Oceania

The Project for Introduction of Hybrid Power Generation System in the Pacific Island Countries

Final Report
(Attachment)

September 2023

Japan InternationalCooperation Agency (JICA)

Okinawa Enetech Co.,Inc.
Okinawa Electric Power Co.,Inc.

IM
JR
23-107

Annex D : Federated State of Micronesia Related Documents

Project Final Report

Contents of Attached Documents

Annex D: Federated State of Micronesia Related Documents

1 Training Schedule

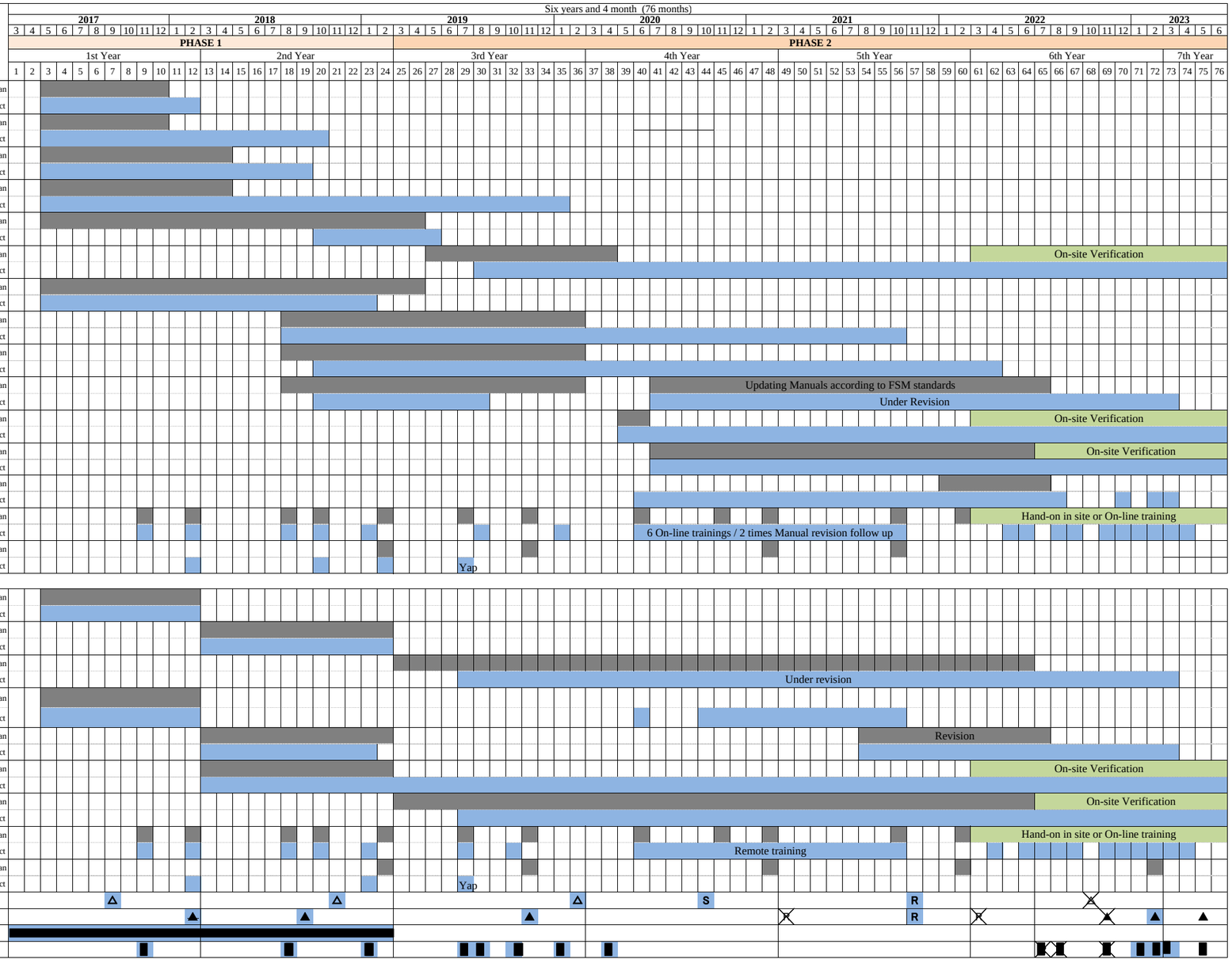
June, 2023

Plan of Operation (PO)

Project Title: The Project for Introduction of Hybrid Power Generation System in Pacific Island Countrie
Project Term: March 2017 - June 2022 (Phase 1: March 2017 – February 2019 , Phase 2: March 2019 – June 2023
Country: Federated States of Micronesia
Target Area: Pohnpei, Chuuk, Yap and Kosrae
Target Group: Related engineers and other technical staff in the target area (DRD, PUC, KUA, CPUC, YSPSC)

Output 1 Activities【Appropriate O&M System for DG】		Product	Organizations in Charge	
1-1.	Operational conditions of the existing DGs are reviewed, including confirmation of objectively verifiable indicators for overall goal and project purpose.	TNA Report, OVI	PUC, CPUC, KUA, YSPSC, JICA Experts	Plan / Act
1-2.	Specific fuel consumption of pilot DG units is measured.	Measurement of Specific fuel consumption	PUC, CPUC, KUA, YSPSC, JICA Experts	Plan / Act
1-3.	Improvement plan for the operation of pilot DG units is prepared.	Improvement plan	PUC, CPUC, KUA, YSPSC, JICA Experts	Plan / Act
1-4.	Existing spare parts and maintenance tools of pilot DG units are confirmed.	List of spare parts and maintenance tools	PUC, CPUC, KUA, YSPSC, JICA Experts	Plan / Act
1-5.	Improvement plan for the operation of pilot DG units is implemented.	Improvement Implementation Report	PUC, CPUC, KUA, YSPSC, JICA Experts	Plan / Act
1-6.	The result of implementation of the improvement plan is evaluated, and improvement plan is updated.	Improvement Evaluation Report	PUC, CPUC, KUA, YSPSC, JICA Experts	Plan / Act
1-7.	The concept of Economic Dispatch Control (EDC) is shared among operators and applied, if possible.	EDC software, manual, EDC sheet	PUC, CPUC, KUA, YSPSC, JICA Experts	Plan / Act
1-8.	Necessary spare parts and maintenance tools for the pilot DG units are prepared.	List of spare parts and maintenance tools prepared	PUC, CPUC, KUA, YSPSC, JICA Experts	Plan / Act
1-9.	Maintenance work schedule for the pilot DG units is prepared.	Maintenance work shedule	PUC, CPUC, KUA, YSPSC, JICA Experts	Plan / Act
1-10.	Check sheets and maintenance manuals for daily maintenance works for pilot DG units are prepared.	Check sheets and maintenance manulas	PUC, CPUC, KUA, YSPSC, JICA Experts	Plan / Act
1-11.	Maintenance works (daily/partial inspection/overhaul work) for pilot DG units are conducted in accordance with the maintenance schedule.	Maintenance record	PUC, CPUC, KUA, YSPSC, JICA Experts	Plan / Act
1-12.	The result of maintenance works is evaluated, and future maintenance work schedule together with budget (including sub-contract fee, cost for tools and equipment) is prepared.	Evaluation report and future schedule for maintenance	PUC, CPUC, KUA, YSPSC, JICA Experts	Plan / Act
1-13.	Specific fuel consumption of the pilot DG units is measured before and after implementation of the related project activities.	Measurement for specific consumption of the pilot DG	PUC, CPUC, KUA, YSPSC, JICA Experts	Plan / Act
1-14.	Related training programs for appropriate O&M of DGs are implemented periodically.	Training record, recommendations, reports, etc.	DRD, PUC, CPUC, KUA, YSPSC, JICA Experts	Plan / Act
1-15.	Knowledge on appropriate O&M of DGs is disseminated among stakeholders.	Seminar, workshop records	DRD, PUC, CPUC, KUA, YSPSC, JICA Experts	Plan / Act

Output 2 Activities【Appropriate planning and O&M of renewable energy (RE)】				
2-1.	Current situation and future development plan of RE is reviewed.	TNA Report, OVI	PUC, CPUC, KUA, YSPSC, JICA Experts	Plan / Act
2-2.	Planning manual for Hybrid Power Generation System is prepared	Planning manual for Hybrid Power Generation	PUC, CPUC, KUA, YSPSC, JICA Experts	Plan / Act
2-3.	Planning manual for Hybrid Power Generation System is reviewed and updated in the target area.	Updated Planning manual for Hybrid Power Generation	PUC, CPUC, KUA, YSPSC, JICA Experts	Plan / Act
2-4.	Operating conditions of the existing RE facilities are reviewed, including confirmation of objectively verifiable indicators for overall goal and project purpose.	TNA Report, OVI	PUC, CPUC, KUA, YSPSC, JICA Experts	Plan / Act
2-5.	O&M manual for RE facilities is prepared.	O&M manual for RE facilities	PUC, CPUC, KUA, YSPSC, JICA Experts	Plan / Act
2-6.	Maintenance works are conducted according to O&M manual of RE facilities.	Maintenance Record	PUC, CPUC, KUA, YSPSC, JICA Experts	Plan / Act
2-7.	The result of maintenance works is evaluated, and future maintenance work schedule together with budget is prepared.	Evaluation report of maintenance work, and schedule	PUC, CPUC, KUA, YSPSC, JICA Experts	Plan / Act
2-8.	Training program for Hybrid Power Generation System including O&M of RE facilities is conducted.	Training record, recommendations, reports, etc.	DRD, PUC, CPUC, KUA, YSPSC, JICA Experts	Plan / Act
2-9.	Knowledge regarding Hybrid Power Generation System is disseminated among stakeholders.	Seminar, workshop records	DRD, PUC, CPUC, KUA, YSPSC, JICA Experts	Plan / Act
△: JCC				
▲: Training in Japan/Fiji				
JICA long term expert, stationed in Fiji				
JICA Consultant Team				



2 PDM

Annex 1

Ver. 3, January. 2020

Draft Project Design Matrix (PDM)

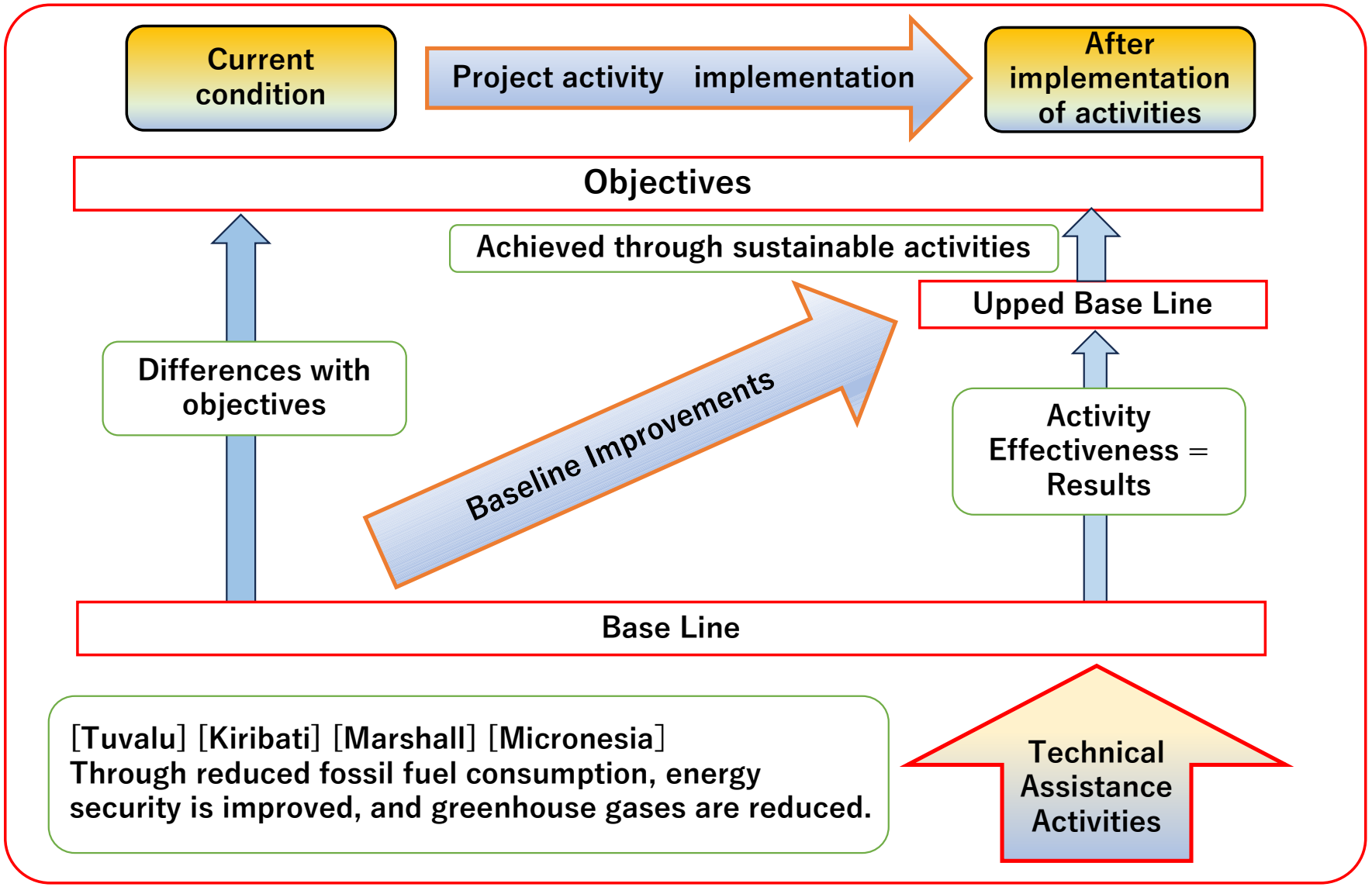
Project Title: The Project for Introduction of Hybrid Power Generation System in Pacific Island Countries
Project Term: March 2017 – June 2022 (Five Years) (Phase 1: March 2017 – February 2019 , Phase 2: March 2019 – June 2022
Country: Federated States of Micronesia
Target Area: Pohnpei, Chuuk, Yap and Kosrae
Target Group: Related engineers and other technical staff in the target area (DRD, PUC, KUA, CPUC, YSPSC)
DRD: Department of Resources and Development PUC:Pohnpei Utilities Corporation KUA: Kosrae Utilities Authority YSPSC:Yap State Public Service Corporation CPUC:Chuuk Public Utility Corporation

Narrative Summary	Objectively Verifiable Indicators	Means of Verification	Important Assumptions
Overall Goal Energy security is improved and greenhouse gases are reduced through the reduction of fossil fuels consumption.	In comparison to the indicators at the time of baseline survey, 1. Reduced amount of CO2 emission of power utilities in the target area 2. Reduced amount of diesel fuel of power utilities in the target area 3. Increased capacity (kW) and actual generated energy (kWh) of renewable energy facilities of power utilities in the target area	1. to 3. Reports of C/P agencies	
Project Purpose Hybrid Power Generation System is introduced.	1. Improvement of specific fuel consumption of pilot DG units (better than the baseline data set at the beginning of the Project) 2. Improvement of performance ratio for the RE power generation systems (better than the baseline data set at the beginning of the Project in consideration of aging deterioration of PV module) 3. Proper application of planning and O&M method of Hybrid Power Generation System	1. Record on specific fuel consumption of Pilot DG units by C/P, checked by Japanese experts 2. Record on operation of RE power generation systems 3. Evaluation by Japanese experts and C/P on plans of Hybrid Power Generation System	C/P agencies continue commitment to the Project by continuing budget allocation as well as assignment of personnel for the post- Project activities.
Outputs 1. Appropriate and economical system for O&M of Diesel Generators (DGs) is enhanced.	<Output 1> 1-1 Adequacy on the use of the work schedule, check sheets and manual for the maintenance work for the pilot DG units 1-2 Number of training participants who are conducting operation and maintenance of DG based on the learnings from the training program (target:2 for each state)	1-1 Evaluation by Japanese experts and C/P on improvement of maintenance work (daily/partial inspection/overhaul work) for pilot DG units 1-2 Capacity assessment of trained O&M staff and managers by Japanese experts	C/P agencies promote investment on renewable energy facilities based on the current national policy/plan.

2. Methodology for appropriate planning and O&M of renewable energy (RE) is established.	<Output 2> 2-1 Number of training participants who have been certified under the Project for the planning method of the Hybrid Power Generation System (target: 1 for each state) 2-2 Number of training participants who are conducting O&M of RE facilities based on the learnings from the training program (target: 2 for each state) 2-3 Preparation of related manuals for Hybrid Power Generation System 2-4 Adequacy of the use of the related manuals for Hybrid Power Generation System	2-1 Capacity assessment of trained staff and managers by Japanese experts 2-2 Capacity assessment of trained O&M staff and managers by Japanese experts 2-3 Evaluation by Japanese Experts on related manuals for Hybrid Power Generation System prepared by C/P 2-4 Evaluation by Japanese experts and C/P on the use of the related manuals for Hybrid Power Generation System	
Activities <Output 1> 1-1 Operational conditions of the existing DGs are reviewed, including confirmation of objectively verifiable indicators for overall goal and project purpose. 1-2 Specific fuel consumption of pilot DG units is measured. 1-3 Improvement plan for the operation of pilot DG units is prepared. 1-4 Existing spare parts and maintenance tools of pilot DG units are confirmed. 1-5 Improvement plan for the operation of pilot DG units is implemented. 1-6 The result of implementation of the improvement plan is evaluated, and improvement plan is updated. 1-7 The concept of Economic Dispatch Control (EDC) is shared among operators and applied, if possible. 1-8 Necessary spare parts and maintenance tools for the pilot DG units are prepared. 1-9 Maintenance work schedule for the pilot DG units is prepared. 1-10 Check sheets and maintenance manuals for maintenance works for pilot DG units are prepared. 1-11 Maintenance works (daily/partial inspection/overhaul work) for pilot DG units are conducted in accordance with the maintenance schedule. 1-12 The result of maintenance works is evaluated, and future maintenance work schedule together with budget (including sub-contract fee, cost for tools and equipment) is prepared. 1-13 Specific fuel consumption of the pilot DG units is measured before and after implementation of the related project activities. 1-14 Related training programs for appropriate O&M system for DGs are implemented periodically. 1-15 Knowledge on appropriate O&M of DGs is disseminated among stakeholders. <Output 2> 2-1 Current situation and future development plan of RE is reviewed. 2-2 Planning manual for Hybrid Power Generation System is prepared. 2-3 Planning manual for Hybrid Power Generation System is reviewed and updated in the target area. 2-4 Operating conditions of the existing RE facilities are reviewed, including	**Inputs** **(Japanese side)** 1. Dispatch of the Japanese experts <JICA long term expert, stationed in Fiji > - Chief Advisor/Hybrid Power Generation System (Completed by March 2019) <JICA Consultant Team> -Team Leader/Operation & Maintenance of DG -Economic operation of DG (EDC) -Maintenance support of DG (Mechanical expert) -Maintenance support of DG (Electrical expert) -O&M of RE power generation system -Integration of RE power generation system -Project Coordinator 2. Training in Japan and Fiji 3. Equipment -In accordance with necessity of activities	**(FSM side)** 1. Assignment of C/Ps -Project Director (P/D) -Project Manager (P/M) -Engineers in charge of O&M (Manager level) - Mechanical Staff - Electrical Staff - Planning officer, and others 2. Facilities and equipment -Project office 3.Recurrent costs - C/Ps' wages and allowances - C/Ps' domestic travel expense in part	**Preconditions** Contents of the current relevant policies on promotion of renewable energy and energy efficiency are not largely changed.

confirmation of objectively verifiable indicators for overall goal and project purpose. 2-5 O&M manual for RE facilities is prepared. 2-6 Maintenance works are conducted according to O&M manual of RE facilities. 2-7 The result of maintenance works is evaluated, and future maintenance work schedule together with budget is prepared. 2-8 Training program for Hybrid Power Generation System including O&M of RE facilities is conducted 2-9 Knowledge regarding Hybrid Power Generation System is disseminated among stakeholders.			

3 Workflow Chart


Current condition
Project activity implementation
After implementation of activities
Objectives
Achieved through sustainable activities
Upped Base Line
Differences with objectives
Baseline Improvements
Activity Effectiveness = Results
Base Line
[Tuvalu] [Kiribati] [Marshall] [Micronesia]
Through reduced fossil fuel consumption, energy security is improved, and greenhouse gases are reduced.
Technical Assistance Activities

4 JCC Meeting Records

4.1 1st JCC Meeting

MINUTES OF MEETING

BETWEEN

THE AUTHORITIES CONCERNED OF

THE GOVERNMENT OF FEDERATED STATES OF MICRONESIA

AND

JAPAN INTERNATIONAL COOPERATION AGENCY

FOR

THE FIRST JOINT COORDINATION COMMITTEE (JCC)

ON

THE PROJECT FOR INTRODUCTION OF HYBRID POWER GENERATION SYSTEM IN PACIFIC ISLAND COUNTRIES

Japan International Cooperation Agency (hereinafter referred to as "JICA") and the authorities concerned of the Federated States of Micronesia (hereinafter referred to as "the FSM side") established a Joint Coordination Committee (hereinafter referred to as "JCC") for the effective and successful implementation of the Project for Introduction of Hybrid Power Generation System in Pacific Island Countries (hereinafter referred to as "the Project").

The first JCC on the Project was held on 25th November 2017, at the Training room at Governor's Administration Building, chaired by Hon. Marion Henry, Secretary, Department of Resources and Development.

Kosrae, 25th November, 2017

Tadayuki Ogawa
Chief Advisor
JICA Expert in Fiji

Honorable Marion Henry
Secretary
Department of Resources and Development
The Federated States of Micronesia

Shinji Shibata
Resident Representative
JICA Micronesia Office

ANNEX

The FSM side and JICA (hereinafter referred to as "both sides") discussed on the issues including the contents of (i)Project Design Matrix (PDM), (ii)Plan of Operation (PO), and (iii)Project Monitoring Sheet, based on the Agenda attached hereto.

The both sides confirmed the main points as described below.

1. Amendment of R/D

The both sides agreed on the amendment of the Record of Discussion dated 18 October, 2016 (hereinafter referred to as "R/D") as follow. All other parts of R/D shall remain unchanged. This amendment will become effective on the date of signing of this Minutes of Meeting.

(1) Duration

1) Current Version
Five (5) years (tentatively December, 2016 – November, 2021) from the date of the first arrival of the JICA experts.
2) Amended Version
March, 2017 – June, 2022

(2) Reason of Amendment

JICA long-term expert stationed in Fiji has started his assignment since March 2017, and the assignment of JICA short-term expert team will last until June 2022.

2. Revision of PDM and PO

The both sides agreed on the revision of PDM and PO as attachment 4 and 5.

3. Project Organization

The both sides confirmed the formation of the Project Counterpart Team and assignment of the officials as described below. The both sides also confirmed that Project Director and Project Manager agreed on the R/D shall be responsible for the coordination among the Project Counterpart Team.

- Project Counterparts

(1) Yap State; YSPSC

1) Operation and Maintenance of Diesel Engine Generators
Alphonsus Ruwema, Power Plant Manager
Casmiro Yithmeng, Chief Mechanic
Chris Igim, Electrician
Roscoe Tamag, Chief Operator
2) Plan for introduction of hybrid power generation systems
Vincent Bouet, Chief Electrical Engineer
Joe Hafler, Assistant Electrical Engineer
3) Operation and Maintenance of Renewable Energy generation system
Joe Hafler, Assistant Electrical Engineer

Charles Laman, Technician, Engineering Division
Steven Ken, Technician, Engineering Division
Alvin A. Defmew, Technician, Engineering Division
Jake Choay, Technician, Engineering Division

(2) Chuuk State; CPUC

1) Operation and Maintenance of Diesel Engine Generators
✓ Dennis Triana, Head of power generation and maintenance
✓ Jimmy Reyes, Lead Mechanic

2) Plan for introduction of hybrid power generation systems
Dennis Triana, Head of power generation and maintenance
Bruno Puas, RE Technician
Albert Francis, Head of power distribution

3) Operation and Maintenance of Renewable Energy generation system
Dennis Triana, Head of power generation and maintenance
Jimmy Reyes, Lead Mechanic
Bruno Puas, RE Technician

(3) Pohnpei State; PUC

1) Operation and Maintenance of Diesel Engine Generators
Winfred Yamada, Manager, Diesel Plant
Qurino Wenio, Mechanic
Elbert Elias, Mechanic
Erickson Semens, Mechanics

2) Plan for introduction of hybrid power generation systems
Dackson Solomon, Manager, Power Generation
Selestino Santiago, Senior Electrician
Pedrus Ehram, Mechanic

3) Operation and Maintenance of Renewable Energy generation system
Sidney Kilmete, Manager, Renewable Energy
Nixon Helgenberger, Electrician
Julian Pelep, Solar Technician

(4) Kosrae State; KUA

1) Operation and Maintenance of Diesel Engine Generators
Robert Taualupe, Operations Manager
Ronald Albert, Supervisor of Operator

2) Plan for introduction of hybrid power generation systems
Gerardo Protacio, Electrical Engineer
Tolenoa Joe, Energy Efficiency Officer
Hairom Livaie, Customer Service Head, Admin. & Training Officer
Robert Taualupe, Operations Manager

3) Operation and Maintenance of Renewable Energy generation system
Robert Taualupe, Operations Manager
Tolenoa Joe, Energy Efficiency Officer
Gifford Sigrah, Distribution Foreman

4. Indicators (as the baseline of project evaluation)

(1) Overall Goal

State	Yap	Chuuk	Pohnpei	Kosrae
Annual CO_2 emission of power utilities in the target area (t)	10,131	10,471	22,458	4,461
Annual consumption of diesel fuel of power utilities in the target area (USG)	$997x10^3$	$1,031x10^3$	$2,210x10^3$	$439x10^3$
Capacity (kW) and generated energy (kWh) of Renewable Energy facilities of power utilities in the target area	575 kW (PV systems owned by YSPSC) 258 MWh T.B.C	265 kW 356 MWh	980 kW (PV) 725 kW (Hydro) 1410 MWh (PV) 666 MWh (Hydro)	345 kW 439 MWh

(2) Project Purpose

State	Yap	Chuuk	Pohnpei	Kosrae
Pilot DG units	Unit 1,2 and 3	Unit 1,2,4 and 5	Unit 4 and 5	2 new units installed under JICA Project
Specific fuel consumption	Deutz - 13.0 kWh/G DEG1&2 CAT 3516– 14.5 kWh/G DEG3 CAT C32 – 14.3 kWh/G	14.91 kWh/G (total average 2017) 13.13kWh/G (unit 3) 14.65kWh/G (unit 5) 14.57kWh/G (unit 4) 15.19kWh/G (Unit 1) 15.21kWh/G (Unit 2)	13.4 kWh/G (total average) 13.7 kWh/G (unit 1) 13.7 kWh/G (unit 2) 13.4 kWh/G (unit 3) 15.7 kWh/G (unit 4) 16.3 kWh/G (unit 5) 10.1 kWh/G (unit 6)	13.6 kWh/G (total average 2016) 12.5 kWh/G (unit 4) 12.62 kWh/G (unit 6) 14.0 kWh/G (unit 8) T.B.C after completion of installation of new DGs
Performance ratio for RE power generation system	66% (PEC)	72% (Airport) 71% (PEC)	76% (COM) 78% (President's office) 71% (PEC)	66% (PEC) 56% (EU)

5. Counterpart training in Japan

(1) Schedule

Counterpart Training in Japan is tentatively planned in February and October, 2018. Further training opportunities will be discussed later.

(2) Goal

The goal of the first training in February is to introduce general overview of power supply & demand situation in remote islands in Japan.
The second training in October will be designed to witness and learn the actual maintenance works of Diesel Engine Generators.

(3) Participants

The eligible participants for the first training are managers and higher staff responsible for the dissemination of Hybrid Power Generation System. ("Hybrid Power Generation System" is the system in which Diesel Engine Generators and Renewable Energy are operated and maintained properly to reduce consumption of fossil fuel and greenhouse gas emission.)

As a result of discussion, following counterparts are nominated as the participants for the first training.

1) Victor Nabeyan, Assistant General Manager (YSPSC)
2) T. B. C (CPUC)
3) Dackson Solomon, Manager, Power Generation (PUC)
4) Hairom Livae, Customer Service Supervisor (KUA)

The participants for the second training would be supervisors/engineers in charge of maintenance of Diesel Engine Generators. The selection of the participants shall be finalized by May, 2018.

6. Identification of DG for overhaul works
Both sides agreed to conduct trainings for DG overhaul works in Kosrae, inviting counterparts from other States. It is because private contractors/supervisors are invited for the supervision of overhaul works in other states.

7. Procurement of fuel flowmeter
JICA Expert team requested FSM side to provide information about specification and quoted price (from three companies) of fuel flowmeter to be procured in Pohnpei and Kosrae state by the middle of December.

8. Technical advice on introducing EMS (Energy Management System)
JICA Expert team will analyze power system composition of Chuuk, Pohnpei and Kosrae state and advice the possible implementation of EMS system for more efficient operation of the hybrid power generation system.

9. The next JCC
FSM side and JICA Expert team agreed that the next (2^{nd}) JCC meeting will be held around February, 2019 at Pohnpei State.

ATTACHMENT 1	Agenda
ATTACHMENT 2	List of Participants
ATTACHMENT 3	Project Monitoring Sheet
ATTACHMENT 4	Project Design Matrix ver. 2
ATTACHMENT 5	Plan of Operation ver. 2

ATTACHMENT 1

Agenda for JCC Meeting

1. Opening Prey and remarks by Hon. Carson Sigrah, Lieutenant Governor, Kosrae State.

2. Opening Remarks by Hon. Marion Henry, Secretary, Department of Resources and Development

3. Explanation and confirmation on the following documents;
   (1) Project Design Matrix (PDM)
   (2) Plan of Operation (PO)
   (3) Project Monitoring Sheet

4. Explanation on the project implementation methodology

5. Confirmation on the Minutes of Meeting (M/M)

6. Explanation on Capacity Assessment

7. Closing Remarks by Mr. Shinji Shibata, Resident Representative of JICA Micronesia Office

ATTACHMENT 2 List of Participants

Organization	Position	Name
Department of Resources and Development, FSM	Secretary	Hon. Marion Henry
Department of Resources and Development, FSM	Assistant Secretary	Mr. Hubert Yamada
Yap State Public Service Corporation	Assistant General Manager	Mr. Victor Nabeyan
Chuuk Public Utility Corporation	CEO	Mr. Mark Waite
Pohnpei Utilities Corporation	Act. General Manager	Mr. Nixon T. Anson
Pohnpei Utilities Corporation	Manager, Power Generation	Mr. Dackson Solomon
Kosrae State Government	Lieutenant Governor	Hon. Carson Sigrah
Kosrae Utilities Authority	General Manager	Mr. Fred Skilling
	Electrical Engineer	Mr. Gerardo Protacio
	Customer Service Head	Mr. Hiron Livaie
	Board Chairman	Mr. Lipar George
	Board Secretary	Mr. Isao Mike
JICA Micronesia Office	Resident Representative	Mr. Shinji Shibata
	Program Officer	Ms. Trish-Farrah E. Billen
JICA	Chief Advisor	Mr. Tadayuki Ogawa
JICA/ Okinawa Enetech Co., Inc	Team Leader	Mr. Luis Kakefuku
JICA/ Okinawa Enetech Co., Inc	Team Sub Leader	Mr. Masanori Shimabuku
JICA/Okinawa Electronic Power Co., Inc	DG Economical Operation	Mr. Hiroyuki Nakachi
JICA/Okinawa Electronic Power Co., Inc	RE Integration Plan	Mr. Chihiro Tobaru
JICA/KD Tech Co., ltd	Operational Coordination	Mr. Takahisa Watanabe

ATTACHMENT 3

PROJECT MONITORING SHEET

Project Title: The Project for Introduction of Hybrid Power Generation System in Pacific Island Countries

Version of the Sheet: Ver.1

Name: Tadayuki OGAWA
Title: Chief Advisor

Submission Date: 25th November, 2017

I. Summary

1 Progress

1-1 Progress of Inputs

(1) Japanese side

1) Long term expert stationed in Fiji has worked in June to confirm the overall operation conditions of existing Diesel Generators (DGs) and Renewable Energy (RE) power generation systems in FSM.

2) Short term expert team arrived at FSM (Yap) on 28th October, 2017. The team is looking into the current activities of operation and maintenance of DGs and RE power generation systems in each state of FSM.

(2) FSM side

Members from FSM side established a following team as the project implementation body.

(1) Yap State

1) Operation and Maintenance of DGs

Alphonsus Ruwema, Power Plant Manager
Casmiro Yithmeng, Chief Mechanic
Chris Igim, Electrician
Roscoe Tamag, Chief Operator

2) Plan for introduction of hybrid power generation systems

Vincent Bouet, Chief Electrical Engineer
Joe Hafler, Assistant Electrical Engineer

3) Operation and Maintenance of Renewable Energy generation system

Joe Hafler, Assistant Electrical Engineer
Charles Laman, Technician, Engineering Division
Steven Ken, Technician, Engineering Division
Alvin A. Defmew, Technician, Engineering Division
Jake Choay, Technician, Engineering Division

(2) Chuuk State

1) Operation and Maintenance of DGs

Dennis Triana, Head of power generation and maintenance

Jimmy Reyes, Lead Mechanic

2) Plan for introduction of hybrid power generation systems

Dennis Triana, Head of power generation and maintenance

Bruno Puas, RE Technician

Albert Francis, Head of power distribution

3) Operation and Maintenance of Renewable Energy generation system

Dennis Triana, Head of power generation and maintenance

Jimmy Reyes, Lead Mechanic

Bruno Puas, RE Technician

(3) Pohnpei State

1) Operation and Maintenance of DGs

Winfred Yamada, Manager, Diesel Plant

Qurino Wenio, Mechanic

Elbert Elias, Mechanic

Erickson Semens, Mechanics

2) Plan for introduction of hybrid power generation systems

Dackson Solomon, Manager, Power Generation

Selestino Santiago, Senior Erectrician

Pedrus Ehram, Mechanic

3) Operation and Maintenance of Renewable Energy generation system

Sidney Kilmete, Manager, Renewable Energy

Nixon Helgenberger, Electrician

Julian Pelep, Solar Technician

(4) Kosrae State

1) Operation and Maintenance of DGs

Robert Taualupe, Operations Manager

Ronald Albert, Supervisor of Operator

2) Plan for introduction of hybrid power generation systems

Gerardo Protacio, Electrical Engineer

Tolenoa Joe, Energy Efficiency Officer

Hiron Livaie, Customer Service Head, Admin. & Training Officer

Robert Taualupe, Operations Manager

3) Operation and Maintenance of Renewable Energy generation system

Robert Taualupe, Operations Manager

Tolenoa Joe, Energy Efficiency Officer

Gifford Sigrah, Distribution Foreman

1-2 Progress of Activities

No.	Activity	Progress
Output 1: 1. Appropriate and economical system for O&M of Diesel Generators (DGs) is enhanced.		
1-1	Operational conditions of the existing DGs are reviewed, including confirmation of objectively verifiable indicators for overall goal and project purpose.	Questionnaire sheets were submitted by JICA expert to FSM counterparts to collect relevant information and to confirm the objectively verifiable indicators for overall goal and project purpose. As a result of this activity, Training Needs Assessment Report is under preparation by JICA expert.
1-2	Specific fuel consumption of pilot DG units is measured.	Data for specific fuel consumption was provided by each state utility. The figure shall be updated after procurement of new flow meter for Pohnpei and Kosrae state.
1-3	Improvement plan for the operation of pilot DG units is prepared.	Detailed operation condition of DGs are under investigation by JICA experts FSM counterparts. Following issues were confirmed by JICA experts; 1) DG operation data shall be recorded and kept in soft data for further power system analysis in Pohnpei. 2) Specific fuel consumption of each unit should be periodically measured and monitored. 3) Periodical patrol checklist for preventive maintenance should be enforced. 4) Seek feasibility of introducing SCADA for remote monitoring and controlling DG and PV systems for Kosrae, Pohnpei, and Chuuk.
1-4	Existing spare parts and maintenance tools of pilot DG units are confirmed.	Existing spare parts and special maintenance tools are under investigation by JICA experts in cooperation with FSM side.
1-7	The concept of Economic Dispatch Control (EDC) is shared among operators and applied, if possible.	EDC manual is under preparation by JICA experts. The basic concept of EDC has been explained by JICA experts.
1-14	Related training programs for appropriate O&M of DGs are implemented periodically.	Technical findings with recommendations are provided for each state.
Output 2: Methodology for appropriate planning and O&M of renewable energy (RE) is established.		
2-1	Current situation and future development plan of RE is reviewed.	Same as activity 1-1

2-4	Operating conditions of the existing RE facilities are reviewed, including confirmation of objectively verifiable indicators for overall goal and project purpose.	Same as activity 1-1
2-8	Training program for Hybrid Power Generation System including O&M of RE facilities is conducted.	Technical findings with recommendations are provided for each state.

1-3 Achievement of Output

Initial baseline survey and preparation work is undergoing for both Output 1 & 2.

1-4 Achievement of the Project Purpose

1-5 Changes of Risks and Actions for Mitigation

1-6 Progress of Actions undertaken by JICA

1-7 Progress of Actions undertaken by the Parties

1-8 Progress of Environmental and Social Considerations (if applicable)

1-9 Progress of Considerations on Gender/ Peace Building/ Poverty Reduction (if applicable)

1-10 Other remarkable/ considerable issues related/ affect to the Project (such as other JICA's projects, activities of counterparts, other donors, private sectors, NGOs, etc.)

2 Delay of Work Schedule and/or Problems (if any)

2-1 Detail

2-2 Cause

2-3 Action to be taken

2-4 Roles of Responsible Persons/ Organization (JICA, the Parties, etc.)

3 Modification of the Project Implementation Plan

3-1 Plan of Operation

- Project period is updated based on the actual dispatch schedule of JICA Experts (March 2017 – June 2022).
- Implementation plan of each activity including trainings are also revised in accordance with the above update.

3-2 Other modifications on detailed implementation plan

II. Project Monitoring Sheet I & II as Attached

(Project Design Matrix and Plan of Operation)

Annex 1

Ver. 2, November. 2017

Draft Project Design Matrix (PDM)

Project Title: The Project for Introduction of Hybrid Power Generation System in Pacific Island Countries
Project Term: March 2017 – June 2022 (Five Years) (Phase 1: March 2017 – February 2019 , Phase 2: March 2019 – June 2022
Country: Federated States of Micronesia
Target Area: Pohnpei, Chuuk, Yap and Kosrae
Target Group: Related engineers and other technical staff in the target area (DRD, PUC, KUA, CPUC, YSPSC)
DRD: Department of Resources and Development PUC:Pohnpei Utilities Corporation KUA: Kosrae Utilities Authority YSPSC:Yap State Public Service Corporation CPUC:Chuuk Public Utility Corporation

Narrative Summary	Objectively Verifiable Indicators	Means of Verification	Important Assumptions
Overall Goal Energy security is improved and greenhouse gases are reduced through the reduction of fossil fuels consumption.	In comparison to the indicators at the time of baseline survey, 1. Reduced amount of CO2 emission of power utilities in the target area 2. Reduced amount of diesel fuel of power utilities in the target area 3. Increased capacity (kW) and actual generated energy (kWh) of renewable energy facilities of power utilities in the target area	1. to 3. Reports of C/P agencies	
Project Purpose Hybrid Power Generation System is introduced.	1. Improvement of specific fuel consumption of pilot DG units (better than the baseline data set at the beginning of the Project) 2. Improvement of performance ratio for the RE power generation systems (better than the baseline data set at the beginning of the Project) 3. Proper application of planning and O&M method of Hybrid Power Generation System **Based on the review on result of Project activities, specific target numbers are to be determined.*	1. Record on specific fuel consumption of Pilot DG units by C/P, checked by Japanese experts 2. Record on operation of RE power generation systems 3. Evaluation by Japanese experts and C/P on plans of Hybrid Power Generation System	C/P agencies continue commitment to the Project by continuing budget allocation as well as assignment of personnel for the post- Project activities.
Outputs 1. Appropriate and economical system for O&M of Diesel Generators (DGs) is enhanced.	<Output 1> 1-1 Adequacy on the use of the work schedule, check sheets and manual for the maintenance work for the pilot DG units 1-2 Number of training participants who are conducting operation and maintenance of DG based on the learnings from the training program	1-1 Evaluation by Japanese experts and C/P on improvement of maintenance work (daily/partial inspection/overhaul work) for pilot DG units 1-2 Capacity assessment of trained O&Mstaff and managers by Japanese experts	C/P agencies promote investment on renewable energy facilities based on the current national policy/plan.

2. Methodology for appropriate planning and O&M of renewable energy (RE) is established.	<Output 2> 2-1 Number of training participants who learned the planning method of the Hybrid Power Generation System 2-2 Number of training participants who are conducting O&M of RE facilities based on the learnings from the training program 2-3 Preparation of related manuals for Hybrid Power Generation System 2-4 Adequacy of the use of the related manuals for Hybrid Power Generation System	2-1 Capacity assessment of trained staff and managers by Japanese experts 2-2 Capacity assessment of trained O&M staff and managers by Japanese experts 2-3 Evaluation by Japanese Experts on related manuals for Hybrid Power Generation System prepared by C/P 2-4 Evaluation by Japanese experts and C/P on the use of the related manuals for Hybrid Power Generation System	
Activities <Output 1> 1-1 Operational conditions of the existing DGs are reviewed, including confirmation of objectively verifiable indicators for overall goal and project purpose. 1-2 Specific fuel consumption of pilot DG units is measured. 1-3 Improvement plan for the operation of pilot DG units is prepared. 1-4 Existing spare parts and maintenance tools of pilot DG units are confirmed. 1-5 Improvement plan for the operation of pilot DG units is implemented. 1-6 The result of implementation of the improvement plan is evaluated, and improvement plan is updated. 1-7 The concept of Economic Dispatch Control (EDC) is shared among operators and applied, if possible. 1-8 Necessary spare parts and maintenance tools for the pilot DG units are prepared. 1-9 Maintenance work schedule for the pilot DG units is prepared. 1-10 Check sheets and maintenance manuals for maintenance works for pilot DG units are prepared. 1-11 Maintenance works (daily/partial inspection/overhaul work) for pilot DG units are conducted in accordance with the maintenance schedule. 1-12 The result of maintenance works is evaluated, and future maintenance work schedule together with budget (including sub-contract fee, cost for tools and equipment) is prepared. 1-13 Specific fuel consumption of the pilot DG units is measured before and after implementation of the related project activities. 1-14 Related training programs for appropriate O&M system for DGs are implemented periodically. 1-15 Knowledge on appropriate O&M of DGs is disseminated among stakeholders. <Output 2> 2-1 Current situation and future development plan of RE is reviewed. 2-2 Planning manual for Hybrid Power Generation System is prepared. 2-3 Planning manual for Hybrid Power Generation System is reviewed and updated in the target area. 2-4 Operating conditions of the existing RE facilities are reviewed, including confirmation of objectively verifiable indicators for overall goal and project purpose.	**Inputs** **(Japanese side)** 1. Dispatch of the Japanese experts <JICA long term expert, stationed in Fiji > - Chief Advisor/Hybrid Power Generation System <JICA Consultant Team> -Team Leader/Operation & Maintenance of DG -Economic operation of DG (EDC) -Maintenance support of DG (Mechanical expert) -Maintenance support of DG (Electrical expert) -O&M of RE power generation system -Integration of RE power generation system -Project Coordinator 2. Training in Japan and Fiji 3. Equipment -In accordance with necessity of activities	**(FSM side)** 1. Assignment of C/Ps -Project Director (P/D) -Project Manager (P/M) -Engineers in charge of O&M (Manager level) - Mechanical Staff - Electrical Staff - Planning officer, and others 2. Facilities and equipment -Project office 3.Recurrent costs - C/Ps' wages and allowances - C/Ps' domestic travel expense in part	**Preconditions** Contents of the current relevant policies on promotion of renewable energy and energy efficiency are not largely changed.

2-5 O&M manual for RE facilities is prepared. 2-6 Maintenance works are conducted according to O&M manual of RE facilities. 2-7 The result of maintenance works is evaluated, and future maintenance work schedule together with budget is prepared. 2-8 Training program for Hybrid Power Generation System including O&M of RE facilities is conducted 2-9 Knowledge regarding Hybrid Power Generation System is disseminated among stakeholders.			

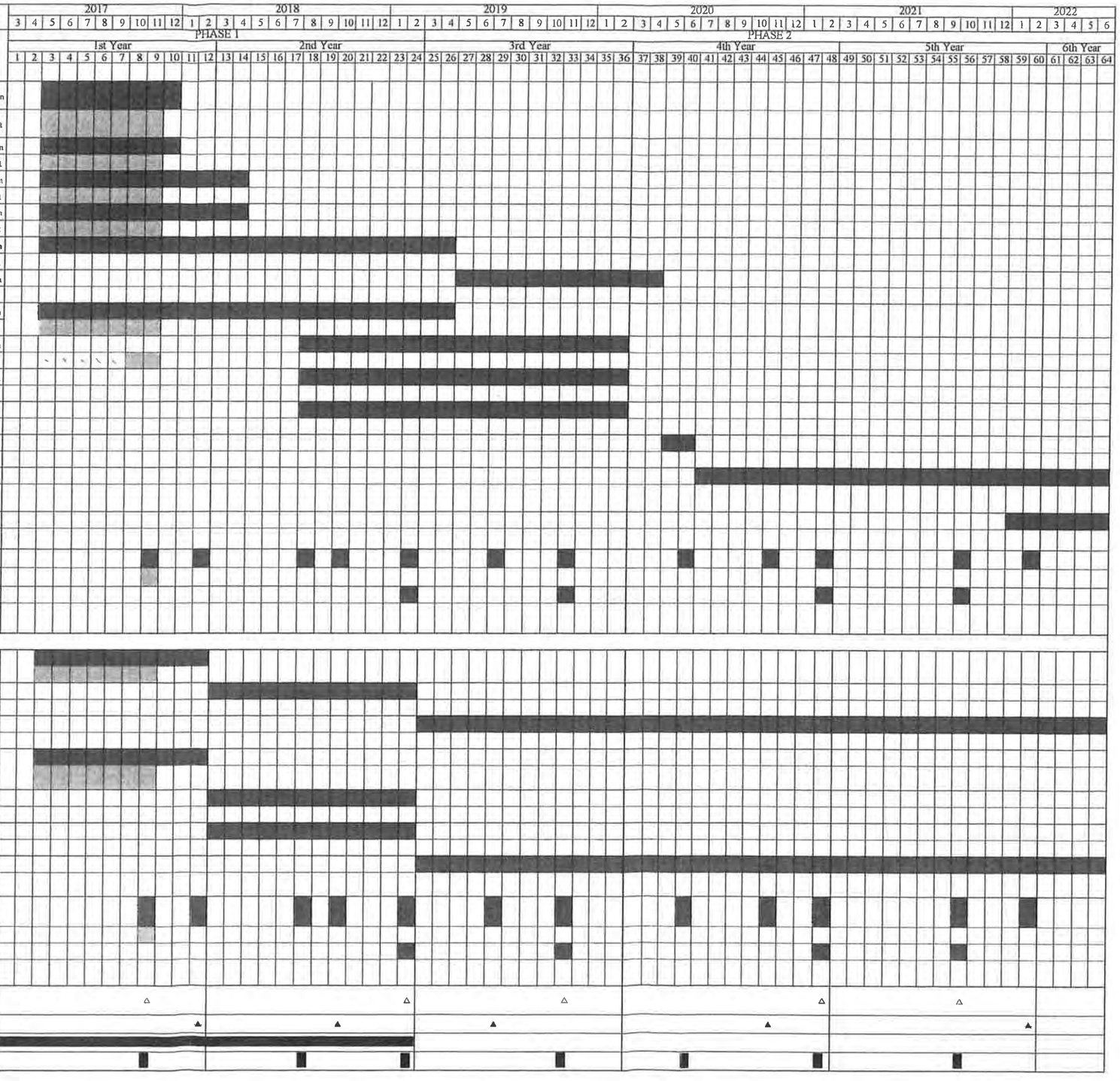
Annex 2

Ver 2 November, 2017

Tentative Plan of Operation (PO)

Project Title: The Project for Introduction of Hybrid Power Generation System in Pacific Island Countries
Project Term: March 2017 - June 2022 (Phase 1: March 2017 – February 2019 , Phase 2: March 2019 – June 2022
Country: Federated States of Micronesia
Target Area: Pohnpei, Chuuk, Yap and Kosrae
Target Group: Related engineers and other technical staff in the target area (DRD, PUC, KUA, CPUC, YSPSC)

Output1 Activities [Appropriate O&M System for DG]		Outcome	Org. in charge	
1-1.	Operational conditions of the existing DGs are reviewed, including confirmation of objectively verifiable indicators for overall goal and project purpose.	TNA Report	PUC, KUA, CPUC, YSPSC and JICA Experts	Plan
				Act
1-2.	Specific fuel consumption of pilot DG units is measured.	Measurement of Specific fuel consumption	PUC, KUA, CPUC, YSPSC and JICA Experts	Plan
				Act
1-3.	Improvement plan for the operation of pilot DG units is prepared.	Improvement plan	PUC, KUA, CPUC, YSPSC and JICA Experts	Plan
				Act
1-4.	Existing spare parts and maintenance tools of pilot DG units are confirmed.	List of spare parts and maintenance tools	PUC, KUA, CPUC, YSPSC and JICA Experts	Plan
				Act
1-5.	Improvement plan for the operation of pilot DG units is implemented.	Improvement Implementation Report	PUC, KUA, CPUC, YSPSC and JICA Experts	Plan
				Act
1-6.	The result of implementation of the improvement plan is evaluated, and improvement plan is updated.	Improvement Evaluation Report	PUC, KUA, CPUC, YSPSC and JICA Experts	Plan
				Act
1-7.	The concept of Economic Dispatch Control (EDC) is shared among operators and applied, if possible.	EDC software, manual, EDC sheet	PUC, KUA, CPUC, YSPSC and JICA Experts	Plan
				Act
1-8.	Necessary spare parts and maintenance tools for the pilot DG units are prepared.	List of spare parts and maintenance tools prepared	PUC, KUA, CPUC, YSPSC and JICA Experts	Plan
				Act
1-9.	Maintenance work schedule for the pilot DG units is prepared.	Maintenance work shedule	PUC, KUA, CPUC, YSPSC and JICA Experts	Plan
				Act
1-10.	Check sheets and maintenance manuals for daily maintenance works for pilot DG units are prepared.	Check sheets and maintenance manulas	PUC, KUA, CPUC, YSPSC and JICA Experts	Plan
				Act
1-11.	Maintenance works (daily/partial inspection/overhaul work) for pilot DG units are conducted in accordance with the maintenance schedule.	Maintenance record	PUC, KUA, CPUC, YSPSC and JICA Experts	Plan
				Act
1-12.	The result of maintenance works is evaluated, and future maintenance work schedule together with budget (including sub-contract fee, cost for tools and equipment) is prepared.	Evaluation report and future schedule for maintenance	PUC, KUA, CPUC, YSPSC and JICA Experts	Plan
				Act
1-13.	Specific fuel consumption of the pilot DG units is measured before and after implementation of the related project activities.	Measurement for specific consumption of the pilot DG	PUC, KUA, CPUC, YSPSC and JICA Experts	Plan
				Act
1-14.	Related training programs for appropriate O&M of DGs are implemented periodically.	Training record, recommendations, reports, etc.	DRD, PUC, KUA, CPUC, YSPSC and JICA Experts	Plan
				Act
1-15.	Knowledge on appropriate O&M of DGs is disseminated among stakeholders.	Seminar, workshop records	DRD, PUC, KUA, CPUC, YSPSC and JICA Experts	Plan
				Act
Output 2 Activities				
2-1.	Current situation and future development plan of RE is reviewed.	TNA Report	PUC, KUA, CPUC, YSPSC and JICA Experts	Plan
				Act
2-2.	Planning manual for Hybrid Power Generation System is prepared	Planning manual for Hybrid Power Generation	PUC, KUA, CPUC, YSPSC and JICA Experts	Plan
				Act
2-3.	Planning manual for Hybrid Power Generation System is reviewed and updated in the target area.	Updated Planning manual for Hybrid Power Generation	PUC, KUA, CPUC, YSPSC and JICA Experts	Plan
				Act
2-4.	Operating conditions of the existing RE facilities are reviewed, including confirmation of objectively verifiable indicators for overall goal and project purpose.	TNA Report	PUC, KUA, CPUC, YSPSC and JICA Experts	Plan
				Act
2-5.	O&M manual for RE facilities is prepared.	O&M manual for RE facilities	PUC, KUA, CPUC, YSPSC and JICA Experts	Plan
				Act
2-6.	Maintenance works are conducted according to O&M manual of RE facilities.	Maintenance Record	PUC, KUA, CPUC, YSPSC and JICA Experts	Plan
				Act
2-7.	The result of maintenance works is evaluated, and future maintenance work schedule together with budget is prepared.	Evaluation report of maintenance work, and schedule	PUC, KUA, CPUC, YSPSC and JICA Experts	Plan
				Act
2-8.	Training program for Hybrid Power Generation System including O&M of RE facilities is conducted.	Training record, recommendations, reports, etc.	DRD, PUC, KUA, CPUC, YSPSC and JICA Experts	Plan
				Act
2-9.	Knowledge regarding Hybrid Power Generation System is disseminated among stakeholders.	Seminar, workshop records	DRD, PUC, KUA, CPUC, YSPSC	Plan
				Act
△: JCC				
▲: Training in Japan/Fiji				
JICA long term expert, stationed in Fiji				
JICA Consultant Team				



4.2 2nd JCC Meeting

MINUTES OF MEETING

BETWEEN

THE AUTHORITIES CONCERNED OF

THE GOVERNMENT OF FEDERATED STATES OF MICRONESIA

AND

JAPAN INTERNATIONAL COOPERATION AGENCY

FOR

THE SECOND JOINT COORDINATION COMMITTEE (JCC)

ON

THE PROJECT FOR INTRODUCTION OF HYBRID POWER GENERATION SYSTEM IN PACIFIC ISLAND COUNTRIES

Japan International Cooperation Agency (hereinafter referred to as "JICA") and the authorities concerned of the Federated States of Micronesia (hereinafter referred to as "the FSM side") established a Joint Coordination Committee (hereinafter referred to as "JCC") for the effective and successful implementation of the Project for Introduction of Hybrid Power Generation System in Pacific Island Countries (hereinafter referred to as "the Project").

The second JCC on the Project was held on 29th January 2019, at the Pohnpei State Government Conference Room chaired by Hon. Marion Henry, Secretary, Department of Resources and Development.

Pohnpei, 29th January, 2019

小川 忠之

Tadayuki Ogawa
Chief Advisor
JICA Expert in Fiji

Honorable Marion Henry
Secretary
Department of Resources and Development
The Federated States of Micronesia

Shinji Shibata
Resident Representative
JICA Micronesia Office

Takahiro Suzuki
Assistant Director
Energy and Mining Group
JICA Headquarters

MINUTES OF MEETING

BETWEEN

THE AUTHORITIES CONCERNED OF

THE GOVERNMENT OF FEDERATED STATES OF MICRONESIA

AND

JAPAN INTERNATIONAL COOPERATION AGENCY

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Pohnpei, 29th January 2018

Honorable Marion Henry
Secretary
Department of Resources and Development
The Federated States of Micronesia

Takayuki Ogawa
Chief Advisor
JICA Expert in Fiji

[illegible]
Assistant Director
Energy and Mining Group
JICA Headquarters

[illegible]
Resident Representative
JICA Micronesia Office

ANNEX

The FSM side and JICA (hereinafter referred to as "both sides") discussed on the issues including the contents of (i)Project Design Matrix (PDM), (ii)Plan of Operation (PO), and (iii)Project Monitoring Sheet, based on the Agenda attached hereto.

The both sides confirmed the main points as described below.

1. Confirmation of PDM, PO and Project Monitoring Sheet
   The both sides confirmed the latest version of PDM and PO as attachment 4 and 5. Also, the project monitoring sheet was agreed as attachment 3.

2. Project Organization
   The both sides confirmed the update of the Project Counterpart Team and assignment of the officials as described below. Those counterparts are core trainers in each task, and expected to disseminate technical knowledge and skills among other members in the organization periodically during the Project.
   The FSM side agreed to make the effort to remain the members as core trainers by 2022.

   ➢ Project Counterparts (Core Trainers)
   "☆" means prioritized counterparts

   (1) Yap State; YSPSC

   1) Operation and Maintenance of Diesel Engine Generators
      Alphonsus Ruwema, Power Plant Manager
      Casmiro Yithmeng, Chief Mechanic
      ☆Chris Igim, Electrician (Electrical)
      Roscoe Tamag, Chief Operator
      ☆Rowino Yarofaliut, Power Plant Mechanic(Mechanical)

   2) Plan for introduction of hybrid power generation systems
      Vincent Bouet, Chief Electrical Engineer

   3) Operation and Maintenance of Renewable Energy generation system
      Charles Laman, Technician, Engineering Division
      Steven Ken, Technician, Engineering Division
      ☆Jake Choay, Technician, PV operator
      Sebastian S. Marleyang, PV operator
      ☆John A. Chieng,

   (2) Chuuk State; CPUC

   1) Operation and Maintenance of Diesel Engine Generators
      Dennis Triana, Head of power generation and maintenance
      Jimmy Reyes, Lead Mechanic
      Basiente Kintin Jr., Mechanic (T.B.C)
   2) Plan for introduction of hybrid power generation systems
      Yolanda Joab Mori, Head of Renewable Energy
      Dennis Triana, Head of power generation and maintenance

Bruno Puas, RE Technician
Albert Francis, Head of power distribution

3) Operation and Maintenance of Renewable Energy generation system
Yolanda Joab Mori, Head of Renewable Energy
Dennis Triana, Head of power generation and maintenance
Jimmy Reyes, Lead Mechanic
Bruno Puas, RE Technician

(3) Pohnpei State; PUC

1) Operation and Maintenance of Diesel Engine Generators
☆Winfred Yamada, Manager, Diesel Plant
☆Elbert Elias, Mechanic
Erickson Semens, Mechanics

2) Plan for introduction of hybrid power generation systems
☆Dackson Solomon, Manager, Power Generation
Selestino Santiago, Senior Electrician
Pedrus Ehram, Mechanic

3) Operation and Maintenance of Renewable Energy generation system
☆Sidney Kilmete, Manager, Renewable Energy
Nixon Helgenberger, Electrician
Julian Pelep, Solar Technician

(4) Kosrae State; KUA

1) Operation and Maintenance of Diesel Engine Generators
☆Robert Taualupe, Operations Manager (Electrical)
☆Ronald Albert, Supervisor of Operator (Mechanical)
Careston Alokao, Power Plant Operator

2) Plan for introduction of hybrid power generation systems
Gerardo Protacio, Electrical Engineer
Hairom Livaie, Customer Service Head, Admin. & Training Officer
Robert Taualupe, Operations Manager

3) Operation and Maintenance of Renewable Energy generation system
☆Robert Taualupe, Operations Manager
☆Gifford Sigrah, Distribution Foreman
Ronnie George, Lineman-2

3. Improvement Plan for the Operation of Pilot DG Units

The FSM side agreed to implement following measures to improve the operation conditions of pilot DG units as explained in the letter issued on 28th September, 2018. The result of implementation of the improvement plan will be evaluated and updated in 2019 together with JICA Experts.

(1) DG operation data shall be printed and kept as paper for further power system analysis such as abnormalities in devices of the DG's facilities.

(2) Specific fuel consumption of each unit should be periodically measured and monitored, and the result shall be reflected in the unit dispatch schedule.

(3) The actual daily patrol checklist for preventive maintenance should be improved according to the sample format provided by the JICA expert team by the end of March, 2019.

(4) To efficiently manage overhaul works, overhaul work schedule should be prepared according to the sample format provided by the JICA expert team by the end of March, 2019.

(5) As for PUC, the JICA expert team confirmed efficient operation on weekday nights running only 2 DGs, but on some nights, 3 units were in operation providing 2000kW of excessive power reserve. To perform efficient operation of the power plant, the appropriate amount of reserve margin should be reminded by plant operators for economic distribution of DGs in accordance with the total demand. FSM side should keep the operation records including the reserve margin and share with JICA expert team.

4. Third Country Training in Fiji

(1) Objective

Counterparts from FSM, RMI, Kiribati and Tuvalu will be invited to Fiji to conduct the 1st regional training under the Project in 2019. The participants will have an opportunity to exchange their views and opinions with other participants to improve their skills and knowledge. Trainers in Fiji will be supported by Japanese Experts to deliver classroom lectures and hands-on trainings in accordance with curriculum. The result of the training will be evaluated to improve the training curriculum, textbooks & materials for the next training.

(2) Proposed training courses

As a result of the past trainings for trainers in Fiji, following training courses are proposed for the 1st regional training in Fiji.

1) Operation & Maintenance for Diesel Engine Generators
2) Grid Integration of Renewable Energy Generation Systems
3) Operation & Maintenance of Renewable Energy generation Systems (Solar PV)

Initially, the training for the above 2) and 3) will be held simultaneously as the participants are expected same in most countries.

(3) Venue

The possible venue of the training are listed as follows;

1) EFL (Energy Fiji Limited) Training Center
2) EFL Diesel Power plants (Vuda, Kinoya, etc.)
3) Solar PV plants (various)

(4) Tentative Schedule

About early October, 2019 (1 week for RE and DG respectively)

5. Training Equipment

Following equipment has been handed over to the FSM side under the Project.

No.	Item	Yap	Chuuk	Pohnpei	Kosrae
1	Fuel flow meter			10	6
2	Pyranometer and thermometer	1	1	1	1
3	String tracer (IV curve tracer)	1	1	1	1
4	Cell line checker	1	1	1	1
5	Simulation software (HOMER Pro)	1	1	1	1

In addition, equipment below will be provided by the end of March, 2019.

No.	Item	Yap	Chuuk	Pohnpei	Kosrae
1	FAN UNIT			3	
2	Digital Pressure Calibrator				1
3	Digital multimeter				1
4	Digital thermometer				1
5	Instrumentation signal measurement / generator				1
6	Ohm meter				1
7	Air compressor kit				1
8	Air hose 1 m×2, 1.5 m×1				1
9	Various types of fittings				1

It is required for the FSM side to keep and utilize above equipment in an appropriate manner. In case of missing/malfunction of equipment, the FSM side is requested to inform JICA Experts immediately.

6. Hand Over of Manuals

Following manuals will be handed over to FSM side by March 2019, as a result of discussion and consultation with counterpart members.

Five hard copies of each manual will be provided for each state.

1) Planning manual for Hybrid Power Generation System
2) Operation & Maintenance Manual for Solar PV System

It is very important that these manuals are fully utilized and revised as necessary after hand over. Therefore, the project counterpart members are requested to share the information and/or conduct training for other staff to apply these manuals in their daily works. The progress of activities will be monitored under the phase-2 period with the assistance by JICA Experts.

7. Venue for the next JCC in FSM

FSM side and JICA Expert team agreed that the next (3rd) JCC meeting will be held around February, 2020 at Yap State.

ATTACHMENT 1 Agenda for JCC Meeting
ATTACHMENT 2 Lists of Participants
ATTACHMENT 3 Project Monitoring Sheet
ATTACHMENT 4 Project Design Matrix ver. 2
ATTACHMENT 5 Plan of Operation ver. 2
ATTACHMENT 6 Mid-term Review

ATTACHMENT 1

Agenda for JCC Meeting

1. Opening Remarks by Hon. Marion Henry, Secretary, Department of Resources and Development, and Mr. Koji Sugiyama, Charge d'Affaires ad interim, Embassy of Japan

2. Explanation and confirmation on the following documents;
   (1) Project Design Matrix (PDM)
   (2) Plan of Operation (PO)
   (3) Project Monitoring Sheet

3. Confirmation on the Minutes of Meeting (M/M)

4. Mid-term Review for the Project

5. Closing Remarks by Mr. Shinji Shibata, Resident Representative of JICA Micronesia Office

ATTACHMENT 2 List of Participants

Organization	Position	Name
Department of Resources and Development, FSM	Secretary	Hon. Marion Henry
Department of Resources and Development, FSM	Assistant Secretary	Mr. Hubert Yamada
Yap State Public Service Corporation	Assistant General Manager	Mr. Victor Nabeyan
Chuuk Public Utility Corporation	CFO	Ms. Lei Shirai
Pohnpei Utilities Corporation	General Manager	Mr. Nixon T. Anson
Pohnpei Utilities Corporation	Manager, Power Generation	Mr. Dackson Solomon
Kosrae Utilities Authority	General Manager	Mr. Fred Skilling
Embassy of Japan	Charge d'Affaires ad interim	Mr. Koji Sugiyama
Embassy of Japan	Second Secretary	Mr. Koji Oda
JICA HQs Pacific and Southeast Asia Division 6	Deputy Director	Mr. Ken Okumura
JICA HQs Energy and Mining Group	Assistant Director	Mr. Takahiro Suzuki
JICA Micronesia Office	Resident Representative	Mr. Shinji Shibata
JICA Micronesia Office	Project Formulation Advisor	Ms. Emi Teshima
JICA Micronesia Office	Program Officer	Ms. Trish-Farrah E. Billen
JICA	Chief Advisor	Mr. Tadayuki Ogawa
JICA/ Okinawa Enetech Co., Inc	Team Sub Leader	Mr. Masanori Shimabuku
JICA/ Okinawa Enetech Co., Inc	Short Team Expert	Mr. Hirokazu Nakamura
JICA/ Okinawa Enetech Co., Inc	Short Team Expert	Mr. Yuma Uezu
JICA/ Okinawa Electric power Co., Inc	Short Team Expert	Mr. Yusuke Kuniba
JICA/KD Tech Co., ltd	Operational Coordination	Mr. Takahisa Watanabe
JICA/ Centinos, Inc	Evaluation Consultant	Mr. Takeshi Kikukawa

ATTACHMENT 3

PROJECT MONITORING SHEET

Project Title: The Project for Introduction of Hybrid Power Generation System in Pacific Island Countries

Version of the Sheet: Ver.2

Project Term: March 2017 -June 2022

Name: Tadayuki OGAWA

Title: Chief Advisor

Submission Date: 29th January, 2019

I. Summary

1 Progress

1-1 Progress of Inputs

(1) Japanese side

1) Long term expert stationed in Fiji has worked in August to plan & coordinate the trainings for the operation and maintenance of Diesel Engine Generators (DEGs) and Renewable Energy (RE) power generation systems in FSM.
2) Short term expert team has worked in July & August to conduct the trainings for the operation and maintenance of Diesel Engine Generators (DEGs) and Renewable Energy (RE) power generation systems in FSM.
3) Counterpart training has been conducted in February and September in Okinawa, Japan inviting counterparts from 5 target countries.

(2) FSM side

In total 30 number of core trainers are registered under the Project, 9 from YSPSC, 5 from CPUC, 10 from PUC and 6 from KUA staff. Facilities and equipment (e.g. training classrooms) for the trainings in FSM were provided by PUC.

1-2 Progress of Activities

No.	Activity	Progress
Output 1: 1. Appropriate and economical system for O&M of Diesel Generators (DGs) is enhanced.		
1-1	Operational conditions of the existing DGs are reviewed, including confirmation of objectively verifiable indicators for overall goal and project purpose.	The result of discussions and analysis for future training needs was compiled as "Training Needs Assessment Report" and submitted to all members in February 2018.
1-2	Specific fuel consumption of pilot DG units is measured.	Specific fuel consumption needs to be measured in PUC and KUA after installation of fuel flow meters procured under the project. The baseline

ATTACHMENT 3

		figure for project evaluation shall be updated after measurment.
1-3	Improvement plan for the operation of pilot DG units is prepared.	Improvement plan was prepared and shared with FSM side in the letter issued on 28th September 2018.
1-4	Existing spare parts and maintenance tools of pilot DG units are confirmed.	Existing spare parts and maintenance tools were confirmed in August 2018.
1-5	Improvement plan for the operation of pilot DG units is implemented.	FSM side is requested to implement the proposed improvement plan under consultation with JICA Expert. After completion of the plan by April 2019, the result of implementation of the improvement plan is evaluated, and improvement plan will be updated.
1-7	The concept of Economic Dispatch Control (EDC) is shared among operators and applied, if possible.	The basic concept of EDC has been explained by JICA Expert in August 2018. Necessary software has been shared with FSM side.
1-8	Necessary spare parts and maintenance tools for the pilot DG units are prepared.	KUA is requested to prepare spare parts and maintenance tools in accordance with the advice by JICA Expert by February 2020.
1-9	Maintenance work schedule for the pilot DG units is prepared.	Draft maintenance work schedule is under preparation by JICA Expert. KUA is requested to share the schedule for overhaul works for pilot DG units.
1-10	Check sheets and maintenance manuals for daily maintenance works for pilot DG units are prepared.	Draft check sheets and maintenance manuals are under preparation by JICA Expert.
Output 2: Methodology for appropriate planning and O&M of renewable energy (RE) is established.		
2-1	Current situation and future development plan of RE is reviewed.	Same as activity 1-1
2-2	Planning manual for Hybrid Power Generation System is prepared.	First issue of the planning manual will be delivered to each state by March, 2019.
2-4	Operating conditions of the existing RE facilities are reviewed, including confirmation of objectively verifiable indicators for overall goal and project purpose.	Same as activity 1-1 Objectively verifiable indicators for overall goal was confirmed at the 1st JCC meeting in 2017.
2-5	O&M manual for RE facilities is prepared.	First issue of the O&M manual will be delivered to each state by March, 2019.

1-3 Achievement of Output

(1) Output 1

Technical advice for the improvement of O&M of DGs has been provided by JICA Experts based on the initial survey of current conditions conducted in 2017. Also, classroom lecture & hands-on training have been provided to ensure appropriate and economical O&M of DGs with draft manuals and check sheets. In addition, counterpart training has been conducted with site visits and hands-on trainings to learn the necessary O&M of DGs in Japan. From now on the contribution from FSM side should be enhanced to implement the improved O&M of DGs based on the learnings from the advice and trainings by JICA Experts.

(2) Output 2

Technical advice for the appropriate planning and O&M of RE has been provided by JICA Experts based on the initial survey of current conditions conducted in 2017. Also, classroom lecture & hands-on training have been provided to ensure appropriate planning and O&M of RE with draft manuals and check sheets. In addition, counterpart training has been conducted with site visits and hands-on trainings to learn the methodology of planning and O&M of RE in Japan. From now on the contribution from FSM side should be enhanced to implement the improved planning and O&M of RE based on the learnings from the advice and trainings by JICA Experts.

1-4 Achievement of the Project Purpose

1-5 Changes of Risks and Actions for Mitigation

1-6 Progress of Actions undertaken by JICA

1-7 Progress of Actions undertaken by the Parties

1-8 Progress of Environmental and Social Considerations (if applicable)

1-9 Progress of Considerations on Gender/ Peace Building/ Poverty Reduction (if applicable)

1-10 Other remarkable/ considerable issues related/ affect to the Project (such as other JICA's projects, activities of counterparts, other donors, private sectors, NGOs, etc.)

2 Delay of Work Schedule and/or Problems (if any)

2-1 Detail

2-2 Cause

2-3 Action to be taken

2-4 Roles of Responsible Persons/ Organization (JICA, the Parties, etc.)

3 Modification of the Project Implementation Plan

3-1 Plan of Operation

3-2 Other modifications on detailed implementation plan

II. **Project Monitoring Sheet I & II as Attached**

(Project Design Matrix and Plan of Operation)

Annex 1

Ver. 2, November. 2017

Draft Project Design Matrix (PDM)

Project Title: The Project for Introduction of Hybrid Power Generation System in Pacific Island Countries
Project Term: March 2017 – June 2022 (Five Years) (Phase 1: March 2017 – February 2019 , Phase 2: March 2019 – June 2022
Country: Federated States of Micronesia
Target Area: Pohnpei, Chuuk, Yap and Kosrae
Target Group: Related engineers and other technical staff in the target area (DRD, PUC, KUA, CPUC, YSPSC)
DRD: Department of Resources and Development PUC:Pohnpei Utilities Corporation KUA: Kosrae Utilities Authority YSPSC:Yap State Public Service Corporation CPUC:Chuuk Public Utility Corporation

Narrative Summary	Objectively Verifiable Indicators	Means of Verification	Important Assumptions
Overall Goal Energy security is improved and greenhouse gases are reduced through the reduction of fossil fuels consumption.	In comparison to the indicators at the time of baseline survey, 1. Reduced amount of CO2 emission of power utilities in the target area 2. Reduced amount of diesel fuel of power utilities in the target area 3. Increased capacity (kW) and actual generated energy (kWh) of renewable energy facilities of power utilities in the target area	1. to 3. Reports of C/P agencies	
Project Purpose Hybrid Power Generation System is introduced.	1. Improvement of specific fuel consumption of pilot DG units (better than the baseline data set at the beginning of the Project) 2. Improvement of performance ratio for the RE power generation systems (better than the baseline data set at the beginning of the Project) 3. Proper application of planning and O&M method of Hybrid Power Generation System **Based on the review on result of Project activities, specific target numbers are to be determined.*	1. Record on specific fuel consumption of Pilot DG units by C/P, checked by Japanese experts 2. Record on operation of RE power generation systems 3. Evaluation by Japanese experts and C/P on plans of Hybrid Power Generation System	C/P agencies continue commitment to the Project by continuing budget allocation as well as assignment of personnel for the post- Project activities.
Outputs 1. Appropriate and economical system for O&M of Diesel Generators (DGs) is enhanced.	<Output 1> 1-1 Adequacy on the use of the work schedule, check sheets and manual for the maintenance work for the pilot DG units 1-2 Number of training participants who are conducting operation and maintenance of DG based on the learnings from the training program	1-1 Evaluation by Japanese experts and C/P on improvement of maintenance work (daily/partial inspection/overhaul work) for pilot DG units 1-2 Capacity assessment of trained O&M staff and managers by Japanese experts	C/P agencies promote investment on renewable energy facilities based on the current national policy/plan.

2. Methodology for appropriate planning and O&M of renewable energy (RE) is established.	<Output 2> 2-1 Number of training participants who learned the planning method of the Hybrid Power Generation System 2-2 Number of training participants who are conducting O&M of RE facilities based on the learnings from the training program 2-3 Preparation of related manuals for Hybrid Power Generation System 2-4 Adequacy of the use of the related manuals for Hybrid Power Generation System	2-1 Capacity assessment of trained staff and managers by Japanese experts 2-2 Capacity assessment of trained O&M staff and managers by Japanese experts 2-3 Evaluation by Japanese Experts on related manuals for Hybrid Power Generation System prepared by C/P 2-4 Evaluation by Japanese experts and C/P on the use of the related manuals for Hybrid Power Generation System	
Activities <Output 1> 1-1 Operational conditions of the existing DGs are reviewed, including confirmation of objectively verifiable indicators for overall goal and project purpose. 1-2 Specific fuel consumption of pilot DG units is measured. 1-3 Improvement plan for the operation of pilot DG units is prepared. 1-4 Existing spare parts and maintenance tools of pilot DG units are confirmed. 1-5 Improvement plan for the operation of pilot DG units is implemented. 1-6 The result of implementation of the improvement plan is evaluated, and improvement plan is updated. 1-7 The concept of Economic Dispatch Control (EDC) is shared among operators and applied, if possible. 1-8 Necessary spare parts and maintenance tools for the pilot DG units are prepared. 1-9 Maintenance work schedule for the pilot DG units is prepared. 1-10 Check sheets and maintenance manuals for maintenance works for pilot DG units are prepared. 1-11 Maintenance works (daily/partial inspection/overhaul work) for pilot DG units are conducted in accordance with the maintenance schedule. 1-12 The result of maintenance works is evaluated, and future maintenance work schedule together with budget (including sub-contract fee, cost for tools and equipment) is prepared. 1-13 Specific fuel consumption of the pilot DG units is measured before and after implementation of the related project activities. 1-14 Related training programs for appropriate O&M system for DGs are implemented periodically. 1-15 Knowledge on appropriate O&M of DGs is disseminated among stakeholders. <Output 2> 2-1 Current situation and future development plan of RE is reviewed. 2-2 Planning manual for Hybrid Power Generation System is prepared. 2-3 Planning manual for Hybrid Power Generation System is reviewed and updated in the target area. 2-4 Operating conditions of the existing RE facilities are reviewed, including confirmation of objectively verifiable indicators for overall goal and project purpose.	**Inputs** **(Japanese side)** 1. Dispatch of the Japanese experts <JICA long term expert, stationed in Fiji > - Chief Advisor/Hybrid Power Generation System <JICA Consultant Team> -Team Leader/Operation & Maintenance of DG -Economic operation of DG (EDC) -Maintenance support of DG (Mechanical expert) -Maintenance support of DG (Electrical expert) -O&M of RE power generation system -Integration of RE power generation system -Project Coordinator 2. Training in Japan and Fiji 3. Equipment -In accordance with necessity of activities	**(FSM side)** 1. Assignment of C/Ps -Project Director (P/D) -Project Manager (P/M) -Engineers in charge of O&M (Manager level) - Mechanical Staff - Electrical Staff - Planning officer, and others 2. Facilities and equipment -Project office 3.Recurrent costs - C/Ps' wages and allowances - C/Ps' domestic travel expense in part	**Preconditions** Contents of the current relevant policies on promotion of renewable energy and energy efficiency are not largely changed.

2-5 O&M manual for RE facilities is prepared. 2-6 Maintenance works are conducted according to O&M manual of RE facilities. 2-7 The result of maintenance works is evaluated, and future maintenance work schedule together with budget is prepared. 2-8 Training program for Hybrid Power Generation System including O&M of RE facilities is conducted 2-9 Knowledge regarding Hybrid Power Generation System is disseminated among stakeholders.			

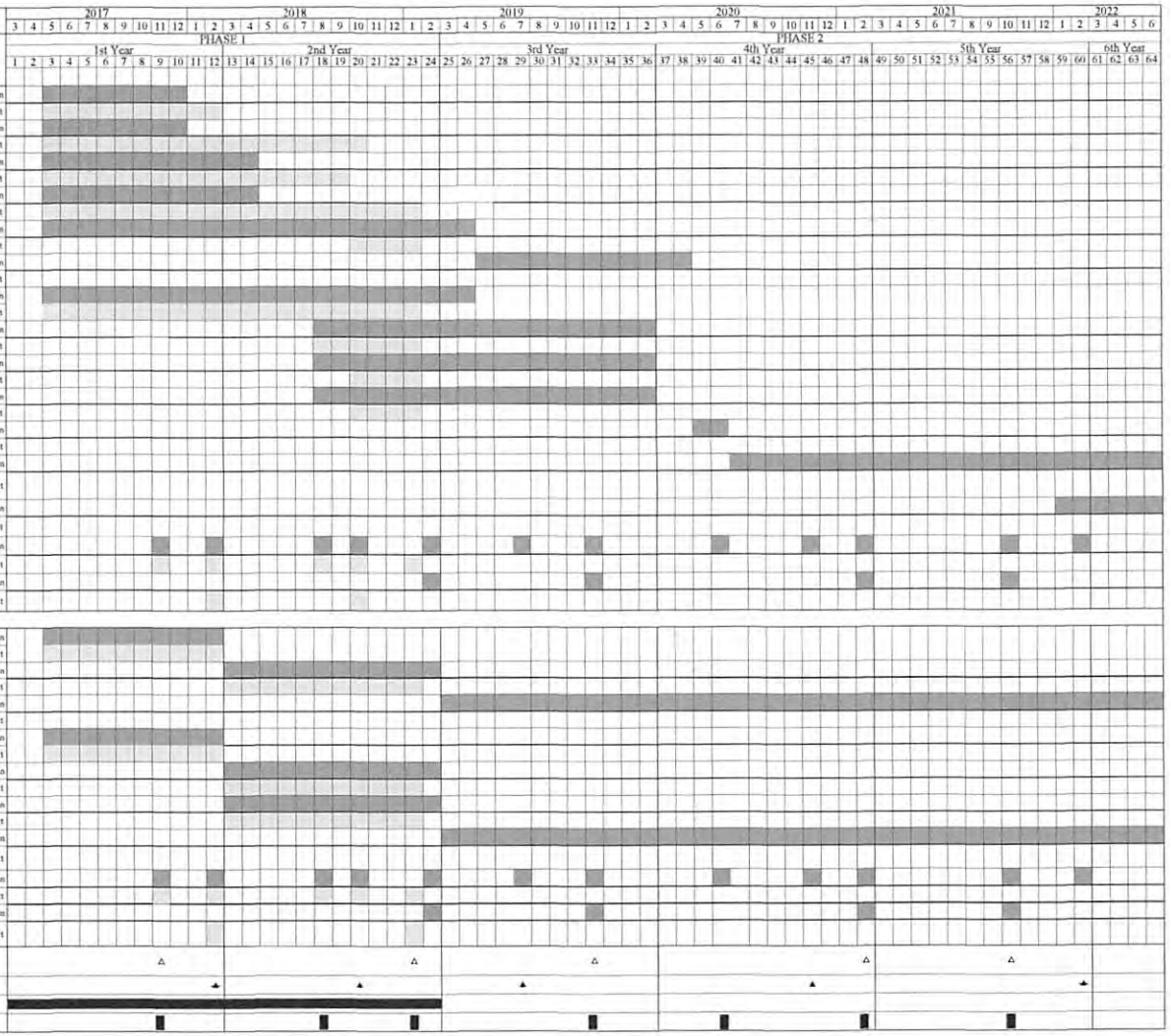
Annex 5

Ver. 2 January, 2019

Plan of Operation (PO)

Project Title: The Project for Introduction of Hybrid Power Generation System in Pacific Island Countries
Project Term: March 2017 - June 2022 (Phase 1: March 2017 – February 2019 , Phase 2: March 2019 – June 2022
Country: Federated States of Micronesia
Target Area: Pohnpei, Chuuk, Yap and Kosrae
Target Group: Related engineers and other technical staff in the target area (DRD, PUC, KUA, CPUC, YSPSC)

Output1 Activities [Appropriate O&M System for DG]		Product	Org m charge	
1-1	Operational conditions of the existing DGs are reviewed, including confirmation of objectively verifiable indicators for overall goal and project purpose.	TNA Report	PUC, KUA, CPUC, YSPSC and JICA Experts	Plan / Act
1-2	Specific fuel consumption of pilot DG units is measured.	Measurement of Specific fuel consumption	PUC, KUA, CPUC, YSPSC and JICA Experts	Plan / Act
1-3	Improvement plan for the operation of pilot DG units is prepared.	Improvement plan	PUC, KUA, CPUC, YSPSC and JICA Experts	Plan / Act
1-4	Existing spare parts and maintenance tools of pilot DG units are confirmed.	List of spare parts and maintenance tools	PUC, KUA, CPUC, YSPSC and JICA Experts	Plan / Act
1-5	Improvement plan for the operation of pilot DG units is implemented.	Improvement Implementation Report	PUC, KUA, CPUC, YSPSC and JICA Experts	Plan / Act
1-6	The result of implementation of the improvement plan is evaluated, and improvement plan is updated.	Improvement Evaluation Report	PUC, KUA, CPUC, YSPSC and JICA Experts	Plan / Act
1-7	The concept of Economic Dispatch Control (EDC) is shared among operators and applied, if possible.	EDC software, manual, EDC sheet	PUC, KUA, CPUC, YSPSC and JICA Experts	Plan / Act
1-8	Necessary spare parts and maintenance tools for the pilot DG units are prepared.	List of spare parts and maintenance tools prepared	PUC, KUA, CPUC, YSPSC and JICA Experts	Plan / Act
1-9	Maintenance work schedule for the pilot DG units is prepared.	Maintenance work shedule	PUC, KUA, CPUC, YSPSC and JICA Experts	Plan / Act
1-10	Check sheets and maintenance manuals for daily maintenance works for pilot DG units are prepared.	Check sheets and maintenance manulas	PUC, KUA, CPUC, YSPSC and JICA Experts	Plan / Act
1-11	Maintenance works (daily/partial inspection/overhaul work) for pilot DG units are conducted in accordance with the maintenance schedule.	Maintenance record	PUC, KUA, CPUC, YSPSC and JICA Experts	Plan / Act
1-12	The result of maintenance works is evaluated, and future maintenance work schedule together with budget (including sub-contract fee, cost for tools and equipment) is prepared.	Evaluation report and future schedule for maintenance	PUC, KUA, CPUC, YSPSC and JICA Experts	Plan / Act
1-13	Specific fuel consumption of the pilot DG units is measured before and after implementation of the related project activities.	Measurement for specific consumption of the pilot DG	PUC, KUA, CPUC, YSPSC and JICA Experts	Plan / Act
1-14	Related training programs for appropriate O&M of DGs are implemented periodically.	Training record, recommendations, reports, etc.	DRD, PUC, KUA, CPUC, YSPSC and JICA Experts	Plan / Act
1-15	Knowledge on appropriate O&M of DGs is disseminated among stakeholders.	Seminar, workshop records	DRD, PUC, KUA, CPUC, YSPSC and JICA Experts	Plan / Act
Output 2 Activities				
2-1	Current situation and future development plan of RE is reviewed.	TNA Report	PUC, KUA, CPUC, YSPSC and JICA Experts	Plan / Act
2-2	Planning manual for Hybrid Power Generation System is prepared.	Planning manual for Hybrid Power Generation	PUC, KUA, CPUC, YSPSC and JICA Experts	Plan / Act
2-3	Planning manual for Hybrid Power Generation System is reviewed and updated in the target area.	Updated Planning manual for Hybrid Power Generation	PUC, KUA, CPUC, YSPSC and JICA Experts	Plan / Act
2-4	Operating conditions of the existing RE facilities are reviewed, including confirmation of objectively verifiable indicators for overall goal and project purpose.	TNA Report	PUC, KUA, CPUC, YSPSC and JICA Experts	Plan / Act
2-5	O&M manual for RE facilities is prepared.	O&M manual for RE facilities	PUC, KUA, CPUC, YSPSC and JICA Experts	Plan / Act
2-6	Maintenance works are conducted according to O&M manual of RE facilities.	Maintenance Record	PUC, KUA, CPUC, YSPSC and JICA Experts	Plan / Act
2-7	The result of maintenance works is evaluated, and future maintenance work schedule together with budget is prepared.	Evaluation report of maintenance work, and schedule	PUC, KUA, CPUC, YSPSC and JICA Experts	Plan / Act
2-8	Training program for Hybrid Power Generation System including O&M of RE facilities is conducted.	Training record, recommendations, reports, etc.	DRD, PUC, KUA, CPUC, YSPSC and JICA Experts	Plan / Act
2-9	Knowledge regarding Hybrid Power Generation System is disseminated among stakeholders.	Seminar, workshop records	DRD, PUC, KUA, CPUC, YSPSC	Plan / Act
	△: JCC			
	▲: Training in Japan/Fiji			
	JICA long term expert, stationed in Fiji			
	JICA Consultant Team			



Mid-term Review
FSM (Pohnpei State)

January 2019

Takeshi Kikukawa

Ver. 1.0

I. Evaluation by Five Criteria m(1/3)

Five Criteria: (i) Relevance, (ii) Effectiveness, (iii) Efficiency, (iv) Impact and (v) Sustainability

#	Item	Viewpoints	Assessment
i	Relevance	a) Consistency with government policy b) Consistency with Japanese government policy c) Meeting the needs of target group and beneficiaries d) Comparative advantage of technology provided by Japan	a) Well aligned with government policy and development program such as Infrastructure Development Plan, Strategic Development Plan and Energy Master Plans. b) Consistent with Development Assistance Policy for FSM and Business Development Plan. c) Project addresses urgent needs of target group. d) DG and RE technologies are well advanced in many regions in Japan.

I. Evaluation by Five Criteria (2/3)

Five Criteria: (i) Relevance, (ii) Effectiveness, (iii) Efficiency, (iv) Impact and (v) Sustainability

#	Item	Viewpoints	Assessment
ii	Effectiveness	a) Regional Chief Advisor b) Collaboration among Other Countries and States	a) Regional Chief Advisor as a focal point of regional activities. b) Five countries. Four states. Coordination and collaboration with external organizations such as Pacific Power Association (PPA) and South Pacific Community (SPC).
iii	Efficiency	a) Dispatch of Japanese Experts b) Provision of Equipment c) Local Operational Cost d) Counterpart Training in Japan e) Assignment of Counterparts	a) Japanese experts have been deployed in time for specific project activities. b) Necessary equipment was provided based on the needs of each state. c) Some C/Ps participated the activities out of pocket. d) The trainings in Japan were held twice and well evaluated by participants. e) In general assigned C/Ps took part in the activities.

2

I. Evaluation by Five Criteria (3/3)

Five Criteria: (i) Relevance, (ii) Effectiveness, (iii) Efficiency, (iv) Impact and (v) Sustainability

#	Item	Viewpoints	Assessment
iv	Impact	a) Prospects of Achieving Overall Goal b) Impact of Project	Overall Goal: Energy security is improved and greenhouse gases are reduced through the reduction of fossil fuels consumption. a) Project aims at improving performance of power supply through hybrid power generation system. b) Project is expected to have positive impacts on not just energy but also overall economic development and improvement of living conditions.
v	Sustainability	a) Policy/Institutional Aspects b) Financial/Organizational Aspects c) Technical Aspects	a) Government policy on energy would remain as the current. b) Turnover of staff and financial sustainability will need to be monitored. c) Knowledge obtained in Project would be retained and transferred within the organizations.

3

II. Suggestions for Management on JICA Project (1/3)

Findings on Issues & Suggestions (1/3)

#	Issues	Possible Challenges	Implication for Business Process Improvement
1	Opportunity Loss	Insufficient resources for O/M a) Knowledge/ communication b) Turnover of staff c) Finance for maintenance d) Facility and accounting management e) Information/data	Improvement of management of operation and maintenance (O/M) for daily business and large-scale, planned maintenance. a) Streamlining job instruction for O/M & Monitoring b) Salary, Recognition, Certification, Tailor-made compensation, Mobilization of females and part-time workforce, Staff exchange program, Temporary leave c) Prioritized budgeting for maintenance, O/M fund, Common inventory control among power utilities, Centralized and planned purchase, Suppliers' financing, Management of reusable spare parts d) Strengthening managerial accounting practice for each small-size work group (not just budget management) e) ITC system, inventory management, accounting practice f) Deployment of staff for operation, maintenance and planning of maintenance

4

II. Suggestions for Management on JICA Project (2/3)

Findings on Issues & Suggestions (2/3)

#	Issues	Possible Challenges	Implication for Business Process Improvement
2	Mid-term Planning	Does the management know exactly what each staff needs to do today for the next few years?	Existing JICA planning manual will be utilized in 2nd Phase. a) Leadership of management (How to do) b) Task for corporate planning division/staff (plus other experts) c) Action plan for planning activities d) Mid-term investment program (update scenario planning. Review of M/P, technical, financial, safeguard, preparation of F/S, etc.) e) Financing plan and funding arrangements f) Tender management & Monitoring/ Rolling development plan

5

II. Suggestions for Management on JICA Project (3/3)6

Findings on Issues & Suggestions (3/3)

#	Issues	Possible Challenges	Implication for Business Process Improvement
3	Linkage of JICA Project with Daily Business	a) Priority of JICA Project b) Workable manuals and knowledge in place c) Resource allocation by middle/line managers (JICA Project, daily O/M, administrative work, R&D, team meeting, etc.) d) Turnover	The knowledge and outputs of Project can be institutionalized. a) Understanding of management on value of Project b) Customize JICA manuals and knowledge at site c) Management may consider business reengineering d) Recognition of performance improvement e) Facilitation of JICA experts

6

Thank you for your attention.

7

4.3 3rd JCC Meeting

MINUTES OF MEETING

BETWEEN

THE AUTHORITIES CONCERNED OF

THE GOVERNMENT OF FEDERATED STATES OF MICRONESIA

AND

JAPAN INTERNATIONAL COOPERATION AGENCY

FOR

THE THIRD JOINT COORDINATION COMMITTEE (JCC)

ON

THE PROJECT FOR INTRODUCTION OF HYBRID POWER GENERATION SYSTEM IN PACIFIC ISLAND COUNTRIES

Japan International Cooperation Agency (hereinafter referred to as "JICA") and the authorities concerned of the Federated States of Micronesia (hereinafter referred to as "the FSM side") established a Joint Coordination Committee (hereinafter referred to as "JCC") for the effective and successful implementation of the Project for Introduction of Hybrid Power Generation System in Pacific Island Countries (hereinafter referred to as "the Project").

The third JCC on the Project was held on 24th January 2020, at the Early Childhood Education Center in Yap chaired by Hon. Marion Henry, Secretary, Department of Resources and Development.

Yap, 24th January, 2020

小川 忠之

Tadayuki Ogawa
Chief Advisor
JICA Senior Advisor

Honorable Marion Henry
Secretary
Department of Resources and Development
The Federated States of Micronesia

For 豊島 柊子

Shinji Shibata
Resident Representative
JICA Micronesia Office

ANNEX

The FSM side and JICA (hereinafter referred to as "both sides") discussed on the issues including the contents of (i)Project Design Matrix (PDM), (ii)Plan of Operation (PO), and (iii)Project Monitoring Sheet, based on the Agenda attached hereto.

The both sides confirmed the main points as described below.

1. Confirmation of PDM, PO and Project Monitoring Sheet for project evaluation
   Since the Project progressed, the Objectively Verifiable Indicator (OVI) has been identified. Both sides confirmed the latest version of PDM and PO as attachment 4 and 5. Also, the project monitoring sheet was agreed as attachment 3.

2. Project Organization
   The both sides confirmed the update of the Project Counterpart Team and assignment of the officials as described below. Those counterparts are core trainers in each task, and expected to disseminate technical knowledge and skills among other members in the organization periodically during the Project.
   The FSM side agreed to make the effort to remain the members as core trainers by 2022.

   ➢ Project Counterparts (Core Trainers)
   "☆" means prioritized counterparts
   (1) Yap State; YSPSC
   1) Operation and Maintenance of Diesel Engine Generators
   Alphonsus Ruwema, Power Plant Manager
   Casmiro Yithmeng, Chief Mechanic
   ☆Chris Igem, Electrician (Electrical)
   Roscoe Tamag, Chief Operator
   ☆Rowino Yarofaliut, Power Plant Mechanic(Mechanical)

   2) Plan for introduction of hybrid power generation systems
   ☆John A. Chieng, Engineering Manager

   3) Operation and Maintenance of Renewable Energy generation system
   Chaem Charles Laman, Technician, Engineering Division
   Steven Ken, Technician, Engineering Division
   ☆Choay Jacob (Jake), Technician, PV operator
   Sebastian S. Marleyang, PV operator

   (2) Chuuk State; CPUC
   1) Operation and Maintenance of Diesel Engine Generators
   Dennis Triana, Head of power generation and maintenance
   Jimmy Reyes, Lead Mechanic

2) Plan for introduction of hybrid power generation systems
Dennis Triana, Head of power generation and maintenance
Albert Francis, Head of power distribution
Chris Killion, RE Technician
Limus Setik, RE Technician

3) Operation and Maintenance of Renewable Energy generation system
Dennis Triana, Head of power generation and maintenance
Chris Killion, RE Technician
Limus Setik, RE Technician

(3) Pohnpei State; PUC

1) Operation and Maintenance of Diesel Engine Generators
☆Winfred Yamada, Manager, Diesel Plant
☆Elpert Elias, Mechanic
☆Dackson Solomon, Manager, Power Generation
Erickson Semens, Mechanics
Pedrus Ehram, Mechanic

2) Plan for introduction of hybrid power generation systems
Selestino Santiago, Senior Electrician
Richard Lohn, Electrician

3) Operation and Maintenance of Renewable Energy generation system
☆Sidney Kilmete, Manager, Renewable Energy
Julian Pelep, Solar Technician

(4) Kosrae State; KUA

1) Operation and Maintenance of Diesel Engine Generators
☆Robert Taualupe, Operations Manager (Electrical)
☆Ronald Albert, Supervisor of Operator (Mechanical)
Careston Alokoa, Power Plant Operator

2) Plan for introduction of hybrid power generation systems
Gerardo Protacio, Electrical Engineer
Robert Taualupe, Operations Manager
Casey Freddy, Customer Service Supervisor

3) Operation and Maintenance of Renewable Energy generation system
☆Robert Taualupe, Operations Manager
☆Gifford Sigrah, Distribution Foreman
Ronnie George, Lineman-2

3. Improvement Plan for the Operation of Pilot DG Units

The FSM side agreed to implement following measures to improve the operation conditions of pilot DG units as explained in the letter issued on December, 2019.

(1) Monthly summary should be kept in hard copy to enable the analysis of operation condition by the maintenance staff.

(2) Specific fuel consumption of each unit should be periodically measured and monitored, and the result shall be reflected in the unit dispatch schedule.

For Pohnpei state we request strongly the completion of the installation of the fuel flow meters provided under the project by the end of March 2020.

According to the report of each State the specific fuel consumption of FSM during 2019 is shown in below table.

State	Baseline (2017)	Achievement (2019)
Yap	13.0 kWh/G (Deutz) 14.5 kWh/G (CAT 3516) 14.3 kWh/G (CAT C32)	14.5 kWh/G (0.261 l/kWh)
Chuuk	14.91 kWh/G (total average)	(Unit 1) 15.3 kWh/G (0.247 l/kWh) (Unit 2) 15.2 kWh/G (0.249 l/kWh) (Unit 4) 14.57 kWh/G (0.259 l/kWh) (Unit 5) 14.65 kWh/G (0.258 l/kWh) Avg: 14.93 Wh/G (0.253 l/kWh)
Pohnpei	13.4 kWh/G (total average)	Unit #4 16.3 kWh/G (0.232 l/kWh) Unit #5 14.3 kWh/G (0.264 l/kWh) Avg:15.3kWh/G (0.247 l/kWh)
Kosrae	13.6 kWh/G (total average)	14.5 kWh/G (0.261 l/kWh)

For all States of FSM we recommend set a person in charge in the measurement of monthly specific fuel consumption of all units and report these result with the JICA expert team.

(Pohnpei) Lillyann David
(Chuuk) Dennis Triana
(Kosrae) Robert Taualupe
(Yap) John A. Chieng

(3) The actual daily patrol checklist for preventive maintenance should be improved according to the sample format provided by the JICA expert team by the end of March, 2020.

(4) To efficiently manage overhaul works, overhaul work schedule should be prepared according to the sample format provided by the JICA expert team by the end of March, 2020.

(5) As for PUC, the JICA expert team confirmed efficient operation on weekday nights running only 2 DGs, but on some nights, 3 units were in operation providing excessive power reserve. To perform efficient operation of the power plant, the appropriate amount of reserve margin should be reminded by plant operators for economic distribution of DGs in accordance with the total demand. FSM side should keep the operation records including the reserve margin and share with JICA expert team.

4. Project Seminar

(1) Objective

Project Seminar will be held to share the basic information and latest progress of the Project with relevant stakeholders to seek possible collaboration. Also, the latest progress of introduction of Hybrid Power Generation System will be shared among concerned stakeholders.

(2) Tentative schedule and Venue

Kosrae (end of July, 2020)

(3) Participants (other than counterpart organization)

1) State government official
2) College, research institute, etc.
3) Development Partner
4) Private company

5. Third Country Training in Fiji

(1) Objective

Counterparts from FSM, RMI, Kiribati and Tuvalu will be invited to Fiji to conduct the 2nd regional training under the Project in 2020. The objective of the training is to provide the continuous learning opportunity for the participants who joined the 1st regional training. Basic to medium level training incorporating more hands-on training, exercise, group discussion will be introduced in this year. The result of the training will be evaluated to improve the training curriculum, textbooks & materials for the next training.

(2) Proposed training courses

As a result of the past trainings for trainers in Fiji, following training courses are proposed for the 1st regional training in Fiji.

1) Operation & Maintenance for Diesel Engine Generators
2) Grid Integration of Renewable Energy Generation Systems
3) Operation & Maintenance of Renewable Energy generation Systems (Solar PV)

Initially, the training for the above 2) and 3) will be held simultaneously as the participants are expected same in most countries.

(3) Venue

The possible venue of the training are listed as follows;

1) EFL (Energy Fiji Limited) Training Center
2) EFL Diesel Power plants (Vuda, Nadi, etc.)
3) Solar PV plants (various)

(4) Tentative Schedule

October, 2020 (1 week for RE and DG respectively)

6. Training Equipment

Following equipment has been handed over to FSM (Items 2~9 KUA only) side under the Project.

No.	Name of equipment	Model No.	Qty.	Manufacturer
1	Simulation software (HOMER Pro)		4	
2	Digital Pressure Calibrator(With calibration certificate)	DPI800S	1	GE Sensing & Inspection Technologies
3	Digital multimeter(with calibration certificate)	TY710	1	Yokogawa Test & Measurement Corporation
4	Digital thermometer(with calibration certificate)	TX1001	1	
5	Instrumentation signal measurement / generator(with calibration certificate)	CA150	1	
6	Ohm meter (with calibration certificate)	240633J	1	
7	Air compressor kit PV211	PV 211	1	GE Sensing & Inspection Technologies
8	Air hose 1m×2, 1.5m×		1	—
9	Various types of fittings (1/8,1/4,3/8,1/2,3/4,1)		1	—

7. Institutionalization of Manuals

Following manuals have been handed over to FSM side by March 2019, as a result of discussion and consultation with counterpart members.

1) Operation & Maintenance of Diesel Engine Generator
2) Planning manual for Hybrid Power Generation System
3) Operation & Maintenance Manual for Solar PV System

It is very important that these manuals are fully utilized and revised as necessary after hand over. Therefore, the project counterpart members are requested to share the information and/or conduct training for other staff to apply these manuals in their daily works. The progress of activities will be monitored under the phase-2 period with the assistance by JICA Experts.

8. Certificate under the Project

The Project has been coordinating with PacTVET Programme supported by EU to acknowledge those core trainers under their programme after their training. JICA training programme will be shared with COM and related stakeholders for their review and potential accreditation.

9. Venue for the next JCC in FSM

FSM side and JICA Expert team agreed that the next (4th) JCC meeting will be held around January, 2021 at Chuuk State.

10. Cost-sharing arrangements for travel

The both sides reconfirmed the cost-sharing arrangements for domestic/overseas travelling as below.

(1) Training in Fiji

JICA will bear all travel cost including air fare, accommodation, and daily allowance.

(2) Training and JCC in FSM

JICA will bear air fare only, FSM side will cover airport tax, accommodation and daily allowance.

10. Flight schedule

JICA prepares above-mentioned tickets for JCC and training with the most effective route, and flight change is fundamentally not allowed. Prior discussion is requested if any flight change is required with unavoidable reasons/ situation.

ATTACHMENT 1 Agenda for JCC Meeting
ATTACHMENT 2 Lists of Participants
ATTACHMENT 3 Project Monitoring Sheet
ATTACHMENT 4 Project Design Matrix ver. 2
ATTACHMENT 5 Plan of Operation ver. 2

ATTACHMENT 1

Agenda for JCC Meeting

1. Opening Remarks by Hon. Marion Henry, Secretary, Department of Resources and Development

2. Explanation and confirmation on the following documents;
   (1) Project Design Matrix (PDM)
   (2) Plan of Operation (PO)
   (3) Project Monitoring Sheet

3. Confirmation on the Minutes of Meeting (M/M)

4. Progress Report of the training in Yap by Mr.Luis Kakefuku

5. Closing Remarks by Ms. Emi Teshima, on behalf of JICA Micronesia Office

ATTACHMENT 2 List of Participants

Organization	Position	Name
Department of Resources and Development, FSM	Secretary	Hon. Marion Henry
Department of Resources and Development, FSM	Assistant Secretary	Mr. Hubert Yamada
Yap State Public Service Corporation	General Manager	Mr. Faustino R. Yangmog
Yap State Public Service Corporation	Engineering Manager	Mr. John Chieng
Chuuk Public Utility Corporation	CFO	Ms. Lei Shirai
Pohnpei Utilities Corporation	General Manager	Mr. Nixon T. Anson
Kosrae State Government	Lieutenant Governor	Mr. Arthy G. Nena
Kosrae Utilities Authority	General Manager	Mr. Fred Skilling
Kosrae Utilities Authority	Legal Counsel	Mr. Casey Freddy
JICA Micronesia Office	Project Formulation Advisor	Ms. Emi Teshima
JICA Micronesia Office	Program Officer	Ms. Trish-Farrah E. Billen
JICA	Chief Advisor	Mr. Tadayuki Ogawa
JICA / Okinawa Enetech Co., Inc	Team Leader	Mr. Luis Kakefuku
JICA / Okinawa Enetech Co., Inc	Short Team Expert	Mr. Hideyasu Hokama
JICA / Okinawa Enetech Co., Inc	Short Team Expert	Mr. Hiroyuki Nakachi

ATTACHMENT 3

PROJECT MONITORING SHEET

Project Title: The Project for Introduction of Hybrid Power Generation System in Pacific Island Countries

Version of the Sheet: Ver.3 (Feb. 2019 – Jan. 2020)

Project Term: March 2017 -June 2022

Name: Tadayuki OGAWA

Title: Chief Advisor

Submission Date: 24th January, 2020

I. Summary

1 Progress

1-1 Progress of Inputs

(1) Japanese side

1) JICA Expert Team has worked in July 2019 in Yap to conduct lectures and on-site trainings for RE grid integration and operation and maintenance of solar PV systems.
2) JICA Expert Team has worked in August 2019 in Chuuk to conduct lectures and on-site trainings for the operation and maintenance of Diesel Engine Generators (DEGs).
3) JICA Expert Team has worked in October 2019 in Pohnpei to conduct lectures and on-site trainings for RE grid integration and operation and maintenance of solar PV systems.
4) JICA Expert Team has worked in January 2020 in Yap to conduct lectures and on-site trainings for RE grid integration and operation and maintenance of solar PV systems.
5) Project Coordinator has visited each state for the preparation of project activities by JICA Expert Team in June and September 2019.

(2) FSM side

In total 32 number of core trainers are registered under the Project, 11 from YSPSC, 6 from CPUC, 8 from PUC and 7 from KUA staff. Facilities and equipment (e.g. training classrooms) for the trainings in FSM were provided by FSM side.

1-2 Progress of Activities

No.	Activity	Progress

ATTACHMENT 3

Output 1: 1. Appropriate and economical system for O&M of Diesel Generators (DGs) is enhanced.		
1-1	Operational conditions of the existing DGs are reviewed, including confirmation of objectively verifiable indicators for overall goal and project purpose.	The result of discussions and analysis for future training needs was compiled as "Training Needs Assessment Report" and submitted to all members in February 2018.
1-2	Specific fuel consumption of pilot DG units is measured.	Specific fuel consumption needs to be measured in PUC and KUA after installation of fuel flow meters procured under the project. The baseline figure for project evaluation shall be updated after measurement. Installation of fuel flow meters provided to PUC under the project has not been installed completely yet and specific fuel consumption for baseline figure for the project evaluation has not been reported.
1-3	Improvement plan for the operation of pilot DG units is prepared.	Improvement plan was prepared and shared with FSM side in the letter issued on 28th September 2018.
1-4	Existing spare parts and maintenance tools of pilot DG units are confirmed.	Existing spare parts and maintenance tools will be confirmed by July 2020.
1-5	Improvement plan for the operation of pilot DG units is implemented.	Improvement plan has been implemented by April 2019 under consultation with JICA Expert.
1-6	The result of implementation of the improvement plan is evaluated, and improvement plan is updated.	The result of implementation of the improvement plan has been evaluated, and improvement plan was updated in Dec 2019.
1-7	The concept of Economic Dispatch Control (EDC) is shared among operators and applied, if possible.	The basic concept of EDC has been explained by JICA Expert in August 2018. Necessary software has been shared with FSM side.
1-8	Necessary spare parts and maintenance tools for the pilot DG units are prepared.	JICA Expert team will finalize the lists upon visit to Kosrae by July 2020.
1-9	Maintenance work schedule for the pilot DG units is prepared.	JICA Expert team will finalize the lists upon visit to Kosrae by July 2020.
1-10	Check sheets and maintenance manuals for daily maintenance works for pilot DG units are prepared.	Pilot DG maintenance manual (OH) was delivered to each state by March, 2019. Check sheets was provided again in the training of August 2019.
1-11	Maintenance works (daily/partial inspection/overhaul work) for pilot DG units are conducted in accordance with the maintenance schedule.	Yet to be commenced.
1-12	The result of maintenance works is evaluated, and future maintenance work schedule together with budget (including sub-contract fee, cost for tools and equipment) is prepared.	Yet to be commenced.
1-13	Specific fuel consumption of the pilot DG units is measured before and after implementation of the related project activities.	Yet to be commenced.
1-14	Related training programs for appropriate	Two counterpart trainings in Japan have

ATTACHMENT 3

	O&M of DGs are implemented periodically.	completed. Regional training in Fiji is on-going.
1-15	Knowledge on appropriate O&M of DGs is disseminated among stakeholders.	Project Seminar was first held in Yap and planned in other States.
Output 2: Methodology for appropriate planning and O&M of renewable energy (RE) is established.		
2-1	Current situation and future development plan of RE is reviewed.	Same as activity 1-1
2-2	Planning manual for Hybrid Power Generation System is prepared.	First issue of the planning manual was delivered to each state by March, 2019.
2-3	Planning manual for Hybrid Power Generation System is reviewed and updated in the target area.	Each utility is expected to review and update the manual under the support by JICA Expert.
2-4	Operating conditions of the existing RE facilities are reviewed, including confirmation of objectively verifiable indicators for overall goal and project purpose.	Same as activity 1-1 Objectively verifiable indicators for overall goal was confirmed at the 1st JCC meeting in 2017.
2-5	O&M manual for RE facilities is prepared.	First issue of the O&M manual was delivered to each state by March, 2019.
2-6	Maintenance works are conducted according to O&M manual of RE facilities.	Each utility is expected to conduct maintenance works under the support by JICA Expert.
2-7	The result of maintenance works is evaluated, and future maintenance work schedule together with budget is prepared.	Yet to be commenced.
2-8	Training program for Hybrid Power Generation System including O&M of RE facilities is conducted.	Two counterpart trainings in Japan have completed. Regional training in Fiji is on-going.
2-9	Knowledge regarding Hybrid Power Generation System is disseminated among stakeholders.	Project Seminar was first held in Yap and planned in other States.

1-3 Achievement of Output

(1) Output 1

Technical advice for the improvement of O&M of DGs has been provided by JICA Experts based on the initial survey of current conditions conducted in 2017. Also, classroom lecture & hands-on training have been provided to ensure appropriate and economical O&M of DGs with draft manuals and check sheets. In addition, counterpart training has been conducted with site visits and hands-on trainings to learn the necessary O&M of DGs in Japan. From now on the contribution from FSM side should be enhanced to implement the improved O&M of DGs based on the learnings from the advice and trainings by JICA Experts. The progress of the updated improvement plan shall be recorded and shared with JICA Experts periodically to further support O&M activities in each state.

(2) Output 2

Technical advice for the appropriate planning and O&M of RE has been provided by JICA Experts based on the initial survey of current conditions conducted in 2017. Also, classroom lecture & hands-on training have been provided to ensure appropriate planning and O&M of RE with draft manuals and check sheets. In addition, counterpart training has been conducted with site visits and hands-on trainings to learn the methodology of planning and O&M of RE in Japan. From now on the contribution from FSM side should be enhanced to implement the improved planning and O&M of RE based on the learnings from the advice and trainings by JICA Experts.

"Planning manual for Hybrid Power Generation System" and "O&M manual for RE facilities" shall be utilized and updated in accordance with the current O&M practices by each utility. Also, the results of O&M works for all solar PV systems shall be recorded and shared with JICA Expert Team.

1-4 Achievement of the Project Purpose

(Indicator 1) Improvement of specific fuel consumption of pilot DG units

State	Baseline (2017)	Achievement (2019)
Yap	13.0 kWh/G (Deutz) 14.5 kWh/G (CAT 3516) 14.3 kWh/G (CAT C32)	14.5 kWh/G (0.261 l/kWh)
Chuuk	14.91 kWh/G (total average)	(Unit 1) 15.3 kWh/G (0.247 l/kWh) (Unit 2) 15.2 kWh/G (0.249 l/kWh) (Unit 4) 14.57 kWh/G (0.259 l/kWh) (Unit 5) 14.65 kWh/G (0.258 l/kWh) Avg: 14.93 Wh/G (0.253 l/kWh)
Pohnpei	13.4 kWh/G (total average)	Unit #4 16.3 kWh/G (0.232 l/kWh) Unit #5 14.3 kWh/G (0.264 l/kWh) Avg:15.3kWh/G (0.247 l/kWh)

Kosrae	13.6 kWh/G (total average)	14.5 kWh/G (0.261 l/kWh)

(Indicator 2) Improvement of performance ratio for RE power generation systems

State	Baseline (2017)	Achievement (2018)
Yap	66% (PEC)	68% (PEC)
Chuuk	72% (Airport) 71% (PEC)	72% (Airport) 71% (PEC)
Pohnpei	76% (COM) 78% (President's Office) 71% (PEC)	76% (COM) 78% (President's Office) 71% (PEC) 65% (UAE)
Kosrae	66% (PEC) 56% (EU)	68% (PEC/EU)

(Indicator 3) Proper application of planning and O&M method of HPGS

State	Planning Manual	O&M Manual
Yap	N/A	Check sheet has been used for outer islands PV systems.
Chuuk	N/A	Check sheet has been used for outer islands PV systems.
Pohnpei	N/A	N/A
Kosrae	N/A	N/A

1-5 Changes of Risks and Actions for Mitigation

N/A

1-6 Progress of Actions undertaken by JICA

N/A

1-7 Progress of Actions undertaken by the Parties

N/A

1-8 Progress of Environmental and Social Considerations (if applicable)

1-9 Progress of Considerations on Gender/ Peace Building/ Poverty Reduction (if applicable)

1-10 Other remarkable/ considerable issues related/ affect to the Project (such as other JICA's projects, activities of counterparts, other donors, private sectors, NGOs, etc.)

Installation of new DEGs has been completed in Kosrae in April 2019 under Grant Aid Project by Japanese Government. The overhaul maintenance works will be carried out with those pilot DEGs under the Project.

2 Delay of Work Schedule and/or Problems (if any)

2-1 Detail

2-2 Cause

2-3 Action to be taken

2-4 Roles of Responsible Persons/ Organization (JICA, the Parties, etc.)

3 Modification of the Project Implementation Plan

3-1 Plan of Operation

3-2 Other modifications on detailed implementation plan

4 Preparation of Government of FSM toward after completion of the Project

Government of FSM and each state utility will be further requested to utilize and update the related manuals and tools for the planning and O&M of Hybrid Power Generation System. Also, those core trainers who have participated in the training in FSM, Japan and Fiji need to continue on the OJT for other staff inside the organization to share the necessary skills and knowledge for the introduction of Hybrid Power Generation System.

II. Project Monitoring Sheet I & II as Attached

(Project Design Matrix and Plan of Operation)

Annex 1

Ver. 3, January. 2020

Draft Project Design Matrix (PDM)

Project Title: The Project for Introduction of Hybrid Power Generation System in Pacific Island Countries
Project Term: March 2017 – June 2022 (Five Years) (Phase 1: March 2017 – February 2019 , Phase 2: March 2019 – June 2022
Country: Federated States of Micronesia
Target Area: Pohnpei, Chuuk, Yap and Kosrae
Target Group: Related engineers and other technical staff in the target area (DRD, PUC, KUA, CPUC, YSPSC)
DRD: Department of Resources and Development PUC:Pohnpei Utilities Corporation KUA: Kosrae Utilities Authority YSPSC:Yap State Public Service Corporation CPUC:Chuuk Public Utility Corporation

Narrative Summary	Objectively Verifiable Indicators	Means of Verification	Important Assumptions
Overall Goal Energy security is improved and greenhouse gases are reduced through the reduction of fossil fuels consumption.	In comparison to the indicators at the time of baseline survey, 1. Reduced amount of CO2 emission of power utilities in the target area 2. Reduced amount of diesel fuel of power utilities in the target area 3. Increased capacity (kW) and actual generated energy (kWh) of renewable energy facilities of power utilities in the target area	1. to 3. Reports of C/P agencies	
Project Purpose Hybrid Power Generation System is introduced.	1. Improvement of specific fuel consumption of pilot DG units (better than the baseline data set at the beginning of the Project) 2. Improvement of performance ratio for the RE power generation systems (better than the baseline data set at the beginning of the Project in consideration of aging deterioration of PV module) 3. Proper application of planning and O&M method of Hybrid Power Generation System	1. Record on specific fuel consumption of Pilot DG units by C/P, checked by Japanese experts 2. Record on operation of RE power generation systems 3. Evaluation by Japanese experts and C/P on plans of Hybrid Power Generation System	C/P agencies continue commitment to the Project by continuing budget allocation as well as assignment of personnel for the post- Project activities.
Outputs 1. Appropriate and economical system for O&M of Diesel Generators (DGs) is enhanced.	<Output 1> 1-1 Adequacy on the use of the work schedule, check sheets and manual for the maintenance work for the pilot DG units 1-2 Number of training participants who are conducting operation and maintenance of DG based on the learnings from the training program (target:2 for each state)	1-1 Evaluation by Japanese experts and C/P on improvement of maintenance work (daily/partial inspection/overhaul work) for pilot DG units 1-2 Capacity assessment of trained O&M staff and managers by Japanese experts	C/P agencies promote investment on renewable energy facilities based on the current national policy/plan.

2. Methodology for appropriate planning and O&M of renewable energy (RE) is established.	<Output 2> 2-1 Number of training participants who have been certified under the Project for the planning method of the Hybrid Power Generation System (target: 1 for each state) 2-2 Number of training participants who are conducting O&M of RE facilities based on the learnings from the training program (target: 2 for each state) 2-3 Preparation of related manuals for Hybrid Power Generation System 2-4 Adequacy of the use of the related manuals for Hybrid Power Generation System	2-1 Capacity assessment of trained staff and managers by Japanese experts 2-2 Capacity assessment of trained O&M staff and managers by Japanese experts 2-3 Evaluation by Japanese Experts on related manuals for Hybrid Power Generation System prepared by C/P 2-4 Evaluation by Japanese experts and C/P on the use of the related manuals for Hybrid Power Generation System	
Activities <Output 1> 1-1 Operational conditions of the existing DGs are reviewed, including confirmation of objectively verifiable indicators for overall goal and project purpose. 1-2 Specific fuel consumption of pilot DG units is measured. 1-3 Improvement plan for the operation of pilot DG units is prepared. 1-4 Existing spare parts and maintenance tools of pilot DG units are confirmed. 1-5 Improvement plan for the operation of pilot DG units is implemented. 1-6 The result of implementation of the improvement plan is evaluated, and improvement plan is updated. 1-7 The concept of Economic Dispatch Control (EDC) is shared among operators and applied, if possible. 1-8 Necessary spare parts and maintenance tools for the pilot DG units are prepared. 1-9 Maintenance work schedule for the pilot DG units is prepared. 1-10 Check sheets and maintenance manuals for maintenance works for pilot DG units are prepared. 1-11 Maintenance works (daily/partial inspection/overhaul work) for pilot DG units are conducted in accordance with the maintenance schedule. 1-12 The result of maintenance works is evaluated, and future maintenance work schedule together with budget (including sub-contract fee, cost for tools and equipment) is prepared. 1-13 Specific fuel consumption of the pilot DG units is measured before and after implementation of the related project activities. 1-14 Related training programs for appropriate O&M system for DGs are implemented periodically. 1-15 Knowledge on appropriate O&M of DGs is disseminated among stakeholders. <Output 2> 2-1 Current situation and future development plan of RE is reviewed. 2-2 Planning manual for Hybrid Power Generation System is prepared. 2-3 Planning manual for Hybrid Power Generation System is reviewed and updated in the target area. 2-4 Operating conditions of the existing RE facilities are reviewed, including	**Inputs** **(Japanese side)** 1. Dispatch of the Japanese experts <JICA long term expert, stationed in Fiji > - Chief Advisor/Hybrid Power Generation System (Completed by March 2019) <JICA Consultant Team> -Team Leader/Operation & Maintenance of DG -Economic operation of DG (EDC) -Maintenance support of DG (Mechanical expert) -Maintenance support of DG (Electrical expert) -O&M of RE power generation system -Integration of RE power generation system -Project Coordinator 2. Training in Japan and Fiji 3. Equipment -In accordance with necessity of activities	**(FSM side)** 1. Assignment of C/Ps -Project Director (P/D) -Project Manager (P/M) -Engineers in charge of O&M (Manager level) - Mechanical Staff - Electrical Staff - Planning officer, and others 2. Facilities and equipment -Project office 3.Recurrent costs - C/Ps' wages and allowances - C/Ps' domestic travel expense in part	**Preconditions** Contents of the current relevant policies on promotion of renewable energy and energy efficiency are not largely changed.

confirmation of objectively verifiable indicators for overall goal and project purpose. 2-5 O&M manual for RE facilities is prepared. 2-6 Maintenance works are conducted according to O&M manual of RE facilities. 2-7 The result of maintenance works is evaluated, and future maintenance work schedule together with budget is prepared. 2-8 Training program for Hybrid Power Generation System including O&M of RE facilities is conducted 2-9 Knowledge regarding Hybrid Power Generation System is disseminated among stakeholders.			

Annex 5

Plan of Operation (PO)

Ver 1 January 2020

Project Title: The Project for Introduction of Hybrid Power Generation System in Pacific Island Countries
Project Term: March 2017 - June 2022 (Phase 1: March 2017 – February 2019 , Phase 2: March 2019 – June 2022
Country: Federated States of Micronesia
Target Area: Pohnpei, Chuuk, Yap and Kosrae
Target Group: Related engineers and other technical staff in the target area (DRD, PUC, KUA, CPUC, YSPSC)

	Output 1 Activities [Appropriate O&M System for DG]	Product	Org. in charge	
1-1.	Operational conditions of the existing DGs are reviewed, including confirmation of objectively verifiable indicators for overall goal and project purpose.	TNA Report	PUC, KUA, CPUC, YSPSC and JICA Experts	Plan Act
1-2.	Specific fuel consumption of pilot DG units is measured.	Measurement of Specific fuel consumption	PUC, KUA, CPUC, YSPSC and JICA Experts	Plan Act
1-3.	Improvement plan for the operation of pilot DG units is prepared.	Improvement plan	PUC, KUA, CPUC, YSPSC and JICA Experts	Plan Act
1-4.	Existing spare parts and maintenance tools of pilot DG units are confirmed.	List of spare parts and maintenance tools	PUC, KUA, CPUC, YSPSC and JICA Experts	Plan Act
1-5.	Improvement plan for the operation of pilot DG units is implemented.	Improvement Implementation Report	PUC, KUA, CPUC, YSPSC and JICA Experts	Plan Act
1-6.	The result of implementation of the improvement plan is evaluated, and improvement plan is updated.	Improvement Evaluation Report	PUC, KUA, CPUC, YSPSC and JICA Experts	Plan Act
1-7.	The concept of Economic Dispatch Control (EDC) is shared among operators and applied, if possible.	EDC software, manual, EDC sheet	PUC, KUA, CPUC, YSPSC and JICA Experts	Plan Act
1-8.	Necessary spare parts and maintenance tools for the pilot DG units are prepared.	List of spare parts and maintenance tools prepared	PUC, KUA, CPUC, YSPSC and JICA Experts	Plan Act
1-9.	Maintenance work schedule for the pilot DG units is prepared.	Maintenance work schedule	PUC, KUA, CPUC, YSPSC and JICA Experts	Plan Act
1-10.	Check sheets and maintenance manuals for daily maintenance works for pilot DG units are prepared.	Check sheets and maintenance manuals	PUC, KUA, CPUC, YSPSC and JICA Experts	Plan Act
1-11.	Maintenance works (daily/partial inspection/overhaul work) for pilot DG units are conducted in accordance with the maintenance schedule.	Maintenance record	PUC, KUA, CPUC, YSPSC and JICA Experts	Plan Act
1-12.	The result of maintenance works is evaluated, and future maintenance work schedule together with budget (including [illegible] cost for tools and equipment) is prepared.	Evaluation report and future schedule [illegible]	PUC, KUA, CPUC, YSPSC and JICA Experts	Plan Act
1-13.	Specific fuel consumption of the pilot DG units is measured before and after implementation of the related project activities	Measurement for specific consumption of the pilot DG	PUC, KUA, CPUC, YSPSC and JICA Experts	Plan Act
1-14.	Related training programs for appropriate O&M of DGs are implemented periodically.	Training record, recommendations, reports, etc.	DRD, PUC, KUA, CPUC, YSPSC and JICA Experts	Plan Act
1-15.	Knowledge on appropriate O&M of DGs is disseminated among stakeholders.	Seminar, workshop records	DRD, PUC, KUA, CPUC, YSPSC and JICA Experts	Plan Act
	Output 2 Activities			
2-1.	Current situation and future development plan of RE is reviewed.	TNA Report	PUC, KUA, CPUC, YSPSC and JICA Experts	Plan Act
2-2.	Planning manual for Hybrid Power Generation System is prepared	Planning manual for Hybrid Power Generation	PUC, KUA, CPUC, YSPSC and JICA Experts	Plan Act
2-3.	Planning manual for Hybrid Power Generation System is reviewed and updated in the target area.	Updated Planning manual for Hybrid Power Generation	PUC, KUA, CPUC, YSPSC and JICA Experts	Plan Act
2-4.	Operating conditions of the existing RE facilities are reviewed, including confirmation of objectively verifiable indicators for overall goal and project purpose.	TNA Report	PUC, KUA, CPUC, YSPSC and JICA Experts	Plan Act
2-5.	O&M manual for RE facilities is prepared.	O&M manual for RE facilities	PUC, KUA, CPUC, YSPSC and JICA Experts	Plan Act
2-6.	Maintenance works are conducted according to O&M manual of RE facilities.	Maintenance Record	PUC, KUA, CPUC, YSPSC and JICA Experts	Plan Act
2-7.	The result of maintenance works is evaluated, and future maintenance work schedule together with budget is prepared.	Evaluation report of maintenance work, and schedule	PUC, KUA, CPUC, YSPSC and JICA Experts	Plan Act
2-8.	Training program for Hybrid Power Generation System including O&M of RE facilities is conducted.	Training record, recommendations, reports, etc.	DRD, PUC, KUA, CPUC, YSPSC and JICA Experts	Plan Act
2-9.	Knowledge regarding Hybrid Power Generation System is disseminated among stakeholders.	Seminar, workshop records	DRD, PUC, KUA, CPUC, YSPSC	Plan Act
	△: JCC			
	▲: Training in Japan/Fiji			
	JICA long term expert, stationed in Fiji			
	JICA Consultant Team			

4.4 4th JCC Meeting

MINUTES OF MEETING

BETWEEN

THE AUTHORITIES CONCERNED OF

THE GOVERNMENT OF FEDERATED STATES OF MICRONESIA

AND

JAPAN INTERNATIONAL COOPERATION AGENCY

FOR

THE FOURTH JOINT COORDINATION COMMITTEE (JCC)

ON

THE PROJECT FOR INTRODUCTION OF HYBRID POWER GENERATION SYSTEM IN PACIFIC ISLAND COUNTRIES

Japan International Cooperation Agency (hereinafter referred to as "JICA") and the authorities concerned of the Federated States of Micronesia (hereinafter referred to as "the FSM side") established a Joint Coordination Committee (hereinafter referred to as "JCC") for the effective and successful implementation of the Project for Introduction of Hybrid Power Generation System in Pacific Island Countries (hereinafter referred to as "the Project").

The fourth JCC on the Project was held on 26th October 2021, through the on-line arrangement connecting stakeholders of FSM and JICA side. The meeting was chaired by Ms. Elina Akinaga, Secretary, Department of Resources and Development.

The both parties acknowledge and agree that the signing of this Minutes of Meeting may be executed by electronic signature, which is considered as an original signature, and therefore has the same force and effect as an original signature. "Electronic signature" includes faxed versions of an original signature or electronically scanned and transmitted versions (e.g., via pdf) of an original signature.

As a result of the discussion on the fourth JCC, JICA and the FSM side agreed on the main points as described in the Annex attached hereto.

Pohnpei, 5th November, 2021

小川 忠之

Ogawa Tadayuki
Chief Advisor
JICA Senior Advisor

Elina Akinaga
Secretary
Department of Resources and Development
The Federated States of Micronesia

K. Muraoka

Muraoka Keiichi
Resident Representative
JICA Micronesia Office

ANNEX

The FSM side and JICA (hereinafter referred to as "both sides") discussed on the issues including the contents of (i)Project Design Matrix (PDM), (ii)Plan of Operation (PO), and (iii)Project Monitoring Sheet, based on the Agenda attached hereto.

The both sides confirmed the main points as described below.

1. Extension of Project Period

It was recommended by JICA Expert to conduct supplementary trainings and meetings at site, in addition to on-line supports, since hands-on trainings at site have been postponed due to COVID-19 pandemic since March 2020. Even though JICA Expert team has been trying to implement on-line support to complete the project activities, some activities related to the training for maintenance of DEG and solar PV system require face-to-face instructions at site in FSM.

The both Parties agreed to process the required procedures for the extension of the Project period by one year, up to June 2023.

2. Confirmation of PDM, PO and Project Monitoring Sheet for project evaluation

Since the Project progressed, the Objectively Verifiable Indicator (OVI) has been identified. Both sides confirmed the latest version of PDM and PO as attachment 4 and 5. Also, the project monitoring sheet was agreed as attachment 3.

3. Project Organization

The both sides confirmed the update of the Project Counterpart Team and assignment of the officials as described below. Those counterparts are core trainers in each task, and expected to disseminate technical knowledge and skills among other members in the organization periodically during the Project.

The FSM side agreed to make the effort to remain the members as core trainers by 2023.

- Project Counterparts (Core Trainers)

"☆" means prioritized counterparts

(1) Yap State: YSPSC

1) Operation and Maintenance of Diesel Engine Generators
Alphonsus Ruwema, Power Plant Manager
Casmiro Yithmeng, Chief Mechanic
☆Chris Igem, Electrician (Electrical)
Roscoe Tamag, Chief Operator
☆Rowino Yarofaliut, Power Plant Mechanic (Mechanical)

2) Plan for introduction of hybrid power generation systems
☆John A. Chieng, Engineering Manager

3) Operation and Maintenance of Renewable Energy generation system

Chaem Charles Laman, Technician, Engineering Division
Steven Ken, Technician, Engineering Division
☆Choay Jacob (Jake), Technician, PV operator

(2) Chuuk State; CPUC

1) Operation and Maintenance of Diesel Engine Generators
Dennis Triana, Head of power generation and maintenance
Jimmy Reyes, Lead Mechanic

2) Plan for introduction of hybrid power generation systems
Dennis Triana, Head of power generation and maintenance
Albert Francis, Head of power distribution
Chris Killion, RE Technician
Limus Setik, RE Technician

3) Operation and Maintenance of Renewable Energy generation system
Dennis Triana, Head of power generation and maintenance
Chris Killion, RE Technician
Limus Setik, RE Technician

(3) Pohnpei State; PUC

1) Operation and Maintenance of Diesel Engine Generators
☆Winfred Yamada, Manager, Diesel Plant
☆Elpert Elias, Mechanic
☆Dackson Solomon, Manager, Power Generation
Erickson Semens, Mechanics
Nixon Helgenberger, Electrician

2) Plan for introduction of hybrid power generation systems
Selestino Santiago, Senior Electrician
Richard Lohn, Electrician

3) Operation and Maintenance of Renewable Energy generation system
☆Sidney Kilmete, Manager, Renewable Energy
Julian Pelep, Solar Technician

(4) Kosrae State; KUA

1) Operation and Maintenance of Diesel Engine Generators
☆Robert Taualupe, Operations Manager (Electrical)
☆Ronald Albert, Supervisor of Operator (Mechanical)
Tedrick Joseph (Mechanic)

2) Plan for introduction of hybrid power generation systems
Gerardo Protacio, Electrical Engineer
Robert Taualupe, Operations Manager
Casey Freddy, Customer Service Supervisor

3) Operation and Maintenance of Renewable Energy generation system

☆Robert Taualupe, Operations Manager
☆Gifford Sigrah, Distribution Foreman
Ronnie George, Lineman-2

4. Continued Revision & Update of Manuals

The FSM side has been working to revise and update following manuals by July 2022, under supervision by JICA Expert.

1) Planning manual for Hybrid Power Generation System
2) Operation & Maintenance Manual for Solar PV System
3) Maintenance Manual for DEGs

It is very important that these manuals are continuously utilized and revised as necessary. Therefore, the project counterpart members are requested to share the information and/or conduct training for other staff to apply these manuals in their daily works. The FSM side confirmed the application of manuals in following occasions;

1) Planning hybrid power generation system by development partners
2) Actual O&M works for solar PV system
3) Actual O&M works for DEGs

5. Supervision for DEG overhaul works

The both sides confirmed the supervision of the DEG overhaul work shall be carried out on DEG unit 9 or 10 in Kosrae from June 2022. In order to coordinate with related project activities in other countries, the FSM side is requested to keep updating the latest overhaul schedule with the JICA Expert at least two months before conducting the overhaul works. MOU shall be concluded between KUA and JICA to confirm the scope of works by JICA Expert.

ATTACHMENT 1 Agenda for JCC Meeting
ATTACHMENT 2 Lists of Participants
ATTACHMENT 3 Project Monitoring Sheet ver. 5
ATTACHMENT 4 Project Design Matrix ver. 4
ATTACHMENT 5 Plan of Operation ver. 6.2

4.5 5th JCC Meeting

MINUTES OF MEETING
BETWEEN
THE AUTHORITIES CONCERNED OF
THE GOVERNMENT OF FEDERATED STATES OF MICRONESIA
AND
JAPAN INTERNATIONAL COOPERATION AGENCY
FOR
THE FIFTH JOINT COORDINATION COMMITTEE (JCC)
ON
THE PROJECT FOR INTRODUCTION OF HYBRID POWER GENERATION SYSTEM IN PACIFIC ISLAND COUNTRIES

Japan International Cooperation Agency (hereinafter referred to as "JICA") and the authorities concerned of the Federated States of Micronesia (hereinafter referred to as "the FSM side") established a Joint Coordination Committee (hereinafter referred to as "JCC") for the effective and successful implementation of the Project for Introduction of Hybrid Power Generation System in Pacific Island Countries (hereinafter referred to as "the Project").

The fifth JCC on the Project was held on 7th April 2023, through the on-line arrangement connecting stakeholders of FSM and JICA side. The meeting was chaired by Mr. Faustino Yarofaisug, Assistant Secretary, Department of Resources and Development.

The both parties acknowledge and agree that the signing of this Minutes of Meeting may be executed by electronic signature, which is considered as an original signature, and therefore has the same force and effect as an original signature. "Electronic signature" includes faxed versions of an original signature or electronically scanned and transmitted versions (e.g., via pdf) of an original signature.

As a result of the discussion on the fifth JCC, JICA and the FSM side agreed on the main points as described in the Annex attached hereto.

Pohnpei, 7th April, 2023

FJ

小川 忠之

Ogawa Tadayuki
Chief Advisor
JICA Senior Advisor

Florian J. Yatilman
Acting Secretary
Department of Resources and Development
The Federated States of Micronesia

Muraoka Keiichi
Resident Representative
JICA Micronesia Office

ANNEX

The FSM side and JICA (hereinafter referred to as "both sides") discussed on the issues including the contents of (i)Project Design Matrix (PDM), (ii)Plan of Operation (PO), and (iii)Project Monitoring Sheet, based on the Agenda attached hereto.

The both sides confirmed the main points as described below.

1. Confirmation of PDM, PO and Project Monitoring Sheet for project evaluation

   Since the Project progressed, the Objectively Verifiable Indicator (OVI) has been identified. Both sides confirmed the latest version of PDM and PO as attachment 4 and 5. Also, the project monitoring sheet was agreed as attachment 3.

2. Project Organization

   The both sides confirmed the update of the Project Counterpart Team and assignment of the officials as described below. Those counterparts are core trainers in each task, and expected to disseminate technical knowledge and skills among other members in the organization periodically during the Project.

   The FSM side agreed to make the effort to remain the members as core trainers by 2023.

   - Project Counterparts (Core Trainers)

   "☆" means prioritized counterparts

   <u>(1) Yap State; YSPSC</u>

   1) Operation and Maintenance of Diesel Engine Generators
      Casmiro Yithmeng, Chief Mechanic
      ☆Chris Igem, Power Plant Manager (Electrical)
      Roscoe Tamag, Chief Operator
      ☆Rowino Yarofaliut, Power Plant Mechanic(Mechanical)

   2) Plan for introduction of hybrid power generation systems
      ☆John A. Chieng, Engineering Manager

   3) Operation and Maintenance of Renewable Energy generation system
      Chaem Charles Laman, Technician, Engineering Division
      ☆Choay Jacob (Jake), Technician, PV operator

   <u>(2) Chuuk State; CPUC</u>

   1) Operation and Maintenance of Diesel Engine Generators
      Dennis Triana, Head of power generation and maintenance
      Jimmy Reyes, Lead Mechanic
   2) Plan for introduction of hybrid power generation systems
      Dennis Triana, Head of power generation and maintenance
      Albert Francis, Head of power distribution
      Chris Killion, RE Technician

Limus Setik, RE Technician

3) Operation and Maintenance of Renewable Energy generation system
Dennis Triana, Head of power generation and maintenance
Chris Killion, RE Technician
Limus Setik, RE Technician

(3) Pohnpei State; PUC

1) Operation and Maintenance of Diesel Engine Generators
☆Elpert Elias, Mechanic
☆Dackson Solomon, Manager, Power Generation
Erickson Semens, Mechanics
Nixon Helgenberger, Electrician

2) Plan for introduction of hybrid power generation systems
Selestino Santiago, Senior Electrician
Richard Lohn, Electrician

3) Operation and Maintenance of Renewable Energy generation system
☆Sidney Kilmete, Manager, Renewable Energy
Julian Pelep, Solar Technician

(4) Kosrae State; KUA

1) Operation and Maintenance of Diesel Engine Generators
☆Robert Taualupe, Operations Manager (Electrical)
☆Ronald Albert, Supervisor of Operator (Mechanical)
Tedrick Joseph (Mechanic)

2) Plan for introduction of hybrid power generation systems
Gerardo Protacio, Electrical Engineer
Robert Taualupe, Operations Manager
Casey Freddy, Assistant General Manager

3) Operation and Maintenance of Renewable Energy generation system
☆Robert Taualupe, Operations Manager
☆Gifford Sigrah, Distribution Foreman
Ronnie George, Lineman-2

3. Continued Revision & Update of Manuals

The FSM side has been working to revise and update following manuals by April 2023, under supervision by JICA Expert.

1) Planning manual for Hybrid Power Generation System
2) Operation & Maintenance Manual for Solar PV System
3) Maintenance Manual for DGs

It is very important that these manuals are continuously utilized and revised as necessary. Therefore, the project counterpart members are requested to share

the information and/or conduct training for other staff to apply these manuals in their daily works. The FSM side confirmed the application of manuals in following occasions;

1) Verify the plan for hybrid power generation system by development partners
   Homer software has been applied for the ADB Phase-1 Project.
2) Actual O&M works for solar PV system
   O&M Manuals and check sheets have been used for several PV systems in capital and remote islands.
3) Actual O&M works for DGs
   O&M Manuals and check sheets have been used for daily and periodical maintenance works for DGs.

4. Improvement Plan for the Operation of Pilot DG Units

The FSM side agreed to implement following measures to improve the operation conditions of pilot DG units. The result of implementation of the improvement plan will be confirmed with JICA Expert teams by the end of the Project.

(PUC)

(1) Reparing fault fuel meters and monthly measurement of SFC.
(2) Periodical patrol checklist for preventive maintenance should be enforced. It is recommended to utilize the check sheet to perform the preventive maintenance works systematically without asking the detailed instructions from the generation manager. Also, it is advised to prepare reports of the work done and keep it to use as reference in case of sudden trouble.

(CPUC)

(1) Keep record of troubles and fixing equipment in accordance with the records in the power plant.
(2) Introduce spare parts account record book.

(KUA)

(1) Periodical generator cleaning to prevent insulation faults.
(2) Cable pit opening curing in the old PS.

(YSPSC)

(1) Inspection of overhead crane.
(2) Record monthly measurement of SFC.

5. Training Equipment

Following equipment has been handed over to FSM side under the Project.

JICA has provided below equipment to improve the operation & maintenance works in DEG and RE.

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List of equipment provided to FSM

No	Equipment Name	Model No.	PUC	CPUC	KUA	YSPSC
1	Fuel flow meter	BRC20-2-P4	10	-	4	-
2	Pyranometer & thermometer	SPST-A-F2	1	1	1	1
3	StringTracer(I -V curve tracer)	SPST-A2A-Y1	1	1	1	1
4	Cell Line Checker (Fault module detector)	SPLC-A-Y1	1	1	1	1
5	Fan Unit (For Power Conditioner)	P83B FANUNIT FM4	3	-	-	-
6	HOMER PRO (Permanent license with Hydro module)	—	1	1	1	1
7	Insulation Tester	IR4053-11	1	1	1	1
8	Battery HiTester	BT3554	1	1	1	1
9	Clamp on AC/DC HiTester	3285	1	1	1	1
10	Radiation thermometer	FT3701	1	1	1	1
11	Battery hydrometer	-	1	1	1	1
12	Vibration measuring instrument	TA415EB	1	1	1	1
13	Thermographic Camera	TiS55	1	1	1	1
14	Digital Multimeter	DT4254	1	1	1	1
15	Mower	MEM428	1	1	-	1
16	High pressure washer	JCE-1408UDX	1	1	-	1
17	Digital Pressure Calibrator	DPI800S	-	-	1	-
18	Digital thermometer	TX1001	-	-	1	-
19	Instrumentation signal measurement / generator	CA150	-	-	1	-
20	Ohm meter	MY600	-	-	1	-
21	Air compressor kit	PV 211	-	-	1	-
22	Air hose	1m×2 / 1.5m×1	-	-	1	-
23	Various types of fittings	—	-	-	1	-

It is required for the FSM side to keep and utilize above equipment in an appropriate manner. In case of missing / malfunction of equipment, the FSM side is requested to inform JICA Expert teams immediately.

6. 2nd phase regional technical cooperation project

JICA is going to launch the 2nd phase regional technical cooperation project covering Palau, FSM, Tuvalu, Samoa and Fiji in 2023. The project will focus Yap in FSM and support other states through on-line arrangements for continued activities.

ATTACHMENT 1 Agenda for JCC Meeting
ATTACHMENT 2 Lists of Participants
ATTACHMENT 3 Project Monitoring Sheet ver. 5
ATTACHMENT 4 Project Design Matrix ver. 4
ATTACHMENT 5 Plan of Operation ver. 6.2

ATTACHMENT 1

Agenda for JCC Meeting

1. Opening Remarks by Mr. Faustino Yarofaisug, Assistant Secretary, Department of Resources and Development

2. Explanation and confirmation on the following documents;
   (1) Project Design Matrix (PDM)
   (2) Plan of Operation (PO)
   (3) Project Monitoring Sheet

3. Confirmation on the Minutes of Meeting (M/M)

4. Progress of Activities

5. Closing Remarks by Mr. Muraoka Keiichi, Resident Representative, JICA Micronesia Office

ATTACHMENT 2 List of Participants

Organization	Position	Name
Department of Resources and Development	Assistant Secretary	Mr. Faustino Yarofaisug
Yap State Public Service Corporation	General Manager	Mr. Faustino R. Yangmog
Chuuk Public Utility Corporation	Chief Financial Officer	Ms. Lei Shirai
Pohnpei Utilities Corporation	Chief of Planning and Engineering Services	Mr. Alex Nanpei
Kosrae Utilities Authority	General Manager	Mr. Fred Skilling
Kosrae Utilities Authority	Assistant General Manager	Mr. Casey Freddy
Kosrae Utilities Authority	Customer Service Supervisor	Mr. Hairom Livaie
JICA Micronesia Office	Resident Representative	Mr. Muraoka Keiichi
JICA	Chief Advisor	Mr. Ogawa Tadayuki
JICA	JICA Expert	Mr. Luis Kakefuku
JICA	JICA Expert	Mr. Shimabuku Masanori
JICA	JICA Expert	Mr. Hokama Hideyasu
JICA	JICA Expert	Mr. Nakamura Hirokazu
JICA	JICA Expert	Mr. Watanabe Takahisa

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ATTACHMENT 3

To RR of JICA Micronesia Office

PROJECT MONITORING SHEET

Project Title: The Project for Introduction of Hybrid Power Generation System in Pacific Island Countries
Version of the Sheet: Ver.6 (Nov. 2021 – Feb. 2023)
Project Term: March 2017 -June 2023

Name: Ms. Elina Akinaga
Title: Project Director
Name: Tadayuki OGAWA
Title: Chief Advisor
Submission Date: 7th April, 2023

I. Summary

1 Progress

1-1 Progress of Inputs

(1) Japanese side

1) Since March 2019, Chief Advisor has been based in Japan and assists JICA expert team & FSM counterparts to continuously upgrade skills and knowledge mainly through on-line support.
2) Due to the spread of COVID-19, JICA expert team has been working for on-line remote trainings since June 2020. Since November 2021, a total of eleven (11) remote sessions were held for O&M of Diesel Engine Generator (DG) and another fourteen (14) sessions were conducted for grid integration of RE, O&M of PV facilities, in these sessions follow-up of revising RE manuals also were held. (Pohnpei: DG/3, RE/4 Chuuk: DG/2, RE/3, Kosrae: DG/3, RE/4, Yap: DG/3, RE/3)
In January 2023 JICA Experts Team has started the DG and RE hands-on training on site and it is planned hold in March the last DG training in Chuuk and RE training in Kosrae .

(2) FSM side

In total 31 number of core trainers are registered under the Project, 10 from YSPSC, 5 from CPUC, 9 from PUC and 7 from KUA staff. Facilities and equipment (e.g., training classrooms) for the trainings in FSM were provided by FSM state side. For the on-line

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support sessions 306 trainers (cumulative total) joined by the end of December of 2022. (131 numbers for DG and175 for RE)

1-2 Progress of Activities

No.	Activity	Progress
Output 1: 1. Appropriate and economical system for O&M of Diesel Generators (DGs) is enhanced.		
1-1	Operational conditions of the existing DGs are reviewed, including confirmation of objectively verifiable indicators for overall goal and project purpose.	The result of discussions and analysis for future training needs was compiled as "Training Needs Assessment Report" and submitted to all members in February 2018.
1-2	Specific fuel consumption of pilot DG units is measured.	KUA (January2023) Fuel flow meters provided under the project has been installed and recent measurement result of SFC in February was: Unit #9: 0.278 l/kWh Unit #10: 0.294 l/kWh PUC (January2023) PUC installed fuel flow meters provided under the project, but some of them needs reparation due to wearing of internal parts. Last measurement in January was as follow: Unit #1: 0.288 l/kWh Unit #2: 0.244 l/kWh Unit #5: 0.266 l/kWh PUC should repair the meters as soon as possible to update the baseline for evaluation. CPUC (June 2022) Unit #1: 0.243 l/kWh Unit #2: 0.243 l/kWh YSPSC (August 2022) Unit #1: 0.269 l/kWh Unit #2: 0.281 l/kWh Unit #3: 0.299 l/kWh
1-3	Improvement plan for the operation of pilot DG units is prepared.	Improvement plan was prepared and shared with FSM side in the letter issued on 28th September 2018.
1-4	Existing spare parts and maintenance tools of pilot DG units are confirmed.	Existing spare parts and maintenance tools were confirmed in July 2020.
1-5	Improvement plan for the operation of pilot DG units is implemented.	Improvement plan has been implemented by April 2019 under consultation with JICA Expert.
1-6	The result of implementation of the improvement plan is evaluated, and improvement plan is updated.	PUC: JICA expert advice 16 tasks, and in January the result shows 4 completed, 3 on going, 4 became unnecessary, 1not possible to do due to shortage in budget, and 4 PUC will share information.

ATTACHMENT 3

		CPUC: JICA expert advice 13 tasks, the report of last June was, 11 completed, 2 on going. KUA: JICA expert advice 20 tasks, the report of last June was, 12 completed, 2 not implemented yet, 2 on going, 2 became not necessary and 2 KUA will share information. YSPSC: JICA expert advice 21 tasks, the report of last June was, 17 completed, 3 not implemented yet and 1 to check.
1-7	The concept of Economic Dispatch Control (EDC) is shared among operators and applied, if possible.	The basic concept of EDC has been explained by JICA Expert in August 2018. Necessary software has been shared with FSM side.
1-8	Necessary spare parts and maintenance tools for the pilot DG units are prepared.	Necessary spare parts and maintenance tools was re-confirmed by August 2021.
1-9	Maintenance work schedule for the pilot DG units is prepared.	Maintenance work schedule for the pilot DG units was prepared by September 2021.
1-10	Check sheets and maintenance manuals for daily maintenance works for pilot DG units are prepared.	Pilot DG maintenance manual (OH) was delivered to each state by March 2019. Check sheets was provided again in the training of August 2019. The manual revision has started in June 2020, updating the contents according to FSM standards. Update completion was set by April. KUA update completed.
1-11	Maintenance works (daily/partial inspection/overhaul work) for pilot DG units are conducted in accordance with the maintenance schedule.	Maintenance works for pilot DG units are conducted in accordance with the maintenance schedule. OH work in units No. 9 and No. 10 at KUA is planned for April.
1-12	The result of maintenance works is evaluated, and future maintenance work schedule together with budgets prepared.	Yet to be commenced. Gathering of sub-contract fee, cost for tools and equipment information.
1-13	Specific fuel consumption of the pilot DG units is measured before and after implementation of the related project activities.	Kosrae OH work is planned for April. Indication for measurement of SFC before and after OH was done.
1-14	Related training programs for appropriate O&M of DGs are implemented periodically.	From November 2021 to February 2023, eleven (11) on-line training was carried out with 131 cumulative total participants.
1-15	Knowledge on appropriate O&M of DGs is disseminated among stakeholders.	Project Seminar was first held in Yap in 2019. Last online seminar schedule for FSM is in study.
Output 2: Methodology for appropriate planning and O&M of renewable energy (RE) is established.		
2-1	Current situation and future development plan of RE is reviewed.	Same as activity 1-1
2-2	Planning manual for Hybrid Power	First issue of the planning manual was

	Generation System is prepared.	delivered to each state by March, 2019.
2-3	Planning manual for Hybrid Power Generation System is reviewed and updated in the target area.	Each utility is expected to review and update the manual under the support by JICA Expert. Updating is going on according to FSM standards and it was planned to finish in December 2022.
2-4	Operating conditions of the existing RE facilities are reviewed, including confirmation of objectively verifiable indicators for overall goal and project purpose.	Same as activity 1-1 Objectively verifiable indicators for overall goal were confirmed at the 1st JCC meeting in 2017. Last Performance ratio of each state is as follow: PUC President Office: PCS fault PEC fund: 31.7% (April 2022) COM: 33.2% (July 2022) CPUC PEC fund:52.5% (Dec2022) Airport: 44.9% (Dec2022) World Bank:75.6% (Dec2022) KUA EU fund: 58.2% (Oct 2022) PEC fund: 50% (Dec 2022) YSPSC PEC fund:38.8% (Aug 2022)
2-5	O&M manual for RE facilities is prepared.	First issue of the O&M manual was delivered to each state by March 2019. Update completion was set by April. Only Pohnpei has finished the update, other 3 states will be checked in March trip.
2-6	Maintenance works are conducted according to O&M manual of RE facilities.	Each utility is expected to conduct maintenance works under the support by JICA Expert. The O&M manual update was scheduled to be completed in December 2022. Only Pohnpei has completed, the other 3 states' manuals will be reviewed during the March visit.
2-7	The result of maintenance works is evaluated, and future maintenance work schedule together with budget is prepared.	Future maintenance plan with budget is in preparation in all states.
2-8	Training program for Hybrid Power Generation System including O&M of RE facilities is conducted.	From November 2021 to February 2023, fourteen (14) on-line training including manuals follow-up was carried out with 175 cumulative total participants.
2-9	Knowledge regarding Hybrid Power Generation System is disseminated among stakeholders.	Same as activity 1-15

(Remarks) Yellow-highlighted activities have already been completed.

1-3 Achievement of Output

(1) Output 1

Technical advice for the improvement of O&M of DGs has been provided by JICA Experts based on the initial survey of current conditions conducted in 2017. Also, classroom lecture, hands-on training and online trainings have been provided to ensure appropriate and economical O&M of DGs with draft manuals and check sheets. In addition, counterpart training has been conducted with site visits and hands-on trainings to learn the necessary O&M of DGs in Japan. Since June 2020, on-line support by JICA Experts has been carried out to monitor the progress of related activities.

From now on further commitment to the Project is expected by FSM counterparts to implement the improved O&M of DGs based on the learnings from the advice and trainings by JICA Experts. The progress of the updated improvement plan shall be recorded and shared with JICA experts periodically to further support O&M activities in each state.

(2) Output 2

Technical advice for the appropriate planning and O&M of RE has been provided by JICA Experts based on the initial survey of current conditions conducted in 2017. Also, classroom lecture, hands-on trainings and online trainings have been provided to ensure appropriate planning and O&M of RE with draft manuals and check sheets. In addition, counterpart training has been conducted with site visits and hands-on trainings to learn the methodology of planning and O&M of RE in Japan. Since June 2020, on-line support by JICA Experts has been carried out to monitor the progress of related activities.

From now on further commitment to the Project is expected by FSM counterparts to implement the improved O&M of RE facilities based on the learnings from the advice and trainings by JICA Experts.

"Planning manual for Hybrid Power Generation System" and "O&M manual for RE facilities" shall be utilized and updated in accordance with the current O&M practices by each utility. Also, the results of O&M work for all solar PV systems shall be recorded and shared with JICA Expert Team. Therefore, further contribution from FSM side should be expected to implement the improved planning and O&M of RE based on the learnings from the advice and trainings by JICA Expert Team.

1-4 Achievement of the Project Purpose

(Indicator 1) Improvement of specific fuel consumption of pilot DG units

State	Baseline (2017)	Achievement (2020)
Yap	14.5 kWh/G (CAT 3516) 14.3 kWh/G (CAT C32)	13.39 kWh/G (0.283 l/kWh) Unit #1: 14.07 kWh/G (0.269 l/kWh) Unit #2: 13.47 kWh/G (0.281 l/kWh) Unit #3: 12.65 kWh/G (0.299 l/kWh)
Chuuk	14.91 kWh/G (total average)	15.57 kWh/G (0.243 l/kWh) Unit #1: 15.57 kWh/G (0.243 l/kWh) Unit #2: 15.57 kWh/G (0.243 l/kWh)
Pohnpei 2020N/A	13.4 kWh/G (total average)	14.29 kWh/G (0.266 l/kWh) Unit #1: 13.14 kWh/G (0.288 l/kWh) Unit #2: 15.51 kWh/G (0.244 l/kWh) Unit #5: 14.23 kWh/G (0.266 l/kWh)
Kosrae	13.6 kWh/G (total average)	13.24 kWh/G (0.286 l/kWh) Unit #9: 13.61 kWh/G (0.278 l/kWh) Unit #10: 12.87 kWh/G (0.294 l/kWh)

(Observation of Results)

YSPSC: The SFC of the units #2 and #3 are below than the baseline. The cause of this could be the influence of the operation condition under RE fluctuation or the necessity of the OH due to the operation hours.

CPUC: Good performance of DGs due to recent OH .

PUC: Need reparation of flow meters of the unit #3 and #5. The SFC average is good. PUC should continue the measurement every month and share results.

KUA: SFC measurement should be done before and after the top OH works planned in next April.

(Indicator 2) Improvement of performance ratio for RE power generation systems

State	Baseline (2017)	Achievement (2021～2022)
Yap	66% (PEC)	38.8% (PEC) (August)
Chuuk	72% (Airport) 71% (PEC)	44.9% (Airport) 52.5% (PEC) (December values)
Pohnpei	76% (COM) 78% (President's Office) 71% (PEC)	33.2% (COM) Fault (President's Office) 31.7% (PEC) (July values)
Kosrae	66% (PEC) 56% (EU)	66.92% (PEC) 56.67% (EU) (2020 December value)

Deterioration of performance indicators are observed in Yap, Chuuk and Pohnpei. Possible causes for the decline in the PR values are as follow.

Yap: Last June, rainwater has leaked into the power cable pit, and the 95mm^2 cable needs to be replaced. The main reason for this fault would be improper installation works. YSPSC is waiting for the cables to arrive.

Chuuk: Airport PV requires replacement of the faults power conditioner. CPUC is studying which PCS manufacturer is the best to install. For PEC fund PV needs to monitor this year's values to know if there are any problems. (Before month value was 60.9%)

Pohnpei: COM PV has many problems after rain. According to the survey by JICA Experts in January, the power cable is damaged, 2 combiner boxes have been burned probably due to moisture inside combiner boxes , and 2 strings are not working. PEC fund PV system stopped since last April and repaired last January. PUC will share PR values of February. President's office PV is now in repair process with the assistance of JICA.

All utilities are encouraged to record and monitor this indicator on a monthly basis and to investigate the cause of any reduction in PV system output.

(Indicator 3) Proper application of planning and O&M method of HPGS

State	Planning Manual	O&M Manual
Yap	Homer software has been applied for the ADB Phase-1 Project.	Check sheet has been used for both capital & outer islands PV systems.
Chuuk	Planning Manuals has created, but we still have some additional manuals to submit to JICA expert team for the checking/review and to finalize the manual.	O&M manuals for PV system have been applied to all grids connect solar system in Weno. The Off-Grid/ Stand-alone solar system in the lagoon and outer Islands are still using the old inspection check list sheet.
Pohnpei	Check sheets, reporting format has been applied. Integration manual update already completed.	O&M manual for PV system have been applied for PEC, JICA & UAE projects.
Kosrae	RE integration manual update already almost completed.	O&M manual update for RE already completed.

1-5 Changes of Risks and Actions for Mitigation

N/A

1-6 Progress of Actions undertaken by JICA

N/A

1-7 Progress of Actions undertaken by the Parties

N/A

1-8 Progress of Environmental and Social Considerations (if applicable)

1-9 Progress of Considerations on Gender/ Peace Building/ Poverty Reduction (if applicable)

1-10 Other remarkable/ considerable issues related/ affect to the Project (such as other JICA's projects, activities of counterparts, other donors, private sectors, NGOs, etc.)

2 Delay of Work Schedule and/or Problems (if any)

2-1 Detail

Although online support activities have been undertaken and no obvious delay was expected, certain activities such as the revision of manuals for diesel operation and maintenance are at a standstill. Despite having a busy work in the power station, the JICA experts recommend a more active participation in the project activities to obtain better efficiency in the operation of the hybrid power generation.

2-2 Cause

The issue was caused by the global COVID-19 pandemic and related international border restrictions.

2-3 Action to be taken.

Both parties should focus on the tasks to be accomplished during the rest of the project period.

2-4 Roles of Responsible Persons/ Organization (JICA, the Parties, etc.)

Record of Discussions (R/D) has been amended to officially agree on the extension of the project period. The R/D has been signed by Department of Resources and Development, Department of Foreign Affairs, and JICA Micronesia Office.

3 Modification of the Project Implementation Plan

3-1 Plan of Operation

Plan of Operation (PO) has also been amended to indicate the extension of project period by one year.

3-2 Other modifications on detailed implementation plan

4 Preparation of Government of FSM toward after completion of the Project

Government of FSM and each state utility will be further requested to utilize and update the related manuals and tools for the planning and O&M of Hybrid Power Generation System. Also, those core trainers who have participated in the training in FSM, Japan and Fiji need to continue on the OJT for other staff inside the organization to share the necessary skills and knowledge for the introduction of Hybrid Power Generation System.

II. **Project Monitoring Sheet I & II as Attached**

(Project Design Matrix and Plan of Operation)

Annex 1

Ver. 4, October. 2021

Draft Project Design Matrix (PDM)

Project Title: The Project for Introduction of Hybrid Power Generation System in Pacific Island Countries
Project Term: March 2017 – June 2023 (Six Years) (Phase 1: March 2017 – February 2019 , Phase 2: March 2019 – June 2023
Country: Federated States of Micronesia
Target Area: Pohnpei, Chuuk, Yap and Kosrae
Target Group: Related engineers and other technical staff in the target area (DRD, PUC, KUA, CPUC, YSPSC)
DRD: Department of Resources and Development PUC:Pohnpei Utilities Corporation KUA: Kosrae Utilities Authority YSPSC:Yap State Public Service Corporation CPUC:Chuuk Public Utility Corporation

Narrative Summary	Objectively Verifiable Indicators	Means of Verification	Important Assumptions
Overall Goal Energy security is improved and greenhouse gases are reduced through the reduction of fossil fuels consumption.	In comparison to the indicators at the time of baseline survey, 1. Reduced amount of CO2 emission of power utilities in the target area 2. Reduced amount of diesel fuel of power utilities in the target area 3. Increased capacity (kW) and actual generated energy (kWh) of renewable energy facilities of power utilities in the target area	1. to 3. Reports of C/P agencies	
Project Purpose Hybrid Power Generation System is introduced.	1. Improvement of specific fuel consumption of pilot DG units (better than the baseline data set at the beginning of the Project) 2. Improvement of performance ratio for the RE power generation systems (better than the baseline data set at the beginning of the Project in consideration of aging deterioration of PV module) 3. Proper application of planning and O&M method of Hybrid Power Generation System	1. Record on specific fuel consumption of Pilot DG units by C/P, checked by Japanese experts 2. Record on operation of RE power generation systems 3. Evaluation by Japanese experts and C/P on plans of Hybrid Power Generation System	C/P agencies continue commitment to the Project by continuing budget allocation as well as assignment of personnel for the post- Project activities.
Outputs 1. Appropriate and economical system for O&M of Diesel Generators (DGs) is enhanced.	<Output 1> 1-1 Adequacy on the use of the work schedule, check sheets and manual for the maintenance work for the pilot DG units 1-2 Number of training participants who are conducting operation and maintenance of DG based on the learnings from the training program (target:2 for each state)	1-1 Evaluation by Japanese experts and C/P on improvement of maintenance work (daily/partial inspection/overhaul work) for pilot DG units 1-2 Capacity assessment of trained O&M staff and managers by Japanese experts	C/P agencies promote investment on renewable energy facilities based on the current national policy/plan.

2. Methodology for appropriate planning and O&M of renewable energy (RE) is established.	<Output 2> 2-1 Number of training participants who have been certified under the Project for the planning method of the Hybrid Power Generation System (target: 1 for each state) 2-2 Number of training participants who are conducting O&M of RE facilities based on the learnings from the training program (target: 2 for each state) 2-3 Preparation of related manuals for Hybrid Power Generation System 2-4 Adequacy of the use of the related manuals for Hybrid Power Generation System	2-1 Capacity assessment of trained staff and managers by Japanese experts 2-2 Capacity assessment of trained O&M staff and managers by Japanese experts 2-3 Evaluation by Japanese Experts on related manuals for Hybrid Power Generation System prepared by C/P 2-4 Evaluation by Japanese experts and C/P on the use of the related manuals for Hybrid Power Generation System	
Activities <Output 1> 1-1 Operational conditions of the existing DGs are reviewed, including confirmation of objectively verifiable indicators for overall goal and project purpose. 1-2 Specific fuel consumption of pilot DG units is measured. 1-3 Improvement plan for the operation of pilot DG units is prepared. 1-4 Existing spare parts and maintenance tools of pilot DG units are confirmed. 1-5 Improvement plan for the operation of pilot DG units is implemented. 1-6 The result of implementation of the improvement plan is evaluated, and improvement plan is updated. 1-7 The concept of Economic Dispatch Control (EDC) is shared among operators and applied, if possible. 1-8 Necessary spare parts and maintenance tools for the pilot DG units are prepared. 1-9 Maintenance work schedule for the pilot DG units is prepared. 1-10 Check sheets and maintenance manuals for maintenance works for pilot DG units are prepared. 1-11 Maintenance works (daily/partial inspection/overhaul work) for pilot DG units are conducted in accordance with the maintenance schedule. 1-12 The result of maintenance works is evaluated, and future maintenance work schedule together with budget (including sub-contract fee, cost for tools and equipment) is prepared. 1-13 Specific fuel consumption of the pilot DG units is measured before and after implementation of the related project activities. 1-14 Related training programs for appropriate O&M system for DGs are implemented periodically. 1-15 Knowledge on appropriate O&M of DGs is disseminated among stakeholders. <Output 2> 2-1 Current situation and future development plan of RE is reviewed. 2-2 Planning manual for Hybrid Power Generation System is prepared. 2-3 Planning manual for Hybrid Power Generation System is reviewed and updated in the target area. 2-4 Operating conditions of the existing RE facilities are reviewed, including	**Inputs** **(Japanese side)** 1. Dispatch of the Japanese experts <JICA long term expert, stationed in Fiji > - Chief Advisor/Hybrid Power Generation System (Completed by March 2019) <JICA Consultant Team> -Team Leader/Operation & Maintenance of DG -Economic operation of DG (EDC) -Maintenance support of DG (Mechanical expert) -Maintenance support of DG (Electrical expert) -O&M of RE power generation system -Integration of RE power generation system -Project Coordinator 2. Training in Japan and Fiji 3. Equipment -In accordance with necessity of activities	**(FSM side)** 1. Assignment of C/Ps -Project Director (P/D) -Project Manager (P/M) -Engineers in charge of O&M (Manager level) - Mechanical Staff - Electrical Staff - Planning officer, and others 2. Facilities and equipment -Project office 3.Recurrent costs - C/Ps' wages and allowances - C/Ps' domestic travel expense in part	**Preconditions** Contents of the current relevant policies on promotion of renewable energy and energy efficiency are not largely changed.

confirmation of objectively verifiable indicators for overall goal and project purpose. 2-5 O&M manual for RE facilities is prepared. 2-6 Maintenance works are conducted according to O&M manual of RE facilities. 2-7 The result of maintenance works is evaluated, and future maintenance work schedule together with budget is prepared. 2-8 Training program for Hybrid Power Generation System including O&M of RE facilities is conducted 2-9 Knowledge regarding Hybrid Power Generation System is disseminated among stakeholders.			

ATTACHMENT 9

March, 2017

Plan of Operation (PO)

Project Title: The Project for Introduction of Hybrid Power Generation System in Pacific Island Countries

Project Term: March 2017 – June 2022 (Phase 1: March 2017 – February 2019 , Phase 2: March 2019 – June 2022)

Country: Federated States of Micronesia

Target Area: Pohnpei, Chuuk, Yap and Kosrae

Target Group: Related engineers and other technical staff in the target area (DRD, PUC, KUA, CPUC, YSPSC)

		Product	Organizations in Charge
Output 1 Activities [Appropriate O&M System for DG]			
1-1	Operational conditions of the existing DGs are reviewed, including confirmation of objectively verifiable indicators for overall goal and project purpose	TNA Report, OVI	PUC, CPUC, KUA, YSPSC, JICA Experts
1-2	Specific fuel consumption of pilot DG units is measured	Measurement of Specific fuel consumption	PUC, CPUC, KUA, YSPSC, JICA Experts
1-3	Improvement plan for the operation of pilot DG units is prepared	Improvement plan	PUC, CPUC, KUA, YSPSC, JICA Experts
1-4	Existing spare parts and maintenance tools of pilot DG units are confirmed	List of spare parts and maintenance tools	PUC, CPUC, KUA, YSPSC, JICA Experts
1-5	Improvement plan for the operation of pilot DG units is implemented	Improvement Implementation Report	PUC, CPUC, KUA, YSPSC, JICA Experts
1-6	The result of implementation of the improvement plan is evaluated, and improvement plan is updated	Improvement Evaluation Report	PUC, CPUC, KUA, YSPSC, JICA Experts
1-7	The concept of Economic Dispatch Control (EDC) is shared among operators and applied, if possible	EDC software, manual, EDC sheet	PUC, CPUC, KUA, YSPSC, JICA Experts
1-8	Necessary spare parts and maintenance tools for the pilot DG units are prepared	List of spare parts and maintenance tools prepared	PUC, CPUC, KUA, YSPSC, JICA Experts
1-9	Maintenance work schedule for the pilot DG units is prepared	Maintenance work shedule	PUC, CPUC, KUA, YSPSC, JICA Experts
1-10	Check sheets and maintenance manuals for daily maintenance works for pilot DG units are prepared	Check sheets and maintenance manules	PUC, CPUC, KUA, YSPSC, JICA Experts
1-11	Maintenance works (daily, partial inspection/overhaul work) for pilot DG units are conducted in accordance with the maintenance schedule	Maintenance record	PUC, CPUC, KUA, YSPSC, JICA Experts
1-12	The result of maintenance works is evaluated, and future maintenance work schedule together with budget (including sub-contract fee, cost for tools and equipment) is prepared	Evaluation report and future schedule for maintenance	PUC, CPUC, KUA, YSPSC, JICA Experts
1-13	Specific fuel consumption of the pilot DG units is measured before and after implementation of the related project activities	Measurement for specific consumption of the pilot DG	PUC, CPUC, KUA, YSPSC, JICA Experts
1-14	Related training programs for appropriate O&M of DGs are implemented periodically	Training record, recommendations, reports, etc.	DRD, PUC, CPUC, KUA, YSPSC, JICA Experts
1-15	Knowledge on appropriate O&M of DGs is disseminated among stakeholders	Seminar, workshop records	DRD, PUC, CPUC, KUA, YSPSC, JICA Experts
Output 2 Activities [Appropriate planning and O&M of renewable energy (RE)]			
2-1	Current situation and future development plan of RE is reviewed	TNA Report, OVI	PUC, CPUC, KUA, YSPSC, JICA Experts
2-2	Planning manual for Hybrid Power Generation System is prepared	Planning manual for Hybrid Power Generation	PUC, CPUC, KUA, YSPSC, JICA Experts
2-3	Planning manual for Hybrid Power Generation System is reviewed and updated in the target area.	Updated Planning manual for Hybrid Power Generation	PUC, CPUC, KUA, YSPSC, JICA Experts
2-4	Operating conditions of the existing RE facilities are reviewed, including confirmation of objectively verifiable indicators for overall goal and project purpose	TNA Report, OVI	PUC, CPUC, KUA, YSPSC, JICA Experts
2-5	O&M manual for RE facilities is prepared.	O&M manual for RE facilities	PUC, CPUC, KUA, YSPSC, JICA Experts
2-6	Maintenance works are conducted according to O&M manual of RE facilities.	Maintenance Record	PUC, CPUC, KUA, YSPSC, JICA Experts
2-7	The result of maintenance works is evaluated, and future maintenance work schedule together with budget is prepared.	Evaluation report of maintenance work and schedule	PUC, CPUC, KUA, YSPSC, JICA Experts
2-8	Training program for Hybrid Power Generation System including O&M of RE facilities is conducted.	Training record, recommendations, reports, etc.	DRD, PUC, CPUC, KUA, YSPSC, JICA Experts
2-9	Knowledge regarding Hybrid Power Generation System is disseminated among stakeholders.	Seminar, workshop records	DRD, PUC, CPUC, KUA, YSPSC, JICA Experts
	△: IC/T		
	▲: Training in Japan (Fis		
	JICA long term expert, stationed in Fis		
	JICA Consultant Team