

**SMALL-SCALE CDM PROGRAMME ACTIVITY DESIGN DOCUMENT FORM
(CDM-SSC-CPA-DD) - Version 01**



NAME /TITLE OF THE PoA: Programme on avoidance of methane production by on-site cassava pulp utilization in Thailand



CDM – Executive Board

page 1

**CLEAN DEVELOPMENT MECHANISM
SMALL-SCALE PROGRAM ACTIVITY DESIGN DOCUMENT FORM (CDM-SSC-CPA-DD)
Version 01**

CONTENTS

- A. General description of CDM programme activity (CPA)
- B. Eligibility of CPA and Estimation of Emission Reductions
- C. Environmental Analysis
- D. Stakeholder comments

Annexes

Annex 1: Contact information on entity/individual responsible for the CPA

Annex 2: Information regarding public funding

Annex 3: Baseline information

Annex 4: Monitoring plan

NOTE:

- (i) This form is for submission of CPAs that apply a small scale approved methodology using the provision of the proposed small scale CDM PoA.
- (ii) The coordinating/managing entity shall prepare a CDM Small Scale Programme Activity Design Document (CDM-SSC-CPA-DD)^{1,2} that is specified to the proposed PoA by using the provisions stated in the SSC PoA DD. At the time of requesting registration the SSC PoA DD must be accompanied by a CDM-SSC CPA-DD form that has been specified for the proposed SSC PoA, as well as by one completed CDM-SSC CPA-DD (using a real case). After the first CPA, every CPA that is added over time to the SSC PoA must submit a completed CDM-SSC CPA-DD.

¹ The latest version of the template form CDM-CPA-DD is available on the UNFCCC CDM web site in the reference/document section.

² At the time of requesting validation/registration, the coordinating managing entity is required to submit a completed CDM-POA-DD, the PoA specific CDM-CPA-DD, as well as one of such CDM-CPA-DD completed (using a real case).

**SMALL-SCALE CDM PROGRAMME ACTIVITY DESIGN DOCUMENT FORM
(CDM-SSC-CPA-DD) - Version 01**



NAME /TITLE OF THE PoA: Programme on avoidance of methane production by on-site cassava pulp utilization in Thailand



CDM – Executive Board

page 2

SECTION A. General description of small scale CDM programme activity (CPA)

A.1. Title of the small-scale CPA:

>>

- The title of the project activity

Activity on avoidance of methane production by on-site cassava pulp utilization at XXXX starch factory in **** (CPA-General)

- The current version number of the document

Version 1

- The date when the document was completed.

Feb, 2009

A.2. Description of the small-scale CPA:

>>

The purpose of the CPA is to avoid methane emissions that would have been released into the atmosphere from anaerobic decay of cassava pulp at stockpiles within the yard of XXXX. Cassava pulp is a by-product of starch production processes and it will be utilized as a raw material to produce ethanol in the CPA of the PoA.

XXXX is one of the largest starch company in Thailand, and the capacity of the factory is **** tons of fresh cassava per day.

XXXX has ** yards to pile cassava pulp within the plant site. The total area of the yards is **** m² (**rai). Cassava pulp is piled in the yard of starch factories, and in the dry season from November to March, after sun drying, cassava pulp is sold as a raw material for animal feed to cassava pellet factories. However, in the rain season from April to October, cassava pulp can not be dried well, therefore it is piled **** tons every day to the yards. As soon as the dry season starts in November, the piled cassava pulp is sundried with new cassava pulp produced in daily operations, and sold to pellet factories. The piled cassava pulp will be totally sold until at the end of February. Therefore, the methane emission from the piled cassava pulp will be started from April, and the emission as well as the amount of piled cassava pulp will be maximum in the end of October, and it will be zero at the end of February when all the piled cassava pulp will be sold.

A.3. Entity/individual responsible for the small-scale CPA:

>> Here the information on the entity/individual responsible of the CPA shall be included, hence forth referred to as CPA implementer(s). CPA implementers can be project participants of the PoA, under which the CPA is submitted, provided their name is included in the registered PoA.

SMALL-SCALE CDM PROGRAMME ACTIVITY DESIGN DOCUMENT FORM
(CDM-SSC-CPA-DD) - Version 01



NAME /TITLE OF THE PoA: Programme on avoidance of methane production by on-site cassava pulp utilization in Thailand



CDM – Executive Board

page 3

Starch company XXXX

A.4. Technical description of the small-scale CPA:

A.4.1. Identification of the small-scale CPA:

>>

A.4.1.1. Host Party:

>>

Kingdom of Thailand

A.4.1.2. Geographic reference or other means of identification allowing the unique identification of the small-scale CPA (maximum one page):

>> *Geographic reference or other means of identification³, Name/contact details of the entity/individual responsible for the CPA, e.g. in case of stationary CPA geographic reference, in case of mobile CPAs means such as registration number, GPS devices.*

Starch company ****

A.4.2. Duration of the small-scale CPA:

A.4.2.1. Starting date of the small-scale CPA:

>>

dd/mm/yyyy

A.4.2.2. Expected operational lifetime of the small-scale CPA:

>>

* years

³ E.g. in case of stationary CPA geographic reference, in case of mobile CPAs means such as registration number, GPS devices.

SMALL-SCALE CDM PROGRAMME ACTIVITY DESIGN DOCUMENT FORM
(CDM-SSC-CPA-DD) - Version 01



NAME /TITLE OF THE PoA: Programme on avoidance of methane production by on-site cassava pulp utilization in Thailand



CDM – Executive Board

page 4

A.4.3. Choice of the crediting period and related information:

Renewable crediting period; or

Fixed Crediting period

[Delete the one that is not applicable]

Fixed crediting period.

A.4.3.1. Starting date of the crediting period:

>>

The date of registration.

A.4.3.2. Length of the crediting period, first crediting period if the choice is renewable CP:

>>

NOTE: Please note that the duration of crediting period of any CPA shall be limited to the end date of the PoA regardless of when the CPA was added.

10 years.

A.4.4. Estimated amount of emission reductions over the chosen crediting period:

>>

Year	Annual estimation of emission reductions (tonnes of CO ₂ e)
2010	XXXX
2011	XXXX
2012	XXXX
2013	XXXX
2014	XXXX
2015	XXXX
2016	XXXX
2017	XXXX
2018	XXXX
2019	XXXX
Total	XXXX
Total number of crediting years	10

**SMALL-SCALE CDM PROGRAMME ACTIVITY DESIGN DOCUMENT FORM
(CDM-SSC-CPA-DD) - Version 01**



NAME /TITLE OF THE PoA: Programme on avoidance of methane production by on-site cassava pulp utilization in Thailand



CDM – Executive Board

page 5

Annual average over the crediting period	XXXX
--	------

A.4.5. Public funding of the CPA:

>>

The CPA do not utilize any public funding.

A.4.6. Information to confirm that the proposed small-scale CPA is not a de-bundled component

>>

1. *For the purposes of registration of a Programme of Activities (PoA)⁴ a proposed small-scale CPA of a PoA shall be deemed to be a de-bundled component of a large scale activity if there is already an activity⁵, which:*
 - (a) *Has the same activity implementer as the proposed small scale CPA or has a coordinating or managing entity, which also manages a large scale PoA of the same sectoral scope, and;*
 - (b) *The boundary is within 1 km of the boundary of the proposed small-scale CPA, at the closest point.*
2. *If a proposed small-scale CPA of a PoA is deemed to be a debundled component in accordance with paragraph 2 above, but the total size of such a CPA combined with a registered small-scale CPA of a PoA or a registered CDM project activity does not exceed the limits for small-scale CDM and small-scale A/R project activities as set out in Annex II of the decision 4/CMP.1 and 5/CMP.1 respectively, the CPA of a PoA can qualify to use simplified modalities and procedures for small-scale CDM and small-scale A/R CDM project activities.*

Based on the above criteria, it is confirmed that the project activity is not a debundled component of a large project activity as the project participants have not registered or applied for another large scale PoA of the same sectoral scope.

A.4.7. Confirmation that small-scale CPA is neither registered as an individual CDM project activity or is part of another Registered PoA:

>>

⁴ Only those POAs need to be considered in determining de-bundling that are: (i) in the same geographical area; and (ii) use the same methodology; as the POA to which proposed CPA is being added

⁵ Which may be a (i) registered small-scale CPA of a PoA, (ii) an application to register another small-scale CPA of a PoA or (iii) another registered CDM project activity

**SMALL-SCALE CDM PROGRAMME ACTIVITY DESIGN DOCUMENT FORM
(CDM-SSC-CPA-DD) - Version 01**



NAME /TITLE OF THE PoA: Programme on avoidance of methane production by on-site cassava pulp utilization in Thailand



CDM – Executive Board

page 6

The CPA is not registered as an individual CDM project activity and is not part of another registered PoA. These can be confirmed by CDM project lists of Thailand DNA and UNFCCC, and should be checked by DOE.

SECTION B. Eligibility of small-scale CPA and Estimation of emissions reductions

B.1. Title and reference of the Registered PoA to which small-scale CPA is added:

>>

Programme on avoidance of methane production by on-site cassava pulp utilization in Thailand

B.2. Justification of the why the small-scale CPA is eligible to be included in the Registered PoA :

>>

The proposed CPA complies with all of the eligibility criteria that are described in A.4.2.2 of PoA DD, as follows.

- 1) **** is a member company of TTSA.
- 2) To avoid methane emissions that would have been released into the atmosphere from anaerobic decay of cassava pulp at stockpiles within the yard of starch factories.
- 3) Methane emissions have been measured from the stockpiles by on-site measurement.
- 4) Cassava pulp is a by-product of starch production processes and it will be utilized as a raw material to produce ethanol within the starch factory.
- 5) Crude ethanol (moisture content 50 to 75%) produced by **** will be transported to automobile ethanol plants, which were already licensed to produce ethanol by the government, and will be refined more than 99.5% to supply as automobile fuel.
- 6) The emission reduction is estimated as **** tCO₂e per year, and may not exceed 60,000 tCO₂e per year.
- 7) The CPA is not registered as a CDM project or as a CPA under another PoA.

B.3. Assessment and demonstration of additionality of the small-scale CPA , as per eligibility criteria listed in the Registered PoA:

>>

For the CPA, investment barrier and technological barrier are chosen to demonstrate the additionality.

**SMALL-SCALE CDM PROGRAMME ACTIVITY DESIGN DOCUMENT FORM
(CDM-SSC-CPA-DD) - Version 01**



NAME /TITLE OF THE PoA: Programme on avoidance of methane production by on-site cassava pulp utilization in Thailand



CDM – Executive Board

page 7

- Investment barrier:

Large investment is necessary for the construction of the ethanol plant, and the profitability of ethanol production project utilizing cassava pulp is much worse than existing ethanol plants, mainly because the production capacity of cassava pulp ethanol plant is very small, only around 30 kl/day, compared with existing ethanol plant whose capacity is around 150 kl/day. On the other hand, continuation of the current practice requires no investment and less operational costs because cassava pulp has been just piled in the yard.

Therefore, in terms of investment, it is difficult to realize the CPA without CDM.

- Technological barrier:

In Thailand, currently, there is no project that produce ethanol from cassava pulp. There is some project in China that utilize cassava pulp as auxiliary raw material for cassava chip ethanol production plant, however there is no plant which use cassava pulp as a main raw material. Cassava pulp contains more fiber than cassava chips or roots, therefore advanced technologies are needed.

Therefore, in terms of technology, it is difficult to realize the CPA without CDM.

In Japan, there are plants that already start commercial operation of ethanol production utilizing cassava pulp as main raw material. Therefore, it is possible for Japanese project participants to transfer the technology to each CPA.

B.4. Description of the sources and gases included in the project boundary and proof that the small-scale CPA is located within the geographical boundary of the registered PoA.

>>

The boundary of a CPA includes:

- (a) Where cassava pulp would have been disposed and methane emissions occur in absence of the CPA
- (b) Ethanol production plant where cassava pulp is utilized as a raw material
- (c) The itineraries between (a) and (b), where the transportation of cassava pulp occurs

In the table below, all sources of the baseline and the project activity are listed.

Table Emission sources included in or excluded from the project boundary

	Source	Gas	Included?	Justification / Explanation
Baseline emissions	Uncontrolled release of methane from anaerobic decay of cassava pulp	CO ₂	No	Not significant. Excluded for simplification and conservativeness
		CH ₄	Yes	Major emission source
		N ₂ O	No	Not significant. Excluded for simplification and conservativeness
	Emissions from trucks for transport cassava pulp from the starch factory to the	CO ₂	Yes	Counted in “project emissions” as “Incremental transportation” compared with project emissions

**SMALL-SCALE CDM PROGRAMME ACTIVITY DESIGN DOCUMENT FORM
(CDM-SSC-CPA-DD) - Version 01**



NAME /TITLE OF THE PoA: Programme on avoidance of methane production by on-site cassava pulp utilization in Thailand



CDM – Executive Board

page 8

Project emissions		CH ₄	No	Not significant. Excluded for simplification and conservativeness
		N ₂ O	No	Not significant. Excluded for simplification and conservativeness
	Emissions from electricity consumption at the ethanol production plant	CO ₂	Yes	Major emission source
		CH ₄	No	Not significant. Excluded for simplification.
		N ₂ O	No	Not significant. Excluded for simplification.
	Emissions from fossil fuel consumption at the ethanol production plant	CO ₂	Yes	Major emission source
		CH ₄	No	Not significant. Excluded for simplification.
		N ₂ O	No	Not significant. Excluded for simplification.
		CO ₂	Yes	Major emission source
	Emissions from incremental transportation of cassava pulp and ethanol	CH ₄	No	Not significant. Excluded for simplification.
		N ₂ O	No	Not significant. Excluded for simplification.

B.5. Emission reductions:

B.5.1. Data and parameters that are available at validation:

>>

Data / Parameter:	φ
Data unit:	-
Description:	Model correction factor to account for model uncertainties
Source of data used:	“Tool to determine methane emissions avoided from disposal of waste at a solid waste disposal site (The latest version)”
Value applied:	0.9
Justification of the choice of data or description of measurement methods and procedures actually applied :	Default value as per “Tool to determine methane emissions avoided from disposal of waste at a solid waste disposal site (The latest version)”.
Any comment:	-

Data / Parameter:	OX
Data unit:	-
Description:	Oxidation factor
Source of data used:	“Tool to determine methane emissions avoided from disposal of waste at a solid waste disposal site (The latest version)”
Value applied:	0
Justification of the choice of data or description of measurement methods and procedures actually applied :	The disposal site of the baseline scenario is not “a managed solid waste disposal sites”. Therefore, default value of “Other type of solid waste disposal site” was selected from “Tool to determine methane emissions avoided from disposal of waste at a solid waste disposal site (The latest version)”.

**SMALL-SCALE CDM PROGRAMME ACTIVITY DESIGN DOCUMENT FORM
(CDM-SSC-CPA-DD) - Version 01**



NAME /TITLE OF THE PoA: Programme on avoidance of methane production by on-site cassava pulp utilization in Thailand



CDM – Executive Board

page 9

applied :	
Any comment:	-

Data / Parameter:	F
Data unit:	-
Description:	Fraction of methane in the disposal site gas (volume fraction)
Source of data used:	“Tool to determine methane emissions avoided from disposal of waste at a solid waste disposal site (The latest version)”
Value applied:	0.5
Justification of the choice of data or description of measurement methods and procedures actually applied :	Default value as per “Tool to determine methane emissions avoided from disposal of waste at a solid waste disposal site (The latest version)”.
Any comment:	-

Data / Parameter:	DOC_f
Data unit:	-
Description:	Fraction of degradable organic carbon (DOC) that can decompose
Source of data used:	“Tool to determine methane emissions avoided from disposal of waste at a solid waste disposal site (The latest version)”
Value applied:	0.5
Justification of the choice of data or description of measurement methods and procedures actually applied :	Default value as per “Tool to determine methane emissions avoided from disposal of waste at a solid waste disposal site (The latest version)”.
Any comment:	-

Data / Parameter:	MCF
Data unit:	-
Description:	Methane correction factor
Source of data used:	AMS III.E. version 15.1
Value applied:	0.28
Justification of the choice of data or description of measurement methods and procedures actually applied :	Default value for stockpiles.
Any comment:	-

Data / Parameter:	DOC
Data unit:	-

**SMALL-SCALE CDM PROGRAMME ACTIVITY DESIGN DOCUMENT FORM
(CDM-SSC-CPA-DD) - Version 01**



NAME /TITLE OF THE PoA: Programme on avoidance of methane production by on-site cassava pulp utilization in Thailand



CDM – Executive Board

page 10

Description:	Fraction of degradable organic carbon (by weight, dry basis) in cassava pulp (Dry basis)
Source of data used:	“Tool to determine methane emissions avoided from disposal of waste at a solid waste disposal site (The latest version)”
Value of data	0.44
Justification of the choice of data or description of measurement methods and procedures actually applied :	Default value of “Pulp, paper and cardboard (other than sludge)” as per “Tool to determine methane emissions avoided from disposal of waste at a solid waste disposal site (The latest version)”.
Any comment:	-

Data / Parameter:	k
Data unit:	-
Description:	Decay rate for cassava pulp
Source of data used:	AMS III.E. version 15.1
Value applied:	0.06
Justification of the choice of data or description of measurement methods and procedures actually applied :	The k value for the relevant waste type must be the lower value from the range provided for the Boreal and Temperate Climate Zone as listed in Table 3.3 in Chapter 3, volume 5 of 2006 IPCC Guidelines for National Greenhouse Gas Inventories.
Any comment:	-

B.5.2. Ex-ante calculation of emission reductions:

>>

I. Baseline emissions

The Baseline emissions of a CPA are CH₄ emissions from decay of degradable organic carbon in cassava pulp in disposal site:

$$BE_y = BE_{CH_4,SS,y} - MD_{reg,y} * GWP_{CH_4} \quad \text{(Equation 1)}$$

BE_y : Baseline emissions in the year “y” (tCO₂e)
 $BE_{CH_4,SS,y}$: Baseline emissions from the decay of cassava pulp
 $MD_{reg,y}$: Methane that would be destroyed or removed in the year “y” for safety or to comply with regulations
 GWP_{CH_4} : GWP for methane

There is presently no regulation or policy in place in Thailand to recover methane from landfill.
Therefore;

**SMALL-SCALE CDM PROGRAMME ACTIVITY DESIGN DOCUMENT FORM
(CDM-SSC-CPA-DD) - Version 01**



NAME /TITLE OF THE PoA: Programme on avoidance of methane production by on-site cassava pulp utilization in Thailand



CDM – Executive Board

page 11

$$MD_{reg,y} = 0 \quad \text{(Equation 2)}$$

Therefore the baseline emissions are calculated as follows:

$$BE_y = BE_{CH_4,SS,y} \quad \text{(Equation 3)}$$

$BE_{CH_4,SS,y}$ is the yearly methane generation potential calculated using “Tool to determine methane emissions avoided from disposal of waste at a solid waste disposal site (The latest version)”

$$BE_{CH_4,SS,y} = \phi * (1-f) * GWP_{CH_4} * (1-OX) * 16/12 * F * DOC_f * MCF * \sum W_x * DOC * e^{-k(y-x)} * (1-e^{-k}) \quad \text{(式 2)}$$

Where:

- $BE_{CH_4,SS,y}$: Baseline emissions from the decay of cassava pulp (tCO₂e)
- ϕ : Model correction factor to account for model uncertainties (= 0.9: Default value in the applied methodology)
- f : Fraction of methane captured at the disposal site and flared, combusted or used in another manner (= 0: Default value in the applied methodology)
- GWP_{CH_4} : Global Warming Potential (GWP) of methane, valid for the relevant commitment period (21)
- OX : Oxidation factor (= 0: Default value in the applied methodology)
- F : Fraction of methane in the disposal site gas (volume fraction) (= 0.5: Default value in the applied methodology)
- DOC_f : Fraction of degradable organic carbon (DOC) that can decompose (= 0.5: Default value in the applied methodology)
- MCF : Methane correction factor (= 0.28: Default value for stockpile)
- W_x : Amount of cassava pulp prevented from disposal in the disposal site in the month x, dry basis (tons)
- DOC : Fraction of degradable organic carbon (by weight, dry basis) in cassava pulp (= 0.44: Default value for stockpile (Pulp, paper and cardboard (other than sludge) (Dry)) in the applied methodology)
- k : Decay rate for EFB (= 0.06: Default value for stockpile (Pulp, paper and cardboard (other than sludge), Boreal and Temperate, Dry)) in the applied methodology)
- x : Month during a year: x runs from the first month of a year (x = 1) to the month y for which avoided emissions are calculated (x = y)
- y : Month for which methane emissions are calculated

See section B.6.3 and B.7 for values selected for the above parameters.

II. Project emissions

Project emissions are calculated by following equation.

$$PE_y = PE_{y,comb} + PE_{y,transp} + PE_{y,power} \quad \text{(Equation 4)}$$

Where:

- PE_y : Project activity direct emissions in the year y (tCO₂e)

**SMALL-SCALE CDM PROGRAMME ACTIVITY DESIGN DOCUMENT FORM
(CDM-SSC-CPA-DD) - Version 01**



NAME /TITLE OF THE PoA: Programme on avoidance of methane production by on-site cassava pulp utilization in Thailand



CDM – Executive Board

page 12

$PE_{y,comb}$: Emissions through combustion of non-biomass carbon of ethanol in the year y (tCO₂e)

$PE_{transp,y}$: Emissions from incremental transportation in the year y (tCO₂e/year)

$PE_{power,y}$: Emissions from electricity and diesel consumption in the year y (tCO₂e/year)

$$PE_{power,y} = PE_{FF,y} + PE_{Elec,y}$$

Where:

$PE_{FF,y}$: Emissions from fossil fuel consumption for ethanol production plant (tCO₂e/year)

$PE_{elec,y}$: Emissions from electricity consumption for ethanol production plant (tCO₂e/year)

The above project emissions will be calculated as follows:

(a) Emissions through combustion of non-biomass carbon of ethanol

Emissions through combustion of non-biomass carbon of ethanol is calculated as follows:

$$PE_{y,comb} = Q_{y,non-biomass} * 44/12 + Q_{y,fuel} * EF_{y,fuel} \quad \text{(Equation 5)}$$

$Q_{y,non-biomass}$: Non-biomass carbon of ethanol consumed in the year y (tonnes of carbon)

$Q_{y,fuel}$: Quantity of auxiliary fossil fuel used in the year y (tonnes)

$EF_{y,fuel}$: CO₂ emission factor for the combustion of the auxiliary fossil fuel (tCO₂/ton)

Ethanol produced in the project do not contain any non-biomass carbon, and no auxiliary fossil fuel will be used when ethanol will be combusted.

$$PE_{y,comb} = 0$$

(b) Emissions from incremental transportation:

CO₂ emissions from incremental transportation by the project activity are calculated as follows:

$$PE_{y,transp} = (Q_y/CT_y) * DAF_w * EF_{CO2} + (Q_{y,ash}/CT_{y,ash}) * DAF_{ash} * EF_{CO2} + (Q_{y,RDF/SB}/CT_{y,RDF/SB}) * DAF_{RDF/SB} * EF_{CO2} \quad \text{(Equation 6)}$$

Where:

Q_y : Quantity of cassava pulp composted in the year “y” (= W_x = ??? tonnes)

CT_y : Average truck capacity for cassava pulp transportation (= ??? tonnes/truck)

DAF_w : Average incremental distance for cassava pulp transportation (= ??? km/truck)

$EF_{CO2,transp}$: CO₂ emission factor from diesel fuel due to transportation (= ??? tCO₂/km)

$Q_{y,comp}$: Quantity of final compost product produced in the year “y” (= 8,625 tonnes)

$CT_{y,comp}$: Average truck capacity for final compost product transportation (= 4 tonnes/truck)

DAF_{comp} : Average distance for final compost product transportation (= 16 km/truck)

$Q_{y,ash}$: Quantity of residues from ethanol production in the year “y” (??? tonnes)

$CT_{y,ash}$: Average truck capacity for residues transportation (tonnes/truck)

DAF_{ash} : Average distance for residues transportation (km/truck)

$Q_{y,RDF/SB}$: Quantity of ethanol produced in the year “y” (tonnes)

$CT_{y,RDF/SB}$: Average truck capacity for ethanol transportation (tonnes/truck)

**SMALL-SCALE CDM PROGRAMME ACTIVITY DESIGN DOCUMENT FORM
(CDM-SSC-CPA-DD) - Version 01**



NAME /TITLE OF THE PoA: Programme on avoidance of methane production by on-site cassava pulp utilization in Thailand



CDM – Executive Board

page 13

DAF_{RDF/SB}: Aggregate average distance for ethanol transportation to the storage in the production site as well as to the end user sites (km/truck)

(c) Emissions from fossil fuel consumption for ethanol production plant

CO₂ emissions from fossil fuel consumption for ethanol production plant are calculated as follows;

$$PE_{FF,y} = \sum (FC_y * NCV_i * EF_{CO_2,i}) \quad (\text{Equation 7})$$

PE_{FF,y}: Emissions from fossil fuel consumption at the ethanol production plant (tCO₂e/year)

FC_y : Annual consumption of fossil fuel i at the ethanol production plant

NCV_i : Net calorific value of fossil fuel i

EF_{CO₂,i} : CO₂ emission factor of fossil fuel i

(d) Emissions from electricity consumption for ethanol production plant

CO₂ emissions from electricity consumption for ethanol production plant are calculated as follows;

$$PE_{elec,y} = EC_y * EF_{grid} \quad (\text{Equation 8})$$

PE_{elec,y} : Emissions from electricity consumption at the ethanol production plant (tCO₂e/year)

EC_y : Annual consumption of grid electricity at the ethanol production facility in year y (MWh/year)

EF_{grid} : Grid emission factor (tCO₂/MWh)

III. Leakage

Leakages need not be considered as there is no transfer of equipment from another activity or to another activity.

IV. Emission reduction

Emission reduction is calculated as follows;

$$\begin{aligned} ER_y &= BE_y - (PE_y + Leakage_y) \\ &= XXXX - (0 + 0) \\ &= XXXX \end{aligned}$$

**SMALL-SCALE CDM PROGRAMME ACTIVITY DESIGN DOCUMENT FORM
(CDM-SSC-CPA-DD) - Version 01**



NAME /TITLE OF THE PoA: Programme on avoidance of methane production by on-site cassava pulp utilization in Thailand



CDM – Executive Board

page 14

B.5.3. Summary of the ex-ante estimation of emission reductions:

>>

Year	Estimation of project activity emissions (tonnes of CO ₂ e)	Estimation of baseline emissions (tonnes of CO ₂ e)	Estimation of leakage (tonnes of CO ₂ e)	Estimation of overall emission reductions (tonnes of CO ₂ e)
2012	XXXX	0	0	XXXX
2013	XXXX	0	0	XXXX
2014	XXXX	0	0	XXXX
2015	XXXX	0	0	XXXX
2016	XXXX	0	0	XXXX
2017	XXXX	0	0	XXXX
2018	XXXX	0	0	XXXX
2019	XXXX	0	0	XXXX
2020	XXXX	0	0	XXXX
2021	XXXX	0	0	XXXX
Total (tonnes of CO ₂ e)	XXXX	0	0	XXXX

B.6. Application of the monitoring methodology and description of the monitoring plan:

B.6.1. Description of the monitoring plan:

>>

In the PoA, monitoring will be done for each CPA. The monitoring plan is provided as follows.

1) Monitoring framework

XXXX will operate and manage the CPA, and measure necessary data for the monitoring of the CPA and report to TTSA based on the operation and monitoring manual prepared by TTSA.

2) The role of XXXX

Table

	CPA implementers (XXXX)
Data collection and reporting	<ul style="list-style-type: none"> - Implement data collection of the CPA - Report data to TTSA - Check data quality
Data storage and management	<ul style="list-style-type: none"> - Enter collected data to a computer. - Implement data management of CPA. - Store and maintain records.
Quality check and quality assurance	<ul style="list-style-type: none"> - Undertake regular maintenance of the facility - Receive necessary training for proper operation of the facility and

**SMALL-SCALE CDM PROGRAMME ACTIVITY DESIGN DOCUMENT FORM
(CDM-SSC-CPA-DD) - Version 01**



NAME /TITLE OF THE PoA: Programme on avoidance of methane production by on-site cassava pulp utilization in Thailand



CDM – Executive Board

page 15

	quality assurance of monitoring data
--	--------------------------------------

3) Monitored data

Data / Parameter:	W_x
Data unit:	tons/year
Description:	Total amount of cassava pulp prevented from piling in month x (tons) (Dry basis)
Source of data to be used:	Measurements by project participants
Value of data applied for the purpose of calculating expected emission reductions in section B.5	**** tons/year (** ton/day * **** days)
Description of measurement methods and procedures to be applied:	
QA/QC procedures to be applied:	
Any comment:	Monitored monthly.

Data / Parameter:	FC_y
Data unit:	GJ/year
Description:	Annual consumption of fuel oil at the ethanol production plant
Source of data to be used:	Records of fuel purchase invoices
Value of data applied for the purpose of calculating expected emission reductions in section B.5	****
Description of measurement methods and procedures to be applied:	
QA/QC procedures to be applied:	Verify the conformity of data with the fuel purchase invoices and equipments fuel consumption
Any comment:	Each delivery of fuel is recorded

Data / Parameter:	EC_y
Data unit:	MWh/year
Description:	Annual consumption of grid electricity at the ethanol production facility in year y
Source of data to be used:	Records of grid electricity purchase invoices

**SMALL-SCALE CDM PROGRAMME ACTIVITY DESIGN DOCUMENT FORM
(CDM-SSC-CPA-DD) - Version 01**



NAME /TITLE OF THE PoA: Programme on avoidance of methane production by on-site cassava pulp utilization in Thailand



CDM – Executive Board

page 16

Value of data applied for the purpose of calculating expected emission reductions in section B.5	****
Description of measurement methods and procedures to be applied:	
QA/QC procedures to be applied:	Verify the conformity of data with the fuel purchase invoices and equipments electricity consumption
Any comment:	

Data / Parameter:	f
Data unit:	-
Description:	Fraction of methane captured at the disposal site and flared, combusted or used in another manner
Source of data to be used:	“Tool to determine methane emissions avoided from disposal of waste at a solid waste disposal site (The latest version)”
Value of data applied for the purpose of calculating expected emission reductions in section B.5	0
Description of measurement methods and procedures to be applied:	Written information from the operator of the solid waste disposal site and/or site visits at the solid waste disposal site
QA/QC procedures to be applied:	
Any comment:	Monitored annually.

**SMALL-SCALE CDM PROGRAMME ACTIVITY DESIGN DOCUMENT FORM
(CDM-SSC-CPA-DD) - Version 01**



NAME /TITLE OF THE PoA: Programme on avoidance of methane production by on-site cassava pulp utilization in Thailand



CDM – Executive Board

page 17

SECTION C. Environmental analysis

>>

C.1. Please indicate the level at which environmental analysis as per requirements of the CDM modalities and procedures is undertaken. Justify the choice of level at which the environmental analysis is undertaken:

- ☐ Please tick if this information is provided at the PoA level. In this case sections C.2. and C.3. need not be completed in this form.

Should be elaborated for each CPA.

C.2. Documentation on the analysis of the environmental impacts, including transboundary impacts:

>>

Should be elaborated for each CPA.

C.3. Please state whether an environmental impact assessment is required for a typical CPA, included in the programme of activities (PoA), in accordance with the host Party laws/regulations:

>>

Should be elaborated for each CPA.

SECTION D. Stakeholders' comments

>>

D.1. Please indicate the level at which local stakeholder comments are invited. Justify the choice:

- ☐ Please tick if this information is provided at the PoA level. In this case sections D.2. to D.4. need not be completed in this form.

Should be elaborated for each CPA.

D.2. Brief description how comments by local stakeholders have been invited and compiled:

>>

Should be elaborated for each CPA.

**SMALL-SCALE CDM PROGRAMME ACTIVITY DESIGN DOCUMENT FORM
(CDM-SSC-CPA-DD) - Version 01**



NAME /TITLE OF THE PoA: Programme on avoidance of methane production by on-site cassava pulp utilization in Thailand



CDM – Executive Board

page 18

D.3. Summary of the comments received:

>>

Should be elaborated for each CPA.

D.4. Report on how due account was taken of any comments received:

>>

Should be elaborated for each CPA.

**SMALL-SCALE CDM PROGRAMME ACTIVITY DESIGN DOCUMENT FORM
(CDM-SSC-CPA-DD) - Version 01**



**NAME /TITLE OF THE PoA: Programme on avoidance of methane production by on-site
cassava pulp utilization in Thailand**



CDM – Executive Board

page 19

Annex 1

**CONTACT INFORMATION ON ENTITY/INDIVIDUAL RESPONSIBLE FOR THE SMALL-
SCALE CPA**

Organization:	
Street/P.O.Box:	
Building:	
City:	
State/Region:	
Postfix/ZIP:	
Country:	
Telephone:	
FAX:	
E-Mail:	
URL:	
Represented by:	
Title:	
Salutation:	
Last Name:	
Middle Name:	
First Name:	
Department:	
Mobile:	
Direct FAX:	
Direct tel:	
Personal E-Mail:	

SMALL-SCALE CDM PROGRAMME ACTIVITY DESIGN DOCUMENT FORM
(CDM-SSC-CPA-DD) - Version 01



NAME /TITLE OF THE PoA: Programme on avoidance of methane production by on-site
cassava pulp utilization in Thailand



CDM – Executive Board

page 20

Annex 2

INFORMATION REGARDING PUBLIC FUNDING

No public funding is used in the CPA.

SMALL-SCALE CDM PROGRAMME ACTIVITY DESIGN DOCUMENT FORM
(CDM-SSC-CPA-DD) - Version 01



NAME /TITLE OF THE PoA: Programme on avoidance of methane production by on-site
cassava pulp utilization in Thailand



CDM – Executive Board

page 21

Annex 3

BASELINE INFORMATION

See B.5 for details about monitoring plan.