JCM Proposed Methodology Form

Cover sheet of the Proposed Methodology Form

Form for submitting the proposed methodology

Host Country	Republic of Tunisia
Name of the methodology proponents submitting this form	EX Research Institute Ltd. Institute for Global Environmental Strategies
Sectoral scope(s) to which the Proposed Methodology applies	13. Waste handling and disposal
Title of the proposed methodology, and version number	Introduction of semi-aerobic landfill technology in solid waste disposal site (SWDS), Version. 01.0
List of documents to be attached to this form (please check):	☐The attached draft JCM-PDD: ☒Additional information
Date of completion	17/07/2025

History of the proposed methodology

Version	Date	Contents revised
01.0	17/07/2025	First edition

A. Title of the methodology

Introduction of semi-aerobic landfill technology in solid waste disposal site (SWDS), Version. 01.0

B. Terms and definitions

Terms	Definitions
Municipal solid waste (MSW)	A heterogeneous mix of different solid waste types, usually collected by local authorities or licensed companies. MSW usually includes household waste, garden/park waste and commercial/institutional waste.
Solid waste disposal site (SWDS)	Designated areas intended as the final disposal place for solid waste.
Landfill gas (LFG)	A natural byproduct of the decomposition of organic material in landfills. LFG is composed of methane (the primary component of natural gas), carbon dioxide (CO_2) and a small amount of non-methane organic compounds.
Managed SWDS	An SWDS that has controlled placement of waste (i.e. waste directed to specific deposition areas, a degree of control of scavenging and a degree of control of fires) and will include at least one of the following: (i) cover material; (ii) mechanical compacting; or (iii) levelling of the waste.
Anaerobic managed SWDS	A managed SWDS which does not have a specific structure to allow the introduction of air into waste layers.
Unmanaged SWDS	An SWDS which does not satisfy any of the conditions to be considered a managed SWDS such as an open dumping site.
Semi-aerobic landfill type	It is a landfill type with a structure that allows air to be naturally introduced into the waste layers without mechanical injection. This is achieved through a structure of the installation of crushed stones surrounding leachate collection pipes that are laid at the bottom of the landfill and vertical perforated ventilation pipes. The leachate collection pipes function both for draining away leachate

	and for air intake. Semi-aerobic condition by introduction of air contributes to accelerating decomposition of the waste materials under aerobic fermentation conditions and avoiding methane gas generation. Having a structure of this landfill type is called as "the Fukuoka Method".

C. Summary of the methodology

Items	Summary
GHG emission reduction measures	Introduction of semi-aerobic landfill technology in SWDS reduces methane emissions from SWDS.
Calculation of reference emissions	Reference emissions are calculated as the CH_4 emissions from anaerobic managed SWDS: Calculated from the amount of MSW and fraction of each waste type disposed at the anaerobic managed SWDS using the first order decay (FOD) model.
Calculation of project emissions	● Project emissions are calculated as a sum of the following emissions: ➢ CH_4 emissions from the project SWDS: Calculated from the amount of MSW and fraction of each waste type disposed at the project semi-aerobic SWDS using the first order decay (FOD) model. ➢ CO_2 emissions from on-site consumption of electricity by project: Amount of the electricity consumed by project multiplied by CO_2 emission factor for electricity. ➢ CO_2 emissions from on-site consumption of fossil fuel by project: Amount of the fossil fuel consumed by project multiplied by net calorific value the fossil fuel and CO_2 emission factor for the fossil fuel.
Monitoring parameters	● Total amount of MSW disposed at the project SWDS ● Weight fraction of the waste type ● Amount of the electricity consumed by project ● Amount of the fossil fuel consumed by project ● Year in the time period in which waste is disposed at the SWDS

D. Eligibility criteria

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

Criterion 1	The project introduces a semi-aerobic landfill technology in an SWDS that is newly established or in a new cell in an existing anaerobic managed SWDS.
Criterion 2	(In case of project in an existing SWDS) The project is limited to the new cell with semi-aerobic landfill technology aiming at reducing landfill gas emissions. In case the semi-aerobic technology cell constructed as part of the project is adjacent to a conventional cell (non-semi-aerobic type), the semi-aerobic condition at the project cell is kept by installing gas ventilation pipes. No migration of landfill gas between the cells covered under the project and other cells is allowed.
Criterion 3	If mandatory environmental regulations require avoidance of methane gas emissions from SWDS (i.e. collection and flaring and/or collection and energy utilization), the corresponding compliance rate is below 50% in Tunisia. Since the time when the monitored compliance with the regulations rate exceeds 50%, the project receives no further credits.

E. Emission Sources and GHG types

Reference emissions	
Emission sources	GHG types
CH_4 generated from anaerobic managed SWDS	CH_4
Project emissions	
Emission sources	GHG types
CH_4 generated from project SWDS	CH_4
Electricity consumption of by project	CO_2
Fossil fuel consumption of by project	CO_2

F. Establishment and calculation of reference emissions

F.1. Establishment of reference emissions

According to the Nationally Determined Contributions (NDCs) of Tunisia, the Business as Usual (BaU) emissions are quantified as follows (see Additional information for detail):

Total National BaU GHG Emissions in 2030 are 49.9 Mt CO_2e, while Waste Sector (including wastewater) BaU Emissions in 2030 are 5.2 Mt CO_2e (approximate).
The NDC assumes that BaU landfill is burying waste in anaerobic managed landfills with limited gas capture. Thus, to ensure that the refence emissions are set below the BaU emissions in a conservative manners, the reference emissions are calculated by applying a 0.73 factor to the BaU emissions, reflecting Tunisia's unconditional contribution corresponds to a reduction in carbon intensity of 27%.

F.2. Calculation of reference emissions

$$RE_p = \sum_{y=p_{start}}^{p_{end}} \left[\varphi_{RE} \times GWP_{CH4} \times (1 - OX) \times \frac{16}{12} \times F \times DOC_f \times MCF_{RE} \times (1 - f_{y,p}) \times \sum_{x=1}^{y-1} \sum_{i} \{ W_{PJ,x} \times P_{i,x} \times DOC_i \times e^{-k_i(y-1-x)} \times (1 - e^{-k_i}) \} \times 0.73 \right]$$

Where:

RE_p	:	Reference emissions during the period p [tCO_2e/p]
y	:	The N[th] year from the first disposal, extending from the first year of the period p ($y=p_{start}$) to the last year of the period p ($y=p_{end}$). If y is equal to 1, methane generation cannot be accounted.
p_{start}	:	The N[th] year from the first disposal, which is the first year of the period p
p_{end}	:	The N[th] year from the first disposal, which is the last year of the period p
φ_{RE}	:	Model correction factor to account for model uncertainties in reference
$f_{y,p}$	:	Fraction of methane from an SWDS that is controlled under mandatory environmental regulations in Tunisia—through destruction, utilization, or other approved measures— during year y of period p
GWP_{CH4}	:	Global Warming Potential of CH_4 [tCO_2e/tCH_4]
OX	:	Oxidation factor (reflecting the amount of methane from an SWDS that is oxidized in the soil or other material covering the waste)
$\frac{16}{12}$	:	Conversion factor [tCH_4/tC]
F	:	Fraction of methane in LFG [volume fraction]
DOC_f	:	Fraction of degradable organic carbon (DOC) that decomposes under the specific conditions occurring in an SWDS [weight fraction]
MCF_{RE}	:	Methane correction factor for reference SWDS

x	:	The N[th] year from the first disposal, extending from the first year in the time period in which waste is disposed at the SWDS (x = 1) to year *y* (x = y)
$W_{PJ,x}$	:	Total amount of MSW disposed at the project SWDS in the year *x* (wet basis) [t]
$P_{i,x}$	:	Weigh fraction of the waste type *i* in the disposed MSW in the year *x* [weight fraction]
DOC_i	:	Fraction of degradable organic carbon in the waste type *i* [weight fraction]
k_i	:	Decay rate for the waste type *i* [1/yr]
i	;	Type of the waste

Regarding identification of φ_{RE}

<u>Option 1</u>

0.75 is applied as default value.($\varphi_{RE} = \varphi_{RE,default}$=0.75)

<u>Option 2</u>

Calculate as the following equation based on specific situation of the project

$$\varphi_{RE} = 1/(1+\sqrt{a^2+b^2+c^2+d^2+e^2+g^2})$$

Where:

a	:	Uncertainty of $W_{PJ,x}$ [−]
b	:	Uncertainty of DOC_i [−]
c	:	Uncertainty of DOC_f [−]
d	:	Uncertainty of F [−]
e	:	Uncertainty of MCF_{RE} [−]
g	:	Uncertainty of $e^{-k_i(y-x)} \times (1-e^{-k_i})$ [−]

G. Calculation of project emissions

$$PE_p = PE_{CH4,p} + PE_{elec,p} + PE_{fuel,p}$$

$$= \sum_{y=p_{start}}^{p_{end}} \left[\varphi_{PJ} \times GWP_{CH4} \times (1-OX) \times \frac{16}{12} \times F \times DOC_f \times MCF_{PJ} \times (1-f_{y,p}) \times \sum_{x=1}^{y-1} \sum_i \{ W_{PJ,x} \times P_{i,x} \times DOC_i \times e^{-k_i(y-1-x)} \times (1-e^{-k_i}) \} \right] + PE_{elec,p} + PE_{fuel,p}$$

Where:

PE_p	:	Project emissions during the period *p* [tCO_2e/p]
$PE_{CH4,p}$	:	The quantity of CH_4 generated from the project SWDS during the period *p* [tCO_2e/p] emissions
$PE_{elec,p}$	:	Project emissions from on-site consumption of electricity by project during the period *p* [tCO_2/p]
$PE_{fuel,p}$	:	Project emissions from on-site consumption of fossil fuel by project during the period *p* [tCO_2/p]
y	:	The N^{th} year from the first disposal, extending from the first year of the period *p* ($y=p_{start}$) to the last year of the period *p* ($y=p_{end}$). If *y* is equal to 1, methane generation cannot be accounted.
p_{start}	:	The N^{th} year from the first disposal, which is the first year of the period *p*
p_{end}	:	The N^{th} year from the first disposal, which is the last year of the period *p*
φ_{PJ}	:	Model correction factor to account for model uncertainties in project
$f_{y,p}$	:	Fraction of methane from an SWDS that is controlled under mandatory environmental regulations in Tunisia—through destruction, utilization, or other approved measures— during year y of period *p*
GWP_{CH4}	:	Global Warming Potential of CH_4 [tCO_2e/tCH_4]
OX	:	Oxidation factor (reflecting the amount of methane from an SWDS that is oxidized in the soil or other material covering the waste)
$\frac{16}{12}$	:	Conversion factor [tCH_4/tC]
F	:	Fraction of methane in LFG [volume fraction]
DOC_f	:	Fraction of degradable organic carbon (DOC) that decomposes under the specific conditions occurring in an SWDS [weight fraction]
MCF_{PJ}	:	Methane correction factor for Project SWDS
x	:	The N^{th} year from the first disposal, extending from the first year in the time period in which waste is disposed at the SWDS (x = 1) to year *y* (x = y)
$W_{PJ,x}$	:	Total amount of MSW disposed at the project SWDS in the year *x* (wet basis) [t]
$P_{i,x}$	:	Weigh fraction of the waste type *i* in the disposed MSW in the year *x* [weight fraction]
DOC_i	:	Fraction of degradable organic carbon in the waste type *i* [weight fraction]
k_i	:	Decay rate for the waste type *i* [1/yr]
i	:	Type of the waste

Regarding identification of φ_{PJ}

Option 1

0.75 is applied as default value.($\varphi_{PJ} = \varphi_{PJ,default}$=0.75)

Option 2

Calculate as the following equation based on specific situation of the project

$$\varphi_{PJ} = 1/(1 + \sqrt{a^2 + b^2 + c^2 + d^2 + e^2 + g^2})$$

Where:

a	:	Uncertainty of $W_{PJ,x}$ [−]
b	:	Uncertainty of DOC_i [−]
c	:	Uncertainty of DOC_f [−]
d	:	Uncertainty of F [−]
e	:	Uncertainty of MCF_{PJ} [−]
g	:	Uncertainty of $e^{-k_i(y-x)} \times (1 - e^{-k_i})$ [−]

$$PE_{elec,p} = EC_{PJ,p} \times EF_{elec,PJ,p}$$

$PE_{elec,p}$	:	Project emissions from on-site consumption of electricity by project during the period *p* [tCO_2/p]
$EC_{PJ,p}$	:	Amount of the electricity consumed by project during the period *p* [MWh/p]
$EF_{elec,PJ,p}$	:	CO_2 emission factor for electricity consumed by project during the period *p* [tCO_2/MWh]

$$PE_{fuel,p} = \sum_j FC_{PJ,j,p} \times NCV_{fuel,PJ,j,p} \times EF_{fuel,PJ,j,p}$$

$PE_{fuel,p}$	:	Project emissions from on-site consumption of fossil fuel by project during the period *p* [tCO_2/p]
$FC_{PJ,j,p}$	:	Amount of the fossil fuel type *j* consumed by project during the period *p* [mass or volume/p]
$NCV_{fuel,PJ,j,p}$	:	Net calorific value for the fossil fuel type *j* consumed by project during the period *p* [GJ/mass or volume]
$EF_{fuel,PJ,j,p}$	:	CO_2 emission factor for the fossil fuel type *j* consumed by project during the period [tCO_2/GJ]

H. Calculation of emissions reductions

$$ER_p = RE_p - PE_p$$

ER_p	:	Emission reductions during the period *p* [tCO_2e/p]
RE_p	:	Reference emissions during the period *p* during the period *p* [tCO_2e/p]
PE_p	:	Project emissions during the period *p* [tCO_2e/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
φ_{RE}	The default value of model correction factor to account for model uncertainties in reference Default value: 0.75	The default value for project emissions or leakage provided in dry conditions as project in Data / Parameter table 1. of CDM Methodological TOOL 04 "Emissions from solid waste disposal sites" (Version 08.1)
φ_{PJ}	The default value of the model correction factor to account for model uncertainties in project Default value: 0.75	The default value for project emissions or leakage provided in dry conditions as project in Data / Parameter table 1. of

		CDM Methodological TOOL 04 "Emissions from solid waste disposal sites" (Version 08.1)
a	Uncertainty of $W_{PJ,x}$ $[-]$ (Option 2 for identification of φ_{RE} and φ_{PJ}) 0.2 is applied because solid waste is weighed using accurate weighbridges.	Table 3. in CDM Methodological TOOL 04 "Emissions from solid waste disposal sites" (Version 08.1)
b	Uncertainty of DOC_i $[-]$ (Option 2 for identification of φ_{RE} and φ_{PJ}) 0.1 is applied because the default value is applied to DOC_i (DOC_i is not measured) in the methodology.	
c	Uncertainty of DOC_f $[-]$ (Option 2 for identification of φ_{RE} and φ_{PJ}) 0.05 is applied if more than 50 per cent of the waste is rapidly degradable organic material. Otherwise 0.15 Is applied.	
d	Uncertainty of F $[-]$ (Option 2 for identification of φ_{RE} and φ_{PJ}) 0 is applied if more than 50 per cent of the waste is rapidly degradable organic material. Otherwise 0.05 Is applied.	
e	Uncertainty of MCF_{RE} or MCF_{PJ} $[-]$ (Option 2 for identification of φ_{RE} and φ_{PJ}) 0 is applied because reference SWDS is an anaerobic managed one in the methodology.	
g	Uncertainty of $e^{-k_i(y-x)} \times \left(1 - e^{-k_i}\right)$ $[-]$ (Option 2 for identification of φ_{RE} and φ_{PJ})	

	The uncertainty values provided express the uncertainty for the exponential term as a whole. Use 0.05 if the SWDS compartments where the project is implemented were closed less than three years ago. In all other cases, use 0.20. In the methodology, 0.20 is applied in conservative manner.	
$f_{y,p}$	Fraction of methane from an SWDS that is controlled under mandatory environmental regulations in Tunisia—through destruction, utilization, or other approved measures— during year y of period *p* As for mandatory environmental regulations during the year *y* of the period *p* in Tunisia; i) in case that the requirement specifies the amount of methane that must be flared, $f_{y,p}$ is identified according to that amount. ii) in case that the requirement specifies a percentage of the captured LFG that is required to be flared, $f_{y,p}$ is identified according to the percentage. iii) in case that the requirement does not specify the amount or percentage of LFG that should be destroyed but requires the installation of a capture system, without requiring the captured LFG to be flared, 0 is applied to $f_{y,p}$ as the default value. iv) the requirement does not specify any amount or percentage of LFG that should be destroyed, but requires the installation of a system to capture and flare the LFG, 0.2 is applied to $f_{y,p}$ as the default value 0.0 is applied to $f_{y,p}$ as the default value until mandatory environmental regulations are established.	The default value provided in Equation (6) (Case 1) and Equation (10)/ Equation (12) (Case 2) in Section 5.4.1.3. of Large-scale Consolidated Methodology ACM0001 "Flaring or use of landfill gas" (Version 19.0) As for 0.2 of the default value, the value is based on assuming a situation in which: the efficiency of the LFG capture system in the project is 50 per cent; the efficiency of the LFG capture system in the

		baseline is 0.2; and, the amount captured in the baseline is flared using an open flare with a destruction efficiency of 50 per cent (consistent with the default value provided in the tool "Project emissions from flaring"). Project participants may propose and justify an alternative default value as a request for revision to this methodology)
GWP_{CH4}	Global Warming Potential of CH_4 [tCO_2e/tCH_4] Default value: 28	GWP values for 100-year time horizon adapted from the IPCC Fifth Assessment Report, 2014 (AR5) Table 8.A.1, Appendix 8.A: Lifetimes, Radiative Efficiencies and Metric Values, "Anthropogenic and Natural

		Radiative Forcing”
OX	Oxidation factor (reflecting the amount of methane from an SWDS that is oxidized in the soil or other material covering the waste) Default value: 0.1	Data / Parameter table 2. of CDM Methodological TOOL 04 “Emissions from solid waste disposal sites” (Version 08.1)
F	Fraction of methane in the LFG [volume fraction] Default value: 0.5	Data / Parameter table 3. of CDM Methodological TOOL 04 “Emissions from solid waste disposal sites” (Version 08.1)
DOC_f	Fraction of degradable organic carbon (DOC) that decomposes under the specific conditions occurring in an SWDS [weight fraction] Default value: 0.5	Data / Parameter table 4. of CDM Methodological TOOL 04 “Emissions from solid waste disposal sites” (Version 08.1)
MCF_{RE}	Methane correction factor for reference SWDS 1.0 is applied to the parameter as the default value, because reference SWDS is assumed to be an anaerobic managed solid waste disposal sites.	Data / Parameter table 5. of CDM Methodological TOOL 04 “Emissions from solid waste disposal sites” (Version 08.1)

MCF_{PJ}	Methane correction factor for project SWDS 0.5 is applied to the parameter as the default value for semi-aerobic solid waste disposal sites. These disposal sites are characterized with controlled placement of waste and include all of the following structures for introducing air to the waste layers: (i) permeable cover material; (ii) leachate drainage system; (iii) regulating pondage; and (iv) gas ventilation system.	Data / Parameter table 5. of CDM Methodological TOOL 04 "Emissions from solid waste disposal sites" (Version 08.1)

<table>
<tr>
<td>DOC_i</td>
<td>
Fraction of degradable organic carbon in the waste type i [weight fraction]
Default values for DOC_i:
<table>
<tr><th>Waste type j</th><th>DOC_i
[% of wet waste]</th></tr>
<tr><td>Wood and wood products</td><td>43</td></tr>
<tr><td>Pulp, paper and cardboard (other than sludge)</td><td>40</td></tr>
<tr><td>Food, food waste, beverages and tobacco (other than sludge)</td><td>15</td></tr>
<tr><td>Textiles</td><td>24</td></tr>
<tr><td>Disposable nappies</td><td>24</td></tr>
<tr><td>Garden, yard and park waste</td><td>20</td></tr>
<tr><td>Glass, plastic, metal, other inert waste</td><td>0</td></tr>
</table>
DOC values above were chosen as the same values used by Tunisia for estimation national inventory report (NIR).
For the following residual waste types, project participants may use or derive default values, as follows:
(a) For empty fruit brunches (EFB), as their characteristics are similar to garden waste, the value for garden, yard and park waste in the table above may be used as a default
(b) For industrial sludge, either a value of 9 per cent (% wet sludge) may be used as a default, assuming an organic dry matter content of 35 percent, or alternatively, if the percentage of organic dry matter content is known, then the DOC value may be calculated as follows: DOCj (% wet sludge) = 9 * (% organic dry matter content/35);
(c) For domestic sludge, either a value of 5 per cent (% wet sludge) may be used as a default, assuming an organic dry matter content of 10 per cent, or alternatively, if the percentage of organic dry matter content is known, then the DOC value may be calculated as follows: DOCj (% wet sludge) = 5 * (% organic dry matter content/10).
</td>
<td>Data / Parameter table 6. of CDM Methodological TOOL 04 “Emissions from solid waste disposal sites” (Version 08.1)</td>
</tr>
</table>

<table>
<tr>
<td>k_i</td>
<td>Decay rate for the waste type i [1/yr]
Default values for k_i:
k_i [1/yr]
The default values from the table below were applied, considering the waste types and climate conditions of the project site:
<table>
<tr><td colspan="2" rowspan="2">Waste type j</td><td colspan="2">Boreal and Temperate (MAT < 20 °C)</td><td colspan="2">Tropical (MAT > 20 °C)</td></tr>
<tr><td>Dry (MAP /PET < 1)</td><td>Wet (MAP /PET > 1)</td><td>Dry (MAP < 1000 mm)</td><td>Wet (MAP > 1000 mm)</td></tr>
<tr><td rowspan="2">Slowly degrading</td><td>Pulp, paper, cardboard (other than sludge), textiles</td><td>0.04</td><td>0.06</td><td>0.045</td><td>0.07</td></tr>
<tr><td>Wood, wood products and straw</td><td>0.02</td><td>0.03</td><td>0.025</td><td>0.035</td></tr>
<tr><td>Moderately degrading</td><td>Other (non-food) organic putrescible garden and park waste</td><td>0.05</td><td>0.10</td><td>0.065</td><td>0.17</td></tr>
<tr><td>Rapidly degrading</td><td>Food, food waste, sewage sludge, beverages and tobacco</td><td>0.06</td><td>0.185</td><td>0.085</td><td>0.40</td></tr>
</table>
</td>
<td>Data / Parameter table 7. of CDM Methodological TOOL 04 “Emissions from solid waste disposal sites” (Version 08.1)</td>
</tr>
<tr>
<td>$W_{PJ,x}$</td>
<td>Total amount of MSW disposed at the project SWDS in the year x (wet basis) [t]

The parameter is monitored (daily) in both of the following cases: (i) when the project introduces a new SWDS with a semi-aerobic technology landfill, and (ii) when the project introduces a new cell with a semi-aerobic landfill technology in an existing SWDS</td>
<td>Historical record by operator of SWDS</td>
</tr>
</table>

$P_{i,x}$	Weight fraction of the waste type *i* in the year x [weight fraction] Annual average data of at least 2 samples (for both rainy season and dry one) disposed at the project area in the year x	Historical record by operator of SWDS
$EF_{elec,PJ,y,p}$	When the project consumes only grid electricity or captive electricity, the project participant applies the CO_2 emission factor respectively. When both grid electricity and captive electricity may be consumed by the project activity, the project participant applies the CO_2 emission factor with higher value. [CO_2 emission factor] For grid electricity: The emission factor is fixed as the most recent officially published value available at the time of PDD submission and shall remain unchanged during the crediting period. For captive electricity: It is determined based on the following options: <u>a) Calculated from its power generation efficiency (ηcap [%]) obtained from manufacturer's specification</u> The power generation efficiency based on lower heating value (LHV) of the captive power generation system from the manufacturer's specification is applied; $EFelec = 3.6 \times 100\ \eta_{cap} \times EF_{fuel,cap}$ <u>b) Calculated from measured data</u> The power generation efficiency calculated from monitored data of amount of fuel input for power generation ($FC_{cap,p}$) and amount of electricity generated ($EGc_{ap,p}$) during the monitoring period p is applied. The measurement is conducted with the monitoring equipment to which calibration certificate	Grid electricity: Ministry of Environment of Tunisia, unless otherwise instructed by the Joint Committee. Captive electricity: <u>For the option a)</u> Specification of the captive power generation system connected to the boiler, provided by the manufacturer (η_{cap} [%]). CO_2 emission factor of the fuel consumed by the captive power generation system connected to the boiler ($EF_{fuel,cap}$ [tCO_2/GJ]) in order of preference: 1) values provided by the fuel supplier;

	is issued by an entity accredited under national/international standards; $EFelec = FC_{cap,p} \times NCVf_{uel,cap} \times EF_{fuel,cap} \times 1/\ EG_{cap,p}$ Where: $NCV_{fuel,cap}$: Net calorific value of the fuel consumed by the captive power generation system connected to the boiler [GJ/mass or volume] <u>c) Conservative default value</u>: A value of 1.3 tCO_2/MWh may be applied.	2) measurement by the project participants; 3) regional or national default values; 4) IPCC default values provided in table 1.4 of Ch.1 Vol.2 of 2006 IPCC Guidelines on National GHG Inventories. Upper value is applied. <u>For the option b)</u> Generated and supplied electricity by the captive power generation system connected to the equipment consuming electricity in the project SWDS (EG_{cap}, [MWh/p]). Fuel amount consumed by the captive power generation system connected to the biomass boiler(s) (FC_{cap}, [mass or

		volume/p]). Net calorific value ($NCV_{fuel,cap}$ [GJ/mass or volume]) and CO_2 emission factor of the fuel ($EF_{fuel,cap}$ [tCO_2/GJ]) in order of preference: 1) values provided by the fuel supplier; 2) measurement by the project participants; 3) regional or national default values; 4) IPCC default values provided in tables 1.2 and 1.4 of Ch.1 Vol.2 of 2006 IPCC Guidelines on National GHG Inventories. Upper value is applied. For the option For the option c) CDM methodological tool "TOOL 05: Baseline, project and/or leakage

		emissions from electricity consumption and monitoring of electricity generation, version 03.0”
$NCV_{fuel,PJ,j,p}$	Net calorific value the fossil fuel type *j* consumed by project during the period *p* [GJ/mass or volume]	In the order of preference: a) values provided by fuel supplier; b) measurement by the project participants; c) regional or national default values; or d) IPCC default values provided in table 1.2 of Ch.1 Vol.2 of 2006 IPCC Guidelines on National GHG Inventories. Upper value is applied.
$EF_{fuel,PJ,j,p}$	CO_2 emission factor for the fossil fuel type *j* consumed by project during the period p [tCO_2/GJ]	In order of preference: a) values provided by fuel supplier; b) measurement by the project participants; c) regional or

		national default values; or d) IPCC default values provided in table 1.4 of Ch.1 Vol.2 of 2006 IPCC Guidelines on National GHG Inventories. Upper value is applied.