JCM Project Design Document Form

A. Project description

A.1. Title of the JCM project

Renewable Power for Huraa and Kuda Huraa

A.2. General description of project and applied technologies and/or measures

The proposed JCM project aims to reduce diesel fuel consumption in electricity distribution to Huraa and Kuda Huraa Islands in Kaafu Atoll, Maldives by installing solar PV system, storage battery and energy management system (EMS). The project is estimated to reduce 11,763 tonnes of CO_2 emissions during the project period through the installation and operation of high-efficiency diesel generators, PV modules, wind turbines, lithium-ion battery bank and EMS on Huraa Island. The project will also connect Kuda Huraa with Huraa, which are currently supplied by separate power systems, and manage the power supply to the two islands using the facilities established on Huraa in an integrated manner.

A.3. Location of project, including coordinates

Country	Republic of Maldives
Region/State/Province etc.:	Kaafu Atoll
City/Town/Community etc.:	Huraa Island and Kuda Huraa Island
Latitude, longitude	04°20'02"N, 73°36'04"E (Huraa Island)

A.4. Name of project participants

The Republic of Maldives	Renewable Energy Maldives Pvt. Ltd.
Japan	Pacific Consultants Co., Ltd. InterAct Inc. Tokyo Electric Power Company, Incorporated Toshiba Corporation

A.5. Duration

Starting date of project operation	01/11/2016
Expected operational lifetime of project	20 years

A.6. Contribution from developed countries

The proposed project is partially supported by the Ministry of the Environment, Japan through the financing programme for JCM model projects which provided financial supports up to 50% of initial investment for the projects in order to acquire JCM credits. As for technology transfer, Japanese project participants and Renewable Energy Maldives (REM) will establish a special purpose company which will generate and distribute electricity to the two islands. The Japanese project participants will provide operation and maintenance training to the operators to be hired locally, and periodical maintenance and support for the storage battery bank and EMS.

B. Application of an approved methodology(ies)

B.1. Selection of methodology(ies)

Selected approved methodology No.	MV_AM002
Version number	01.0
Selected approved methodology No.	N/A
Version number	N/A
Selected approved methodology No.	N/A
Version number	N/A

B.2. Explanation of how the project meets eligibility criteria of the approved methodology

Eligibility criteria	Descriptions specified in the methodology	Project information
Criterion 1	The project involves power generation and distribution, and is the sole power provider in the given area.	The project will set up a special purpose company which will generate and distribute power, and will be the sole power provider in Huraa and Kuda Huraa.
Criterion 2	The project involves an installation of a solar PV system in a small-scale grid in which there is no other power source than diesel generators.	The project will install solar PV systems in a grid when combined will have a peak load of around 2MW. The only power source at present is diesel generators.
Criterion 3	The project involves an installation of a system composed of a storage battery and an EMS.	The project will install a storage battery bank and EMS.

Criterion 4	The PV modules have obtained a certification of design qualifications (IEC 61215, IEC 61646 or IEC 62108) and safety qualification (IEC 61730-1 and IEC 61730-2).	The PV modules have a certification of design qualifications IEC 61215 and safety qualification IEC 61730-1 and IEC 61730-2.
Criterion 5	The PV modules have an efficiency 19.0% or higher and the temperature coefficient of Pmax of the PV modules is equivalent to or better than -0.29%/˚C.	The efficiency of the PV modules is 19.4% and the temperature coefficient of Pmax is -0.29%/˚C.
Criterion 6	The storage battery will retain at least 80% of its rated capacity after 12,000 cycles of 0-100% charge and discharge at the rate of 3C.	The storage battery will retain at least 80% of its rated capacity after 12,000 cycles of 0-100% charge and discharge at the rate of 3C.
Criterion 7	The EMS can forecast the outputs of the solar PV system, develop an operation plan of the storage battery, and control the operation of the diesel generators and storage battery.	The EMS can forecast the outputs of the solar PV system, develop an operation plan of the storage battery, and control the operation of the diesel generators and storage battery.
Criterion 8	If the project involves an installation of diesel generators, the efficiency of such generators are same or better than all diesel generators in operation before installation.	The project will install diesel generators which are more efficient than all diesel generators operating at present in Huraa and Kuda Huraa.
Criterion 9	All of the consumers supplied electricity by the project are either supplied solely by the project or have a facility to measure the electricity supplied by the project.	All of the consumers supplied electricity by the project are either supplied solely by the project or have a facility to measure the electricity supplied by the project.

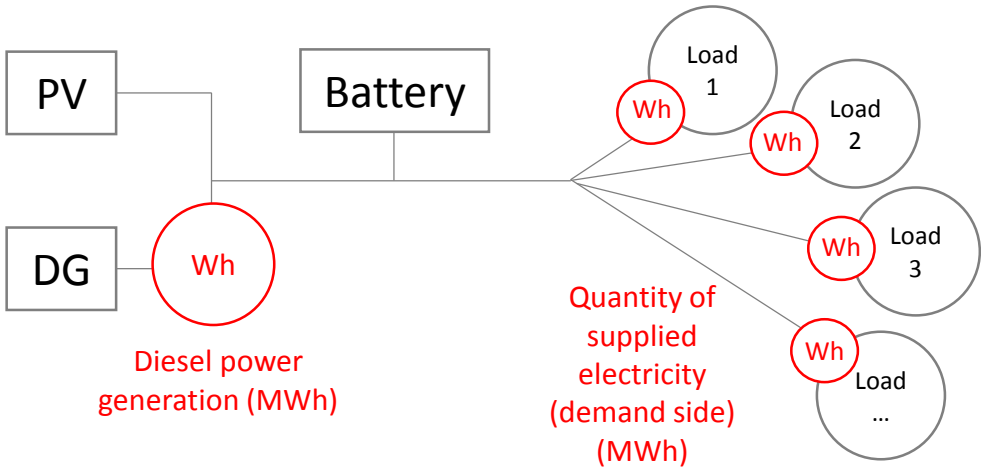
C. Calculation of emission reductions

C.1. All emission sources and their associated greenhouse gases relevant to the JCM project

Reference emissions	
Emission sources	GHG type
Electricity generation by diesel generators and electricity distribution in	CO_2

the gird	
Project emissions	
Emission sources	GHG type
Electricity generation by diesel generators and electricity distribution in the gird	CO_2

C.2. Figure of all emission sources and monitoring points relevant to the JCM project



The emission source of the project is diesel fuel consumption only.

Monitoring points for calculating CO_2 emissions are as follows,

- Quantity of electricity generated by diesel generators (MWh)
- Quantity of supplied electricity (demand side) (MWh)

C.3. Estimated emissions reductions in each year

Year	Estimated Reference emissions (tCO_{2e})	Estimated Project Emissions (tCO_{2e})	Estimated Emission Reductions (tCO_{2e})
2016	6,877	6,124	753
2017	7,112	6,371	741
2018	7,359	6,631	728
2019	7,617	6,904	713
2020	7,889	7,191	698
2021	8,130	7,484	646
2022	8,379	7,745	634
2023	8,638	8,016	622
2024	8,905	8,297	608
2025	9,183	8,588	595

2026	9,230	8,681	549
2027	9,279	8,735	544
2028	9,329	8,791	538
2029	9,380	8,848	532
2030	9,433	8,906	527
2031	9,487	9,007	480
2032	9,542	9,069	473
2033	9,599	9,132	467
2034	9,658	9,197	461
2035	9,717	9,263	454
Total (tCO_{2e})	174,743	162,980	11,763

D. Environmental impact assessment	
Legal requirement of environmental impact assessment for the proposed project	Yes

E. Local stakeholder consultation

E.1. Solicitation of comments from local stakeholders

The main local stakeholders of the project are Huraa Island Council and residents, Four Seasons Resort at Kuda Huraa (FSR), Hotel Properties Limited (HPL: owner of Kuda Huraa), Ministry of Environment and Energy (MEE) and State Electric Power Company Limited (STELCO). Several meeting have been organized to inform the stakeholders on the project and solicit their views.

16 December 2014 : Meeting with MEE
15 December 2014 : Stakeholder meeting with Huraa Island Council and FSR
23 October 2014 : Meeting with MEE
22 October 2014 : Meeting with Huraa Island Council
21 October 2014 : Meeting with FSR
20 October 2014 : Meeting with Huraa Island Council
21 August 2014 : Meeting with MEE
21 August 2014 : Meeting with STELCO
19 August 2014 : Meeting with Huraa Island Council

18 August 2014 : Meeting with Huraa Island Council 18 August 2014 : Meeting with FSR 18 August 2014 : Meeting with Huraa residents 17 August 2014 : Meeting with Huraa Island Council

E.2. Summary of comments received and their consideration

Stakeholders	Comments received	Consideration of comments received
Huraa Island Council and residents	The project is welcome. The most important thing is to keep the power price at the same level as current.	No action is needed.
FSR	We must have stable power supply. We are a high-end resort and cannot risk blackouts.	Further discussions are necessary to convince FSR that there will be no power interruptions.
HPL	Yet to be consulted	-
MEE	We welcome the implementation of the project under the JCM.	No action is needed.
STELCO	We are interested in the project concept and technology.	No action is needed.

F. References

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Reference lists to support descriptions in the PDD, if any.

Annex

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Revision history of PDD

Version	Date	Contents revised
01.0	To be added	First Edition