Monitoring report form
(Version 05.1)

MONITORING REPORT		
Title of the project activity	Luohe MSW Landfill Site LFG Recovery to Power Project	
UNFCCC reference number of the project activity	5238	
Version number of the monitoring report	Version 02	
Completion date of the monitoring report	11/07/2016	
Monitoring period number and duration of this monitoring period	Second monitoring period 01/04/2013-29/02/2016(first and last days included)	
Project participant(s)	Shanghai BCCY New Power Industry Co.,Ltd UPM Umwelt-Projekt-Management GmbH	
Host Party	China	
Sectoral scope(s)	Sectoral scope1:Energy Industries (renewable/non-renewable sources) Sectoral scope13:Waste handling and disposal	
Selected methodology(ies)	AMS III.G Landfill Methane Recovery(version 06) AMS I.D Grid connected renewable electricity generation(version 16)	
Selected standardized baseline(s)	N/A	
Estimated amount of GHG emission reductions or net GHG removals by sinks for this monitoring period in the registered PDD	112,012 tCO_2e	
Total amount of GHG emission reductions or net GHG removals by sinks achieved in this monitoring period	GHG emission reductions or net GHG removals by sinks reported up to 31 December 2012	GHG emission reductions or net GHG removals by sinks reported from 1 January 2013 onwards
	0 tCO_2e	149,590tCO_2e

SECTION A. Description of project activity

A.1. Purpose and general description of project activity

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Luohe MSW Landfill Site LFG Recovery to Power Project (Hereinafter referred to as the project activity) is developed by Shanghai BCCY New Power Industry Co., Ltd. ,which aims to recover and destroy landfill gas (LFG) generated at the municipal solid waste (MSW) landfill site in Luohe city(Luohe city landfill area #1), Henan province, P.R. China. The collected LFG is used for electricity production. The electricity generation offsets carbon emissions from the combustion of fossil fuel. Consequently ERs are claimed for both methane combustion and power displacement.

The project activity employs a gas collection system, a transmitting system, a pre-treatment system and gas engines with 4 sets of gas engines with capacity of 500kW each (a total capacity of 2 MW). The gas engines combust landfill gas, which contains methane, to produce electricity and export it to the grid. The project activity boundary is the site of the project activity, Luohe landfill, where the gas is captured and used. Moreover, since the electricity generated by the LFG is exported to Central China Power Grid, the project activity boundary also includes all the power generation sources connected to the Central China Power Grid.

The project construction began on 03/08/2009; and was commissioned on 31/05/2010.

The total claimed amount of ERs is 149,590 tCO_2e in this monitoring period from 01/04/2013 to 29/02/2016(first and last days included).

A.2. Location of project activity

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The plant site of the project activity is located in the northeast area inside of Luohe City MSW landfill site, one kilometer south of Chengang village, Luohe City, Henan Province, People's Republic of China. The coordinate of engine house of the power plant is longitude 113˚59'59"E (113.9997 E) and latitude 33˚30'20" N (33.5056 N).

A.3. Parties and project participant(s)

Party involved ((host) indicates a host Party)	Private and/or public entity(ies) project participants (as applicable)	Indicate whether the Party involved wishes to be considered as project participant (yes/no)
China	Shanghai BCCY New Power Industry Co.,Ltd	No
Germany	UPM Umwelt-Projekt-Management GmbH	No

A.4. Reference of applied methodology and standardized baseline

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Applied approved baseline and monitoring methodologies:

AMS-III.G. Landfill methane recovery (version 06)

AMS-I.D. Grid connected renewable electricity generation (version 16)

Used tools:

"Tool to determine methane emissions avoided from disposal of waste at a solid waste disposal site" (version 5.1.0)

"Tool to calculate the emission factor for an electricity system" (version 02.2.0)

The above methodologies and tools are available at http://cdm.unfccc.int/methodologies/SSCmethodologies/approved.html

A.5. Crediting period of project activity

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10-years fixed crediting period was chosen for the project activity, which is from 07/10/2011 to 06/10/2021.

A.6. Contact information of responsible persons/entities

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Responsible person: Ms. Wanglei
Telephone:+86 371 6396 9330
FAX:+86 371 6552 1780
E-mail:lwang@bccynewpower.com

SECTION B. Implementation of project activity

B.1. Description of implemented registered project activity

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The implementation of the project is in compliance with the registered PDD. The construction of the project started on 03/08/2009 and was connected to CCPG since 31/05/2010 for a total installed capacity of 2 MW.

Table B.1 Relevant dates for the project activity

No.	Project activity	Date
1	Installation of flow meter F	27/01/2010
2	Installation of gas analyser	27/01/2010
3	Installation of electricity meter E1,E2	10/04/2010
4	Installation of electricity meter E3	25/05/2010
5	Installation of engine flow meter F1,F2	31/08/2010
6	DCS system operation	20/10/2010
7	Installation of engine flow meter F3	25/08/2012
8	Installation of engine flow meter F4	10/08/2013
9	2# gas engine connected to CCPG	31/05/2010
10	1# gas engine connected to CCPG	01/06/2010
11	3# gas engine connected to CCPG	02/11/2012
12	4# gas engine connected to CCPG	10/12/2013

There were no event or situation occurred during the monitoring period (01/04/2013-29/02/2016) which may impact on the applicability of the methodology.

Technology applied in the project
The technologies adopted in the project include a gas collection system, a gas pre-treatment system, gas engines, a transmitting system, and a monitoring system.

Gas collection system
The gas collection system consists of gas collecting wells, gas collecting sub-hoses and a main pipe. The numbers of gas wells are increased as waste accumulating in the landfill area. All sub-hoses are connected to the main pipe so that the recovered LFG from gas wells could be collected together for utilization. The operation pressure of the gas collection system is provided by draught fans.

Gas pre-treatment system
Prior to electricity generation, LFG is pre-treated to remove its impurities, moistures etc, to prevent corrosion in the engines. The gas pre-treatment is composed of leachate condensation separation; filtration, dewatering, drying, pressurization and removing solid impurities.

Gas engines and transmitting system
The project activity employs 4 sets of gas engines with capacity of 500kW each when the LFG

generation hits the peak at the landfill site. The generated electricity is exported to CCPG through the transmitting system. The engines are produced by a domestic engine company named Jinan Diesel Engine Co., Ltd. The specification of the gas engines is listed in Table B.2.

To transform the voltage from 400V to 10kV, a transformer is installed by the project activity.

Table B.2: Specification of Gas Engines

Model	500GF-N1(500GF-NK)
Rate Power	500kW/625kVA
Rate Voltage	400V
Rate Speed	1000r/min
Frequency	50Hz
Manufacturer	Jinan Diesel Engine Co., Ltd

Monitoring system
For the detailed information of monitoring system, please refer to section C.

B.2. Post-registration changes

B.2.1. Temporary deviations from registered monitoring plan, applied methodology or applied standardized baseline

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No temporary deviations from registered monitoring plan or applied methodology were applied during the monitoring period.

B.2.2. Corrections

>>
Not applicable.

B.2.3. Changes to start date of crediting period

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The start date of crediting period is changed from 01/12/2011 to 07/10/2011 by EB upon request of PP.

B.2.4. Inclusion of a monitoring plan to the registered PDD that was not included at registration

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Not applicable.

B.2.5. Permanent changes from registered monitoring plan, applied methodology or applied standardized baseline

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There have been no permanent changes from registered monitoring plan or applied methodology or applied standardized baseline.

B.2.6. Changes to project design of registered project activity

>>
There have been no changes to project design of registered project activity.

B.2.7. Types of changes specific to afforestation or reforestation project activity

>>
Not applicable.

SECTION C. Description of monitoring system

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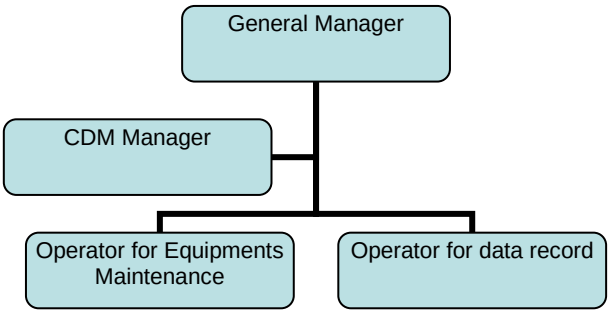
The detailed monitoring plan is described as follow:
1. Organizational structure



Roles and responsibilities

Table C.1 Roles and responsibilities

Title	Name	Responsibility
General Manager	Hanxu	Manage the issues related to CDM monitoring
CDM Manager	Liangnan	Double check the collected data; review quality and support the general manager
Operator for Equipments Maintenance	Pangwei	Data collection; data check; data archiving and data delivery
Operator for data record	Jia Rongxin	Meter maintenance and calibration

2. Data monitoring
The location of the main meters are displayed as following diagram:

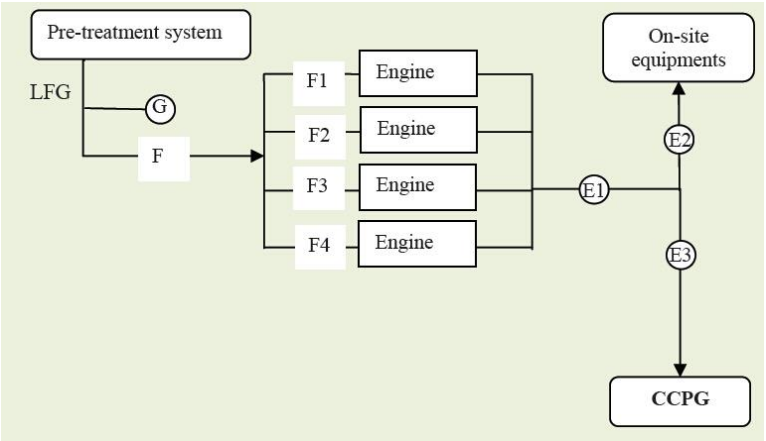


Figure C.1: Chart of the monitoring meters

Legend:

G	Gas analyzer to continuously measure methane fraction
F	Flow meter to continuously measure the flow of total collected LFG, which can automatically measure temperature and pressure, expressing LFG volumes in normalized cubic meters.
F1	Flow meter to continuously measure the flow of LFG fed to 1# engine, which can automatically measure temperature and pressure, expressing LFG volumes in normalized cubic meters.
F2	Flow meter to continuously measure the flow of LFG fed to 2# engine, which can automatically measure temperature and pressure, expressing LFG volumes in normalized cubic meters.
F3	Flow meter to continuously measure the flow of LFG fed to 3# engine,

	which can automatically measure temperature and pressure, expressing LFG volumes in normalized cubic meters.
F4	Flow meter to continuously measure the flow of LFG fed to 4# engine, which can automatically measure temperature and pressure, expressing LFG volumes in normalized cubic meters.
E1	Electricity meter to continuously measure the electricity produced by all the engines.
E2	Electricity meter to continuously measure the electricity consumed by all the on-site equipments.
E3	Electricity meter (bi-directional) to continuously measure the electricity exported to CCPG and imported from the grid.

3. Data collection procedures
The data are fully recorded and archived by DCS automatically and shown in the control system. The data are recorded once per hour. DCS of a historian database, primarily to provide data backup to the sheet of excel. Ultimately it forms the CDM Monitoring Operating Record. All data are kept 2 years after the end of the crediting period.

Total landfill gas captured ($LFG_{total,y}$)
Continuously measured by a flow meter and the data are recorded and electronic archived once per hour by computer automatically. The monitoring data are checked every day and summarized every month. The flow meter is calibrated annually to ensure the accuracy.

Landfill gas combusted in engines ($LFG_{engines,\ y}$; $LFG_{engines\ 2,\ y}$; $LFG_{engines\ 3,\ y}$; $LFG_{engines\ 4,\ y}$)
Each parameter is continuously measured by a flow meter and the data are recorded and electronic archived once per hour by computer automatically. The data are checked by the operators every day and reported to General Manger by CDM manager monthly. The flow meter is calibrated annually to ensure the accuracy.
All the flow meters with temperature and pressure compensation are installed on site, which can automatically measure the temperature and pressure, expressing LFG volumes in normalized cubic meters.
To be conservative, the monthly minimum of total LFG amount and sum of LFG to engines 1#、2#、3#、4# is used for ER calculation.

Electricity produced by all the engines ($EL_{LFG,\ y}$)
The electricity produced by all engines in the project is continuously measured by the electricity meter E1 installed at the low voltage side of the on-site transformer substation. The monitoring data are checked by the operators every day and reported to General Manger by CDM manager monthly. The electricity meter E1 is calibrated annually to ensure the accuracy.

The amount of electricity consumed by the project activity ($EL_{onsite,y}$)
The electricity consumed by the project is continuously measured by the electricity meter E2 installed at the low voltage side of the on-site transformer substation. The monitoring data are checked by the operators every day and reported to General Manger by CDM manager monthly. The electricity meter E2 is calibrated annually to ensure the accuracy.

Net amount of electricity exported to CCPG by the project activity ($EL_{grid,y}$)
This meter is bi-directional and has two-way metering, recording both the electricity exported to the grid and the electricity imported from the grid . The electricity meter E3 is installed and sealed at the control room of project site by Luohe grid company. The data of electricity exports and imports are recorded and archived by DCS per hour automatically and shown in the control system. The monitoring data are checked by the operators every day and reported to General Manger by CDM manager monthly. The electricity meter E3 is calibrated annually to ensure the accuracy. The data could be cross-check by the sale receipts provided by the Luohe grid company.

Methane fraction in the landfill gas ($W_{CH4,y}$)

Continuously measured by a gas analyzer and the data are recorded and electronic archived once per hour by computer automatically. The monitoring data are checked by the operators every day and reported to General Manger by CDM manager monthly. The gas analyzer meter is calibrated annually to ensure the accuracy.

Operation hours of the generators
The data are recorded and archived by DCS automatically and shown in the control system. The data is recorded once per hour. The monitoring data are checked by the operators every day and reported to General Manger by CDM manager monthly.

4. QA and QC
In order to ensure monitoring plan with high quality, QA/QC measures are carried out in monitoring data recording and checking, equipment calibrating and staff training.

Data recording: all data collected are recorded in electronic files which are regularly backed up. The data are checked by the operators every day and reported to General Manger by CDM manager monthly.

Equipment calibration and maintenance: Flow meters, gas analyzer, other critical CDM project equipments are subject to regular maintenance and testing according to technical specifications from the manufactures to ensure accuracy and good performance. The detailed information of calibration could be referred to section D.

Training: All the staffs involved in this monitoring plan take training during the monitoring period, and the training plan includes CDM knowledge and special skill for monitoring, which is:
(1) Information about CDM
(2) Roles and responsibility of each staff
(3) Information about data to be collected
(4) Instruments calibration

5. Emergency procedures
As for the data acquisition system, the DCS consists of monitoring and recording the data. Once the system has some problems, the Technical Department would solve as soon as possible.
In case of equipment malfunction or breakdown, corrective actions are carried out to minimize the unintended emissions.

SECTION D. Data and parameters

D.1. Data and parameters fixed ex ante or at renewal of crediting period

Data/parameter:	**GWP_{CH4}**
Unit	-
Description	Global warming potential of CH_4
Source of data	IPCC 2007 Guidelines For National Greenhouse Gas Inventories
Value(s) applied)	25
Choice of data or measurement methods and procedures	-
Purpose of data	Baseline emission calculation
Additional comments	

Data/parameter:	**D_{CH4}**
Unit	tCH_4/m^3
Description	Methane density

Source of data	ACM0001
Value(s) applied)	0.0007168
Choice of data or measurement methods and procedures	-
Purpose of data	Baseline emission calculation
Additional comments	At standard temperature and pressure (0 degree Celsius and 1,013 bar) the density of methane is 0.0007168 tCH_4/m^3.

Data/parameter:	**$EF_{grid,y}$**
Unit	tCO_2/MWh
Description	The grid emission factor
Source of data	PDD section B.6.1
Value(s) applied)	0.8529
Choice of data or measurement methods and procedures	Tool to calculate the emission factor for an electricity system(version 02)
Purpose of data	Baseline emission calculation
Additional comments	The data based on IPCC default value because National specific value is unavailable.

D.2. Data and parameters monitored

Data/parameter:	**$LFG_{total,y}$**
Unit	Nm^3
Description	Total LFG captured at Normal Temperature and Pressure in the year y
Measured/calculated/default	Measured
Source of data	Daily records of the flow meter F
Value(s) of monitored parameter	14,381,496.12
Monitoring equipment	Refer to Table C.2 Detailed calibration information
Measuring/reading/recording frequency:	The monitoring frequency is continuous. And the data are recorded and electronic archived once per hour by computer automatically. The operator checks the data every day, and totalized the data every month.
Calculation method (if applicable):	Not applicable
QA/QC procedures:	Flow meter is subject to regular maintenance and testing regime to ensure accuracy .The calibration is done once every year by a qualified third party.
Purpose of data:	Baseline emission calculation
Additional comments:	-

Data/parameter:	**$LFG_{engines,y}$; $LFG_{engines\ 2,y}$; $LFG_{engines\ 3,y}$; $LFG_{engines\ 4,y}$**
Unit	Nm^3
Description	LFG combusted in engine 1# ,2#,3#,4# at Normal Temperature and Pressure in the year y
Measured/calculated/default	Measured
Source of data	Daily records of the flow meter F1,F2,F3,F4

Value(s) of monitored parameter	<table><tr><td>Equipment</td><td>LFG Flow(Nm^3)</td><td>Monitoring Period</td></tr><tr><td>F1</td><td>3,620,783.02</td><td rowspan="5">01/04/2013-29/02/2016</td></tr><tr><td>F2</td><td>3,893,091.62</td></tr><tr><td>F3</td><td>3,417,473.96</td></tr><tr><td>F4</td><td>2,941,005.25</td></tr><tr><td>sum</td><td>13,872,353.85</td></tr></table>
Monitoring equipment	Refer to Table C.2 Detailed calibration information
Measuring/reading/recording frequency:	The monitoring frequency is continuous. And the data are recorded and electronic archived once per hour by computer automatically. The operator checks the data every day, and totalized the data every month.
Calculation method (if applicable):	Not applicable
QA/QC procedures:	Flow meter is subject to regular maintenance and testing regime to ensure accuracy .The calibration is done once every year by a qualified third party.
Purpose of data:	Baseline emission calculation
Additional comments:	-

Data/parameter:	**$W_{CH4,y}$**
Unit	-
Description	Methane fraction in the LFG
Measured/calculated/default	Measured
Source of data	Daily records of the gas analyser G
Value(s) of monitored parameter	The average value is 50.53% in the monitoring period(01/04/2013-29/02/2016)
Monitoring equipment	Refer to Table C.2 Detailed calibration information
Measuring/reading/recording frequency:	The monitoring frequency is continuous. And the data are recorded and electronic archived once per hour by computer automatically. The operator checks the data every day, and totalized the data every month.
Calculation method (if applicable):	Not applicable
QA/QC procedures:	The gas analyzer is subject to regular maintenance and testing regime to ensure accuracy .The calibration is done once every year by a qualified third party.
Purpose of data:	Baseline emission calculation
Additional comments:	-

Data/parameter:	**$EL_{LFG,y}$**
Unit	MWh
Description	Total amount of electricity produced by all engines in the year y
Measured/calculated/default	Measured
Source of data	Daily records of the electricity meter E1
Value(s) of monitored parameter	30,334.71
Monitoring equipment	Refer to Table C.2 Detailed calibration information
Measuring/reading/recording frequency:	The monitoring frequency is continuous. And the data are recorded and electronic archived once per hour by computer automatically. The operator checks the data every day, and totalized the data every month.

Calculation method (if applicable):	Not applicable
QA/QC procedures:	E1 is subject to regular maintenance and testing regime to ensure accuracy .The calibration is done once every year by a qualified third party.
Purpose of data:	-
Additional comments:	-

Data/parameter:	**$EL_{onsite,y}$**
Unit	MWh
Description	The amount of electricity consumed by the project activity in the year y
Measured/calculated/default	Measured
Source of data	Daily records of the electricity meter E2
Value(s) of monitored parameter	1,452.09
Monitoring equipment	Refer to Table C.2 Detailed calibration information
Measuring/reading/recording frequency:	The monitoring frequency is continuous. And the data are recorded and electronic archived once per hour by computer automatically. The operator checks the data every day, and totalized the data every month.
Calculation method (if applicable):	Not applicable
QA/QC procedures:	E2 is subject to regular maintenance and testing regime to ensure accuracy .The calibration is done once every year by a qualified third party.
Purpose of data:	-
Additional comments:	-

Data/parameter:	**$EL_{grid,y}$**
Unit	MWh
Description	Net amount of electricity exported to CCPG by the project activity in the year y
Measured/calculated/default	Measured
Source of data	Daily records of the electricity meter E3
Value(s) of monitored parameter	27,644.26
Monitoring equipment	Refer to Table C.2 Detailed calibration information
Measuring/reading/recording frequency:	The monitoring frequency is continuous. And the data are recorded and electronic archived once per hour by computer automatically. The operator checks the data every day, and totalized the data every month.
Calculation method (if applicable):	Not applicable
QA/QC procedures:	Crosschecked with the electricity sale receipts. Archived data and sale receipts are kept until the two years after the crediting period.
Purpose of data:	-
Additional comments:	-

Data/parameter:	**Operation hours of the generators**
Unit	Hours
Description	Operation hours of the generators in the year y
Measured/calculated/default	Measured

Source of data	Daily records
Value(s) of monitored parameter	Engine / Operating hours(h) / Monitoring Period 1# / 21,370.00 / 01/04/2013-29/02/2016 2# / 22,973.00 3# / 20,488.00 4# / 17,483.00 sum / 82,314.00
Monitoring equipment	Not applicable
Measuring/reading/recording frequency:	The monitoring frequency is continuous. And the data are recorded and electronic archived once per hour by computer automatically. The operator checks the data every day, and totalized the data every month.
Calculation method (if applicable):	-
QA/QC procedures:	-
Purpose of data:	-
Additional comments:	

Data/parameter:	**$MD_{reg,y}$**
Unit	tCO_2e
Description	Methane emission that would be captured and destroyed to comply with national or local safety requirements or legal regulation in the year y
Measured/calculated/default	-
Source of data	No methane would be destroyed to comply with Chinese regulatory requirements related to LFG
Value(s) of monitored parameter	0
Monitoring equipment	-
Measuring/reading/recording frequency:	Anually
Calculation method (if applicable):	-
QA/QC procedures:	-
Purpose of data:	-
Additional comments:	

Table C.2 Detailed calibration information

Name	Type	Accuracy	Serial Number	Calibration Frequency	Calibration Validaty	Calibration Entity
Flow meter F	V10FTH3E5S	1.0	ZN10F0302	annually	24/09/2012-23/09/2013	Institute of Metrology of Henan Province
					23/09/2013-22/09/2014	Calibration and Testing Center For Gas Flowmetre of the Quality and Technology Supervison Bureau of Jiangsu
					22/09/2014-21/09/2015	
					21/09/2015-20/09/2016	
Flow meter F1	PRVZW-100	0.5	F61-1007-10319	annually	20/08/2012-19/08/2013	Shanghai Institute of Measurement and Testing Technology National Center of Measurement and Test for East Chian
					05/08/2013-04/08/2014	Calibration and Testing Center For Gas Flowmetre of the Quality and Technology Supervison Bureau of Jiangsu
					04/08/2014-03/08/2015	
					03/08/2015-	

					02/08/2016	
Flow meter F2	RLVZM-100	0.5	F61-1207-00209	annually	05/11/2012-04/11/2013	Shanghai Institute of Measurement and Testing Technology National Center of Measurement and Test for East Chian
					05/08/2013-04/08/2014	Calibration and Testing Center For Gas Flowmetre of the Quality and Technology Supervison Bureau of Jiangsu
					04/08/2014-03/08/2015	
					03/08/2015-02/08/2016	
Flow meter F3	PRVZW-100	0.5	F61-1007-10318	annually	20/08/2012-19/08/2013	Shanghai Institute of Measurement and Testing Technology National Center of Measurement and Test for East Chian
					05/08/2013-04/08/2014	Calibration and Testing Center For Gas Flowmetre of the Quality and Technology Supervison Bureau of Jiangsu
					04/08/2014-03/08/2015	
					03/08/2015-02/08/2016	
Flow meter F4	RLVZM-100	0.5	F61-1305-0167	annually	18/11/2013-17/11/2014	Calibration and Testing Center For Gas Flowmetre of the Quality and Technology Supervison Bureau of Jiangsu
					15/11/2014-14/11/2015	
					14/11/2015-13/11/2016	
Gas analyzer	GTR 196	2%	55300/7	annually	18/09/2012-17/09/2013	Shenzhen Academy of Metrology and Quality Inspection National Hi-tech Metrology
					10/09/2013-09/09/2014	
					09/09/2014-08/09/2015	
					24/06/2015-23/06/2016	
Electricity meter E1	DTSD546	0.5S	100308 008276	annually	01/07/2012-30/06/2013	Institute of Metrology of Henan Province
					17/06/2013-16/06/2014	
					10/06/2014-09/06/2015	
					09/06/2015-08/06/2016	
Electricity meter E2	DTSD546	0.5S	100308 008277	annually	01/07/2012-30/06/2013	Institute of Metrology of Henan Province
					17/06/2013-16/06/2014	
					10/06/2014-09/06/2015	
					09/06/2015-08/06/2016	
Electricity meter E3	DSSD536	0.5S	100106 653840	annually	13/04/2012-12/04/2013	Electric Energy Meter Metrology Certre of Luohe Power Supply Company of Electric Power of HeNan
					12/04/2013-11/04/2014	
					11/04/2014-10/04/2015	
					10/04/2015-09/04/2016	

D.3. Implementation of sampling plan

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Not applicable

SECTION E. Calculation of emission reductions or GHG removals by sinks

E.1. Calculation of baseline emissions or baseline net GHG removals by sinks

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The emission reductions are calculated as follows:

$BE_y = (MD_{project,y-} MD_{reg,y}) * GWP_{CH4} + EL_{grid,y} * EF_{grid,y}$ (1)

Where:

BE_y: Baseline emissions in year y (tCO_2e);

$MD_{project,y}$: The amount of methane that would have been destroyed/combusted during the year, in tonnes of methane (tCH_4) in project scenario;

$MD_{reg,y}$: The amount of methane that would have been destroyed/combusted during the year in the absence of the project due to regulatory and/or contractual requirement, in tones of methane (tCH_4);

GWP_{CH4}: Global Warming Potential value for methane 25 ;

$EL_{grid,y}$: Net quantity of electricity produced using LFG, which in the absence of the project activity would have been produced by power plants connected to the grid during year y, in megawatt hours (MWh);

$EF_{grid,y}$: The emission factor of CCPG in year y , in tCO_2/MWh;

In the monitoring period from 01/04/2013 to 29/02/2016, the actual monitoring values are shown as follows:

To be conservative, the smaller value of F and the sum of sub-pipeline LFG flow should be used to calculate the parameter $MD_{project,y}$ .The detailed calculation process has been showed in Luohe ER Sheet, and the value of $MD_{project,y}$ in this monitoring period is 5,040.51 tCH_4.

For the project, there is no contractual requirement. And the local and national mandatory regulations are not enforced to be implemented. Therefore, $MD_{reg,y}$ is zero.

Parameter	Unit	Value	Monitoring Period
$MD_{project,y}$	tCH_4	5,040.51	01/04/2013-29/02/2016
$MD_{reg,y}$	tCH_4	0	
GWP_{CH4}	-	25	
$EL_{grid,y}$	MWh	27,644.26	
$EF_{grid,y}$	tCO_2/MWh	0.8529	

$BE_y = (MD_{project,y-} MD_{reg,y}) * GWP_{CH4} + EL_{grid,y} * EF_{grid,y}$

$=(5,040.51tCH_4-0tCH_4)*25+27,644.26MWh *0.8529tCO_2/MWh$

$=126,012.75tCO_2e +23,577.78tCO_2e$

$=149,590tCO_2e$

E.2. Calculation of project emissions or actual net GHG removals by sinks

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Since the project activity is a renewable energy project which generates electricity using LFG, and also electricity import is already considered in the net quantity of electricity calculation, hence the project activity dose not result in project emissions.

$PE_y=0\ tCO_2e$

E.3. Calculation of leakage

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As per AMS III.G version 06 and AMS I.D version 16, the methane recovery technology is not equipment transferred from another activity, so leakage effects are not to be considered.

E.4. Summary of calculation of emission reductions or net GHG removals by sinks

Item	Baseline emissions or baseline net GHG removals by sinks (t CO_2e)	Project emissions or actual net GHG removals by sinks (t CO_2e)	Leakage (t CO_2e)	GHG emission reductions or net GHG removals by sinks (t CO_2e) achieved in the monitoring period		
				Up to 31/12/2012	From 01/01/2013	Total amount
Total	149,590	0	0	0	149,590	149,590

E.5. Comparison of actual emission reductions or net GHG removals by sinks with estimates in registered PDD

Item	Values estimated in ex ante calculation of registered PDD	Actual values achieved during this monitoring period
Emission reductions or GHG removals by sinks (t CO_2e)	112,012[1]	149,590

E.6. Remarks on difference from estimated value in registered PDD

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The actual emission reductions during the morning period are 149,590tCO_2e,which is higher than the estimated value 112,012 tCO_2e in the PDD during the same period.

The actual emission reductions increase due to following reasons: 1) Actual value of GWP_{CH4} is 25 for the second commitment, which is different from 21 used in the PDD; 2)the quantity of waste estimation was more conservative in the registered PDD, actual quantity of waste is much higher than expected; 3)Content of organic matter in waste components analysis is also higher than expected.

Take reason 1) consideration: If apply 25 as the value of GWP_{CH4} in the ex-ante ER sheet downloaded from UNFCCC website ,the estimation emission reductions for this monitoring period would be change from 112,012tCO_2e to 128,357tCO_2e.

Table E.1 Quantity of waste

Year	Estimated value(tons)	Actual value(tons)
2010	161,695	169,650
2011	168,265	180,630
2012	174,835	189,854
2013	181,770	216,054
2014	189,070	239,178
2015	196,735	266,780
2016.1.1-2016.2.29	33,600	46,825

Take reason 1) and reason 2) into consideration, the total ex-ante emission reduction is of this monitoring period would be changed from 112,012 tCO_2e to 137,597 tCO_2e

[1] According to PDD version 06, as the emission reduction in ex-ante calculation is different for each year, the average daily emission reduction for each year is adopted for analysis:
in 2013, the ex-ante ERs is 35,198 tCO_2e ,and ERs duration 01/04/2013-31/12/2013 is 26,519 tCO_2e(35,198/365*275=26,519 tCO_2e) ;
in 2014, the ex-ante ERs is 37,857 tCO_2e;
in 2015, the ex-ante ERs is 40,544 tCO_2e ;
in 2016,the ex-ante ERs is 43,262 tCO_2e , and ERs duration 01/01/2016-29/02/2016 is 7,092 tCO_2e (43,262/366*60=7,092tCO_2e)
the total ex-ante emission reductions during this crediting period is112,012tCO_2e (26,519 tCO_2e +37,857 tCO_2e +40,544 tCO_2e +7,092 tCO_2e =112,012 tCO_2e).

Table E.2 Waste components

component	Estimated value	Actual value[2]
	Weight Fraction%(wet waste)	Weight Fraction%(wet waste)
Wood and wood products	3	4.0
Pulp, paper and cardboard	7	12.7
Food, food waste, beverages and tobacco	35	36.25
Textiles	4	5.15
Garden, yard and park waste	14	11.9
Glass, plastic, metal other inert	37	30.0

When take reason 1), reason 2) and reason 3) into consideration, the total ex-ante emission reduction of this monitoring period would be changed from 112,012 tCO_2e to 156,493tCO_2e. Actual emission reduction achieved during this monitoring period is 149,590 tCO_2e, which is lower than 156,493tCO_2e

2 Average value of waste components analysis for year 2013, 2014 and 2015

Appendix 1. Contact information of project participants and responsible persons/entities

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Document information

Version	*Date*	*Description*
05.1	4 May 2015	Editorial revision to correct version numbering.
05.0	1 April 2015	Revisions to: • Include provisions related to delayed submission of a monitoring plan; • Provisions related to the Host Party; • Remove reference to programme of activities; • Overall editorial improvement.
04.0	25 June 2014	Revisions to: • Include the Attachment: Instructions for filling out the monitoring report form (these instructions supersede the "Guideline: Completing the monitoring report form" (Version 04.0)); • Include provisions related to standardized baselines; • Add contact information on a responsible person(s)/ entity(ies) for completing the CDM-MR-FORM in A.6 and Appendix 1; • Change the reference number from *F-CDM-MR* to *CDM-MR-FORM*; • Editorial improvement.
03.2	5 November 2013	Editorial revision to correct table in page 1.
03.1	2 January 2013	Editorial revision to correct table in section E.5.
03.0	3 December 2012	Revision required to introduce a provision on reporting actual emission reductions or net GHG removals by sinks for the period up to 31 December 2012 and the period from 1 January 2013 onwards (EB70, Annex 11).
02.0	13 March 2012	Revision required to ensure consistency with the "Guidelines for completing the monitoring report form" (EB 66, Annex 20).
01	28 May 2010	EB 54, Annex 34. Initial adoption.

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