Joint Crediting Mechanism Approved Methodology KE_AM003

"Installation of Run-of-river Small Hydropower Generation Plant"

A. Title of the methodology

Installation of Run-of-river Small Hydropower Generation Plant, Version 01.0

B. Terms and definitions

Terms	Definitions
Small hydropower plant	A small hydropower plant is a hydropower plant with an installed capacity of up to 10 MW[1].
Run-of-river hydropower plant	A run-of-river hydropower plant is a type of hydroelectric generation which does not have a dam[2].

C. Summary of the methodology

Items	Summary
GHG emission reduction measures	Displacement of electricity using fossil fuel as a power source by installation and operation of a small hydropower plant.
Calculation of reference emissions	The reference emissions are calculated on the basis of the net power output of the small hydropower plant which means the gross energy generation by the project small hydropower plant minus the auxiliary/station electricity consumption, multiplied by the conservative emission factor.
Calculation of project emissions	The project emissions are the emissions from the small hydropower plant, which are assumed to be zero.
Monitoring parameters	The quantity of electricity generated by the project small hydropower plant.

[1] If the installed capacity of the project hydropower plant is equal to or less than 30 kW and not connected to national electricity grid on the day of validation, the approved methodology KE_AM001 "Electrification of communities using Micro hydropower generation" may be applied.

[2] A dam is defined as a structure built across a river with a height greater than 15m or more from its foundation.

D. Eligibility criteria

This methodology is applicable to projects that satisfy all of the following criteria.

Criterion 1	The project installs a run-of-river small hydropower plant.

E. Emission Sources and GHG types

Reference emissions	
Emission sources	GHG types
Generation of electricity using fossil fuel as power source	CO_2
Project emissions	
Emission sources	GHG types
Generation of electricity from small hydropower plant	N/A

F. Establishment and calculation of reference emissions

F.1. Establishment of reference emissions

In order to identify the reference emission factor simplistically and secure net emission reductions, this methodology applies the lowest emission factor of diesel power generation. The most efficient diesel generator in the world has a generation efficiency close to 49%. A power generation efficiency of 49% translates into an emission factor of 0.533 tCO_2/MWh. This value is lower than the lowest standardized grid emission factor in 2014, which is 0.5793 tCO_2/MWh as the build margin calculated at that time addressed in the report published by the National Environment Management Authority of Kenya (NEMA 2014). This will ensure net emission reductions.

F.2. Calculation of reference emissions

$$RE_p = EG_p \times EF_{RE}$$

RE_p : Reference emissions during period *p* [tCO_2/p]

EG_p : Quantity of electricity generated by project small hydropower plant during period *p* [MWh/p]

EF_{RE} : Reference CO_2 emission factor [tCO_2/MWh]

G. Calculation of project emissions

$PE_p = 0$

PE_p : Project emissions during period *p* [tCO_2/p]

H. Calculation of emissions reductions

$ER_p = RE_p - PE_p$
$= RE_p$

ER_p : Emission reductions during period *p* [tCO_2/p]
RE_p : Reference emissions during period *p* [tCO_2/p]
PE_p : Project emissions during period *p* [tCO_2/p]

I. Data and parameters fixed *ex ante*

The source of each data and parameter fixed *ex ante* is listed as below.

Parameter	Description of data	Source
EF_{RE}	The reference CO_2 emission factor The default value for EF_{RE} is set to be 0.533 (tCO_2/MWh). *The efficiency of the most efficient diesel engine is close to but below 49%.	Additional information. The default value is revised if deemed necessary by the JC.

History of the document

Version	Date	Contents revised
01.0	23 March 2017	JC3, Annex 5 Initial approval.