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

CONTENTS

Annexes

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).

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

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

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Programmatic CDM Project for Energy Utilization of Broiler Chicken Manure in at xxxxxx of the Broiler Poultry Farm in Ust-Kamenogorskaya Ptitse Fabrika (UK-PF), Kazakhstan

Version 1
dd/mm/yyyy

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

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This CDM Programme Activity (hereafter, "CPA") is implemented under the Programmatic of Activity (hereafter, "PoA"), "Programmatic CDM Project for Energy Utilization of Broiler Chicken Manure in Ust-Kamenogorskaya Ptitse Fabrika (UK-PF), Kazakhstan". The coordinating/managing entity (hereafter, "C/ME") of this Project is Ust-Kamenogorskaya Ptitse Fabrika (UK-PF), which is also the implementer of this CPA and one of the largest broiler chicken farms in Ust-Kamenogorsk, the Eastern Kazakhstan, annually raising approximately 1 million heads of chicken. This PoA is a voluntary project implemented by YK-PF.

The purpose of this CPA is to convert the currently used coal boilers by installing the small-scale chicken manure boilers in the District A of the broiler farm of UK-PF as shown in the map below.
(CPA location has to be identified in the map below.)

The xxxxxx annually raises around xxxxxx broilers with annual poultry manure generation of approximately xxxxx tons. The CPA uses xxxx tons of this manure as the alternative fuel to coal by installing x units of poultry manure boilers with the manure treatment capacity of xxxx kg per hour. With this conversion of fuels from coal to poultry manure by this CPA, about xxxx tons of coal will be annually saved with the average GHGs emission reduction of xxxx ton CO_2 equivalent per year.

The CPA also contributes to improvement of the environment quality through reduction of air pollutant emission from coal boilers such as SO_x and dust and poultry manure to be stockpiled at the disposal site, which is located within the boundary of the POA shown in the map above.

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

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- Both C/ME of this PoA and the implementer and responsible entity of the CPA is Ust-Kamenogorskaya Ptitse Fabrika (UK-PF)

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

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

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A.4.1.1. Host Party:

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Republic of Kazakhstan

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

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The project site is located at the xxxxxx of the broiler farm owned by UK-PF as shown in the above-mentioned map. The latitude and longitude of the project site are xx°xx'xx.xx" N and xx°xx'xx.xx" E.

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

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

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This starting date of this CPA is dd/mm/yyyy, which is the date of purchase order of the poultry manure boilers (may be altered by each CPA).

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

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10 years

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

Fixed Crediting period

A.4.3.1. Starting date of the crediting period:

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The starting date of the crediting period is the same date as the registration date.

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

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10 years

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

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Table 1. Estimated amount of emission reductions

Years	**Estimation of annual emission reductions (tCO_2e)**
YYYY	XXXXX
YYYY	XXXXX
YYYY	XXXXX
YYYY	XXXXX
YYYY	XXXXX
YYYY	XXXXX
YYYY	XXXXX
YYYY	XXXXX
YYYY	XXXXX
YYYY	XXXXX
Total emission reductions (tCO_2e)	XXXXX
Total number of crediting years	10
Annual average over the crediting period of estimated reductions (tCO_2e)	XXXXX

A.4.5. Public funding of the CPA:

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No public funding is involved in this CPA. This CPA does not also include any diversion of ODA funds.

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

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As highlighted in Appendix 13 of EB 54 report "Guidelines on Assessment on Debundling for SSC Project Activities", a proposed small-scale CPA of a PoA shall be deemed to be a debundled component of a large project activity if there is already an activity, which satisfies both conditions (a) and (b) below:

(a) Has the same activity implementer as the proposed small scale CPA or has a C/ME, which also manages a large scale PoA of the same technology/measure, and;
(b) The boundary is within 1 km of the project boundary of the proposed small-scale CPA, at the closest point.

Since this is the first CPA to be conducted by UK-PF, it is clearly not a debundled component of another CPA. (need to be proved for each CPA respectively)

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

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There is no registered CDM project within project area or the same physical area.

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:

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Programmatic CDM Project for Energy Utilization of Broiler Chicken Manure in Ust-Kamenogorskaya Ptitse Fabrika (UK-PF), Kazakhstan, Version 1

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

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This CPA is eligible to be included in the registered PoA since it satisfies the criteria defined in A.4.2.2. in CDM-SSC-PoA-DD of the registered PoA as described below.

Table 2. Justification of Inclusion in the Registered PoA

Criteria	Justification of Applicability
(a) Located within the project boundary under the management of UK-PF	Applicable. The location of this CPA is within the project boundary under the management of UK-PF as described in A.4.1.2.
(b) A project to apply AMS-I.C.: Thermal energy production with or without electricity (Version 18) and AMS-III.E.: Avoidance of methane production from decay of biomass through controlled combustion, gasification or mechanical/thermal treatment (Version 16.0) as the baseline and	Applicable. The CPA is developed under AMS-I.C. and AMS-III.E.

monitoring methodology	
(c) A project to generate only thermal energy from poultry manure as the only energy sources (except for thre 1st ignition) which replaces the heat production from coal fuel boilers currently in operation within the project boundary.	Applicable. The CPA only generate thermal energy from poultry manure as the only energy sources to replace the heat generation from coal fuel boilers currently in operation within the project boundary.
(d) The technology to be employed is the incineration technology designed for poultry chicken manure.	Applicable. The CPA employs the incineration technology designed for poultry manure.
(e) The maximum thermal energy generation volume is less than or equal to 45MWth.	Applicable. The thermal energy generation volume of the CPA is less than 45MWth.
(f) A project utilizes the poultry manure generated within the project boundary only and not procured from outside the project boundary.	Applicable. The CPA use of poultry manure generated only from District A, which is within the boundary of the POA.
(g) A project disposes the incineration residues (ashes) at the final disposal site designated by the CME of this PoA within the project boundary.	Applicable. The CPA disposes the incineration residues at the final disposal site designated by the CME of the POA within the project boundary.

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

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In accordance with the Annex 24 of EB63: Attachment A to Appendix B of the simplified modalities and procedures for small scale CDM project activities, the additionality of a small scale project can be demonstrated by objectively identifying one of the barriers mentioned below:

- Investment barrier
- Technological barrier
- Barrier due to prevailing practices
- Other barriers

The CPA identified the barriers of (a), (b), (c) to demonstrate its additionality below.

(a) Investment barrier

To demonstrate its investment barrier, the CPA estimated its financial internal rate of return through discounted cashflow analysis. It also analyzed pay-back period of the project based on the estimation of project income and cost (initial investment and operation/maintenance). The details of the pre-conditions for this analysis, the estimations of income and cost, and analysis results are shown in the Annex 5 of this document. The result of this analysis is as shown in the table below.

Case 1	Financial Internal Rate of Return (IRR)	Payback Period
Case 1: The proposed project with income from selling the CERs	xxxx%	xx years
Case 2: The proposed project without income from selling the CERs	xxxx%	xx years
Case 3: Case 1 with a decrease of the CER income by 10%	xxxx%	xx years
Case 4: Case 1 with a decrease of the CER income by 20%	xxxx%	xx years

In the case of the CPA without the income from selling the CER, it is not feasible with a negative IRR (-0.61%) and payback period of 11years which is beyond the durable years of the project facility (poultry manure boilers). In the case of the CPA with the income from selling the CERs, the IRR shows higher value than the investment benchmark of Kaakhstan (7.5%) with the payback period of 7 years even though the CER income is discounted by 20% (US$8/ton$CO_2$). This result clearly shows the investment barrier of the CPA without CER under CDM.

(b) Technological barrier

The fuel utilization technology of poultry manure in the boilers to be introduced in the proposed project is a technology of "First-of-its-kind" in Kazakhstan. Therefore, there is a definitive technological barrier against application of this technology in this country.

The Annex 11 of EB63: Guidelines on Additonality of First-of-its-kind Project Activities identify its definition and eligibility conditions as shown in the table below:

Definition	Eligible physical/geographical extent	▪ Default physical/geographical extent of "First-of-its-kind" is the whole area of the host country. ▪ If the project extends beyond a country, it can also extend beyond the country. ▪ If the geographical extent is less than the boundary of host country, justification is required to prove that the technology is the "First-of-its-kind" within the project boundary.
	Measures	▪ The measures in relation to the following areas are currently included as the technology of the "First-of-its-kind. ➢ Switch of fuel or feedstock ➢ Change of technology including fuel switch or not (Energy efficiency improvement technologies and measures are also included.) ➢ Destruction of methane ➢ Avoidance of methane generation
	Technology	▪ The technologies which provide same output (products or services) with one of the differences in the following terms: ➢ Energy sources/fuels ➢ Feedstock ➢ Scale of facility/equipment (micro, small or large)
Eligibility Conditions		▪ The measures/technologies adopted by the project are different from the currently applied ones (conventional measures/technologies) within the geographical extent of the proposed project at the beginning of the project.

	▪ The project participants set the credit period of 10 years or less at its maximum.

The poultry manure boiler belongs to the measures of fuel switch and avoidance of methane emissions while it deals with energy sources/fuels. The technology has never been utilized in any areas or sectors of Kazakhstan. The project participants set the credit period of this CPA under this POA at 10 years. Thus the CPA complies with the definitions and eligibility conditions of "First-of-its-kind" and demonstrates its technological barrier.

(c) Barrier due to prevailing practices

Currently, almost all broiler farms in Kazakhstan utilizes coal boilers for air conditioning of broiler houses. Coal supply market and system is stable while all the broiler farms have sufficient experience and know-how of coal boiler maintenance and operation. On the other hand, there is completely no experience of manufacturing as well as operating poultry manure boilers in Kazakhstan. Supply of poultry manure as the alternative fuel is entirely unprepared.

In this respect, there is a clear barrier against introduction of the project technology due to prevailing practices.

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.

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The boundary applied to this CPA includes:

(a) Physical and geographical location of the heat production and supply system with poultry manure boilers; and
(b) Broiler houses to which the heat produced in (a) is supplied in the form of hot water

As mentioned above, this CPA is obviously located within the geographical boundary of the registered PoA.

The sources and gases included in the SSC-CPA boundary are as follows:

(Baseline Scenario)

Type of GHGs	Emission Source
CO_2	▪ Emission from consumption of coal in the baseline boilers that is converted by the proposed project with the heat supply from the poultry manure boilers
CH_4	▪ Emission from disposal of poultry manure that would have been disposed in the absence of the proposed project

(Project Scenario)

Type of GHGs	Emission Source
CO_2	▪ Emission from consumption of fossil fuels in the poultry manure boilers. (Not estimated in this proposed project since the use of fossil fuels in the boilers are minimal.)
	▪ Emission from consumption of electricity in the project.

(Leakage)

Type of GHGs	Emission Source
CO_2	▪ Leakage from the transfer of the currently used poultry manure boilers from outside project boundary. (Not estimated in this proposed project since the boilers are newly designed, manufactured and installed by the project.
	▪ Leakage from the transfer of the existing coal boilers are transferred outside the project boudndary. (Not estimated in this propose project since the existing coal boilers will be operated within the project boundary for the purpose of heat supply to the remaining broiler house after the implementation of the proposed project.

B.5. Emission reductions:

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

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Detailed information on the data and parameters that are available at validation and do not require monitoring are described below. Data and parameters used for ex-ante calculation that need to be monitored after project implementation are shown in B.6.1.

Data / Parameter:	ϕ
Data unit:	-
Description:	Model correction factor to account for model uncertainties
Value applied:	0.9
Justification of the choice of data or description of measurement methods and procedures actually applied:	Conservative value is applied
Any comment:	Oonk et el. (1994) have validated several landfill gas models based on 17 realized landfill gas projects. The mean relative error of multi-phase models was assessed to be 18%. Given the uncertainties associated with the model and in order to estimate emission reductions in a conservative manner, a discount of 10% is applied to the model results

Data / Parameter:	OX
Data unit:	-
Description:	Oxidation factor (reflecting the amount of methane from SWDS that is oxidized in the soil or other material covering the waste)
Source of data used:	Conduct a site visit at the solid waste disposal site in order to assess the type of cover of the solid waste disposal site. Use the IPCC 2006 Guidelines for National Greenhouse Gas Inventories for the choice of the value to be applied
Value applied:	0
Justification of the choice of data or description of	On-site inspection of the conditions of the existing solid waste disposal site.

measurement methods and procedures actually applied:	
Any comment:	-

Data / Parameter:	F
Data unit:	-
Description:	Fraction of methane in the SWDS gas (volume fraction)
Source of data used:	IPCC 2006 Guidelines for National Greenhouse Gas Inventories
Value applied:	0.5
Justification of the choice of data or description of measurement methods and procedures actually applied:	IPCC default value is applied.
Any comment:	This factor reflects the fact that some degradable organic carbon does not degrade, or degrades very slowly, under anaerobic conditions in the SWDS. A default value of 0 is recommended by IPCC

Data / Parameter:	DOC_f
Data unit:	-
Description:	Fraction of degradable organic carbon (DOC) that can decompose
Source of data used:	IPCC 2006 Guidelines for National Greenhouse Gas Inventories
Value applied:	0.5
Justification of the choice of data or description of measurement methods and procedures actually applied:	IPCC default value is applied.
Any comment:	-

Data / Parameter:	MCF
Data unit:	-
Description:	Methane correction factor
Source of data used:	IPCC 2006 Guidelines for National Greenhouse Gas Inventories
Value applied:	0.28
Justification of the choice of data or description of measurement methods and procedures actually applied:	On-site inspection of the solid waste disposal site in terms of its physical and operational conditions.
Any comment:	The methane correction factor (MCF) accounts for the fact that unmanaged SWDS produce less methane from a given amount of waste than managed SWDS, because

	a larger fraction of waste decomposes aerobically in the top layers of unmanaged SWDS

Data / Parameter:	DOC_j
Data unit:	-
Description:	Fraction of degradable organic carbon (by weight) in the waste type *j*
Source of data used:	IPCC 2006 Guidelines for National Greenhouse Gas Inventories (adapted from Volume 5, Tables 2.4 and 2.5)
Value applied:	0.38 (DOC_j of food waste as % of dry waste is applied)
Justification of the choice of data or description of measurement methods and procedures actually applied:	Analysis and characterization/categorization of the poultry manure on-site.
Any comment:	-

Data / Parameter:	k_j
Data unit:	-
Description:	Decay rate for the waste type *j*
Source of data used:	IPCC 2006 Guidelines for National Greenhouse Gas Inventories (adapted from Volume 5, Table 3.3)
Value applied:	0.05 (The lower value of k for food waste in dry boreal and temperate climate is adopted in accordance with the recommendations on k value for stockpiling of waste. in Chapter 3, volume 5 of 2006 IPCC Guidelines for National Greenhouse Gas Inventories.)
Justification of the choice of data or description of measurement methods and procedures actually applied:	On-site inspection and characterization of the existing solid waste disposal site.
Any comment:	Document in the CDM-PDD the climatic conditions at the SWDS site (temperature, precipitation and, where applicable, evapotranspiration). Use long-term averages based on statistical data, where available. Provide references

Data / Parameter:	$\eta_{BL,thermal}$
Data unit:	-
Description:	The efficiency of the plant using fossil fuel that would have been used in the absence of the project activity
Source of data used:	Data reported by UK-PF
Value applied:	0.6
Justification of the choice of data or description of	On site specific data or default value to be applied

measurement methods and procedures actually applied:	
Any comment:	According to SSC AMS I.C.(ver.18) determined by adopting one of the following criteria: a) Highest measured operational efficiency over the full range of operating conditions of a unit with similar specifications, using baseline fuel. The efficiency tests shall be conducted following the guidance provided in relevant national/international standards; b) Highest of the efficiency values provided by two or more manufacturers for units with similar specifications, using the baseline fuel; c) Default efficiency 100%

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

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As to the estimation of GHGs emission reduction by the conversion of coal boilers with poultry manure boilers by this CPA, the SSC methodology "AMS-IC: Thermal energy production with or without electricity (Version 19)" is applied while the estimation of GHGs emission reduction through avoidance of methane emission from the disposal site is made by utilizing the SSC methodology "AMS-III.E.: Avoidance of methane production from decay of biomass through controlled combustion, gasification or mechanical/thermal treatment (Version 16.0)" with some relevant methodological tools.

(a) Estimation based on AMS-I.C.

(Baseline Emission)

In accordance with the simplified baseline methodology for the small scale CDM projects under AMS-I.C., the baseline emission is estimated by the following equation:

$$BE_{thermal,CO2,y} = (EG_{thermal,y} / \eta_{BL,thermal}) \cdot EF_{FF,CO2}$$

Where:

$BE_{thermal,CO2,y}$	The baseline emissions from steam/heat displaced by the project activity during the year *y* (tCO_2)
$EG_{thermal,y}$	The net quantity of steam/heat supplied by the project activity during the year *y* (TJ)
$EF_{FF,CO2}$	The CO_2 emission factor of the fossil fuel that would have been used in the baseline plant; tCO_2/TJ, obtained from reliable local or national data if available, otherwise, IPCC default emission factors are used
$\eta_{BL,thermal}$	The efficiency of the plant using fossil fuel that would have been used in the absence of the project activity

For ex-ante estimation, the following values are applied.

Parameter	Unit	Value	Data Source

$EG_{thermal,y}$	TJ	xxxx	Based on estimation of heat supplied by the poultry manure boilers
$EF_{FF,CO2}$	tCO_2/TJ	xxxx	Nationally available coal statistics
$\eta_{BL,thermal}$	-	xxxx	Based on the calibrated data provided by UP-KF

Thus, the baseline emission is estimated as follows:

$$BE_{thermal,CO2,y} = (EG_{thermal,y} / \eta_{BL,thermal}) \cdot EF_{FF,CO2} = \frac{xxxxx \bullet xx}{xxx} = xxxx(tonCO2/yr)$$

(Project Emission)
Project emission in accordance with AMS-I.C., shall include the following sources:

- CO_2 emissions from on-site consumption of fossil fuels due to the project activity
- CO_2 emissions from electricity consumption by the project activity
- Any other significant emissions associated with project activity within the project boundary

In the case of the proposed project, on-site consumption of fossil fuels by the poultry manure boilers in the project activity is minimal and ignorable since they are only utilized at the time of its ignition. It also has no other significant emission emissions associated with project activity than the emission from electricity consumption by the project activity. Therefore, the project emission in the proposed project is estimated by the equation below.

$$PE_y = PE_{CO2,EC,y}$$

Where:

PE_y = Project emissions in year y (tCO_2/y)

$PE_{CO2,EC,y}$ = CO_2 emissions from electricity consumption by the project activity (tCO_2/yr)

In the equation above, CO_2 emission from electricity consumption by the project activity ($PE_{CO2,EC,y}$) is estimated by the formula below.

$$PE_{CO2,EC,y} = EC_{PJ,y} \cdot EF_{grid,y}$$

Where:

$PE_{CO2,EC,y}$ = CO_2 emissions from electricity consumption by the project activity (tCO_2/yr)

$EC_{PJ,y}$ = Electricity consumption by the project activity (MWh)

$EF_{grid,y}$ = CO_2 emission factor of the grid electricity (tCO_2/MWh)

For ex-ante estimation, the following values are applied:

Parameter	Unit	Value	Data Source

$EC_{PJ,y}$	MWh	xxxx	Based on the actual power consumption records of the same boilers in Japan.
$EF_{grid,y}$	tCO_2/MWh	xxxx	Nationally available grid emission factor

Thus, the project emission is estimated as follows:

$$PE_{CO2,EC,y} = EC_{PJ,y} \cdot EF_{grid,y} = xx \bullet xx = xx(tonCO2/year)$$

(Leakage)
AMS-I.C. requires the following leakage estimation:

- If the energy generating equipment currently being utilised is transferred from outside the boundary to the project activity, leakage is to be considered.
- In case collection/processing/transportation of biomass residues is outside the project boundary CO_2 emissions from collection/processing/transportation[13] of biomass residues to the project site.

In the case of the proposed project, the poultry manure boilers are newly manufactured for the project: therefore no leakage will occur due to transfer of equipment from outside the project boundary. On the other hand, poultry manure to be utilized as the fuel is also procured within the project boundary and no leakage will arise from collection/processing/transport of biomass residues to the project site.

Thus, the leakage emission from the proposed project in accordance with AMS-I.C. can be regarded as none.

(Emission reduction)
The emission reduction from the proposed project is estimated by the equation below:

$$ER_y = BE_y - PE_y - LE_y$$

Where:

ER_y = Emission reductions in year y (tCO_2e)

BE_y = Baseline emissions in year y (tCO_2e)

PE_y = Project emissions in year y (tCO_2)

LE_y = Leakage emissions in year y (tCO_2)

Thus, the emission reduction of this CPA in accordance with AMS-I.C. is estimated as follows:

$$ER_y = BE_y - PE_y - LE_y = xxxx - xxxx - 0 = xxxx(tonCO2/yr)$$

(b) <u>Estimation based on AMS-III.E.</u>

(Baseline emission)

The baseline emission in the CPA is estimated as the amount of methane emission from decay of the poultry manure to be disposed at the disposal site in the absence of the project activity. According to AMS-III.E., the amount of methane emission is estimated by the use of the "Tool to determine methane emissions avoided from disposal of waste at a solid disposal site", as shown in the equation below.

$$BE_{y,CH4} = \varphi \cdot (1 - f) \cdot GWP_{CH4} \cdot (1 - OX) \cdot \frac{16}{12} \cdot F \cdot DOC_f \cdot MCF \cdot \sum_{x=1}^{y} \sum_{j} W_{j,x} \cdot DOC_j \cdot e^{-k_j \cdot (y-x)} \cdot (1 - e^{-k_j})$$

Where:

$BE_{y,CH4}$	Methane emissions during the year y from waste disposal at the solid waste disposal site (SWDS) during the period from the start of waste disposal activity to the end of the year y (tCO_2e)
Φ	Model correction factor to account for model uncertainties (fixed parameter: 0.9)
f	Fraction of methane captured at the SWDS and flared, combusted or used in another manner (fixed parameter: 0)
GWP_{CH4}	Global Warming Potential (GWP) of methane, valid for commitment(fixed parameter: 12)
OX	Oxidation factor (reflecting the amount of methane from SWDS that is oxidized in the soil or other material covering the waste (default value: 0.1)
F	Fraction of methane in the SWDS gas (volume fraction) (default value:0.5)
DOC_f	Fraction of degradable organic carbon (DOC) that can decompose (default value:0.5)
MCF	Methane correction factor (determined by types of SWDS)
$W_{j,x}$	Amount of organic waste type j disposed at the SWDS in the year x (tons)
DOC_j	Fraction of degradable organic carbon (by weight) in the waste type j
k_j	Decay rate for the waste type j
J	Waste type category
X	Year during the crediting period: x runs from the first year of the first crediting period (x=1) to the year y for which avoided emissions are calculated (x=y)
Y	Year for which methane emissions are calculated.

For ex-ante estimation, the following values are applied.

Parameter	Unit	Value	Data Source
Φ	-	0.9	Conservative value is applied.
f	-	0	No methane is captured by the CPA.
GWP_{CH4}	-	12	2006 IPCC Guidelines
OX	-	0	Determined based on the result of on-site inspection of the

			conditions of the existing solid waste disposal site
F	-	0.5	IPCC default value
DOC_f	-	0.5	IPCC default value
MCF	-	0.28	Determined based on on-site inspection of the solid waste disposal site in terms of its physical and operational conditions.
$W_{j,x}$	Tons/yr	xxxx	250 (kg/hour)×8000 (hours/yr) ×2 (units)
DOC_j	-	0.38	Determined based on analysis and characterization/ categorization of the poultry manure on-site.
k_j	-	0.05	The lower value of k for food waste in dry boreal and temperate climate is adopted in accordance with the recommendations on k value for stockpiling of waste in Chapter 3, volume 5 of 2006 IPCC Guidelines for National Greenhouse Gas Inventories.

Based on the above determination of the relevant values, baseline emission is estimated every year for 10 years of the crediting period as shown below.

Baseline Emission of the CPA based on AMS-III.E.

YYYY	YYYY	YYYY	YYYY	YYYY	YYYY	YYYY	YYYY	YYYY	YYYY	Total
XXX	XXX	XXX	XXX	XXX	XXX	XXX	XXX	XXX	XXX	XXX

(Project Emission)

AMS-III.E. requires the estimation of the project emissions from the following sources:

- CO2 emissions related to the gasification and combustion of the non-biomass carbon content of the waste (plastics, rubber and fossil derived carbon) or RDF/SB and auxiliary fossil fuels used in the combustion, gasification or mechanical/thermal treatment facility;
- Incremental CO2 emissions due to:
  - Incremental distances between the collection points to the project site as compared to the baseline disposal site;
  - Transportation of combustion residues and final waste from controlled burning to disposal site;
- CO2 emissions related to the fossil fuel and/or electricity consumed by the project activity facilities, including the equipment for air pollution control required by regulations. In case the project activity consumes grid-based electricity, the grid emission factor (tCO2e/MWh) should be used, or it should be assumed that diesel generators would have provided a similar amount of electricity, calculated as described in category I.D.

In the case of the proposed project, consumption of fossil fuels by the project activity is minimal and igonorable as mentioned above.

Further, there is no incremental CO_2 emission due to incremental distance between the collection points to the project site as compared to the baseline project site since the project collects the poultry manure generated within the project site. The transportation of combustion residues from poultry manure boilers to disposal site does not increase the transport distance compared with baseline case.

The CO_2 emission from electricity consumption by the project activity is estimated in the equation above in accordance with AMS-I.C.
Thus, the project emission in relation to AMS-III.E. can be regarded as none in the proposed project.

(Leakage)
AMS-III.E. requires that leakage effects at the site of the other activity are to be considered if the controlled combustion, gasification or mechanical/thermal treatment technology is equipment transferred from another activity or if the existing equipment is transferred to another activity.

However, in the case of the proposed project, none of the above leakage effects occur as there is no transfer of project facilities and equipment from outside the project boundary while the existing equipment is not transferred to another activity.

Thus, the leakage emission can be regarded as none in the case of the proposed project.

(Emission Reduction)
(Emission reduction)
The emission reduction from the proposed project is estimated by the equation below:

$$ER_y = BE_y - PE_y - LE_y$$

Where:

ER_y = Emission reductions in year y (tCO_2e)

BE_y = Baseline emissions in year y (tCO_2e)

PE_y = Project emissions in year y (tCO_2)

LE_y = Leakage emissions in year y (tCO_2)

However, as not the project and leakage emission are none in the case of this CPA, the emission reduction equals to baseline emission.

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)
YYYY	XXXX	XXXX	0	XXXX
YYYY	XXXX	XXXX	0	XXXX
YYYY	XXXX	XXXX	0	XXXX
YYYY	XXXX	XXXX	0	XXXX
YYYY	XXXX	XXXX	0	XXXX
YYYY	XXXX	XXXX	0	XXXX
YYYY	XXXX	XXXX	0	XXXX
YYYY	XXXX	XXXX	0	XXXX
YYYY	XXXX	XXXX	0	XXXX
YYYY	XXXX	XXXX	0	XXXX
Total (tonnes of CO_2 e)	XXXX	XXXX	0	XXXX

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

B.6.1. Description of the monitoring plan:

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Monitoring will be conducted by a person in charge of the record keeping system assigned above by the technical director of UK-PF. Detailed responsibilities and authorities for project management, monitoring procedures and QA/QC procedures would be drawn up for the purpose and put in place. Duties thereof will be incorporated in the person's daily activity schedules to ensure data continuity and high-quality data collection. The monitoring will be conducted for THE CPA based on the monitored and recorded data of the CPA. The monitored parameters and data are as follows.

Data / Parameter:	
Description:	Continuous operation of the equipment/system
Unit:	-
Monitoring/recording frequency:	Annual check of all appliances or a representative sample thereof to ensure that they are still operating or are replaced by an equivalent in service appliance.
Measurement methods and procedures:	Recording of thermal energy output based on metering of calibrated thermometer for each CPA.

Data / Parameter:	EF_{CO2}
Description:	CO_2 emission factor for the grid electricity in year y
Unit:	tCO_2e/kWh
Monitoring/recording frequency:	
Measurement methods and procedures:	As described in AMS-I.D

Data / Parameter:	$EF_{CO2,i}$
Description:	CO_2 emission factor of fossil fuel type i
Unit:	tCO_2e/GJ
Monitoring/recording frequency:	As per the "Tool to calculate project or leakage CO2 emissions from fossil fuel combustion".
Measurement methods and procedures:	As per the "Tool to calculate project or leakage CO2 emissions from fossil fuel combustion".

Data / Parameter:	
Description:	Quantity of electricity generated/supplied
Unit:	MWh
Monitoring/recording frequency:	Continuous monitoring, integrated hourly and at least monthly recording.
Measurement methods and procedures:	Measured using calibrated meters. Calibration shall be as per the relevant paragraphs of .General guidelines to SSC CDM methodologies. In case the project activity is exporting electricity to other facilities, the metering shall be carried out at the recipient's end and measurement results shall be cross checked with records for sold/purchased electricity (e.g.

	invoices/receipts). Metering the energy produced by a sample of the systems where the simplified baseline is based on the energy produced multiplied by an emission coefficient.

Data / Parameter:	
Description:	Quantity of hot air
Unit:	Nm^3/hr
Monitoring/recording frequency:	Continuous monitoring, integrated hourly and at least monthly recordings
Measurement methods and procedures:	Measured using calibrated meters. Calibration shall be as per the relevant paragraphs of .General guidelines to SSC CDM methodologies.. If applicable, measurement results shall be cross checked with records for sold/purchased electricity (e.g. invoices/receipts). Where it is not feasible (e.g. because of too high temperature), spot measurements can be used through sampling with a 90% confidence level and a 10% precision.

Data / Parameter:	
Description:	Quantity of steam
Unit:	Nm^3/hr
Monitoring/recording frequency:	Continuous monitoring, integrated hourly and at least monthly recordings
Measurement methods and procedures:	Measured using calibrated meters. Calibration shall be as per the relevant paragraphs of .General guidelines to SSC CDM methodologies.. If applicable, measurement results shall be cross checked with records for sold/purchased electricity (e.g. invoices/receipts).

Data / Parameter:	
Description:	Net quantity of thermal energy supplied by the project activity during the year y
Unit:	TJ
Monitoring/recording frequency:	Continuous monitoring, aggregated annually.
Measurement methods and procedures:	Heat generation is determined as the difference of the enthalpy of the steam or hot fluid and/or gases generated by the heat generation equipment and the sum of the enthalpies of the feed-fluid and/or gases blow-down and if applicable any condensate returns. The respective enthalpies should be determined based on the mass (or volume) flows, the temperatures and, in case of superheated steam, the pressure. Steam tables or appropriate thermodynamic equations may be used to calculate the enthalpy as a function of temperature and pressure. In case of equipment that produces hot water/oil this is expressed as the difference in the enthalpy between the hot water/oil supplied to and returned by

	the plant. In case of equipment that produces hot gases or combustion gases, this is expressed as the difference in the enthalpy between the hot gas produced and all streams supplied to the plant. The enthalpy of all relevant streams shall be determined based on the monitored mass flow, temperature, pressure, density and specific heat of the gas. In case the project activity is exporting heat to other facilities, the metering shall be carried out at the recipient.s end and measurement results shall be cross checked with records for sold/purchased thermal energy (e.g. invoices/receipts). Metering the energy produced by a sample of the systems where the simplified baseline is based on the energy produced multiplied by an emission coefficient.
Data / Parameter:	
Description:	Quantity of fossil fuel type j combusted in year y
Unit:	Mass or volume unit
Monitoring/recording frequency:	As per the "Tool to calculate project or leakage CO2 emissions from fossil fuel combustion".
Measurement methods and procedures:	As per the "Tool to calculate project or leakage CO2 emissions from fossil fuel combustion".

Data / Parameter:	$B_{Biomass,y}$
Description:	Net quantity of biomass consumed in year y
Unit:	Mass or volume
Monitoring/recording frequency:	Continuously and estimate using annual mass/energy balance
Measurement methods and procedures:	Use mass or volume based measurements. Adjust for the moisture content in order to determine the quantity of dry biomass. The quantity of biomass shall be measured continuously or in batches. If more than one type of biomass fuel is consumed, each shall be monitored separately. For the case of processed renewable biomass (e.g. briquettes) data shall be collected for mass, moisture content, NCV of the processed biomass that is supplied to users with an appropriate sampling frequency. Cross-check: Cross-check the measurements with an annual energy balance that is based on purchased quantities (e.g. with sales receipts) and stock changes. In cases where emission reductions are calculated based on energy output, check the consistency of measurements ex post with annual data on energy generation, fossil fuels and biomass used and the efficiency of energy generation as determined ex ante.

Data / Parameter:	
Description:	Moisture content of the biomass (wet basis)
Unit:	%
Monitoring/recording frequency:	The moisture content of biomass of homogeneous quality shall be monitored for each batch of biomass. The weighted average should be calculated for each monitoring period and used in the calculations.
Measurement methods and procedures:	On-site measurements. This applies in the case where emission reductions are calculated based on biomass energy input. For all cases, ex ante estimates should be provided in the PDD and used during the crediting period. In case of dry biomass, monitoring of this parameter is not necessary.

Data / Parameter:	T
Description:	Temperature
Unit:	°C
Monitoring/recording frequency:	Continuous monitoring, integrated hourly and at least monthly recording.
Measurement methods and procedures:	Measured using calibrated meters. Calibration shall be as per the relevant paragraphs of the "General guidelines to SSC CDM methodologies".

Data / Parameter:	P
Description:	Pressure
Unit:	kg/cm^2
Monitoring/recording frequency:	Continuous monitoring, integrated hourly and at least monthly recording.
Measurement methods and procedures:	Measured using calibrated meters. Calibration shall be as per the relevant paragraphs of the "General guidelines to SSC CDM methodologies".

Data / Parameter:	$NCV_{i,y}$
Description:	Net calorific value of fossil fuel type i
Unit:	GJ/mass or volume unit
Monitoring/recording frequency:	As per the "Tool to calculate project or leakage CO2 emissions from fossil fuel Combustion".
Measurement methods and procedures:	As per the "Tool to calculate project or leakage CO2 emissions from fossil fuel Combustion".

Data / Parameter:	NCV_k
Description:	Net calorific value of biomass type k

Unit:	GJ/mass or volume unit
Monitoring/recording frequency:	Determine once in the first year of the crediting period.
Measurement methods and procedures:	Measurement in laboratories according to relevant national/international standards. Measure quarterly, taking at least three samples for each measurement. The average value can be used for the rest of the crediting period. Measure the NCV based on dry biomass. Check the consistency of the measurements by comparing the measurement results with, relevant data sources (e.g. values in the literature, values used in the national GHG inventory) and default values by the IPCC. (If the measurement results differ significantly from previous measurements or other relevant data sources, conduct additional measurements)

Data / Parameter:	f
Data unit:	-
Description:	Fraction of methane captured at the SWDS and flared, combusted or used in another manner
Source of data	Written information from the operator of the solid waste disposal site and/or site visits at the solid waste disposal site
Measurement procedures (if any):	-
Monitoring frequency:	Annually
QA/QC procedures:	-
Any comment:	-

Data / Parameter:	GWP_{CH4}
Data unit:	tCO_2e / tCH_4
Description:	Global Warming Potential (GWP) of methane, valid for the relevant commitment period
Source of data	Decisions under UNFCCC and the Kyoto Protocol (a value of 21 is to be applied for the first commitment period of the Kyoto Protocol)
Monitoring frequency:	Annually
Any comment:	-

Data / Parameter:	W_x
Data unit:	Tons
Description:	Total amount of organic waste prevented from disposal in year *x* (tons)
Source of data	Measurements by project participants
Measurement procedures (if any):	-
Monitoring frequency:	Continuously, aggregated at least annually
QA/QC procedures:	-
Any comment:	-

Data / Parameter:	$p_{n,j,x}$
Data unit:	-
Description:	Weight fraction of the waste type *j* in the sample *n* collected during the year *x*
Source of data	Sample measurements by project participants
Measurement procedures (if any):	Sample the waste prevented from disposal, using the waste categories *j*, as provided in the table for DOC_j and k_j, and weigh each waste fraction
Monitoring frequency:	The size and frequency of sampling should be statistically significant with a maximum uncertainty range of 20% at a 95% confidence level. As a minimum, sampling should be undertaken four times per year
QA/QC procedures:	-
Any comment:	This parameter only needs to be monitored if the waste prevented from disposal includes several waste categories *j*, as categorized in the tables for DOC_j and k_j

Data / Parameter:	Z
Data unit:	-
Description:	Number of samples collected during the year *x*
Source of data	Project participants
Monitoring frequency:	Continuously, aggregated annually
QA/QC procedures:	-
Any comment:	This parameter only needs to be monitored if the waste prevented from disposal includes several waste categories *j*, as categorized in the tables for DOC_j and k_j

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.

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

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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:

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SECTION D. Stakeholders' comments

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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.

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

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D.3. Summary of the comments received:

>>

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

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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:	

Annex 2

INFORMATION REGARDING PUBLIC FUNDING

No public funding is involved in the project activity.

Annex 3

BASELINE INFORMATION

All baseline information is provided in Section B.

Annex 4

MONITORING INFORMATION

All monitoring information is provided in Section B.6.

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