



## Monitoring report form (Version 03.2)

### Monitoring report

<b>Title of the project activity</b>	Fugu County Yabo 30MW Semi-coke Waste Gas Power Generation Project
<b>Reference number of the project activity</b>	Ref.7308
<b>Version number of the monitoring report</b>	Version 1.0
<b>Completion date of the monitoring report</b>	15/03/2014
<b>Registration date of the project activity</b>	14/11/2012
<b>Monitoring period number and duration of this monitoring period</b>	1 <sup>st</sup> monitoring period from 14/11/2012 to 31/01/2014
<b>Project participant(s)</b>	Fugu County Yabo Semi-coke Meidian Co., Ltd.
<b>Host Party(ies)</b>	People's Republic of China
<b>Sectoral scope(s) and applied methodology(ies)</b>	Sectoral scope 1: Energy Industries and Scope 4, Manufacture Industry ACM0012 "Consolidated baseline and monitoring methodology for GHG emission reductions for waste gas or waste heat or waste pressure based energy system" Version 4.0.0
<b>Estimated amount of GHG emission reductions or net anthropogenic GHG removals by sinks for this monitoring period in the registered PDD</b>	143,535
<b>Actual GHG emission reductions or net anthropogenic GHG removals by sinks achieved in this monitoring period</b>	139,682
<b>Actual GHG emission reductions or net anthropogenic GHG removals by sinks achieved during the period up to 31 December 2012(if applicable)</b>	8,842
<b>Actual GHG emission reductions or net anthropogenic GHG removals by sinks achieved during the period from 1 January 2013 onwards (if applicable).</b>	130,840

## SECTION A. Description of project activity

### A.1. Purpose and general description of project activity

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The purpose of the project is to recover waste gas from the process of semi-coke production of Yabo Company for electricity generation, which is delivered to Northwest China Power Grid. Yabo Company has an existing semi-coke production facility with the output of 600kt/y.

The proposed project activity involves installation of two 75t/h gas-fired boilers, two 15MW condensing steam turbines with two 15MW generators each. The waste gas from the semi-coke plants is transformed into steam in two gas-fired boilers and generates power by two condensing steam turbines & generators. The electricity generated is supplied to the Yulin power grid, which is connected to the Northwest China Power Grid through Shaanxi power grid, which is dominated by fossil fuel-fired power plants. Thus, the implementation of the project activity helps to reduce the greenhouse gas (CO<sub>2</sub>) Emissions.

The project activity was put into commercial operation on Dec. 1<sup>st</sup> 2012. During the first monitoring period (14/11/2012 – 31/01/2014), the total emission reductions achieved is: 139,682tCO<sub>2</sub>e.

### A.2. Location of project activity

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The project activity is located in the Bandungou Industry Zone, Laogaochuan Town, Fugu County, Shaanxi Province, P. R. China. The latitude is N39°13'04", and the longitude is E110°35'12". The maps below show the location of the project activity.



Figure A.1 The location of the Shaanxi Province in China



Figure A.2 The location of the project in Fugu County

### 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 if the Party involved wishes to be considered as project participant (Yes/No)
People's Republic of China (host)	Fugu County Yabo Semi- coke Meidian Co., Ltd.	No

### A.4. Reference of applied methodology

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Approved consolidated baseline and monitoring methodology ACM0012 "Consolidated baseline methodology for GHG emission reductions from waste energy recovery projects" Version 4.0.0

<http://cdm.unfccc.int/methodologies/DB/L731WMCXLT0WE6ALG5AYAGLTJP7KW7>

The "Tool to calculate the emission factor for an electricity system" (Version 2.2.1)

<http://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-07-v2.2.1.pdf>

The "Tool for the demonstration and assessment of additionality (version 06.1.0)"

<http://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-01-v6.1.0pdf>

The "Tool to determine the baseline efficiency of thermal or electric energy generation systems"

<http://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-09-v1.pdf>

The "Tool to determine the remaining lifetime of equipment"

<http://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-10-v1.pdf>

The "Tool to calculate project or leakage CO<sub>2</sub> emissions from fossil fuel combustion"

<http://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-03-v2.pdf>

### A.5. Crediting period of project activity

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The fixed crediting period is adopted by the project activity. And the crediting period of the project activity is from 14 Nov. 2012 to 13 Nov. 2022.

## SECTION B. Implementation of project activity

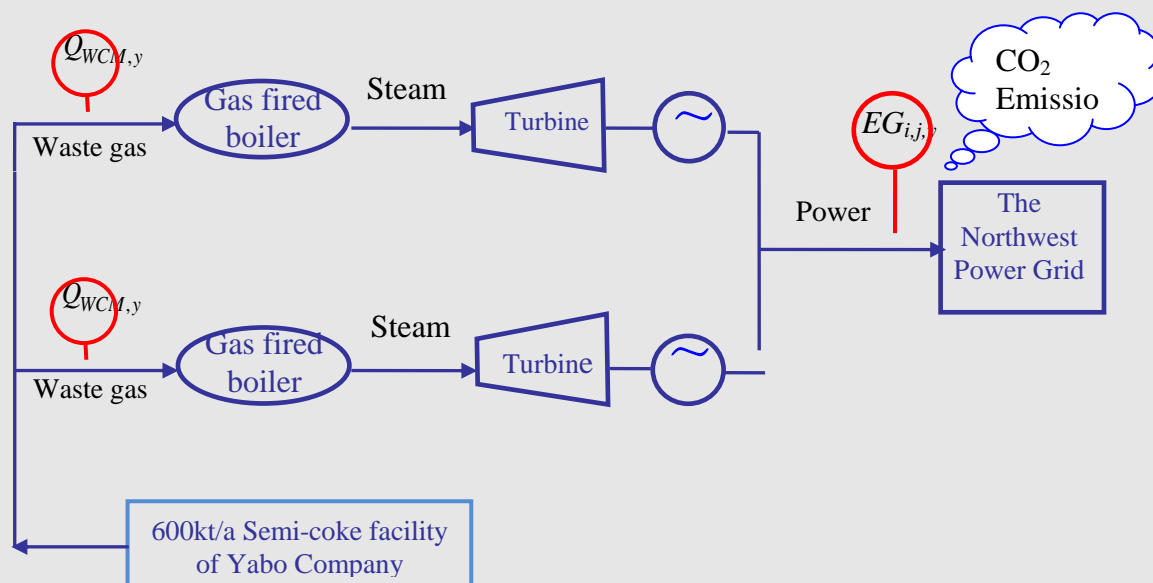
### B.1. Description of implemented registered project activity

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The project activity consists of one site and has been implemented as described in the registered PDD. The start date of the project activity is 24/09/2011, when the Engineering Procurement and Construction Contract was signed. The project activity was put into commercial operation on Dec. 1<sup>st</sup> 2012. During this monitoring period, there are no events or situations that occurred which may impact the applicability of the methodology.

The project recovers the waste gas from semi-coke production for power generation and the electricity generated is sold to the Northwest China Power Grid. The project activity involves the installation of two 75t/h gas-fired boilers, two 15MW condensing steam turbines and two 15MW generators.

The main process of the project activity can be seen in following figure:



The key technical indicators<sup>1</sup> of the boilers, turbines and generators of the Project are listed in the following table.

<b>Boiler</b>	<b>Turbine</b>	<b>Generator</b>
Model Type: TG-75/3.82-Q Rated steam generation capacity: 75 t/h Rated steam pressure: 3.82MPa Rated steam temperature: 450°C	Model type: N15-3.43 Rated power: 15MW Intake steam temperature: 435°C Intake steam pressure: 3.43 MPa	Model type: QF-15-2 Rated power: 15MW Rated rotating velocity: 3000r/min

## **B.2. Post registration changes**

### **B.2.1. Temporary deviations from registered monitoring plan or applied methodology**

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N/A

### **B.2.2. Corrections**

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N/A

### **B.2.3. Permanent changes from registered monitoring plan or applied methodology**

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N/A

### **B.2.4. Changes to project design of registered project activity**

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N/A

### **B.2.5. Changes to start date of crediting period**

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N/A

### **B.2.6. Types of changes specific to afforestation or reforestation project activity**

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N/A

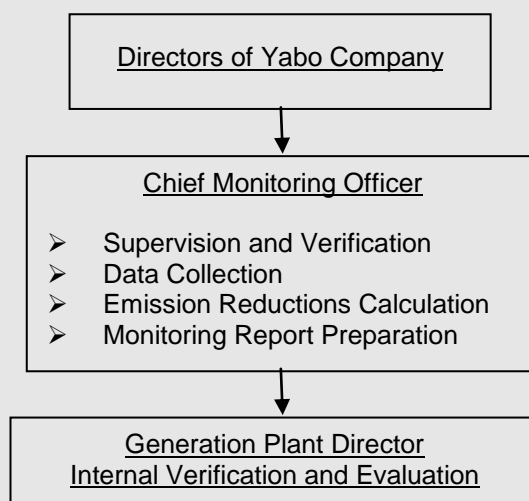
## **SECTION C. Description of monitoring system**

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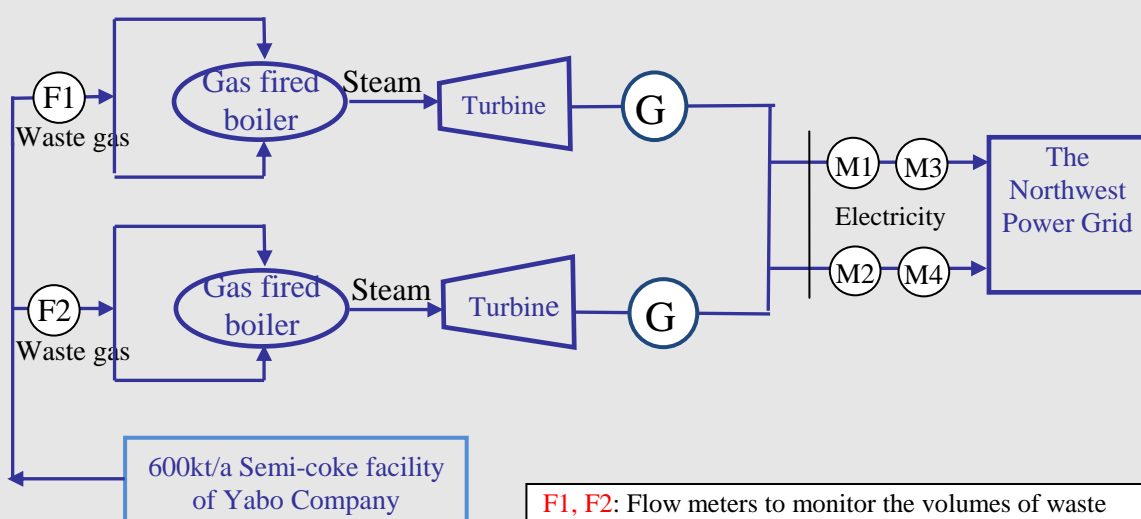
### **Organizational structure, roles and responsibilities of personnel:**

A chief monitoring officer was appointed by Yabo Company who takes charge of the supervision and verification of the measurement and data collection (meter reading, sales receipts), calculate emission reductions and prepare a monitoring report.

<sup>1</sup> Reference to the nameplates and technical agreements of the boilers, turbines and generators.



### Monitoring Equipment and program:



**F1, F2:** Flow meters to monitor the volumes of waste gas consumption of the project plant  
**M1, M2:** Electricity meters to monitor the net quantity of electricity delivered to the Northwest Power Grid by the project plant, and the sum of M1 and M2 is the total net quantity of electricity delivered to the NWPG.  
**M3, M4:** the online backup electricity meter to monitor the net quantity of electricity delivered to the Northwest Power Grid by the project plant

### Monitoring system:

#### **(1) Monitoring of Electricity supply and consumption by the project activity**

Electricity meters are installed to measure the quantity of electricity generation by the proposed project activity and the net quantity of electricity supplied to Northwest China Power Grid. Bi-directional meters M1 and M2 are installed at the substation to measure the electricity supplied to the grid by the project activity and the electricity consumption by the proposed project activity from the grid, which are the main electricity meters for emission reduction calculation. Bi-directional meters M3 and M4 are the online backup electricity meters to monitor the net quantity of electricity delivered to the Northwest Power Grid by the project plant.

## (2) Monitoring of waste gas for power generation

Meter F1 is installed at the entrance to the #1 gas fired boiler to measure the quantity of waste gas that supplies for the #1 turbine generator for power generation. Meter F2 is installed at the entrance to the #2 gas fired boiler to measure the quantity of waste gas that supplies for the #2 turbine generator for power generation.

### **Data generation, aggregation, recording, calculation and reporting:**

The site operators are in charge of reading and recording the meters, and the accumulated data on electricity meters and gas flow meters are recorded per month and aggregated into monthly report. The monthly report is checked and the emission reductions are calculated by CDM project manager. The electricity sales receipts or invoices are used for crosscheck. The records will be kept for two years after the end of the crediting period or the last issuance of CERs.

### **Emergency procedures for the monitoring system:**

In case the discrepancies between the sale receipts and the meters occur, conservative method will be used and the method will be agreed by the grid company and the project owner.

When main meters are out of service, calibrated backup meters are to be used and the data in the malfunction period measured by backup meters are used to calculate the emission reduction. The starting time and the ending time will be recorded carefully; and the report needs to be archived and provided to DOE.

When the waste gas provision is paused and the starting and ending time will be recorded carefully and the emission reductions during this period will not be included.

During this monitoring period, no emergency situations happened.

## **SECTION D. Data and parameters**

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

<b>Data / Parameter:</b>	$Q_{WCM,BL}$
<b>Unit:</b>	Nm <sup>3</sup> at NTP
<b>Description:</b>	Average quantity of WECM released in atmosphere in three years prior to the start of the project activity
<b>Source of data:</b>	Manufacturer's specifications
<b>Value(s) applied:</b>	Quantity of waste gas generated in absence of the implementation of the project is $3.6 \times 10^8 \text{ Nm}^3$ .
<b>Purpose of data:</b>	The data is used for baseline emission calculation.
<b>Additional comment:</b>	

<b>Data / Parameter:</b>	$Q_{BL,product}$
<b>Unit:</b>	Tons/yr

Description:	Production associated with the relevant waste energy generation as it occurs in the baseline scenario. The minimum of the following two figures should be used: (1) historical production data from start-up, if plant operational history is less than three years, of the plant or (2) the most relevant manufacture's data for normal operating conditions. In case of new facilities or where data is not available the manufacture's data for normal operating conditions shall be used.
Source of data:	Manufacture's data
Value(s) applied:	600,000
Purpose of data:	The data is used for baseline emission calculation.
Additional comment:	For this project activity, the manufacture's data for normal operating conditions is used.

<b>Data / Parameter:</b>	$q_{wcm, product}$
Unit:	Nm <sup>3</sup> /Ton
Description:	Specific waste gas production per unit of product (departmental or plant product which most logically relates to waste gas generation) generated as per manufacturer's or external expert's data. This parameter should be analyzed for each modification in process which can potentially impact the waste gas quantity.
Source of data:	Manufacture's data
Value(s) applied:	600
Purpose of data:	The data is used for baseline emission calculation.
Additional comment:	For this project activity, the manufacturer's data is used.

<b>Data / Parameter:</b>	$EF_{ELec, i, j, y}$
Unit:	tCO <sub>2</sub> /MWh
Description:	CO <sub>2</sub> emission factor of the Northwest China Power Grid, displaced due to the project activity, during the year $y$ .
Source of data:	Data issued by China's DNA
Value(s) applied:	0.7926
Purpose of data:	The data is used for baseline emission calculation.
Additional comment:	Official Data

## D.2. Data and parameters monitored

(Copy this table for each piece of data and parameter.)

<b>Data / Parameter:</b>	$Q_{wcm, y}$
Unit:	Nm <sup>3</sup>
Description:	Quantity of waste gas used for energy generation during year $y$
Measured/ Calculated / Default:	Measured
Source of data:	Meter records

Value(s) of monitored parameter:	37760.47 * 10 <sup>4</sup>																																		
Monitoring equipment:	<table border="1"> <tr> <td colspan="4">Flow meter</td> </tr> <tr> <td>Meter</td> <td>F1</td> <td colspan="2">F2</td> </tr> <tr> <td>Type</td> <td>3051CD0A02A1AB3 H2L4</td> <td colspan="2">3051CD0A02A1AB3 H2L4</td> </tr> <tr> <td>Accuracy</td> <td>1.0</td> <td colspan="2">1.0</td> </tr> <tr> <td>Serial number</td> <td>6003434</td> <td colspan="2">6003485</td> </tr> <tr> <td>Calibration frequency</td> <td>annual</td> <td colspan="2">annual</td> </tr> <tr> <td>Calibration date and validity</td> <td colspan="3">           Calibration: 14/11/2012 validity: to 13/11/2017            Calibration: 11/11/2013 validity: to 10/11/2018         </td> </tr> <tr> <td colspan="4">Calibrated by Shaanxi Institute of Metrology according to the technical standard (JJG835-1993).</td> </tr> </table>			Flow meter				Meter	F1	F2		Type	3051CD0A02A1AB3 H2L4	3051CD0A02A1AB3 H2L4		Accuracy	1.0	1.0		Serial number	6003434	6003485		Calibration frequency	annual	annual		Calibration date and validity	Calibration: 14/11/2012 validity: to 13/11/2017 Calibration: 11/11/2013 validity: to 10/11/2018			Calibrated by Shaanxi Institute of Metrology according to the technical standard (JJG835-1993).			
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Measuring/ Reading/ Recording frequency:	Continuous measurement, monthly recording.																																		
Calculation method (if applicable):	The value is the sum of data on the meter F1 and F2.																																		
QA/QC procedures:	Flow Meter will be calibrated periodically according to relative national standards and regulations. And the accuracy level of the flow meters shall also meet the requirement of the relevant national standards or regulations.																																		
Purpose of data:	The data is used for baseline emission calculation.																																		
Additional comment:																																			

<b>Data / Parameter:</b>	$EG_{i,j,y}$
Unit:	MWh
Description:	Quantity of net electricity supplied by the project activity during the year $y$ in MWh
Measured/Calculated /Default:	Measured
Source of data:	Meter records
Value(s) of monitored parameter:	176233.2

Monitoring equipment:	Gateway meter				
	Meter	M1	M2	M3	M4
		Main meter		Online Backup meter	
	Type	DTSD2815	DTSD2815	DTSD2815	DTSD2815
	Accuracy class	0.5s	0.5s	0.5s	0.5s
	Serial number	DN003371	DN003373	DN003372	DN003374
	Calibration frequency	annual	annual	annual	annual
	Calibration date and validity	Calibration: 24/09/2012 validity: to 23/09/2017; Calibration: 23/09/2013 validity: to 22/09/2018			
	Calibration entity	Calibrated by Yulin Electricity Supply Company Energy Metering Center according to the technical standard (JJG596-1999)			
Measuring/Reading/Recording frequency:	Measured continuously, aggregated monthly				
Calculation method (if applicable):	The sum of difference of the quantity of the electricity supplied and the electricity imported of the meter M1 and M2.				
QA/QC procedures:	The electricity meter will undergo maintenance/calibration to the national relative power industry standards. Electricity meters will be calibrated by Qualified institution or entity once three years and calibration documents will be kept by Yabo company.				
Purpose of data:	The data is used for baseline emission calculation.				
Additional comment:					

### D.3. Implementation of sampling plan

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N/A

## 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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According to the methodology and registered PDD, the baseline emissions calculation is:

$$BE_y = f_{cap} * f_{wcm} * \sum_j \sum_i (EG_{i,j,y} * EF_{Elec,i,j,y})$$

Where:

$BE_y$	The total baseline emissions during the year y in tCO <sub>2</sub>
$EG_{i,j,y}$	Is the quantity of electricity supplied to the recipient j by generator, which in the absence of the project activity would have been sourced from i <sup>th</sup> source (i can be either grid or identified source) during the year y in MWh,
$EF_{Elec,i,j,y}$	Is the CO <sub>2</sub> emission factor for the electricity source i (i=gr (grid) or i= is (identified source)), displaced due to the project activity, during the year y in tons CO <sub>2</sub> /MWh
$f_{wcm}$	Fraction of total electricity generated by the project activity using waste gas. This fraction is 1 if the electricity generation is purely from use of waste gas. If the boiler providing steam for electricity generation uses both

	waste and fossil fuels, this factor is estimated using equation (1d). If the steam used for generation of the electricity is produced in dedicated boilers but supplied through common header, this factor is estimated using equation (1d/1e). NOTE: For project activity using waste pressure to generate electricity, electricity generated from waste pressure use should be measurable and this fraction is 1.
$f_{cap}$	Energy that would have been produced in project year $y$ using waste gas/heat generated in base year expressed as a fraction of total energy produced using waste gas in year $y$ . The ratio is 1 if the waste gas/heat/pressure generated in project year $y$ is same or less than that generated in base year. The value is estimated using equation (1f) or (1g) and (1g-1).

### Calculation of $f_{wcm}$

Since the fuel used in the project activity is purely waste gas and there is no fossil fuels involved,  $f_{wcm}$  equals to 1.

### Calculation of $f_{cap}$

As described in the registered PDD, method 2 is used in the project activity. During this monitoring period,  $37760.47 \times 10^4 \text{ Nm}^3$  waste gas was consumed within 427 days. Hence  $f_{cap}$  is calculated as below:

$$f_{cap} = \frac{Q_{wcm, BL}}{Q_{wcm, y}} = \frac{3.6 \times 10^8 / 365 \times 427}{37760.47 \times 10^4} = \frac{4.21150685}{3.776047} = 1.1153 > 1, \text{ according to methodology, } f_{cap} = 1.$$

### The net electricity supplied by the project activity

As described in the registered PDD, the net electricity supplied by the project activity is the sum of the difference of the quantity of the electricity supplied and the electricity imported of the meter M1 and M2, thus the net electricity supply 176,233.2 MWh is used in the baseline emissions calculation.

$$BE_y = BE_{En, y} = BE_{Elec, y} = f_{cap} * f_{wcm} * \sum_j \sum_i (EG_{i, j, y} * EF_{Elec, i, j, y}) = 1 * 1 * 176233.2 * 0.7926 = 139,682 \text{ tCO}_2\text{e}$$

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

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According to the registered PDD and methodology, project emissions involved in the project boundary are caused by the electricity imported from the grid. Since the electricity imported from the grid has been considered and subtracted in the baseline emissions calculation, the project emissions due to electricity consumption as a result of the project activity needn't to be taken into account in this step. And no other project emissions are involved in the project boundary; therefore, project emissions are zero.

### E.3. Calculation of leakage

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In accordance with ACM0012, no leakage is considered. The leakage from the project is zero.

$$L_y = 0$$

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

Item	Baseline emissions or baseline net GHG removals by sinks (t CO <sub>2</sub> e)	Project emissions or actual net GHG removals by sinks (t CO <sub>2</sub> e)	Leakage (t CO <sub>2</sub> e)	Emission reductions or net anthropogenic GHG removals by sinks (t CO <sub>2</sub> e)
<b>Total</b>	139,682	0	0	139,682

**E.5. Comparison of actual emission reductions or net anthropogenic 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
<b>Emission reductions or GHG removals by sinks (t CO<sub>2</sub>e)</b>	143,535	139,682

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

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Since the actual value reached during the monitoring period is less than the ex-ante calculation of the registered PDD, no explanation is need according to the monitoring report guideline.

**E.7. Actual emission reductions or net anthropogenic GHG removals by sinks during the first commitment period and the period from 1 January 2013 onwards**

Item	Actual values achieved up to 31 December 2012	Actual values achieved from 1 January 2013 onwards
<b>Emission reductions or GHG removals by sinks (t CO<sub>2</sub>e)</b>	8,842	130,840

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## Document information

<i>Version</i>	<i>Date</i>	<i>Description</i>
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 anthropogenic 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.
Decision Class: Regulatory Document Type: Form Business Function: issuance Keywords: monitoring report, performance monitoring		