Overview of JICA's Cooperation in Energy Sector

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Japan International Cooperation Agency (JICA)

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Green Power Island Program

Green, Reliable and Affordable Supply



Capacity Development

Resilience against natural disaster

Maximize RE integration

Regional Approach
(Training Center & Resources in Fiji)

Infrastructure Management
(Asset management, robust design and construction)

Grid Stabilization
(Demand Response, Enabling Technolgy, etc.)

Recent projects in the Pacific

Renewable Energy and Diesel Power Operation in Small Islands（2017～）(Okinawa)

- Project for the Installation of Solar Electricity Generation System in Ebeye Island (2017～25)
- Private business F/S for the Introduction of EV in Majuro

- The Project for Study on Upgrading and Maintenance of National Power Grid（2017～19）
- Project for Upgrading Transmission Grid (2022～26)

・Technical Cooperation
・Grand Aid Project (including F/S)
- Others (soft loan, assistance for SME, information collection survey)

Marshall Is.

Palau

Fed. States of Micronesia

The Project for Power Sector Improvement for the State of Kosrae（2016～19）

The Project for Introduction of Hybrid Power Generation System in PICs (2017～23) (FSM, RMI, Kiribati, Tuvalu, Fiji)

- The Project for Formulating RE Roadmap (2018～21)
- Advisor for Renewable Energy Promotion (2024~26)

Kiribati

Development of Regional Training Hub in Fiji

Promotion of Private Sector Investment

New Guinea

Solomon Is.

Tuvalu

Tokelau

The Project for Energy Transition in PICs (2024～29) (Palau, FSM, Samoa, Tuvalu, Fiji)

W. Sam.

Am. Samoa

Wallis & Futuna

- Ramu Transmission System Reinforcement Project (2013-26)
- Advisor for Promotion of Electrification Policy Implementation（2024-26)

- Power Sector Expansion Project (2007-18)

Vanuatu

Cook Is.

Tonga

Niue



- Data Collection Survey on Power Sector in Espiritu Santo（2016～17）
- The Project for the Construction of Hydro Power Station in Espiritu Santo (2022~)

- The Project for Installation of Wind Power Generation System（2017～19）
- Project for Improving Grid Operation Under Centralized Control Center（2024-2026）



Highlight Projects : <Fiji, Tuvalu, Samoa, Palau and FSM>
The Project for Energy Transition in PICs (2024-'29)

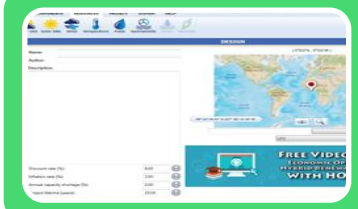
<Project Purpose>

Energy transition is enhanced in terms of generation and transmission planning for further VRE integration.



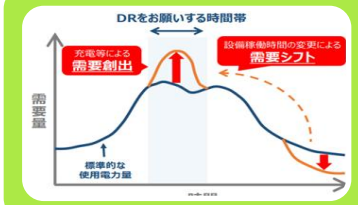
(Output 1) Training for energy transition

- Understanding of energy transition is enhanced through the capacity development for optimum generation plan.



(Output 2) Power supply and grid planning

- Methodologies for power transmission/distribution grid planning is established with a viewpoint of grid stabilization and least cost development



(Output 3) Demand Response

- Introduction of demand response is investigated and promoted for further grid stabilization.



(Output 4) Sustainable regional training system is strengthened.

- Establishment of sustainable training system is undertaking with PPA, DOE and EFL.

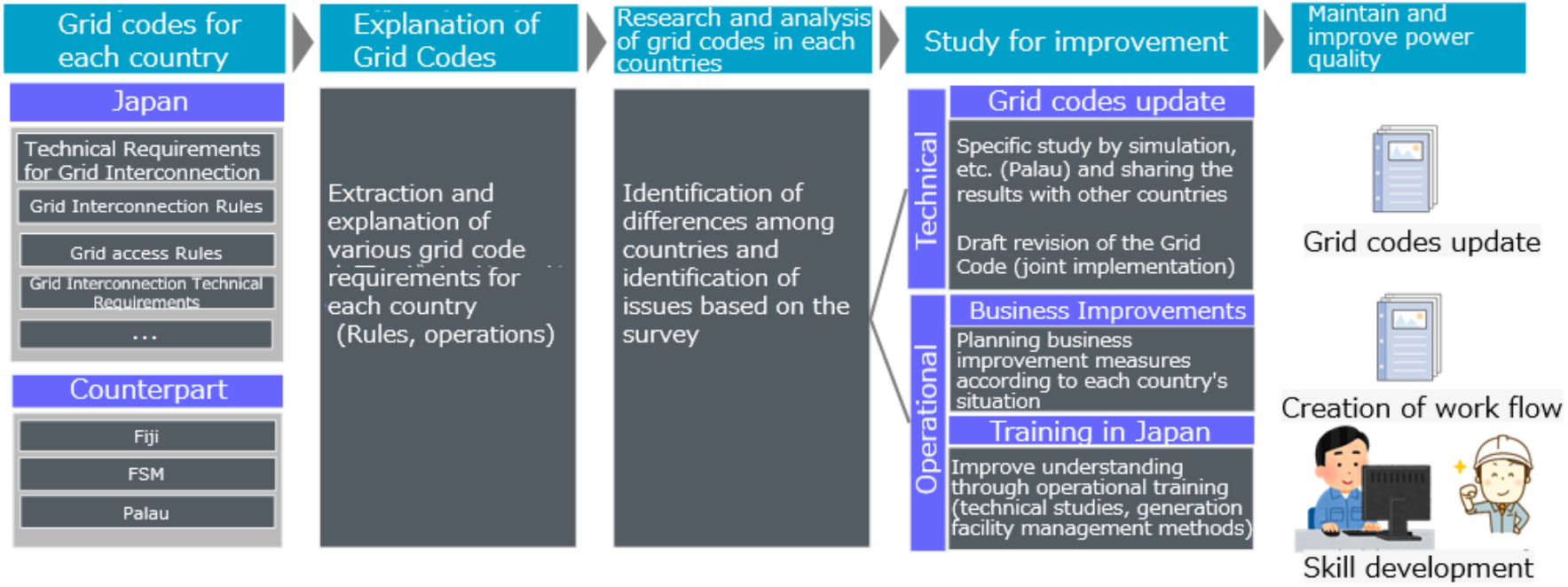
Highlight Projects : <Fiji, Tuvalu, Samoa, Palau and FSM>
The Project for Energy Transition in PICs (2024-'29)

1. Grid Stabilization (Samoa)

- Continuous improvement for the grid model in Upolu incl. dynamic simulations to confirm challenges and countermeasures for further VRE integration.
- A series of trainings have been provided to best utilize the grid simulation tool (CPAT-GUI) to enhance technical analysis skills.

2. Technical support for Grid Code (GC) development

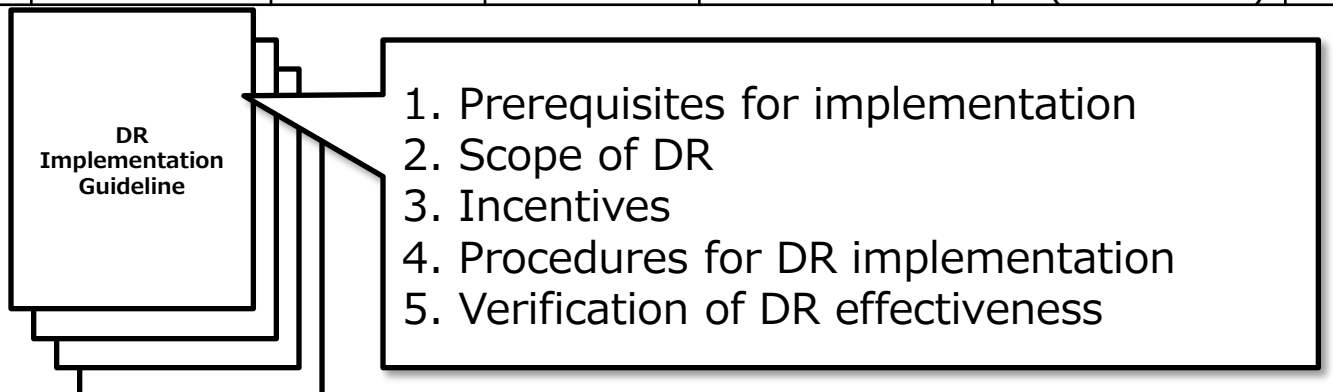
- Recommendations to update the GC were proposed in consideration of the latest interconnection requirements in Japan (Fiji).



3. Demand Response

- Continued supports to finalize the implementation plan for DR pilot projects in Fiji and FSM(Yap).
- Development of implementation guide line for DR.

Country	Potential dispatchable demand					
	Air conditioner, refrigerator (commercial facility)	Large ice machine	Electric tank water heater	Water storage facility	Seawater desalination facility	Others
Fiji	×	○	×	△	×	
Samoa	○	○	×	△	×	
FSM (Yap State)	○	○	×	△	×	Wastewater treatment facility may be used
Palau	○	△	×	○	△(hotels etc.)	



Key Message

- Through the Green Power Island Program, JICA can mobilize expertise and practical experience from utilities in Japan to support the energy transition toward sustainable and resilient energy systems.
- Under the initiative of the Fiji Government, EFL and PPA, JICA will support sustainable capacity development through a regional training and mutual knowledge-sharing approach.





THANK YOU VERY MUCH
FOR YOUR ATTENTION.

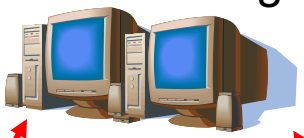
Grid Stabilization for Maximum RE Integration

RE Generation System



- Resilient system design
- Floating PV system

EMS for Microgrid



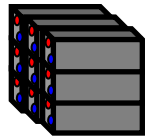
Output restriction & Forecast

Battery charge/discharge

Control & Supervision

Demand Response

Energy Storage



- Support for short-term frequency fluctuation
- Reduction of excess energy
- Improving DEG specific fuel consumption

Enabling Technology (e.g. Grid Forming Inverter, M-G set)



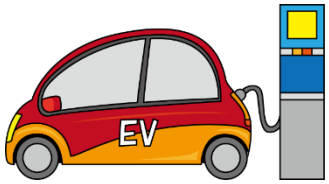
- Inertia and synchronizing force
- Short circuit current
- Black start capability

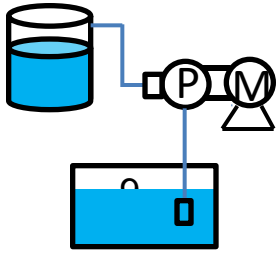
Dispatchable Load



Ice making machine

Electric Vehicle





Water supply pump

Resilient Infrastructure Management

Plan
- Loop / double circuit configuration
- Underground cables for important feeders in urban areas

Design & Construction
- Robust foundation and structure
- Away from buildings & trees

Restoration after disaster
- Early restoration system (trainings, knowledge sharing)
- Emergency power supply (EV, Generator Vehicle)



Solar Home System surviving TC (Tonga)



EV charged by Solar (Marshall)

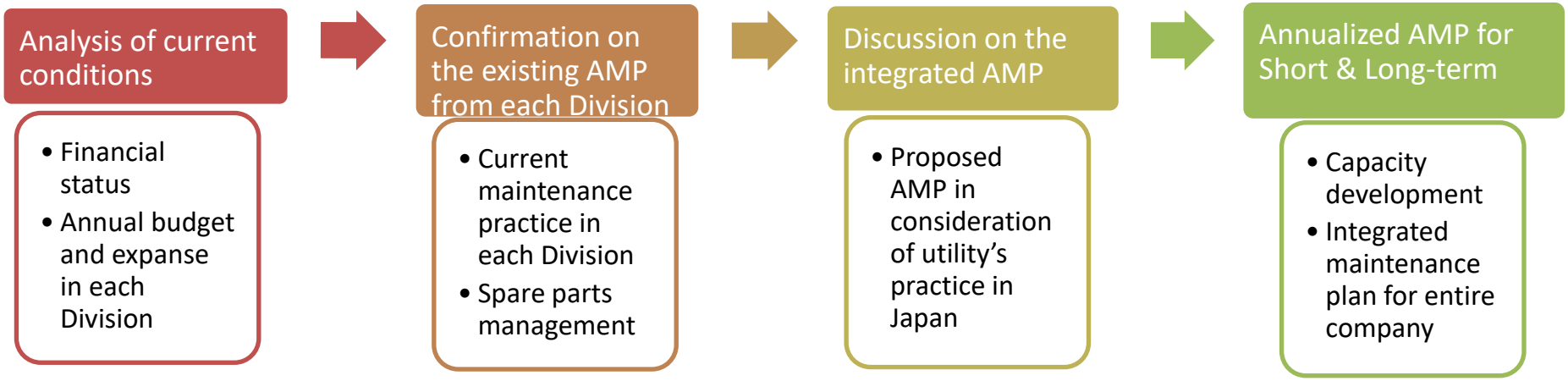
Resilient Infrastructure Management

1. Challenges on Asset Management

(1) Financial & human resources
(2) Frequent natural disasters
(3) Improper maintenance system for the existing assets
(4) Maintenance records for the existing equipment (e.g. diesel engine generators)
(5) Spare parts for maintenance works

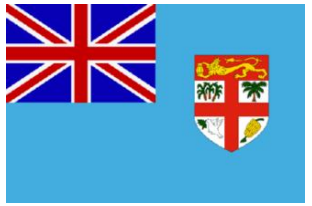
2. Technical support for the establishment of Asset Management Plan (AMP)

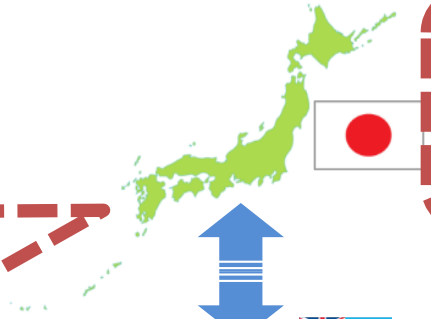
Integrated AMP is required to prepare for the levelized annual budget for maintenance works and spare parts.



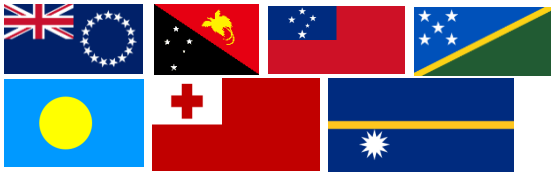
Regional Approach for Capacity Development

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





- Region-wide training
- Training for core trainers (classroom, hands-on)
- Follow-up after training



Not only countries conducting JICA's on-going project but also 7 countries (Cook Islands, PNG, Samoa, Solomon Islands, Palau, Tonga, Nauru) joined the regional training initiative since 2021.

- Know-how and experience of region-wide training
- Training of trainers in Fiji (lecture & hands-on)
- Advise on training materials

Fiji as Hub

- Training center in place
- Experienced & skilled trainers (EFL, DOE)
- Collaboration with PPA

Interactive learnings



Among multiple Counterpart

Member Countries

- Similarity of Member Countries
- Lacking training resources
- Higher cost if individual trainings are conducted



PV System for Training (3.5kW)
EFL Lautoka Training Center

Development Partners

- Training needs
- Core trainers
- Existing situation and future plan
- Feedback after training