

Pacific Islands Climate Collaborative (“Collaborative”)
- 2023 Virtual Forum -

Green Power Island Program



OGAWA Tadayuki
Senior Advisor

Japan International Cooperation Agency (JICA)

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Rapid introduction of Variable Renewable Energy (VRE) is on-going to achieve the national target of carbon neutral and RE penetration in power supply.

Diversification of power sources is important from the viewpoint of energy security, but in reality many countries are still facing **difficulties in O&M for Diesel Engine Generators (DEGs) and RE systems.**

For this reason, we propose to make the best use of existing assets taking into consideration of the **step-by-step energy transition for future decarbonization.**

Concept of Green Power Island Program

The aim of the **Green Power Island Program** is to build upon the **Hybrid Island Program** and strengthen the strategy for decarbonizing electric power.

Green Power Island Program Concept

Electric power supply side

Electric power demand side



Renewable energies



Energy management system,
storage batteries, etc.



To create a structure balancing supply/demand, by promoting energy savings and demand side management, to respond with fluctuating renewable energy generation.

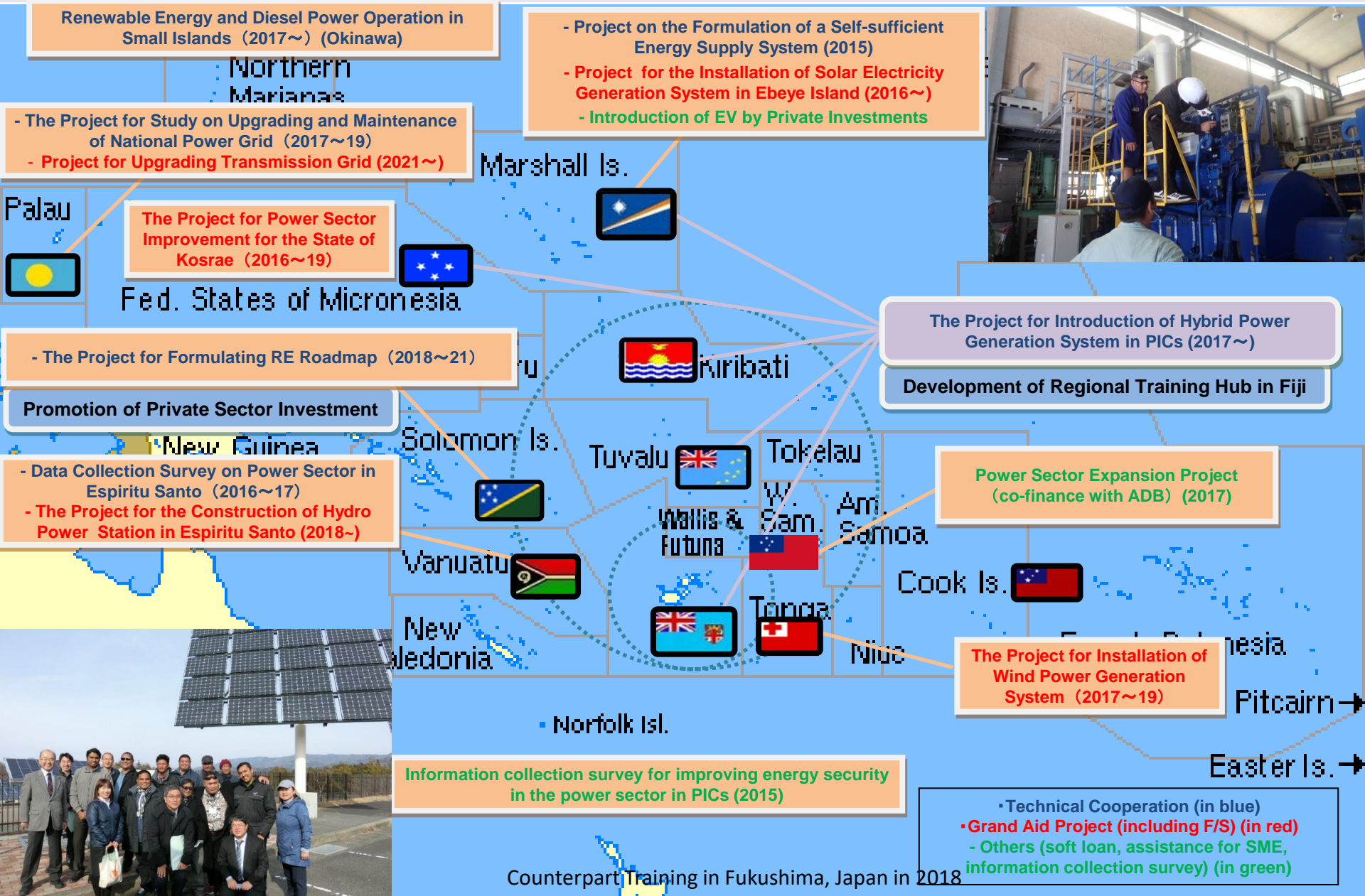


Greener electric
power system

To achieve optimal operation of power supply, by utilizing renewable energies, storage batteries and other facilities, with maintaining stability and economic viability.

Green Power Island Program

- Program Map -



Counterpart Training in Fukushima, Japan in 2018

Highlight Projects : <Fiji, FSM, RMI, Kiribati and Tuvalu> The Project for Introduction of Hybrid Power Generation System

CHALLENGE

- ❖ High dependency on imported fossil fuel ⇒ High tariff, and volatility risk of oil prices ⇒ Low energy security
- ❖ Mitigation against climate change ⇒ Increasing penetration of variable Renewable Energy ⇒ unreliable power supply

STRATEGY & CONCEPT

Variable Renewable Energy (RE)

- ☺ Solid Effect on Fuel Reduction
- ☹ Output depends on weather conditions



“Optimal Integration of RE”
and “Appropriate O&M on RE”



Diesel Engine Generator (DEG)

- ☺ Stable output
- ☹ Fuel price volatility and energy security



“Appropriate and Economic
O&M on DEG”

>>> Hybrid Power Generation System

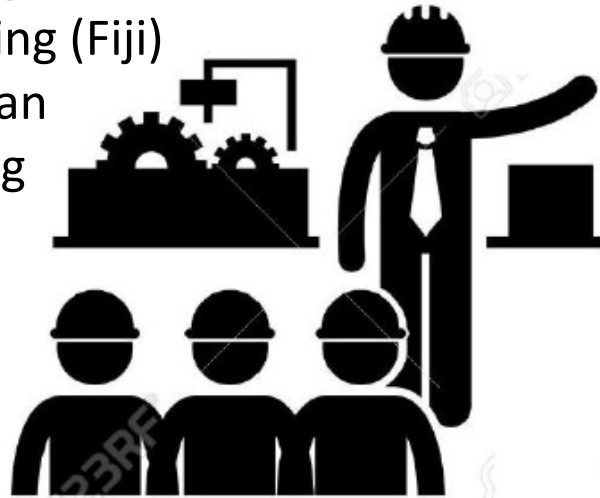
Ultimate Goal

- ❖ Increased **Energy Security** by reducing fuel consumption by DEG
- ❖ Addressing **Climate Change** by reducing CO₂ emissions
- ❖ Establishment of Regional Training system in Fiji

Highlight Projects : <Fiji, FSM, RMI, Kiribati and Tuvalu> The Project for Introduction of Hybrid Power Generation System

- On-site training
- Regional Training (Fiji)
- Training in Japan
- remote training

JICA Experts



Counterparts from 5 countries

Pro:
It provides an environment for sharing hands-on experience.

Cons:
It would require time and efforts of both sides.



Core Counterparts



Disseminate skills and knowledge
In each organization

Diesel Engine Generator



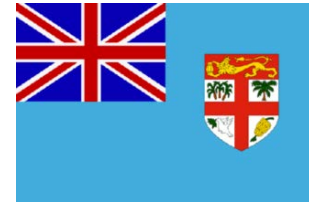
- Improvement of Specific Fuel Consumption (eg reduction of diesel fuel oil by 360kL/year in RMI)
- Overhaul works done by utility without external supervisors (Kiribati)
- Preparation for O&M Manual, Check Sheets & Maintenance Schedule

Renewable Energy

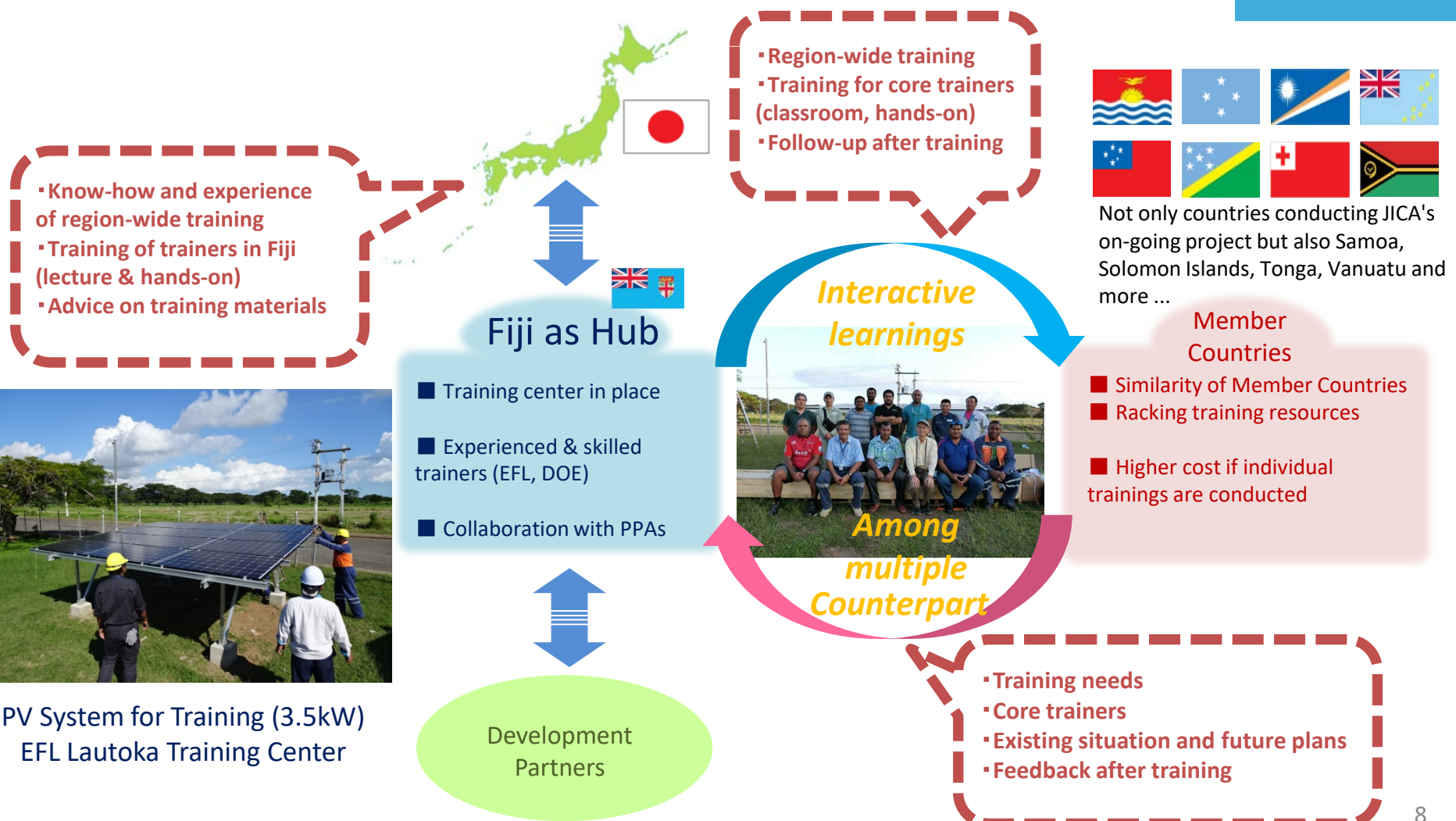


- PV Maintenance with measuring instruments
- Improvement of PV Performance Ratio (eg 66% (2016) \Rightarrow 75% (2020) in FSM)
- Preparation for Grid Integration Manual, O&M Manual for PV system
- Modeling by simulation tool (HOMER)

Highlight Projects : <Fiji, FSM, RMI, Kiribati and Tuvalu> The Project for Introduction of Hybrid Power Generation System



Concept of Region-wide Training “Regional Center of Excellence” at EFL Lautoka Training Center



1. Purpose of the survey

In Samoa, penetration of variable renewable energy supply is rapidly increasing compared to other countries. Samoa EPC (utility) is under investigation to stop operation of DEGs during low demand period, and 100% renewable energy supply in 2031. JICA has been supporting EPC to conduct a **power system analysis & simulation**, in order to consider required measures for grid stabilization.

2. Survey area

Samoa Upolu (**Similar survey was also conducted in Tuvalu**)

3. Survey period

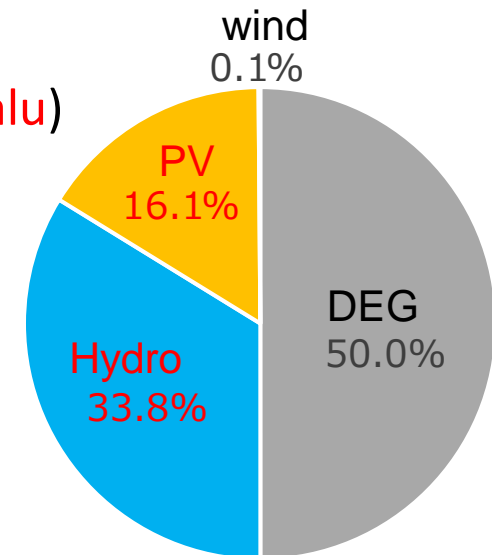
January 2021 to March 2022 _ _ _

July 2022 to June 2023 _ _ _

4. Consultant team

Okinawa Enetech Co., Ltd.

Okinawa Electric Power Co., Inc.



Percentage of annual power generation in Upolu Island (2018)

Baseline Survey

1. Collection, organization and analysis of existing systems and related information

Training and knowledge sharing

2. Creation of system model deploying power system simulation tool (CPAT-GUI)
3. Conducting system simulation to identify impact on grid operation
4. Examination of supply & demand balance using a simulation tool (HOMER)
5. Comparative study of grid stabilization technology
6. Examination of standards required for IPP operators
7. Sharing experiences and knowledge acquired in the remote islands of Okinawa

Sharing survey results with the target countries

Continued capacity development is required to formulate & fine-tune system model based on on-site actual measurement data (voltage, active/reactive power, etc.) and accurate facility information (impedance, etc.).

Closing Recap

- JICA will continuously support PICs through Green Power Island Program to promote RE integration through mobilizing resources and experience in Japan.
- In addition, capacity development will be facilitated through regional approach under the initiative of Fiji Government, utility company in Fiji, and Pacific Power Association.



Training of Trainers at EFL Training Center in Fiji

**THANK YOU VERY MUCH
FOR YOUR ATTENTION.**