

MONITORING REPORT

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* as contained within the document entitled "Guidelines for completing the monitoring report form (CDM-MR)" (EB 54 meeting report, annex 34).
There is no mandatory JI MR template, therefore CDM MR template was used.

MONITORING REPORT
version #2, 19/12/2012

**«WASTE COAL PROCESSING IN LUHANSK REGION OF UKRAINE WITH THE AIM OF
REDUCING GREENHOUSE GASES EMISSIONS INTO THE ATMOSPHERE»**

Monitoring period #2:

Monitoring period starting date: 01/07/2010

Monitoring period closing date: 31/10/2012

SECTION A. General description of the project activity

A.1. Brief description of the project activity:

1. Purpose of the project activity and the measures taken to reduce greenhouse gas emissions;

This Project is aimed at coal extraction from the waste heaps of the Krasnodon Districts of Luhansk Region of Ukraine. These waste heaps have been accumulated some time before the start of the project activity from the mining waste of underground mines. Project activity will prevent greenhouse gas emissions into the atmosphere during combustion of the heaps and will contribute an additional amount of coal, without the need for mining. The Project activities include installation of the equipment for coal extraction and beneficiation near the processing waste heaps and applying special machinery that will perform preparation, loading and transportation of the rock from the waste heaps to the beneficiation factory. After purifying of the matter, the extracted coal will be sold for heat and power generation and the remaining bare rock will be utilized for land engineering and road building.

Emission reductions due to the implementation of this project will come from three major sources:

- Removing the source of green-house gas emissions from the burning / slow burning waste heap by the extraction of non-combusted coal contained in a waste heap;
- Negative leakage through reduced fugitive emissions of methane due to the replacement of coal that would have been mined, by the coal extracted from the heap under the project activity.
- Reduce electricity consumption at waste heap dismantling in comparison with energy consumption at coal mining.

In the baseline scenario it is assumed that this common practice will continue and waste heaps will be burning and emitting GHG into the atmosphere until the coal is consumed. Whereas using improved extraction techniques, proposed in this project, the residual coal can be extracted from the waste heaps and the coal can be used to for the energy needs of local consumers. The reclaimed coal will replace coal that would have otherwise been mined, causing fugitive emissions of methane during the mining process.

Thus, **the baseline scenario** is the continuation of the current situation, which is the continuation of the situation before the project was installed, without beneficiation plant and waste heap dismantling.

The project activity will prevent greenhouse gas emissions into the atmosphere during combustion of the heaps and will contribute an additional amount of coal, without the need for mining. The Project includes the installation of coal extraction units and the grading of the extracted coal. Extracted coal is then sold for heat and power production.

Therefore, in **the project scenario** the coal extracted from the waste heaps will partly substitute the coal from the mine, decreasing fugitive methane emissions, and reduce emissions GHG emissions due to waste heap combustion by extracting all of the combustible material from the waste heaps.

2. Relevant dates for the project activity (e.g. construction, commissioning, continued operation periods, etc.).

The project has been initiated in the start of 2006. Installation and construction works were initiated by the end of 2007. Processing complex was commissioned in November 2007. The operations at the facility have started on the March 2008. The JI was one of the drivers for the project from the start and financial benefits provided by the JI mechanism were considered as one of the reasons to start the project and are crucial in the decision to start the operations.

3. Total emission reductions achieved in this monitoring period.

Total amount of emission reductions achieved from 01/07/2010 to 31/10/2012, rounded down to whole tons, is 2465909 tons of CO₂e. Average annual emission reductions for the monitoring period is 1056818 tons of CO₂e

A.2. Project Participants

Small Private Commercial Production Company “SLAVUTICH” is the project host.

A letter of endorsement from the Ukrainian Designated Focal Point had previously been received for the proposed project, reference No. 2988/23/7, dated 11/10/2012.

A letter of approval from the Ukrainian Designated Focal Point was received for the proposed project, reference No. 3484/23/7, dated 15/11/2012.

A letter of approval from the Netherland Designated Focal Point was received for the proposed project, reference 2012JI54, dated 19/12/2012.

A.3. Location of the project activity:

The Project activities are physically limited to the waste heaps that are legally operated by the company and territory under beneficiation facilities on waste heaps processing.

Industrial site removal and processing of waste coal is located 5 km east of Molodohvardiysk town Krasnodon district, Luhansk Region, Ukraine. The geographic coordinates of the site are: +48° 21' 53.81", +39° 41' 56.41"¹.

¹<http://maps.google.com/maps?&q=48.364946,39.699004&spn=0.3,0.3&output=kml>



Fig.1 *Satellite photo of location of project*

A.4. Technical description of the project

The Project envisages low ash coal concentrate for the needs of households energy sector.

The main stages of coal extraction and sorting can be found below.



Fig.2 *Processing Complex.*



Fig.3 Project equipment

Source for receiving low ash coal concentrate is waste coal at the operational site SLAVUTICH MChTPP.

The principle of operation of the main production equipment is as follows:

- moisturize the raw material (dry waste coal) by transferring them to a nearby reservoir with loading equipment.
- hydraulic mining of raw materials (coal washing waste liquid containing suspended solids not less than 400 g / l) by the dredger, capacity 1300 m³ / h.
- wet classification (separation) of liquid waste coal (pulp) by more than 0.20 mm size and simultaneous dehydration low ash coarse fraction is produced in ten low-frequency screens GLKV-1500.32 with aim to produce low ash coal concentrate.

Material, extracted from the dump, must undergo processing technology in the water. For this initial phase of waste coal dump processing the usage of excavators, bulldozers and trucks is involved. Dismantling of waste heap is done by excavators with subsequent loading of dry product for trucks to transport them to the pond.

The horizontal movement of technique is considered to be. The second stage is the loading in of wet feedstock by dredger, on the floating slurry pipeline slurry is fed to the main slurry pipeline, laid on the bank. Main slurry pipeline is connected to the distribution flange. In accordance with the technique of production work on the extraction of waste coal, the project site bowl conventionally divided into stope on the conditions of displacement of the dredger. Waste coal is developed in three levels. Work on their groove on each level provides a ledge. On the ground floor of the development are the existing water surface elevations at a maximum depth of 5.0 m in compliance with a protective buffer zone.

Excavation of waste coal is considered to be by trenching. Floating dredge slurry pipeline is connected to the trunk placed on the bank at the submarine base plates. After finishing processing the first level, around the perimeter of the project site in compliance with the protection zone shall be done soil-replacement device of dredger for the new one with length of 9.0 m for the development of the underlying second layer and with the length of 12.0 m for the development of the third layer.

From the distribution point of pipeline slurry is fed to the thunder of ten working screens GLKV 1500.32 brand (unit capacity consisting of ten screens for feedstock - 500 t / h) set in the production area.

The principle of screening is to classify (division) of the original product (liquid waste coal as a slurry) by size more than 0.20 mm in ten working screens with simultaneous dehydration of low ash coarse fraction.

After screening dehydrated low ash coarse product is poured into the cones on the finished product storage area (with concrete surface, where it is natural drying). On a site area for dry drain there is pan to collect and discharge of drainage water in reservoir. Sublattice product (secondary waste) with a diameter less than 0.20 mm fractions from each screening enters the chute, which is connected to the gravity flow line liquid secondary waste removal. Via the liquid secondary wastes gravity directed to waste dredger.

Given the relief location of the reservoir on site waste coal extraction, the way of lightening of liquid secondary waste will ensure the future usage of treated water for further work of dredger. Ready coarse low ash product (coal concentrate) will be transported by vehicles from storage area by existing technology road of length of 5 km to the loading point CBP (Central Beneficiation Plant) "Sukhodolskaya", which has its own storage space and shipping.

Loading area of the finished product on the Central beneficiation plant has concrete surface and drainage network of drainage water into the existing septic tank.

The volume of waste coal to be treated in the project area, is 10.000 ths. m³.

The following schedule is set for the operation of the complex to extract waste coal:

- 1) 8 months per year (244 days during spring – autumn season);
- 2) 30 (31) working days per month;
- 3) 2 shifts per day;
- 4) 8 hours per shift.

Technical characteristics of used equipment

Low-frequency screens GLKV-1500.32²

Specific performance of outgoing product: by dehydration (300-600 g / l, 0.2 0.2 mm sieve), t / h	50
Useful surface area that sifts, m	2×2.6
The number of layers of screens, pc.	2
The distance between the upper and lower sieve, mm	150
The amplitude of the oscillations mm	1..2.5
The oscillation frequency, sec.	25
Weight of sieve, p to, kg	2500
Dimensions, mm	3030x2030x1500

² <http://www.zemsnyad.net.ua/prod6.html>

Electric drive (electric motor three-phase induction of general application):	
Power, kW	2x1.5
Rotation speed n, r / min	1410

Table.1 Technical characteristics of project screens

The dredger

Productivity on the pulp, m ³ /hr	1300
Weight dredge up to, t	40
Length dredger with ripper, m	31
Dimensions	
length, m	22
width, m	5.5
height, m	1.0

Table.2 Technical characteristics of project dredger

Name of equipment	U, kV	Installed capacity, P _{ust} , kW	Cos φ	Rotation frequency of el.drive, rot./min	Overall dimensions, mm Lxbxh	Mass, m, kg	Number of units
Dredging pump set	0.38	55	0.92	2900	1582x600x785	670	1
Electric drive of traction winches of dredger	0.38	5,5	0.87	1500	170x465x662	114	4
Electric drive of dredger turntable	0.38	11	0.88	1500	340x495x590	129	1
Supply pulp pump set (I stage)	0.38	132	0.93	1500	1705x940x1005	1676	1
Supply pulp pump set (II stage)	0.38	75	0.89	1500	832x1135x2995	1535	1
Electric drive of centrifuge FDM	0.38	22	0.9	3000	700x1200	350	1
Electric drive of the conveyor line	0.38	7,5	0.9	1500	-	88.3	1
Pump set for coal waste loading	0.38	11	0.92	1500	1215x485x555	310	1

Table.3 Technical characteristics of dredger electric equipment

A waste heap is shown in the figures below:



Fig.4 Waste heaps

Most of the equipment utilized by the project such as trucks, excavators, bulldozers is of a standard type used for industrial applications worldwide. The project activity will use a limited number of individually ordered equipment.

The above mentioned confirms that the conception of the project is based on the current modern common practice. The project is not expected replacement project technology to another technology during the period of the project.

<p>A.5. Title, reference and version of the baseline and monitoring methodology applied to the project activity:</p>

A JI-specific methodology is applied, as described in the PDD.

Baseline scenario

The baseline scenario is the continuation of the existing situation. Coal is produced by the underground mines and is used for energy generation. Waste heaps are often self-heating and burning that causes carbon dioxide emissions into the atmosphere.

Emission sources in the baseline that are included into the project boundary are:

- Carbon dioxide emissions from the burning of coal in the waste heaps.
- Emissions of carbon dioxide due to consumption of coal for energy production. Carbon dioxide emissions that occur during the combustion of energy coal are calculated as stationary combustion emissions from coal in the equivalent of the amount of coal that is extracted from the waste heaps in the project scenario. This emission source is also present in Resthe project scenario and the emissions are assumed to be equal in both project and baseline scenario. Therefore, this emission source is not included into consideration both in the project and the baseline scenario.

Project scenario

In the project scenario waste heaps under processing are taken down and all combustible matter is extracted. Therefore, the possibility of emissions due to spontaneous self-heating and burning of the waste heaps is eliminated. Project activity anticipates combustion of auxiliary diesel fuel to supply coal extraction plant with rock from the waste heaps. Electricity is used to run the project equipment. Additional coal provided by the project reduces the need for coal to be mined from underground.

Emission sources in the project scenario:

- Carbon dioxide emissions from the use of fuel to run part of the project equipment (motor cars),
- Carbon dioxide emissions associated with the electricity consumption by the project equipment.
- Carbon dioxide emissions that occur during the combustion of energy coal are calculated as stationary combustion emissions from coal in the equivalent of the amount of coal that is extracted from the waste heaps in the project scenario. This emission source is also present in the baseline scenario and the emissions are assumed to be equal in both project and baseline scenario. Therefore, this emission source is not included into consideration both in the project and the baseline scenario.

Leakage

Emission sources are:

- fugitive methane emissions due to the mining activities
- emissions of carbon dioxide due to consumption of electricity and other forms of energy in coal mining in the mine.

Thus, emission reductions due to the implementation of this project will come from three major sources:

- Removing the source of green-house gas emissions from the burning / slow burning waste heap by the extraction of non-combusted coal contained in a waste heap;
- Negative leakage through reduced fugitive emissions of methane due to the replacement of coal that would have been mined, by the coal extracted from the heap under the project activity.
- Reduce electricity consumption at waste heap dismantling in comparison with energy consumption at coal mining.

A.6. Registration date of the project activity:

The project has not received the ID number ITL at this time. For information about the Letter of Approval, see paragraph A.2 of this Monitoring Report.

A.7. Crediting period of the project activity and related information (start date and choice of crediting period):

The registered PDD uses crediting periods in line with the commitment periods under the Kyoto Protocol. Therefore the first commitment period will cover 2008 to 2012, the second period will be for 2013 to 2017.

Period	Start date	End date
1	14/03/2008	31/12/2012
2	01/01/2013	31/12/2017

Table.4 Crediting period dates

A.8. Name of responsible person(s)/entity(ies):

Contact information of the entity and persons responsible:

Mr. Ivan Bobkin, project manager, Crewing Planning Limited,
Email i.bobkin@yandex.ru Tel/Fax: +38 044 4391110.

SECTION B. Implementation of the project activity
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B.1. Implementation status of the project activity

1. The starting date of operation of the project activity.

The starting date of a JI project activity is the date on which the implementation or construction or real action of the project begins. This date is the date of real action of the project begins – 01/07/2010. The starting date of operation of the project activity and generation the first ERU – 01/07/2010.

2. The information regarding the actual operation of the project activity during this monitoring period, including information on special events, for example overhaul times, downtimes of equipment, exchange of equipment, etc.

There were no special events during this monitoring period. Scheduled downtimes of equipment for repairs and due to the severe frosts during this monitoring period: 01/01/2011-31/03/2011, 01/01/2012-31/03/2012.

3. A brief description of: (i) events or situations that occurred during the monitoring period, which may impact the applicability of the methodology, and (ii) how the issues resulting from these events or situations are being addressed.

There were no special events during this monitoring period.

Procedures identified for corrective actions in order to provide for more accurate future monitoring and reporting

In cases if any errors, fraud, inconsistencies or situations when monitoring data are unavailable will be identified during the monitoring process special commission will appointed by project host management that will conduct a review of such case and issue an order that must also include provisions for necessary corrective actions to be implemented that will ensure such situations are avoided in future.

The project host management will also establish a communication channel that will make it possible to submit suggestions, improvement proposals and project ideas for more accurate future monitoring for every person involved in the monitoring activities. Such communications will be delivered to the project host management who is required to review these communications and in case it is found appropriate implement necessary corrective actions and improvements. Project participant - - will conduct periodic review of the monitoring plan and procedures and if necessary propose improvements to the project participants. Also, to prevent the situations in which monitoring data are unavailable, all parameters are fixed and saved on paper and electronically in a database the Owner and Developer of the project separately.

Emergency preparedness for cases where emergencies can cause unintended emissions

The project operation does not foresee any factors or emergencies that can cause unintended GHG emissions. Safe operation of equipment and personnel is ensured by systematic safety training. Procedures for dealing with general emergencies such as fire, major malfunction etc. are developed as part of the mandatory business regulations and are in accordance with local requirements.

B.2. Revision of the monitoring plan

The monitoring plan is presented in Section D PDD, used without revisions.

B.3. Request for deviation applied to this monitoring period

N/A

B.4. Notification or request of approval of changes
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N/A

SECTION C. Description of the monitoring system

The monitoring plan is described in Section D and Annex 3 to PDD.

1. Introduction

The project adopts a JI specific monitoring approach. This monitoring plan describes the responsibilities of the JI Project Management Team and the methods and procedures to be adopted to implement the monitoring plan described in the Project Design Document in respect of this project activity.

2. Project Management & Responsibilities

The operational and management structure (as shown in below the figure) and the responsibilities of the principals are as follows. Ultimate responsibility for the project rests with the JI Project Manager.

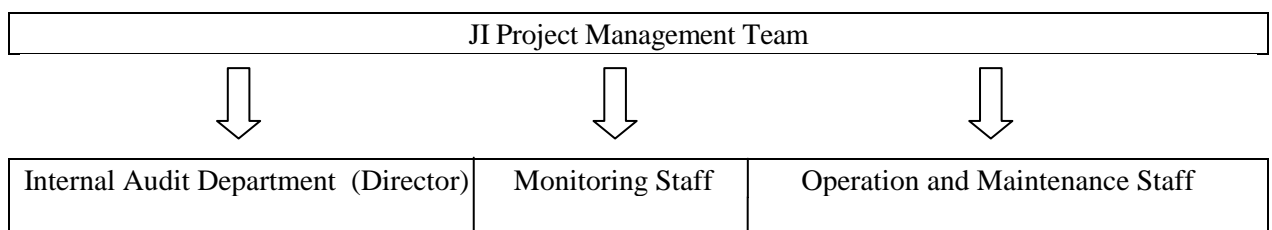


Fig.5 The management structure of the project

The JI Project Manager is responsible for:

- Checking and signing off all project operational-related activities
- Appointing and liaising with the accredited independent entity (AIE)
- Identifying an audit team leader to be appointed by the Chief Engineer or a delegated authority
- Appointing a JI technical team to undertake the operational activities
- Organizing training and refresher courses
- Preparing and supervising a Health and Safety Plan for the JI technical team
- Supervising the work of the JI technical team
- Cross checking reported volumes and sales receipts

Internal Audit Department (Director)

The project owner - SLAVUTICH MChTPP implement provisions of this monitoring plan into its organizational and quality management structure. For monitoring, collection, registration, visualization, archiving, reporting of the monitored data and periodical checking of the measurement devices the management team headed by the Director of the company is responsible.

The monitoring staff is responsible for:

- Monitoring and recording of the relevant parameters

The operation and maintenance staff are responsible for:

- Operation and maintenance of the project infrastructure
- Service and maintenance equipment is performed by technical personnel beneficiation plant.

For monitoring period the following parameters have collected and registered:

1. Additional electricity consumed in the relevant period as a result of the implementation of the project activity

This parameter is registered by a specialized electricity meters. The meters are situated next to the current transformers on the site of the project activity. These meters register all electric energy consumed by the project activity as they are located on the only electrical input available on site. Readings are used in the commercial dealings with the energy supply company. Monthly bills for electricity are available. Regular cross-checks with the energy supply company are performed. Monthly and annual reports are based on the monthly bills.

2. Amount of diesel fuel that has been used for the project activity in the relevant period.

For the metering of this parameter the commercial data of the company are used. Receipts and other accounting data are used in order to confirm the amount of fuel consumed. All fuel consumption is taken into account and is attributed to the project activity. If the data in the commercial documents mentioned are provided in litres rather than in tonnes the data in litres are converted into tonnes using the density of 0,85 kg/l³. Regular cross-checks with the suppliers are carried out. The monthly and annual reports are based on these data.

3. Amount of coal that has been extracted from the waste heaps and combusted for energy use in the project activity in the relevant period which is equal to the amount of coal that has been mined in the baseline scenario and combusted for energy use.

3.1. Amount of fraction.

For the metering of this parameter the commercial data of the company are used. Receipts and acceptance certificates from the customers are used in order to confirm the amount of coal restored. Only shipped coal is taken into account and is attributed to the project activity. Weighting of the coal is done on site by the special automobile scales. Regular cross-checks with the customers are performed. The monthly and annual reports are based on these shipment data.

3.2. Ash content and moisture of fraction.

Ash content and moisture fraction is defined accredited for technical competence and independence of the laboratory in accordance with regulations (GOST 11022-95 "Mineral solid fuel. Methods of determination the ash content"⁴, GOST 11014-2001 "Brown coal, hard coal and oil shale. Accelerated methods for determining the moisture"⁵ and GOST 27314-91 «Mineral solid fuel. Methods of determination the moisture content»⁶). Analysis of ash content and moisture fraction is done in the laboratory. Ash content and moisture of coal fraction measured regularly with registration annually certificates.

Archiving, data storage and record handling procedure

Documents and reports on the data that are monitored will be archived and stored by the project participants. The following documents will be stored: primary documents for the accounting of monitored parameters in paper form; intermediate reports, orders and other monitoring documents in paper and electronic form; documents on measurement devices in paper and electronic form. These documents and other data monitored and required for determination and verification, as well as any other data that are relevant to the operation of the project will be kept for at least two years after the last transfer of ERUs.

³ GOST 305-82 Diesel Fuel. Specifications. 0,85 kg/l is taken as an average between two suggested types of diesel: summer and winter <http://elarum.ru/info/standards/gost-305-82/>

⁴ <http://vsesnip.com/Data1/16/16768/index.htm>

⁵ <http://vsesnip.com/Data1/40/40907/index.htm>

⁶ <http://vsesnip.com/Data1/29/29367/index.htm>

Training of monitoring personnel

The project will utilize technology that requires skills and knowledge in heavy machinery operation, coal beneficiation technology operation, electric equipment operation etc. This kind of skills and knowledge is available locally through the system of vocational training and education. This system is state-supervised in Ukraine. Professionals who graduate from vocational schools receive a standard certificate in the field of their professional study. Only workers with proper training can be allowed to operate industrial equipment like. Management of the project host will ensure that personnel of the project have received proper training and are eligible to work with the prescribed equipment.

Training on safety issues is mandatory and must be provided to all personnel of the project as required by local regulations. Procedure for safety trainings includes the scope of the trainings, training intervals, forms of training, knowledge checks etc. The project host management will maintain records for such trainings and periodic knowledge check-ups.

Activities that are directly related to the monitoring do not require specific training other than provided by the professional education. However, monitoring personnel will receive training on monitoring procedures and requirements. Personnel of the project host management will receive necessary training and consultations on Kyoto Protocol, JI projects and monitoring from the project participant.

The program of training

The project does not require extensive initial training. The staff has got basic industrial profession training locally. Most of the required personnel such as heavy machinery operators, trucks and excavator drivers, electric and mechanical maintenance workers are locally available.

The program of maintenance service

Maintenance needs are covered by the local capacities: in-house maintenance workers and outsourced maintenance and repair subcontractors. The project makes provisions for training needs. All workers have a valid professional education certificate and pass periodical safety trainings and exams. Professional education can be obtained locally in the Luhansk region in all of the professional areas covered by the project.

SECTION D. Data and parameters

D.1. Data and parameters determined at registration and not monitored during the monitoring period, including default values and factors

Data / Parameter:	GWP_{CH4}
Data unit:	tCO ₂ e/tCH ₄
Description:	Global Warming Potential of Methane
Source of data used:	IPCC default value as per registered PDD
Value(s) :	21
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Leakage calculations
Additional comment:	

Data / Parameter:	ρ_{CH4}
Data unit:	t/m ³
Description:	Density of methane under conditions of 20°C and 1 atm
Source of data used:	IPCC ⁷
Value(s) :	0.00067
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Leakage calculations
Additional comment:	

Data / Parameter:	$EF_{CH4, CM}$
Data unit:	m ³ /t
Description:	Average rate for fugitive methane emissions from coal mining
Source of data used:	National Inventory Report of Ukraine 1990-2009 ⁸ , p.90
Value(s) :	25.67
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Leakage calculations
Additional comment:	

Data / Parameter:	$EF_{grid, y}$
Data unit:	tCO ₂ e/MWh
Description:	Relevant emission factor for the electricity from the grid ⁹ by consumers of electricity, which referred to the 2-class in the year y
Source of data used:	For the years 2008-2011 – NEIA Orders No.43 dated 28.03.2011, No.62 dated 15.04.2011, No.63 dated 15.04.2011, No.75 dated

⁷ http://www.ipcc-nggip.iges.or.jp/public/2006gl/pdf/2_Volume2/V2_4_Ch4_Fugitive_Emissions.pdf

⁸ http://unfccc.int/national_reports/annex_i_ghg_inventories/national_inventories_submissions/items/5888.php

⁹ For the years 2008-2011 – NEIA Orders No.43 dated 28.03.2011, No.62 dated 15.04.2011, No.63 dated 15.04.2011, No.75 dated 12.05.2011

http://neia.gov.ua/nature/control/uk/publish/category?cat_id=111922

	12.05.2011			
Value(s) :	2010	2011	2012	
	1.225	1.227	1.227	
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Project and baseline emission calculations			
Additional comment:				

Data / Parameter:	$N_{Coal,y}^E$			
Data unit:	MWh/t			
Description:	Average electricity consumption per ton of coal, produced in Ukraine in the year y			
Source of data used:	Fuel and energy resources of Ukraine, Statistical Yearbook, State Statistics Committee of Ukraine, Kiev 2009-2011 ¹⁰			
Value(s) :	2010	2011	2012	
	0.0926	0.0842	0.0842	
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Baseline emission calculations			
Additional comment:				

Data / Parameter:	A_{Coal}			
Data unit:	%			
Description:	Average ash content of power station coal produced in Ukraine			
Source of data used:	Guide of quality, volume of coal production and enrichment products in 2008–2010, Ministry of Coal Industry of Ukraine, State Committee of Ukraine			
Value(s) :	2010	2011	2012	
	39.70	39.80	39.80	
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Baseline, project emission and leakage calculations			
Additional comment:				

Data / Parameter:	W_{Coal}			
Data unit:	%			
Description:	Average moisture of power station coal produced in Ukraine			
Source of data used:	Guide of quality, volume of coal production and enrichment products in 2008–2010, Ministry of Coal Industry of Ukraine, State Committee of Ukraine			
Value(s) :	2010	2011	2012	
	8.30	8.30	8.30	
Indicate what the data are	Baseline, project emission and leakage calculations			

¹⁰ <http://www.ukrstat.gov.ua/>

used for (Baseline/ Project/ Leakage emission calculations)	
Additional comment:	

Data / Parameter:	ρ_{WHB}
Data unit:	ratio
Description:	Correction factor for the uncertainty of the waste heaps burning process
Source of data used:	Scientific research was verified and confirmed by accredited independent entities ¹¹
Value(s) :	0.78
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Baseline emission calculations
Additional comment:	

Data / Parameter:	NCV_{coal}								
Data unit:	GJ/t								
Description:	Net Calorific Value of coal								
Source of data used:	National Inventory Report of Ukraine 1990-2010 ¹²								
Value(s) :	<table border="1"> <thead> <tr> <th></th> <th>2010</th> <th>2011</th> <th>2012</th> </tr> </thead> <tbody> <tr> <td></td> <td>21.60</td> <td>21.60</td> <td>21.60</td> </tr> </tbody> </table>		2010	2011	2012		21.60	21.60	21.60
	2010	2011	2012						
	21.60	21.60	21.60						
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Baseline emission and leakage calculations								
Additional comment:									

Data / Parameter:	$OXID_{coal}$								
Data unit:	ratio								
Description:	Carbon Oxidation factor of coal								
Source of data used:	National Inventory Report of Ukraine 1990-2010								
Value(s) :	<table border="1"> <thead> <tr> <th></th> <th>2010</th> <th>2011</th> <th>2012</th> </tr> </thead> <tbody> <tr> <td></td> <td>0.962</td> <td>0.962</td> <td>0.962</td> </tr> </tbody> </table>		2010	2011	2012		0.962	0.962	0.962
	2010	2011	2012						
	0.962	0.962	0.962						
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Baseline emission and leakage calculations								
Additional comment:									

¹¹ Report on the fire risk of Luhansk Region's waste heaps, Scientific Research Institute "Respirator", Donetsk, 2012.

¹²

http://unfccc.int/files/national_reports/annex_i_ghg_inventories/national_inventories_submissions/application/zip/ukr-2012-nir-13apr.zip

Data / Parameter:	k_{coal}^C			
Data unit:	tC/TJ			
Description:	Carbon content of coal			
Source of data used:	National Inventory Report of Ukraine 1990-2010			
Value(s) :		2010	2011	2012
		25.99	25.99	25.99
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Baseline emission and leakage calculations			
Additional comment:				

Data / Parameter:	NCV_{diesel}			
Data unit:	GJ/t			
Description:	Net Calorific Value of diesel fuel			
Source of data used:	National Inventory Report of Ukraine 1990-2010			
Value(s) :		2010	2011	2012
		42.50	42.50	42.50
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Baseline emission and leakage calculations			
Additional comment:				

Data / Parameter:	$OXID_{DIESEL}$			
Data unit:	Ratio			
Description:	Carbon Oxidation factor of diesel fuel			
Source of data used:	National Inventory Report of Ukraine 1990-2008			
Value(s) :		2010	2011	2012
		0.99	0.99	0.99
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Project emission calculations			
Additional comment:				

Data / Parameter:	k_{diesel}^C			
Data unit:	tC/TJ			
Description:	Carbon content of diesel fuel			
Source of data used:	National Inventory Report of Ukraine 1990-2010			
Value(s) :		2010	2011	2012
		20.20	20.20	20.20
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Project emission calculations			

calculations)	
Additional comment:	

D.2. Data and parameters monitored

Data / Parameter:	$FR_{Coal,y}$
Data unit:	t
Description:	Amount of sorted fraction, which is extracted from the waste heaps because of the project activity in a period y
Measured /Calculated /Default:	m
Source of data:	Loading sheet
Value(s) of monitored parameter:	Provided by the company
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Baseline emission and leakage calculations
Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	Weighting of the coal is caring out on railway station by the special railway scale. Regular cross-checks with the customers are performed. Railway scale are passed periodic calibration and verification by national standards.
Measuring/ Reading/ Recording frequency:	Monthly
Calculation method (if applicable):	Direct measurement and calculation according to state standards
QA/QC procedures applied:	

Data / Parameter:	$FC_{BE, Coal, y}$
Data unit:	t
Description:	Amount of coal that has been mined in the baseline scenario and combusted for energy use, equivalent to the amount of coal extracted from the waste heaps in the project activity in period y
Measured /Calculated /Default:	c
Source of data:	N/A
Value(s) of monitored parameter:	Calculated by the equation 3.
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Baseline emission and leakage calculations
Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	N/A
Measuring/ Reading/ Recording frequency:	Monthly
Calculation method (if applicable):	Calculated by the equation 3.
QA/QC procedures applied:	N/A

Data / Parameter:	$A_{Rock,y}$
Data unit:	%
Description:	Average ash content of sorted fraction, which is extracted from waste heap in period y
Measured /Calculated /Default:	M
Source of data:	Laboratory research
Value(s) of monitored parameter:	Provided by the company
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Baseline emission and leakage calculations
Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	N/A
Measuring/ Reading/ Recording frequency:	Monthly
Calculation method (if applicable):	Laboratory research
QA/QC procedures applied:	According to the national standards.

Data / Parameter:	$W_{Rock,y}$
Data unit:	%
Description:	Average moisture of sorted fraction, which is extracted from waste heap in period y
Measured /Calculated /Default:	M
Source of data:	Laboratory research
Value(s) of monitored parameter:	Provided by the company
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Baseline emission and leakage calculations
Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	N/A
Measuring/ Reading/ Recording frequency:	Annually
Calculation method (if applicable):	Laboratory research
QA/QC procedures applied:	According to the national standards.

Data / Parameter:	$EC_{PJ,y}$
Data unit:	MWh
Description:	Additional electricity consumed in period y as a result of the

	implementation of the project activity	
Measured /Calculated /Default:	M,C	
Source of data:	Acts from energy utility company	
Value(s) of monitored parameter:	Provided by the company	
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Project emission calculations	
Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	Electronic meter SL 7000 Smart	
	Data unit	kWh
	Producer	Actaris ¹³
	Type	SL761B071
	Serial number	35011678
	Accuracy class	1.0
	Calibration	13/11/2007
	Calibration frequency	6 yr
	Validity	"Lugansk Energy Union" Ltd.
Measuring/ Reading/ Recording frequency:	Monthly	
Calculation method (if applicable):	Direct measurement and calculation according to state standards	
QA/QC procedures applied:	Electronic meter within TP is passed periodic calibration and verification by national standards.	

Data / Parameter:	<i>FC_{PJ,Diesel,y}</i>
Data unit:	t
Description:	Amount of diesel fuel that has been used for the project activity in the period y
Measured /Calculated /Default:	C
Source of data:	Monthly data from the company
Value(s) of monitored parameter:	Provided by the company
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Project emission calculations
Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	N/A
Measuring/ Reading/ Recording frequency:	Monthly
Calculation method (if applicable):	The calculation is based on actual value of fuel
QA/QC procedures applied:	N/A

¹³ <http://www.actaris.com.ua/rus/katalog/schetchik-Actaris-SL7000>

SECTION E. Emission reductions calculation

E.1. Baseline emissions calculation

Emissions in the baseline scenario are calculated as follows:

$$BE_y = BE_{WHB,y} \quad (\text{Equation 1})$$

where:

BE_y - baseline emissions in period y (tCO₂e),

$BE_{WHB,y}$ - baseline emissions due to burning of the waste heaps in period y (tCO₂).

Baseline Emissions due to burning of the waste heaps, in turn, are calculated as:

$$BE_{WHB,y} = FC_{BE,Coal,y} / 1000 * \rho_{WHB} * NCV_{Coal} * OXID_{Coal} * k_{Coal}^C * 44/12 \quad (\text{Equation 2})$$

where:

$FC_{BE,Coal,y}$ - amount of coal that has been mined in the baseline scenario and combusted for energy use, equivalent to the amount of coal extracted from the waste heaps in the project activity in period y , t. Calculated by the equation 3.

ρ_{WHB} - correction factor for the uncertainty of the waste heap burning process, ratio. This factor is defined on the basis of the survey of all the waste heaps in the area that provides a ratio of waste heaps that are or have been burning at any point in time to all existing waste heaps.

NCV_{coal} - net calorific value of coal, GJ/t.

$OXID_{coal}$ - carbon oxidation factor of coal, ratio.

k_{coal}^C - carbon content of coal, tC/TJ.

$44/12$ - ration between molecular mass of CO₂ and C. Reflect oxidation of C to CO₂.

In order to correctly calculate the amount of energy coal produced in mines and substituted by coal, received by dismantling of waste heap, it is necessary to recount, taking into account different value of ash and moisture content of energy coal and fraction, obtained by dismantling of the waste heaps. If in the mass of carbonaceous rocks we extract moisture and substances that are not burned during combustion, and turn to ash, we obtain the conditional ideal coal with no moisture and ash content. Therefore, to obtain coal with averaged over Ukraine characteristics it is necessary to add to that ideal coal the averaged moisture and ash content. In addition to moisture and ash, the coal (carbonaceous rocks) also contains sulfur, but its amount does not exceed a few percent¹⁴, content of it in carbonaceous rocks always less than in coal, extracted from the mine, so to calculate the amount produced in coal mine, which replaced by coal from waste heaps, this value can be neglected. Thus, the amount of coal produced in mines in the baseline scenario is calculated by the equation:

$$FC_{BE,Coal,y} = FR_{Coal,y} * (1 - A_{Rock,y} / 100 - W_{Rock,y} / 100) / (1 - A_{Coal} / 100 - W_{Coal} / 100) \quad (\text{Equation 3})$$

Where:

$FR_{Coal,y}$ - amount of sorted fraction, which is extracted from the waste heaps because of the project in a period y , t;

$A_{Rock,y}$ - the average ash content of sorted fractions, which is extracted from waste heap in period y , %;

$W_{Rock,y}$ - the average moisture of sorted fractions, which is extracted from waste heap in period y , %;

A_{Coal} - the average ash content of power station coal, mined in Ukraine, %;

W_{Coal} - the average moisture of power station coal, mined in Ukraine, %;

¹⁴ <http://masters.donntu.edu.ua/2009/feht/semkovskiy/library/article9.htm>

100 - conversion factor from percent to fraction, ratio.

If the average ash content and the average moisture of sorted fraction, which are extracted from the waste heap in the period y, are not available for the developer, or are irregular with a high level of uncertainty (table D.2 of PDD), they are taken equal to the relevant nation indicators, and

$$FC_{BE,Coal,y} = FR_{Coal,y} \quad (\text{Equation 4})$$

The total baseline emissions are presented in the table below.

		6 months 2010	2011	10 months 2012	Total
Baseline Emissions due to burning of the waste heaps	tCO ₂ e	523275	758974	610274	1892523
Total Baseline emissions during the period 01/07/2010-31/10/2012	tCO ₂ e	523275	758974	610274	1892523

Table.5 Total Baseline emissions

E.2. Project emissions calculation

The project emissions are calculated from the CO₂ emissions from the diesel fuel combustion and the additional energy consumption used by the formula given below.

Emissions from the project activity are calculated as follows:

$$PE_y = PE_{EL,y} + PE_{Diesel,y} \quad (\text{Equation 5})$$

where

PE_y , -project emissions due to project activity in the period y (tCO₂e),

$PE_{EL,y}$ - project emissions due to consumption of electricity from the grid by the project activity in the period y (tCO₂e),

$PE_{Diesel,y}$ -project emissions due to consumption of diesel fuel by the project activity in the period y (tCO₂e).

These, in turn, are calculated as:

$$PE_{EL,y} = EC_{PJ,y} * PE_{grid,y} \quad (\text{Equation 6})$$

where:

$EC_{PJ,y}$ - additional electricity consumed in period y as a result of the implementation of the project activity (MWh),

$EF_{grid,y}$ - relevant emission factor for the electricity from the grid in the period y, kgCO₂/kWh (tCO₂/MWh)

$$PE_{Diesel,y} = FC_{PJ,Diesel,y} / 1000 * NCV_{Diesel} * OXID_{Diesel} * k^C_{Diesel} * 44/12 \quad (\text{Equation 7})$$

where:

$FC_{PJ,Diesel,y}$ - amount of diesel fuel that has been used for the project activity in the period y, t.

NCV_{Diesel} - net calorific value of diesel fuel, GJ/t;

$OXID_{Diesel}$ - carbon oxidation factor of diesel fuel, ratio;

k^C_{Diesel} - carbon content of diesel fuel, t C/TJ;

$44/12$ - ration between molecular mass of CO₂ and C. Reflect oxidation of C to CO₂.

The total project emissions are presented in the table below.

		6 months 2010	2011	10 months 2012	Total
Project Emissions due to consumption of electricity from the grid by the project activity	tCO ₂ e	1128	1774	1521	4423
Project Emissions due to consumption of diesel fuel by the project activity	tCO ₂ e	638	845	499	1982
Total Project emissions during period 01/07/2010-31/10/2012	tCO ₂ e	1766	2619	2020	6405

Table.6 Total Project emissions

E.3. Leakage calculation

Leakage

Leakage is the net change of anthropogenic emissions by sources and/or removals by sinks of GHGs which occurs outside the project boundary, and that can be measured and is directly attributable to the JI project.

This project will result in a net change in fugitive methane emissions due to the mining activities. Source of the leakage is the fugitive methane emissions due to coal mining and electricity consumption due to coal mining. This leakage is directly attributable to the JI project activity according to the following assumption: the coal produced by the project activity from the waste heap will substitute the coal produced by underground mines of the region in the baseline scenario. This assumption is explained by the following logic: Energy coal market is demand driven as it is not feasible to produce coal without demand for it. Coal is a commodity that can be freely transported to the source of demand and coal of identical quality can substitute some other coal easily. The project activity cannot influence demand for coal on the market and supplies coal extracted from the waste heaps. In the baseline scenario demand for coal will stay the same and will be met by the traditional source – underground mines of the region. Therefore, the coal supplied by the project in the project scenario will have to substitute the coal mined in the baseline scenario. It is also important to mention that Ukraine is a net exporter of energy coal so the coal produced by the project activity will substitute domestically mined coal (in 2010 energy coal production was 40.3 Mt, import was 3 Mt and export was 6.1 Mt¹⁵). According to this approach equivalent product supplied by the project activity (with lower associated specific green-house gas emissions) will substitute the baseline product (with higher associated specific green-house gas emissions).

This leakage is measurable: through the same procedure as used in 2006 IPCC Guidelines¹⁶ (See Volume 2, Chapter 4, Page 4-11) and also used in CDM approved methodology ACM0009¹⁷ (Page 8). Activity data (in our case amount of coal extracted from the waste heap which is monitored directly) is multiplied by the emission factor (which is sourced from the relevant national study - National Inventory Report¹⁸ of Ukraine under the Kyoto Protocol) and conversion coefficients. It is important to mention that IPCC and relevant National Inventories take into account raw amount of coal that is being

¹⁵ <http://www.uaenergy.com.ua/c225758200614cc9/0/d465824d78686a04c225787000542600>

¹⁶ http://www.ipcc-nggip.iges.or.jp/public/2006gl/pdf/2_Volume2/V2_4_Ch4_Fugitive_Emissions.pdf

¹⁷ <http://cdm.unfccc.int/UserManagement/FileStorage/K4P3YG4TNQ5ECFNA8MBK20SMR6HTEM>

¹⁸ http://unfccc.int/files/national_reports/annex_i_ghg_inventories/national_inventories_submissions/application/zip/ukr-2012-nir-13apr.zip

mined in these calculations whereas in the PDD coal extracted from the waste heaps is high quality coal concentrate. Therefore, approach taken in the PDD is conservative as in coal mining more raw coal should be mined causing more fugitive methane emissions to produce equivalent amount of high quality coal concentrate.

Electricity consumption and related greenhouse gas emissions due to dismantling of waste heap to be taken into account in calculating the project emissions. Carbon dioxide emissions due to electricity consumption in the coal mine way in an amount, equivalent to the design of coal - a leakage, that can be taken into account at base of the State Statistics Committee data¹⁹, concerning unit costs of electricity at coal mines in Ukraine in the relevant year.

The criteria for definition of the project boundary are provided in the *Guidance on criteria for baseline setting and monitoring*, JISC 18, Annex 2, paragraph 14. In the case of a JI project aimed at reducing emissions, the project boundary shall:

- (a) Encompass all anthropogenic emissions by sources of GHGs which are:
 - (i) Under the control of the project participants;
 - (ii) Reasonably attributable to the project.

Therefore, fugitive CH₄ emissions from mining activities and CO₂ emission due to electricity consumption at coal mines cannot be included into the project boundary as they are not “Under the control of the project participants”. PDD correctly lists SLAVUTICH MChTPP as a project participant hosting this project activity. SLAVUTICH MChTPP is performing the dismantling of the waste heaps, processing waste heap matter with the dense medium cyclone technology. SLAVUTICH MChTPP does not operate or own any coal mines, therefore, any changes in fugitive methane emissions from mining are not under the direct control of project participants. This reason those leakages were included into the ‘leakages’ category and not considered the baseline emissions. Also, for example, approved CDM methodology ACM0009 “Consolidated baseline and monitoring methodology for fuel switching from coal or petroleum fuel to natural gas” Version 3.2 treats the same emission source as leakage – **Fugitive methane emissions** on Page 8 out of 16. It is also worth mentioning that leakage by definition is a “net change of anthropogenic emissions” and can be negative or positive depending on the nature of such change. It is also important to mention that including this particular source into baseline emissions or into leakages does not impact estimated emission reductions. For the value of Emission factor for fugitive methane emissions from coal mining (25,67 m³/t) the data provided in the National Inventory Report²⁰ of Ukraine 1990-2009, p.90 are used. This document is the official GHG Inventory prepared by the Host Country as part of the reporting requirements of the Kyoto Protocol.

The description of this particular emission factor states that it is the weighted average emission factor for the methane emissions from coal mining sourced from the study - Triplett J., Filippov A., Paisarenko A. Inventory of methane emissions from coal mines in Ukraine: 1990-2001. Partnership for Energy and Environmental Reform, 2002²¹.

As for the analogy with the electricity from the grid versus renewable electricity: the source of the leakage here are the fugitive methane emissions due to coal mining. These emissions are specific to the coal that is being mined. Coal produced by the project activity is not mined but extracted from the waste heap through the advanced beneficiation process. Therefore, coal produced by the project activity substitutes the coal would have been otherwise mined in the baseline. Coal that is mined in the baseline has fugitive methane emissions associated with it and the coal produced by the project activity does not have such emissions associated with it.

Leakages in the period y are calculated as follows:

¹⁹ <http://www.ukrstat.gov.ua/>

²⁰ http://unfccc.int/national_reports/annex_i_ghg_inventories/national_inventories_submissions/items/5888.php

²¹ <http://www.epa.gov/cmop/docs/inventory2002.pdf>

$$LE_y = LE_{CH_4, y} + LE_{EL, y} \quad (\text{Equation 8})$$

Leakages due to fugitive emissions of methane in the mining activities in the period y (tCO₂e).

$$LE_{CH_4, y} = -FC_{BE, Coal, y} * EF_{CH_4, CM} * \rho_{CH_4} * GWP_{CH_4} \quad (\text{Equation 9})$$

where:

$FC_{BE, Coal, y}$ - amount of coal that has been mined in the baseline scenario and combusted for energy use, equivalent to the amount of coal extracted from the waste heaps in the project activity in period y, t. Calculated by the equation 3.

$EF_{CH_4, CM}$ - average rate for fugitive methane emissions from coal mining, m³/t;

ρ_{CH_4} - methane density, t/m³;

GWP_{CH_4} - Global Warming Potential of Methane, tCO₂e/tCH₄.

Leakages due to electricity consumption at coal mines in a period y, calculated by the equation:

$$LE_{EL, y} = -FC_{BE, Coal, y} * N^E_{Coal, y} * EF_{grid, y} \quad (\text{Equation 10})$$

where:

$FC_{BE, Coal, y}$ - amount of coal that has been mined in the baseline scenario and combusted for energy use, equivalent to the amount of coal extracted from the waste heaps in the project activity in period y, t. Calculated by the equation 3.

$N^E_{Coal, y}$ - average electricity consumption per ton of coal, produced in Ukraine in the year y, MWh/t

$EF_{grid, y}$ - relevant emission factor for the electricity from the grid in the period y, tCO₂/MWh.

Leakages due to consumption of other types of energy in coal mines are insignificant compared to the emissions due to electricity consumption²², so in connection with this, and for reasons of conservatism, take them equal to zero.

		6 months 2010	2011	10 months 2012	Total
Leakages due to fugitive emissions of methane in the mining activities in the period y	tCO ₂ e	-122363	-177478	-149932	-449773
Leakages due to electricity consumption in the mining activities in the period y	tCO ₂ e	-38430	-50767	-40821	-130018
Total leakages during the period 01/07/2010-31/10/2012	tCO ₂ e	-160793	-228245	-190753	-579791

Table.7 Total leakages

E.4. Emission reductions calculation / table

The emission reductions are calculated as follows:

$$ER_y = BE_y - LE_y - PE_y \quad (\text{Equation 11})$$

where:

²² www.mishor.esco.co.ua/2005/Thesis/10.doc

ER_y - emissions reductions of the JI project in period y (tCO₂e)

LE_y - leakages in period y (tCO₂e);

BE_y - baseline Emission in period y (tCO₂e);

PE_y - project Emission in period y (tCO₂e).

Year	Estimated project emissions (tonnes of CO ₂ equivalent)	Estimated leakage (tonnes of CO ₂ equivalent)	Estimated baseline emissions (tonnes of CO ₂ equivalent)	Estimated emission reductions (tonnes of CO ₂ equivalent)
6 months 2010	1766	-160793	523275	682302
2011	2619	-228245	758974	984600
10 months 2012	2020	-190753	610274	799007
Total (tonnes of CO ₂ equivalent)	6405	-579791	1892523	2465909

Table.8 Total Emission Reductions

E.5. Comparison of actual emission reductions with estimates in the JI-PDD

Item	Values applied in ex-ante calculation of the registered JI-PDD	Actual values reached during the monitoring period
6 months 2010	682302	682302
2011	984600	984600
10 months 2012	799007	799007
Emission reductions (tCO₂e)	2465909	2465909

Table.9 Comparison of actual emission reductions with estimates in the JI-PDD

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

No differences.
