

JCM proposed methodology and its attached sheet are preliminary drafts and have neither been officially approved under the JCM, nor are guaranteed to be officially approved under the JCM.

JCM Proposed Methodology Form

Cover sheet of the Proposed Methodology Form

Form for submitting the proposed methodology

Host Country	Vietnam
Name of the methodology proponents submitting this form	Energy Saving for Irrigation Facility by Introducing High-efficiency Pumps
Sectoral scope(s) to which the Proposed Methodology applies	Energy Saving
Title of the proposed methodology, and version number	Energy Saving for Irrigation Facility by Introducing High-efficiency Pumps , Ver1.0
List of documents to be attached to this form (please check):	<input type="checkbox"/> The attached draft JCM-PDD: <input type="checkbox"/> Additional information
Date of completion	

History of the proposed methodology

Version	Date	Contents revised

A. Title of the methodology

Energy saving by introducing high efficiency pumps in irrigation and drainage facility

B. Terms and definitions

Terms	Definitions
Pumps for irrigation system	With the implementation of JCM project, pump is renewed or newly introduced in the target facility, commercial facility etc for irrigation and drainage
Project pump	Pump which is renewed or newly introduced in the target facility in case that JCM project is conducted The size of pump is in the range from 3,000 to 4,000 (m ³ /h) as the middle size
Reference pump	Pump which is renewed or newly introduced in the target facility in case that JCM project is not conducted and also occupies major market share
Pump efficiency	Pump efficiency (%) is calculated by dividing water power (kW) by shaft input power (kW)

C. Summary of the methodology

Items	Summary
<i>GHG emission reduction measures</i>	This methodology applies to the project that aims for saving energy by introducing high efficiency pumps in the target facility in Vietnam
<i>Calculation of reference emissions</i>	Reference emissions are GHG emissions from using reference pumps, calculated with power consumption of project pumps, ratio of pump efficiency of reference/project pumps and CO ₂ emission factor for electricity consumed
<i>Calculation of project emissions</i>	Project emissions are GHG emissions from using project pumps, calculated with power consumption of project pumps and CO ₂ emission factor for electricity consumed
<i>Monitoring parameters</i>	Power consumption of project pump

D. Eligibility criteria

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

Criterion 1	Project pump is installed to irrigation and drainage facility which uses middle size pump.
Criterion 2	Project pump is a pump with a efficiency of more than 80% within a specified range of flow.
Criterion 3	Pump product maker has testing facility for product efficiency in its factory and pump system engineering facility for after-care-service.
Criterion 4	Project pump uses environmental friendly paints such as paints with 0.1 % or less lead, cadmium and tar during the production process.

E. Emission Sources and GHG types

Reference emissions	
Emission sources	GHG types
Power consumption by reference pump	CO2
Project emissions	
Emission sources	GHG types
Power consumption by project pump	CO2

F. Establishment and calculation of reference emissions

F.1. Establishment of reference emissions

Reference emissions are calculated by multiplying power consumption of project pump, ratio of pump efficiency for reference/project pumps, and CO2 emission factor for electricity consumed. The pump efficiency of reference pump is conservatively set as a default value in the following manner to ensure the net emission reductions.

1. The reference pump efficiency is set at a maximum value in corresponding capacity range.
2. The maximum values of pump efficiency are defined as " $\eta_{RE,i}$ " as described in Section I.

F.2. Calculation of reference emissions

$$RE_{i,p} = \sum_i \{ EC_{PJ,i,p} \times (\eta_{PJ,i} \div \eta_{RE,i}) \times EF_{elec} \}$$

$RE_{i,p}$: Reference emissions during the period p [tCO ₂ /p]
$EC_{PJ,i,p}$: Power consumption of project pump i during the period p [MWh/p]
$\eta_{PJ,i}$: Pump efficiency of project pump i [-]
$\eta_{RE,i}$: Pump efficiency of reference pump i [-]
EF_{elec}	: CO ₂ emission factor for consumed electricity [tCO ₂ /MWh]

G. Calculation of project emissions

$$PE_{i,p} = \sum_i (EC_{PJ,i,p} \times EF_{elec})$$

$PE_{i,p}$: Project emissions during the period p [tCO ₂ /p]
$EC_{PJ,i,p}$: Power consumption of project pump i during the period p [MWh/p]
EF_{elec}	: CO ₂ emission factor for consumed electricity [tCO ₂ /MWh]

H. Calculation of emissions reductions

$$ER_p = RE_{i,p} - PE_{i,p}$$

ER_p	: Emission reductions during the period p [tCO ₂ /p]
$RE_{i,p}$: Reference emissions during the period p [tCO ₂ /p]
$PE_{i,p}$: Project emissions during the 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_{elec}	CO ₂ emission factor for consumed electricity. When project pump consumes only grid electricity, the project participant applies the	The most recent value available at the time of validation is applied and fixed for the

Parameter	Description of data	Source
	CO2 emission factor. For grid electricity: The most recent value available from the source stated in this table at the time of validation	monitoring period thereafter. The data is sourced from the official data by Ministry of Natural Resource and Environment of Vietnam (MONRE)
$\eta_{RE,i}$	the pump efficiency of the reference pump i is the default efficiency value $\eta_{RE,i} = 0.746$	Specifications of reference pump i prepared for the quotation or factory acceptance test data by manufacturer. The default efficiency value is derived from the result of quality test on efficiency of pumps from manufacturers that has high market share. The survey should prove the use of clear methodology. The “ $\eta_{RE,i}$ ” should be revised if necessary from survey result which is conducted by JC or project participants every three years.
$\eta_{Pj,i}$	The efficiency of project pump i	Specifications of project pump i prepared for the quotation or factory acceptance test data by manufacturers.