Joint Crediting Mechanism Guidelines for Developing Proposed Methodology

CONTENTS

1. Scope and applicability

1. Joint Crediting Mechanism Guidelines for Developing Proposed Methodology (hereinafter referred to as "these Guidelines") are intended to assist each side or project participants (hereinafter referred to as "methodology proponents") in preparing proposed methodologies for the Joint Crediting Mechanism (hereinafter referred to as "JCM") (hereinafter referred to as "proposed methodologies").
2. These Guidelines are also to be referred to by the Joint Committee in developing and assessing proposed methodologies.
3. These Guidelines describe standards which are requirements to be met, except guidance indicated with terms "should" and "may" as defined in paragraph 5 below.
4. Submission and subsequent assessment of a proposed methodology are conducted in line with the procedure delineated in Joint Crediting Mechanism Project Cycle Procedure.

2. Terms and definitions

5. The following terms apply in this Guidelines:
   (a) "Should" is used to indicate that among several possibilities, one course of action is recommended as particularly suitable;
   (b) "May" is used to indicate what is permitted.
6. Terms in the Proposed Methodology Form are defined in JCM Glossary of Terms available on the JCM website.

3. Key concepts

3.1. Reference emissions

7. In the JCM, emission reductions to be credited are defined as the difference between reference emissions and project emissions.
8. The reference emissions are calculated to be below business-as-usual (BaU) emissions, either by discounting BaU emissions or by other methods determined in the methodologies to be approved by the Joint Committee.
9. The net emission reductions from JCM projects are accounted as Indonesian domestic emission reductions.

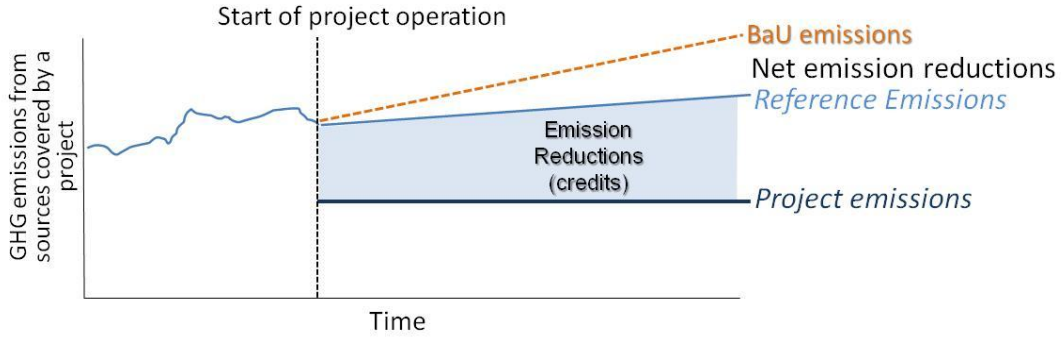

Figure: Indicative diagram of the relationship between the BaU emissions, reference emissions and project emissions

3.2. Eligibility criteria

10. Eligibility criteria in proposed methodologies contain the following:
    (a) Requirements for the project in order to be registered as a JCM project.
    (b) Requirements for the project to be able to apply the approved methodology.

4. General Guidelines

11. Methodology proponents prepare the proposed methodology by filling in the Proposed Methodology Form and the Proposed Methodology Spreadsheet, attached to these Guidelines.
12. These Guidelines, the Proposed Methodology Form and the Proposed Methodology Spreadsheet may be obtained electronically from the JCM website.
13. The Proposed Methodology Form and the Proposed Methodology Spreadsheet are completed in English language.
14. Methodology proponents provide supporting documents to justify key logical and quantitative assumptions regarding the choice of eligibility criteria, default values and establishment of reference emissions.
15. The Joint Committee develops the Proposed Methodology Form and the Proposed Methodology Spreadsheet and may revise them if necessary.
16. The Proposed Methodology Form is not altered, that is, is completed without modifying its format, font, headings. If sections of the Proposed Methodology Form are not applicable, it is explicitly stated that the section is left blank on purpose.
17. The Proposed Methodology Spreadsheet enables calculation of GHG emission reductions automatically through inputting values by project participants. The Proposed Methodology Spreadsheet consists of the following:
    (a) An Input Sheet containing all the parameters to be monitored *ex post*, project-specific parameters to be fixed *ex ante* by the project participants (e.g. historical data) as well as the default factors which can be changed by the project participants. For each

parameter, the methodology proponents fill in all the required fields, except for those of the inputted values;

(b) A Calculation Process Sheet containing all the default values which cannot be changed by the project participant, calculation process to derive reference emissions and project emissions, and the resulting emission reductions.

18. The proposed methodology:
    (a) Describes the procedures in a manner that is sufficiently explicit to enable the methodology to be used, be applied to projects unambiguously, and be reproduced by a third party;
    (b) Is possible for projects following the methodology to be subjected to JCM validation and/or verification;
    (c) Includes all algorithms, formulae, and step-by-step procedures needed to apply the methodology and validate the project, i.e. calculating reference emissions and project emissions;
    (d) Provides instructions for making any logical or quantitative assumptions that are not provided in the methodology and is made by the methodology user;
    (e) Avoids the intentional increase of credits caused by perverse incentives (e.g. when an increase in output is triggered by incentive to increase credits).
19. The presentation of values in the Proposed Methodology Form and the Proposed Methodology Spreadsheet should be in international standard format (e.g. 1,000 representing one thousand and 1.0 representing one). The units used should be accompanied by their equivalent S.I. units/norms (thousand/million) as part of the requirement to ensure transparency and clarity.

5. Instructions for completing the Proposed Methodology Form

Instructions for completing the Proposed Methodology Form are provided below. A hypothetical proposed methodology on building energy management systems (BEMS) is inserted to enhance the clarity of these Guidelines. This methodology is purely indicative and does not imply that the methodology is to be adopted.

Cover sheet of the Proposed Methodology Form	
Form for submitting the proposed methodology	
Host Country	The Republic of Indonesia
Name of the methodology proponents submitting this form	Energy Management System Japan Ltd.
Sectoral scope(s) to which the Proposed Methodology applies	3. Energy demand

Title of the proposed methodology, and version number	Improving the Efficiency of Energy Use with Building Energy Management System (BEMS) Version 01.0
List of documents to be attached to this form (please check):	☐The attached draft JCM-PDD: ☒Additional information 1) Catalog of adopted technology: BEMS 2) Regulation for energy efficiency of commercial buildings. 3) Feasibility studies and technical reports
Date of completion	01/04/2013

- *Methodology proponents should submit the proposed methodology to the Joint Committee which is established by the Republic of Indonesia and Japan.*
- *The methodology proponents are each side, project participants, or the Joint Committee.*
- *Please identify sectoral scope(s) according to the JCM sectoral scope(s) listed in Annex I.*
- *Please indicate the following: (a) The title of the proposed methodology; (b) The version number of the document. Please provide an unambiguous title for the proposed methodology. The title should reflect the project types to which the methodology is applicable. Do not use project-specific titles.*
- *If the methodology proponents have attached additional information, please provide description of the documents.*
- *Fill in the date of completion in DD/MM/YYYY.*

History of the proposed methodology

Version	Date	Contents revised
01.0	01/04/2013	First edition

- *If the methodology proponents revise a previously submitted methodology, please provide date of revision in DD/MM/YYYY as well as a brief summary of revision.*

A. Title of the methodology

Improving the Efficiency of Energy Use with Building Energy Management System (BEMS) Version 01.0

- *Please indicate the following: (a) The title of the proposed methodology; (b) The version number of the document. Provide an unambiguous title for the proposed methodology. The title should reflect the project types to which the methodology is applicable. Do not use project-specific titles.*
- *Please include the GHG emission reduction measures (e.g. technology, product, or service) adopted.*

B. Terms and definitions

Terms	Definitions
BEMS	BEMS is a computer system designed to recognize the status of energy use within indoor environments in commercial buildings and so forth using; measurement/gauging, control, and monitoring devices; analysis, diagnosis, and data storage equipment in an attempt to “control” energy consuming operations of equipment and facilities in these structures. Furthermore, if the system is utilized for “visualization" only, it is not to be directly used for emission reductions. Therefore, such project is not to be included in this methodology

- *Please provide definitions of key terms that are used in the proposed methodology.*

C. Summary of the methodology

Items	Summary
GHG emission reduction measures	Building energy management system (BEMS) that improves the efficiency of energy consumption for existing buildings by monitoring and regulating electricity and fuel consumption.
Calculation of reference emissions	Reference emissions is calculated on the basis of project emissions derived from monitored fuel and electricity consumption, under the assumption that certain percentage of energy consumption is decreased through introduction of BEMS.

	The BaU scenario assumes that BEMS will not be introduced in the Republic of Indonesia, which is justified since there are currently no plans to introduce BEMS. In the methodology, the rates of emission reductions through various BEMS measures are fixed at a rate lower than those commonly observed. Therefore, the methodology results in a net reduction of emissions, since reference emissions are lower than BaU emissions.
Calculation of project emissions	Project emissions are calculated on the basis of monitored electricity and fuel consumption.
Monitoring parameters	Electricity and fuel consumption are monitored.

- *Please summarize the key elements of the proposed methodology, including brief description on:*
  - *GHG emission reduction measures;*
  - *How the proposed methodology calculates the reference emissions;*
  - *How the proposed methodology calculates the project emissions;*
  - *Key monitoring parameters and methods.*

D. Eligibility criteria

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

Criterion 1	Energy Management System is to be introduced in already existing buildings.
Criterion 2	The operation and control of equipment and facilities to reduce energy consumption for indoor environments are to be carried out by Energy Management System itself, not just upgrading equipments for energy consumption.
Criterion 3	Be able to identify all energy consumption in the building(s) having equipment controlled by Energy Management System.

- *Eligibility criteria are those that can be examined objectively.*
- *Eligibility criteria include:*
  - *Characteristics to identify the measures (e.g. technology, product, or service) applied to the methodology;*
  - *Conditions that are necessary in order to enable robust calculation of GHG emission*

reductions by the algorithm contained in the methodology, e.g. the situation before the implementation of the measure, in cases where reference emissions is calculated on the basis of historical performance of the facility.

- *Eligibility criteria should be, to the extent possible, those that can be ascertained upon validation, i.e. eligibility criteria should avoid those which need to be monitored ex post. For example, actual performance of a measure should not be included as eligibility criteria, since it is not certain at the validation whether the stated performance can be achieved. On the other hand, performance as defined by nameplate figures can be included as eligibility criteria since it can be readily checked upon validation.*
- *Eligibility criteria may be represented by:*
  - *Certain technology (e.g. ultra supercritical coal fired power plants);*
  - *Certain technology with a design efficiency or performance indicator above a certain threshold (e.g. a power plant with a thermal efficiency above X%);*
  - *Certain sector to which the measure is applied.*

E. Emission Sources and GHG types

The emission sources include all the following GHG emission sources and GHG types in the building to which BEMS is applied.

Reference emissions	
Emission sources	GHG types
Electricity consumption by lighting	CO_2
Electricity consumption by air conditioner	CO_2
Diesel fuel consumption by boiler	CO_2
Electricity consumption by fan	CO_2
Electricity consumption by ICT equipments	CO_2
N/A	N/A
N/A	N/A
Project emissions	
Emission sources	GHG types
Electricity consumption by lighting	CO_2
Electricity consumption by air conditioner	CO_2
Diesel fuel consumption by boiler	CO_2
Electricity consumption by fan	CO_2
Electricity consumption by ICT equipments	CO_2

N/A	N/A
N/A	N/A

- *Please identify all GHG emissions by sources that are significant and reasonably attributable to the JCM project.*
- *If deemed appropriate, please explain whether any sources related to the reference emissions or the project emissions have been excluded, and if so, justify their exclusion.*
- *Upstream emissions may be excluded unless they are deemed to be significant.*

F. Establishment and calculation of reference emissions

F.1. Establishment of reference emissions

Reference emissions are calculated on the basis of project emissions derived from monitored fuel and electricity consumption, under the assumption that certain percentage of energy consumption is decreased through introduction of BEMS.

The BaU emissions assume the emissions when BEMS will not be introduced in the Republic of Indonesia, which is justified since there are currently no plans to introduce BEMS.

In the methodology, the rates of emission reductions through various BEMS measures are fixed at a rate lower than those commonly observed. Therefore, the methodology results in a net reduction of emissions, since reference emissions are lower than the BaU emissions.

F.2. Calculation of reference emissions

~~RE_y = ($PEC_{,y}$~~RE_p = (PEC_p * $EF_{e,yp}$ + Σ(-$PFC_{i,y}$ ~~* NCV_{yp}~~ * $NCV_{i,p}$ * $EF_{CO2,f,i,yp}$)) / (100% - EER_j)

~~RE_y~~RE_p	Reference CO_2 emissions during the period ~~of year y~~*p* [tCO_2/~~y~~p]
~~PEC_y~~PEC_p	Project electricity consumption by applicable equipment ~~in year y~~during the period *p* [MWh/~~y~~p]
$EF_{e,yp}$	CO_2 emissions factor of electricity ~~in year y~~during the period *p* [tCO_2/MWh]
$PFC_{i,yp}$	Project consumption of fossil fuel *i* of the applicable equipment ~~in year y~~during the period *p* [kl, t, 1000 Nm^3/~~y~~p]
~~NCV_y~~$NCV_{i,p}$	Net calorific value of fossil fuel *i* (diesel, kerosene, natural gas, etc.) ~~in year y~~ during the period *p* [GJ/kl, t, 1000 Nm^3] *Any default value (XX GJ/kl, t, 1000 Nm^3) or specific value for the project that the project participants measure is available.
$EF_{CO2,f,i,yp}$	CO_2 emissions factor of fossil fuel *i* (diesel, kerosene, natural gas, etc.) ~~in year y~~ during the period *p* [tCO_2/GJ]

EER_j	Percentage of improvement in energy consumption efficiency [%] for building type *j* using BEMS	
	Office building	VV%
	Commercial building	WW%
	Hotel	XX%
	Hospital	YY%
	Other	ZZ%

- *Please provide only one procedure for establishing reference emissions, which, in the view of the methodology proponent, represents plausible emissions in providing the same outputs or service level of the proposed JCM project in the Republic of Indonesia.*
- *Reference emissions should be established, taking into account the following:*
  - *If the reference emissions are defined by multiplying an emission factor and an output, the output should be identical to or less than the monitored output of the project.*
  - *The reference emissions should comply with all applicable regulations of the Republic of Indonesia.*
- *Please provide a description on how the reference emissions are derived. Provide also a description of how and why the reference emissions are below the BaU emissions.*
- *Reference emissions may be derived from:*
  - *The current situation and performance;*
  - *Average historical performance;*
  - *Performance of similar products and technologies which compete with the project technology;*
  - *Legal requirements;*
  - *Voluntary standards and targets;*
  - *Best available technology of the Republic of Indonesia.*

- *Please elaborate the method to calculate the reference emissions. Please be specific and complete, so that the procedure can be carried out in an unambiguous way, replicated, and subjected to assessment and verification:*
  - *Please explain the underlying rationale for the method to calculate (e.g. marginal vs. average, etc.);*
  - *Please use consistent variables, equation formats, subscripts, etc.;*
  - *Please number all equations in the Proposed Methodology Form;*
  - *Please define all variables, with units indicated;*
  - *Please justify the conservativeness of the method to calculate.*
- *Please elaborate all parameters, coefficients, and variables used in the calculation of*

reference emissions:

- *For those values that are provided in the methodology:*
  - *Please clearly indicate the precise references from which these values are taken (e.g. official statistics, IPCC Guidelines, commercial and scientific literature);*
  - *Justify the conservativeness of the values provided.*
- *For those values that are to be provided by the project participants, please clearly indicate how the values are to be selected and justified, for example, by explaining:*
  - *What types of sources are suitable (official statistics, expert judgment, proprietary data, IPCC Guidelines, commercial and scientific literature, etc.);*
  - *The vintage of data that is suitable;*
  - *What spatial level of data is suitable (local, regional, national, international);*
  - *How conservativeness of the values is to be ensured.*

- *For all data to be monitored or recorded by the project participants, please specify the procedures to be followed if expected data are unavailable. For instance, the methodology could point to a preferred data source, and indicate a priority order for use of additional data and/or fall back data sources to preferred sources (e.g. private, international statistics, etc.).*
- *Please note any parameters, coefficients, variables, etc. that are used to calculate reference emissions but should be obtained through monitoring.*
- *Please explain any parts of the method to calculate that are not self-evident. Provide references as necessary. Explain implicit and explicit key assumptions in a transparent manner.*
- *When referring to and/or making use of life cycle analysis (LCAs) and/or LCA tools, methodology proponents provide, in a transparent manner, all equations, parameterizations and assumptions used in the LCA. For example, this could be accomplished by highlighting the relevant sections in an attached copy of the referenced LCA.*
- *The most recent IPCC default values may be used as necessary, when country or project specific data are not available or difficult to obtain.*
- *Methodologies requiring sampling as a part of monitoring clearly indicate the sampling method, statistical treatment of sampled data (e.g. confidence level, margin of error). A useful reference is the statistical treatment of sampled data for large scale CDM project activities in latest version of "Standard for Sampling And Surveys For CDM Project Activities and Programme of Activities" for large-scale CDM project activities.*
- *Emission reductions from reduced consumption of international transport fuels cannot be claimed under the JCM.*

G. Calculation of project emissions

Project emissions are calculated on the basis of monitored electricity and fuel consumption.

~~$PE_y = PEC_y$~~ $PE_p = PEC_p * EF_{e,yp} + \Sigma(PFC_{i,y}$ ~~$* NCV_{yp}$~~ $* NCV_{i,p} * EF_{CO2,f,i,yp})$

~~PE_y~~PE_p	Project CO_2 emissions ~~in year *y*~~during the period *p* [tCO_2/~~y~~p]
~~PEC_y~~PEC_p	Project electricity consumption by applicable equipment ~~in year *y*~~during the period *p* [MWh/~~y~~p]
$EF_{e,yp}$	CO_2 emissions factor of electricity ~~in year *y*~~during the period *p* [tCO_2/MWh]
$PFC_{i,yp}$	Project consumption of fossil fuel *i* of the applicable equipment ~~in year *y*~~during the period *p* [kl, t, 1000 Nm^3/~~y~~p]
~~NCV_y~~$NCV_{i,p}$	Net calorific value of fossil fuel *i* (diesel, kerosene, natural gas, etc.)~~ in year *y*~~ during the period *p* [GJ/kl, t, 1000 Nm^3] *Any default value (XXGJ/kl, t, 1000 Nm^3) or specific value for the project that the project developer measures is available.
$EF_{CO2,f,i,yp}$	CO_2 emissions factor for fossil fuel *i* (diesel, kerosene, natural gas, etc.)~~ in year *y*~~ during the period *p* [tCO_2/GJ]

- *Where applicable, method to calculate project emissions should adhere to the instruction provided in the section on the reference emissions.*

H. Calculation of emissions reductions

Emission reductions are calculated as the difference between the reference emissions and project emissions, as follows.

~~$ER_y = RE_y - PE_y$~~

~~ER_y~~$ER_p = RE_p - PE_p$

ER_p	GHG emission reductions ~~in year *y*~~during the period *p* [tCO_2e/p]
~~RE_y~~RE_p	Reference emissions ~~in year *y*~~during the period *p* [tCO_2e/~~y~~p]
~~PE_y~~PE_p	Project emissions ~~in year *y*~~during the period *p* [tCO_2e/~~y~~p]

- *Please elaborate the method to calculate used to estimate, measure or calculate the emission reductions from the JCM project. In most cases, this will be simple equation with two terms: the reference emissions, and the project emissions.*

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
EER_j	Percentage of improvement in energy consumption efficiency for building type *j* using BEMS	Results of feasibility studies and existing technical reports.
$EF_{e,~~y~~p}$	CO_2 emissions factor of electricity ~~in year y~~during the period *p*	IEA CO_2 emissions from fuel combustion 2011 edition
~~NCV_y~~$NCV_{i,p}$	Net calorific value of fossil fuel *i* (diesel, kerosene, natural gas, etc.) ~~in year y~~during the period *p*	IPCC guideline 2006
$EF_{CO2,f,i,~~y~~p}$	CO_2 emissions factor of fossil fuel *i* (diesel, kerosene, natural gas, etc.) ~~in year y~~during the period *p*	IPCC guideline 2006

- *Please identify sources of default values, where default values are applied to the proposed methodology.*

6. Instructions for completing the Proposed Methodology Spreadsheet

Instructions for completing the Proposed Methodology Spreadsheet are provided below. The Input Sheet of the Proposed Methodology Spreadsheet should be completed as follows. A hypothetical Input Sheet of the Proposed Methodology Spreadsheet on building energy management systems (BEMS) is inserted to enhance the clarity of these Guidelines. This is purely indicative and does not imply that the Input Sheet of the Proposed Methodology Spreadsheet is adopted.

Proposed methodology spreadsheet (input sheet) [Attachment to Proposed Methodology Form]

Table 1: Parameters to be monitored *ex post*

(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)
Monitoring point No.	Parameters	Description of data	Estimated Values	Units	Monitoring option	Source of data	Measurement methods and procedures	Monitoring frequency	Other comments
(1)	$PFC_{D,y}$	Project diesel fuel consumption during the period of year y		kl/y	Option B	purchase records	- Collecting purchase amount from retailer invoices and inputting to a spreadsheet manually - Project deputy managers double check the input data with invoices every 6 months	once a month	
(2)	PEC_y	Project electricity consumption during the period of year y		MWh/y	Option C	monitored data	- Collecting electricity consumption data with validated/calibrated electricity monitoring devices and inputting to a spreadsheet electrically - Verified monitoring devices are installed and they are calibrated once a year. - Verification and calibration shall meet international standard on corresponding monitoring devices.	continuous	
(3)	$PFC_{L,y}$	Project LPG consumption during the period of year y		t/y	N/A	N/A	N/A	N/A	N/A
(4)	$PFC_{N,y}$	Project natural gas consumption during the period of year y		$1000Nm^3/y$	N/A	N/A	N/A	N/A	N/A
(5)	$PFC_{K,y}$	Project kerosene consumption during the period of year y		kl/y	N/A	N/A	N/A	N/A	N/A

Table 2: Project-specific parameters to be fixed *ex ante*

(a)	(b)	(c)	(d)	(e)	(f)
Parameters	Description of data	Estimated Values	Units	Source of data	Other comments
EER_{office}	Percentage of improvement in energy consumption efficiency for [Office Building] using BEMS		%	Past records of 30 similar size office buildings for the period of 2008-2012 measured by the project participant, BEMS provider. Data set of each building has the data of before and after BEMS implementation at least for one year respectively.	

Table3: *Ex-ante* estimation of CO_2 emission reductions

CO_2 emission reductions	Units
0	tCO_2/y

[Monitoring option]

Option A	Based on public data which is measured by entities other than the project participants (Data used: publicly recognized data such as statistical data and specifications)
Option B	Based on the amount of transaction which is measured directly using measuring equipments (Data used: commercial evidence such as invoices)
Option C	Based on the actual measurement using measuring equipments (Data used: measured values)

Proposed methodology spreadsheet (input sheet) [Attachment to Proposed Methodology Form]

Table 1: Parameters to be monitored *ex post*

(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)
Monitoring point No.	Parameters	Description of data	Estimated Values	Units	Monitoring option	Source of data	Measurement methods and procedures	Monitoring frequency	Other comments
(1)	$PFC_{D,p}$	Project diesel fuel consumption during the period *p*		kl/p	Option B	purchase records	- Collecting purchase amount from retailer invoices and inputting to a spreadsheet manually - Project deputy managers double check the input data with invoices every 6 months	once a month	
(2)	PEC_p	Project electricity consumption during the period *p*		MWh/p	Option C	monitored data	- Collecting electricity consumption data with validated/calibrated electricity monitoring devices and inputting to a spreadsheet electrically - Verified monitoring devices are installed and they are calibrated once a year. - Verification and calibration shall meet international standard on corresponding monitoring devices.	continuous	
(3)	$PFC_{L,p}$	Project LPG consumption during the period *p*		t/p	N/A	N/A	N/A	N/A	N/A
(4)	$PFC_{N,p}$	Project natural gas consumption during the period *p*		$1000Nm^3/p$	N/A	N/A	N/A	N/A	N/A
(5)	$PFC_{K,p}$	Project kerosene consumption during the period *p*		kl/p	N/A	N/A	N/A	N/A	N/A

Table 2: Project-specific parameters to be fixed *ex ante*

(a)	(b)	(c)	(d)	(e)	(f)
Parameters	Description of data	Estimated Values	Units	Source of data	Other comments
EER_{office}	Percentage of improvement in energy consumption efficiency for [Office Building] using BEMS		%	Past records of 30 similar size office buildings for the period of 2008-2012 measured by the project participant, BEMS provider. Data set of each building has the data of before and after BEMS implementation at least for one year respectively.	

Table3: *Ex-ante* estimation of CO_2 emission reductions

CO_2 emission reductions	Units
0	tCO_2/p

[Monitoring option]

Option A	Based on public data which is measured by entities other than the project participants (Data used: publicly recognized data such as statistical data and specifications)
Option B	Based on the amount of transaction which is measured directly using measuring equipments (Data used: commercial evidence such as invoices)
Option C	Based on the actual measurement using measuring equipments (Data used: measured values)

The Calculation Process Sheet of the Proposed Methodology Spreadsheet should be completed as follows. A hypothetical Calculation Process Sheet of the Proposed Methodology Spreadsheet on building energy management systems (BEMS) is inserted to enhance the clarity of these Guidelines. This is purely indicative and does not imply that the Calculation Process Sheet is adopted.

Proposed methodology spreadsheet (Calculation Process Sheet) [Attachment to Proposed Methodology Form]

1. Calculations for emission reductions	Fuel type	Value	Units	Parameter
Emission reductions during the period of year y		0	tCO_2/y	ER_y
2. Selected default values, etc.				
CO_2 emission factor of electricity in year y	Electricity	0.456	tCO_2/MWh	$EF_{e,y}$
Net calorific value of fossil fuel in year y #1	Diesel	37.7	GJ/kl	$NCV_{D,y}$
CO_2 emission factor of fossil fuel in year y #1	Diesel	0.0687	tCO_2/GJ	$EF_{CO2,f,D,y}$
Net calorific value of fossil fuel in year y #2	LPG	50.8	GJ/t	$NCV_{L,y}$
CO_2 emission factor of fossil fuel in year y #2	LPG	0.0599	tCO_2/GJ	$EF_{CO2,f,L,y}$
Net calorific value of fossil fuel in year y #3	Natural gas	43.5	GJ/1000Nm3	$NCV_{N,y}$
CO_2 emission factor of fossil fuel in year y #3	Natural gas	0.051	tCO_2/GJ	$EF_{CO2,f,N,y}$
Net calorific value of fossil fuel in year y #4	Kerosene	36.7	GJ/kl	$NCV_{K,y}$
CO_2 emission factor of fossil fuel in year y #4	Kerosene	0.0679	tCO_2/GJ	$EF_{CO2,f,K,y}$
3. Calculations for reference emissions				
Reference emissions during the period of year y		0	tCO_2/y	RE_y
Project emissions during the period of year y		0	tCO_2/y	PE_y
Energy use reduction coefficient with BEMS	Office building	10.0	%	EER_j
4. Calculations of the project emissions				
Project emissions during the period of year y		0	tCO_2/y	PE_y
Project emissions (electricity) during the period of year y		0	tCO_{2e}/y	
Project electricity consumption during the period of year y	Electricity	0	MWh/y	PECy
CO_2 emission factor of electricity	Electricity	0.456	tCO_2/MWh	$EF_{e,y}$
Project emissions (diesel) during the period of year y		0	tCO_2/y	
Project diesel fuel consumption during the period of year y		0	kl/y	$PFC_{D,y}$
Net calorific value of fossil fuel	Diesel	37.7	GJ/kl	$NCV_{D,y}$
CO_2 emission factor of fossil fuel	Diesel	0.0687	tCO_2/GJ	$EF_{CO2,f,D,y}$
Project emissions (LPG) during the period of year y		0	tCO_2/y	
Project LPG consumption during the period of year y		0	t/y	$PFC_{L,y}$
Net calorific value of fossil fuel	LPG	50.8	GJ/t	$NCV_{L,y}$
CO_2 emission factor of fossil fuel	LPG	0.0599	tCO_2/GJ	$EF_{CO2,f,L,y}$
Project emissions (natural gas) during the period of year y		0	tCO_2/y	
Project natural gas consumption during the period of year y		0	$1000Nm^3/y$	$PFC_{N,y}$
Net calorific value of fossil fuel	Natural gas	43.5	GJ/1000Nm3	$NCV_{N,y}$
CO_2 emission factor of fossil fuel	Natural gas	0.051	tCO_2/GJ	$EF_{CO2,f,N,y}$
Project emissions (kerosene) during the period of year y		0	tCO_2/y	
Project kerosene consumption during the period of year y		kl/y	kl/y	$PFC_{K,y}$
Net calorific value of fossil fuel	Kerosene	36.7	GJ/kl	$NCV_{K,y}$
CO_2 emission factor of fossil fuel	Kerosene	0.0679	tCO_2/GJ	$EF_{CO2,f,K,y}$

[List of Default Values]

Net calorific value of fossil fuel	$NCV_{i,y}$	
Diesel	37.7	GJ/kl
LPG	50.8	GJ/t
Natural gas	43.5	$GJ/1000Nm^3$
Kerosene	36.7	GJ/kl

CO_2 emission factor of fossil fuel	$EF_{f,i,y}$	
Diesel	0.0687	tCO_2/GJ
LPG	0.0599	tCO_2/GJ
Natural gas	0.051	tCO_2/GJ
Kerosene	0.0679	tCO_2/GJ

Units of fossil fuel	
Diesel	kl/y
LPG	t/y
Natural gas	$1000Nm^3/y$
Kerosene	kl/y

CO_2 emission factor of electricity	$EF_{e,y}$
Electricity	0.456

Emissions reduction coefficient with BEMS	EER	
Office building	10	%
Commercial building	20	%
Hotel	30	%
Hospital	40	%
Other	50	%

Proposed methodology spreadsheet (Calculation Process Sheet) [Attachment to Proposed Methodology Form]

1. Calculations for emission reductions	Fuel type	Value	Units	Parameter
Emission reductions during the period *p*		0	tCO_2/p	ER_p
2. Selected default values, etc.				
CO_2 emission factor of electricity during the period *p*	Electricity	0.456	tCO_2/MWh	$EF_{e,p}$
Net calorific value of fossil fuel during the period *p* #1	Diesel	37.7	GJ/kl	$NCV_{D,p}$
CO_2 emission factor of fossil fuel during the period *p* #1	Diesel	0.0687	tCO_2/GJ	$EF_{CO2,f,D,p}$
Net calorific value of fossil fuel during the period *p* #2	LPG	50.8	GJ/t	$NCV_{L,p}$
CO_2 emission factor of fossil fuel during the period *p* #2	LPG	0.0599	tCO_2/GJ	$EF_{CO2,f,L,p}$
Net calorific value of fossil fuel during the period *p* #3	Natural gas	43.5	GJ/1000Nm3	$NCV_{N,p}$
CO_2 emission factor of fossil fuel during the period *p* #3	Natural gas	0.051	tCO_2/GJ	$EF_{CO2,f,N,p}$
Net calorific value of fossil fuel during the period *p* #4	Kerosene	36.7	GJ/kl	$NCV_{K,p}$
CO_2 emission factor of fossil fuel during the period *p* #4	Kerosene	0.0679	tCO_2/GJ	$EF_{CO2,f,K,p}$
3. Calculations for reference emissions				
Reference emissions during the period *p*		0	tCO_2/p	RE_p
Project emissions during the period *p*		0	tCO_2/p	PE_p
Energy use reduction coefficient with BEMS	Office building	10.0	%	EER_j
4. Calculations of the project emissions				
Project emissions during the period *p*		0	tCO_2/p	PE_p
Project emissions (electricity) during the period *p*		0	tCO_{2e}/p	
Project electricity consumption during the period *p*	Electricity	0	MWh/p	PEC_p
CO_2 emission factor of electricity	Electricity	0.456	tCO_2/MWh	$EF_{e,p}$
Project emissions (diesel) during the period *p*		0	tCO_2/p	
Project diesel fuel consumption during the period *p*		0	kl/p	$PFC_{D,p}$
Net calorific value of fossil fuel	Diesel	37.7	GJ/kl	$NCV_{D,p}$
CO_2 emission factor of fossil fuel	Diesel	0.0687	tCO_2/GJ	$EF_{CO2,f,D,p}$
Project emissions (LPG) during the period *p*		0	tCO_2/p	
Project LPG consumption during the period *p*		0	t/p	$PFC_{L,p}$
Net calorific value of fossil fuel	LPG	50.8	GJ/t	$NCV_{L,p}$
CO_2 emission factor of fossil fuel	LPG	0.0599	tCO_2/GJ	$EF_{CO2,f,L,p}$
Project emissions (natural gas) during the period *p*		0	tCO_2/p	
Project natural gas consumption during the period *p*		0	$1000Nm^3/p$	$PFC_{N,p}$
Net calorific value of fossil fuel	Natural gas	43.5	GJ/1000Nm3	$NCV_{N,p}$
CO_2 emission factor of fossil fuel	Natural gas	0.051	tCO_2/GJ	$EF_{CO2,f,N,p}$
Project emissions (kerosene) during the period *p*		0	tCO_2/p	
Project kerosene consumption during the period *p*		0	kl/p	$PFC_{K,p}$
Net calorific value of fossil fuel	Kerosene	36.7	GJ/kl	$NCV_{K,p}$
CO_2 emission factor of fossil fuel	Kerosene	0.0679	tCO_2/GJ	$EF_{CO2,f,K,p}$

[List of Default Values]

Net calorific value of fossil fuel	$NCV_{i,p}$	
Diesel	37.7	GJ/kl
LPG	50.8	GJ/t
Natural gas	43.5	$GJ/1000Nm^3$
Kerosene	36.7	GJ/kl

CO_2 emission factor of fossil fuel	$EF_{f,i,p}$	
Diesel	0.0687	tCO_2/GJ
LPG	0.0599	tCO_2/GJ
Natural gas	0.051	tCO_2/GJ
Kerosene	0.0679	tCO_2/GJ

Units of fossil fuel	
Diesel	kl/p
LPG	t/p
Natural gas	$1000Nm^3/p$
Kerosene	kl/p

CO_2 emission factor of electricity	$EF_{e,p}$
Electricity	0.456

Emissions reduction coefficient with BEMS	EER	
Office building	10	%
Commercial building	20	%
Hotel	30	%
Hospital	40	%
Other	50	%

- *The Input Sheet of the Proposed Methodology Spreadsheet consists of a table of parameters to be monitored ex post, and parameters to be fixed ex ante, which, combined, should provide a complete listing of the data that needs to be collected for the application of the methodology. The tables may include data that is collected from other sources (e.g. official statistics, expert judgment, proprietary data, IPCC Guidelines, commercial and scientific literature, etc.), measured, or sampled. Parameters that are calculated with equations provided in the methodology should not be included in this section.*

For the "Parameters to be monitored ex post"(table 1), the following items are filled:

- *Parameter: the variable used in equations in the proposed methodology;*
- *Description of data: a clear and unambiguous description of the parameter;*
- *Estimated value: this field is for the project participants to fill in to calculate emission reductions, and may be left blank in the proposed methodology.*
- *Unit: The International System Unit (SI units – refer to <http://www.bipm.fr/enus/3_SI/si.html>)*
- *Monitoring option: please select option(s) from below. If appropriate, please provide the order of priority and the conditions when the options are chosen.*
  - *Option A: Based on public data which is measured by entities other than the project participants (Data used: publicly recognized data such as statistical data and specifications)*
  - *Option B: Based on the amount of transaction which is measured directly using measuring equipments (Data used: commercial evidence such as invoices)*
  - *Option C: Based on the actual measurement using measuring equipments (Data used: measured values)*
- *Source of data: A description which data sources should be used to determine this parameter. Clearly indicate how the values are to be selected and justified, for example, by explaining:*
  - *What types of sources are suitable (official statistics, expert judgment, proprietary data, IPCC, commercial and scientific literature, etc.);*
  - *What spatial level of data is suitable (local, regional, national, international).*
- *Measurement methods and procedures: For option B and C, a description of the measurement procedures or reference to appropriate standards. Provide also QA/QC procedures.*
- *Monitoring frequency: A description of the frequency of monitoring (e.g. continuously, annually, etc).*
- *Other Comments: Other input not covered by the items above.*

- *Where applicable, the table "Parameters to be fixed ex ante"(table 2), should also adhere to the instruction provided above. Data that is determined only once and remains fixed should be considered under "I. Data and parameters fixed ex ante".*

Annex I. Sectoral Scopes for the JCM

1. Energy industries (renewable - / non-renewable sources);
2. Energy distribution;
3. Energy demand;
4. Manufacturing industries;
5. Chemical industry;
6. Construction;
7. Transport;
8. Mining/Mineral production;
9. Metal production;
10. Fugitive emissions from fuels (solid, oil and gas);
11. Fugitive emissions from production and consumption of halocarbons and sulphur hexafluoride;
12. Solvents use;
13. Waste handling and disposal;
14. Reducing Emissions from Deforestation and Forest Degradation in developing countries; and the role of conservation, sustainable management of forests and enhancement of forest carbon stocks in developing countries (REDD-plus);
15. Agriculture.