to as "the Project"), and entrusted the study to the Japan International Cooperation Agency (hereinafter referred to as "JICA").

JICA sent to Kiribati the Basic Design Study Team (hereinafter referred to as "the Team"), headed by Mr. Kenshiro Tanaka, an officer, Third Project Management Division, Grant Aid Management Department, JICA, and was scheduled to stay in the country from November 25 to December 15, 2003.

The Team held discussions with the officials concerned of the Government of Kiribati and conducted a field survey in the study area.

In the course of the discussions and the field survey, both sides confirmed the main items described in the attached sheets.

Tarawa, December 4, 2003

Kenshiro Tanaka
Leader
Basic Design Study Team
Japan International Cooperation Agency

Teekabu Tikai
Permanent Secretary
Ministry of Public Works and Utilities

Tokia Greig
Chief Executive Officer
Public Utilities Board

ATTACHMENT

1. Objective of the Project

The objective of the Project is to establish a reliable and economical power supply system at Tarawa Atoll.

2. Project Site

The Project site is as shown in Annex-1.

3. Responsible and Implementing Organizations

- The Responsible Agency is the Ministry of Public Works and Utilities (MPWU).
- The Implementing Agency is the Public Utilities Board (PUB).
- The organization of MPWU and PUB are shown in Annex-2-1 and Annex-2-2, respectively.

4. Items Requested by the Government of Kiribati

As the result of discussions, requested components were confirmed as below:

- to supply and install one unit of new 1,400kW medium speed diesel engine generator,
- to supply and install electrical and mechanical auxiliary equipment,
- to supply all spare parts to cover two year operation,
- to extend the existing power station building for above generator,
- to supply and install 11kV power cables with accessories for the area shown in Annex-1,
- to supply and install the 11kV distribution equipment,

  and
- To supply one unit of four ton crane truck and cable jacks for maintenance works.

JICA will assess the appropriateness of the request and will report to the Government of Japan.

5. Japan's Grant Aid Scheme

The Kiribati side understands the Japan's Grant Aid scheme explained by the Team, as described in Annex-3.

The Kiribati side will take necessary measures, as described in Annex-4, for smooth implementation of the Project, as a condition for the Japan's Grant Aid to be implemented.

6. Further Schedule of the Study

6-1. The consultant members of the Team will proceed further studies in Kiribati until December 15, 2003.

6-2. JICA will prepare the Draft Basic Design Study Report in English and dispatch a mission to Kiribati in order to explain its contents in the second half of February, 2004.

6-3. If the contents of the Report are accepted in principle by the Government of Kiribati, JICA will complete the Final Report and send it to the Kiribati side by the end of May, 2004.

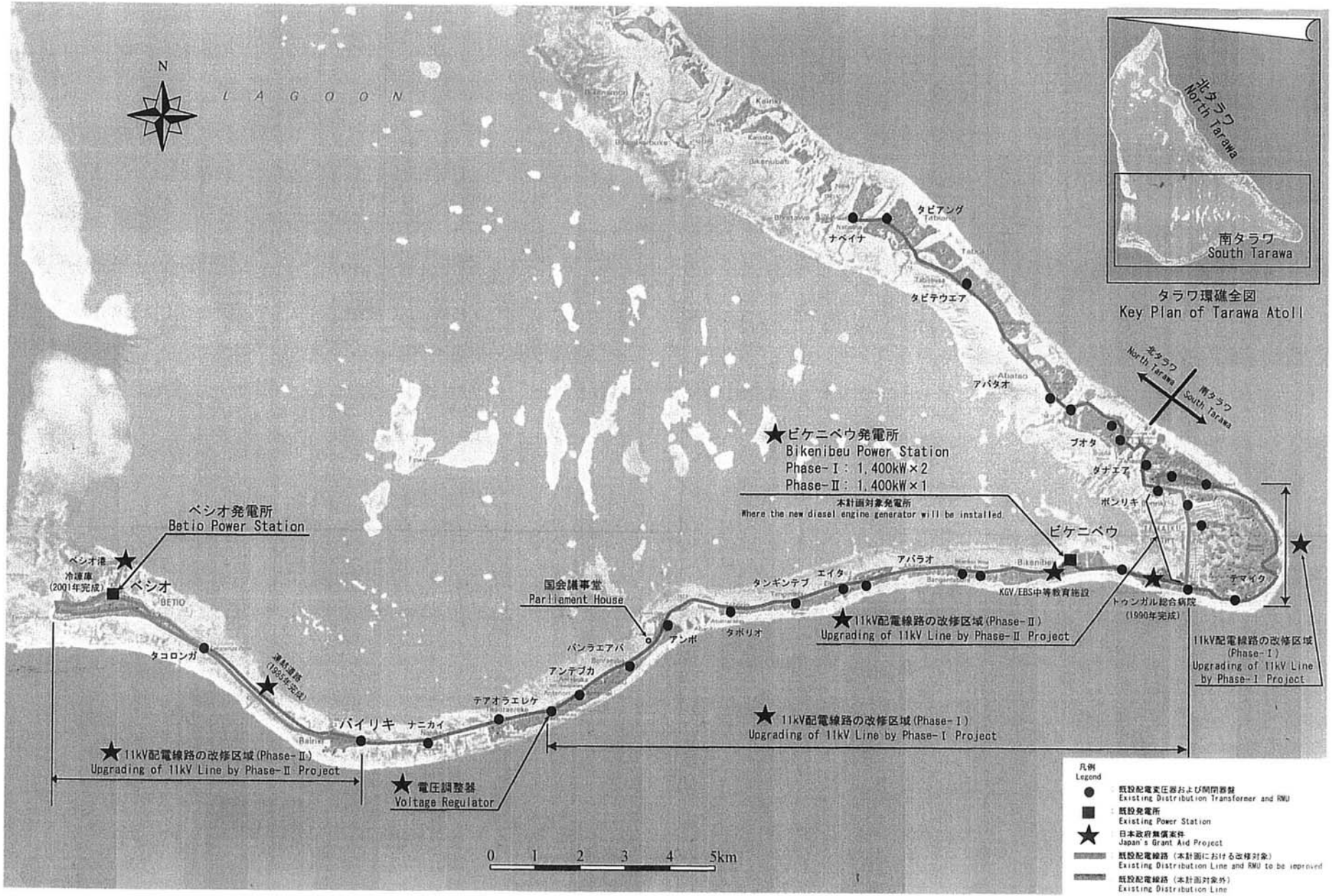
7. Other Relevant Issues

7-1. The Kiribati side will carry out any relocation of existing utilities (power and communication lines, water lines, etc.), if necessary.

7-2. If an approved EIS (Environmental Impact Statement) is necessary to implement the Project, the procedures necessary for EIS shall be implemented by the Kiribati side by the end of April, 2004.

7-3 The Kiribati side will allocate the budget for the implementation of installation of 415V distribution lines including procurement of materials such as LV cables, watt-hour meters, etc. at the Project sites in conformity with the construction schedule.

7-4 The Kiribati side will notify owners and occupiers in relation to any works to be carried out on their land, one month before the commencement of the construction works for the Project.



タラワ環礁 11kV 配電網
11kV Distribution Network in Tarawa