







# PPA workshop in Fiji and Guam

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# **1. Introduction of KANSAI**

CopenStreetMap



#### Kansai EPCO at a Glance

Kansai Electric Power Co., Inc. (Kansai EPCO) is the <u>No.1 utility</u> in 60Hz west area in Japan









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The Kansai

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#### **Global Sustainable Electricity Partnership**





Global Sustainable Electricity Partnership

### 10 member companies in 8 countries



- Develop joint policy frameworks and implement related initiatives
- Take joint positions on global electricity-related issues
- Provide human capacity building assistance

on the efficient generation and use of electricity

• Demonstrate replicable small-scale renewable energy projects



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- Capital Projects
- Human Capacity Building activities
- Education for Sustainable Energy Development (ESED) Scholarship Program



#### **Global Sustainable Electricity Partnership**





# 2. PPA workshop in Fiji and Guam









### **Further Collaboration**





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### History of GSEP / PPA workshop

	Theme	Contents	Venue and Date	
1	Renewable Energies	ble Energies Renewable energy such as wind power , photovoltaic system, micro hydropower etc		
2	Photovoltaic Systems	ovoltaic Systems PV system mainly practical and suitable for Pacific Islands. (Standalone system etc.)		
3	Demand SideEffective use of electricity in order to reduce CO2Managementemissions and consumer.		Palau(2010) Fiji(2009)	
4	Grid Connected Solar PV	Solar PV system mainly designed for Grid Connected.	Palau(2010) Fiji(2010)	
5	Energy Efficiency Improvement	Energy saving method. Legislation, mechanism and business model on energy efficiency Building energy management.	Fiji (2012) Guam (2012)	
6	Tariff StructureTariff structure related contents that can help promoteDevelopmenttheir sustainable development		Fiji (May. 2014) Guam (Aug. 2014)	
7	grid interconnection of renewable energies	knowledge of renewable energy to increase the share of renewables to help combat climate change and their reliance on imported fossil fuels.	Fiji (March. 2017) Guam (June. 2017)	



**Date, Venue and Participants** 

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	Date	Venue	Participants	
Southern Hemisphere	May 27-31, 2017 (5 days)	Republic of Fiji	19 participants 10 utilities	
Northern Hemisphere	June 12-17, 2017 (5 days)	Guam	14 participants 7 utilities	

Total 33 participants from <u>17 Pacific islands utilities</u>

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#### **Program**

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Davil	AM	<ul> <li>Opening ceremony</li> <li>Introduction and presentation of each utility</li> </ul>	Each utilities
Dayı	PM	Current status of renewable energies in PPA countries - PV / Wind Power / Others / Tariff for renewable energies	PPA
Day2	AM	Current status of renewable energy in Japan - Target toward 2030 and FIT mechanism in Japan - Influence and Challenges on the Reliable Power Supply with High Penetration of Renewable Energy - Application and Control Technology of Battery Energy Storage for Power System	KANSAI
	РМ	Procedures for renewable energy grid connection in PPA countries - What should be considered on RE grid connections?	Dr. Wade
Day3	AM	How to increase grid interconnection of renewable energy - Grid connection requirements and regulation in Japan - PV output forecast for power system operation	KANSAI
	PM	How to increase grid interconnection of renewable energy in PPA countries	Dr. Wade
Day4	AM	Renewable energy integration into micro grids and smart grids         - GSEP capital projects         - Renewable energy integration in Japanese remote island grids         - Introduction of smart meter system for smart grid technology	KANSAI
	PM	Site Visit	PPA & local utility
Day5	AM	<ul> <li>Open session – questions to presenters on topics discussed during the week</li> <li>Evaluation survey</li> <li>Handing of certificates</li> </ul>	
	PM	Closing ceremony	

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#### **Participants' Utilities**





Mr. Hearther

Mr. Tararo

Mr. Aukitino

Mr. Katauea

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#### Participants in Guam, Northern Hemisphere





**General Satisfaction** 

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Comments :

- •I am satisfied with the workshop. It provides us good information on renewable energy project development.
- •Well-administered, delivered and coordinated.



### **《Good experience during the workshop》**

- •Being able to share our problems in our utilities
- Broad comparison of renewable energy technologies
- •Learn how to fix issues related to renewable energies we are currently facing
- •The quizzes helped you think
- Case studies in the Pacific Islands

### **«**Suggestions to improve in a future workshop**»**

- More practical
- Divide the class in small groups for case study discussions

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#### **Brief Summary and photos**







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### **Brief Summary and photos**

Workshop in Fiji



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### **Brief Summary and photos**

#### Workshop in Guam













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#### Site visit



Workshop in Fiji

### **Butoni Wind Farm**

-Capacity : 275 kW -37 wind turbines and a generating

#### Workshop in Guam

### **Guam's Dandan Solar facility**

- -Project size : 25.65MW
- -Renewable Energy Purchaser : Guam Power Authority -Anticipated Completion : October 2015





### **Further Collaboration**



We will continue to collaborate for future sustainable development including "Power supply challenges".

# 3. Solar-Ice Project in Dhiffushi Island in Maldives

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### **Dhiffushi Island**

- Dhiffushi is one of the inhabited Island located in KAAFU Atoll of North Male' Atoll next to Meerufenfushi Island.
- The population at Dhiffushi end of 2015 reports 1247 with 51% of them are Male population.
- Peak demand is 130kW (in 2012)
- 40% of the population engage in fishing.
- Traveling from Male' to Dhiffushi take 40-45 minutes by speed boat.







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### **Project Scheme**





#### **Outline of Dhiffushi Solar Ice Project**

#### POWERHOUSE

New powerhouse built by STELCO for its existing diesel generators and the new PV system equipment.

#### HYBRID SYSTEM

40 kW PV system is connected to Dhiffushi's power grid and works in conjunction with the existing diesel generators.

#### MULTI-FUNCTIONAL FRAME STRUCTURE

3 metre-high frame structure holds four separate 10 kW PV panel arrays inclined at 5 degrees, limiting the extent of damage in case of a tsunami and providing good shade for residents.

#### ICE HOUSE

Industrial ice machine installed in new ice house on the pier effectively functions as the supplydemand controller for the gridconnected PV system.

#### POWER CONDITIONERS

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Four power conditioners and a system controller are installed inside the powerhouse.

#### FLEXIBLE CONTROL SYSTEM

The control system is operated in both automatic and manual mode. This flexibility helps maximize PV power generation and improve its stability, making maintenance and troubleshooting easier.

#### CABLING

The PV system and ice-making machine are connected to the powerhouse through underground cables.



### **Benefit from Solar Ice**

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#### Idea for sustainable Solar Ice system



Sustainable Solar System

Customer can pay for electricity by ice. Utility can prepare for maintenance.

#### Sustainable Ice Maker The PV system provides sufficient electricity for the ice production at a reasonable price

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Idea for sustainable Solar Ice system

# National Energy GLOBE Award Maldives 2017

#### Jury-Rating

The suggested ice maker will improve the efficiency of the existing photovoltaic system. The generator has a range of 5% of total energy requirements to 25%, it will not require a battery to store its excess energy and the resulting byproduct will improve the lives of locals as well as local economy. This means less toxic waste to dispose of. The design can easily be recreated on other islands thereby further lessening the countries carbon footprint as there would be less need to distribute ice from Male, the capital of the Maldives.

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2017

WINNE

ENERGY GLOBE

MALDIVES



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### **Advanced Concept of Solar Ice Project**



## \* "Solar X Hybrid Project"

- · Integration of power supply (solar) ,grid and demand (ice etc. )
- Achieve economical feasibility of the rural electrification type project by providing not only electricity <u>value added commodity such as ice itself.</u>

# Thank you !

