MONITORING REPORT

CONTENTS

* 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, 01/08/2012

«WASTE HEAP DISMANTLING IN SVERDLOVSK DISTRICT OF LUHANSK REGION OF UKRAINE WITH THE AIM OF REDUCING GREENHOUSE GASES EMISSIONS INTO THE ATMOSPHERE»

Monitoring period #1:

Monitoring period starting date: 01/01/2008
Monitoring period closing date: 30/06/2012

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;

The main idea of the project is to process waste heaps originated due to coal extraction from mines. Coal extraction from the mine's waste heap will prevent greenhouse gas emissions into the atmosphere as if in the case of spontaneous burning and will produce additional amount of coal instead of its mining. 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 mine.

This Project is aimed at coal extraction from the mine's waste heaps of the Sverdlovsk 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.

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.

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. Brief description of the installed technology and equipments

The technology applied in this project is the dense medium coal washing plant. The technological process and equipment used in the project reflect current good engineering practices. The basic technology of coal washing plant has gained wide popularity in the 1990s as the most efficient process for coal washing. Technological process is advanced, does not require vast amounts of materials and workforce, is reliable

and productive. The technology used in this project is state-of-the-art technology and is unlikely to be replaced by any other technology during the lifetime of the project as it offer the best quality and efficiency of the coal washing process among other technologies commonly used in Ukraine such as simple vibration screens and spiral separators.

3. 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. 15th of November 2007 is the date of commissioning of the beneficiation plant equipment .The operations at the facility have started on the 15th of November 2007. 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.

4. Total emission reductions achieved in this monitoring period.

Total amount of emission reductions achieved from 01/01/2008 to 30/06/2012, rounded down to whole tons, is 5127994 tons of CO_2e.

A.2. Project Participants

Party involved *	Legal entity project participant (as applicable)	Please indicate if the Party involved wishes to be considered as project participant (Yes/No)
Ukraine (Host party)	Small Private Commercial Production Company "SLAVUTICH"	No
The Netherlands	Ohana LLP	No

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. 1847/23/7, dated 16/07/2012.
A letter of approval from the Ukrainian Designated Focal Point was received for the proposed project, reference No. 2022/23/7, dated 27/07/2012.

A letter of approval from the Netherland Designated Focal Point was received for the proposed project, reference 2012JI37, dated 31/07/2012.

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. The project boundary includes waste heap the closed mine number 74 and waste heap of closed mine number 72, near village Fedorivka, Sverdlovsk district, beneficiation complex with special machinery. Industrial Sites of the Mine No 74 and No 72, located near village Fedorivka Sverdlovsk district, Luhansk Region, Ukraine. The geographic coordinates of the site are: 48° 6′ 26.13″ N, 39° 32′ 15.53″ E [1].

1 http://toolserver.org/~geohack/geohack.php?language=ru&pagename=%D0%A1%D0%BB%D0%B0%D0%B2%

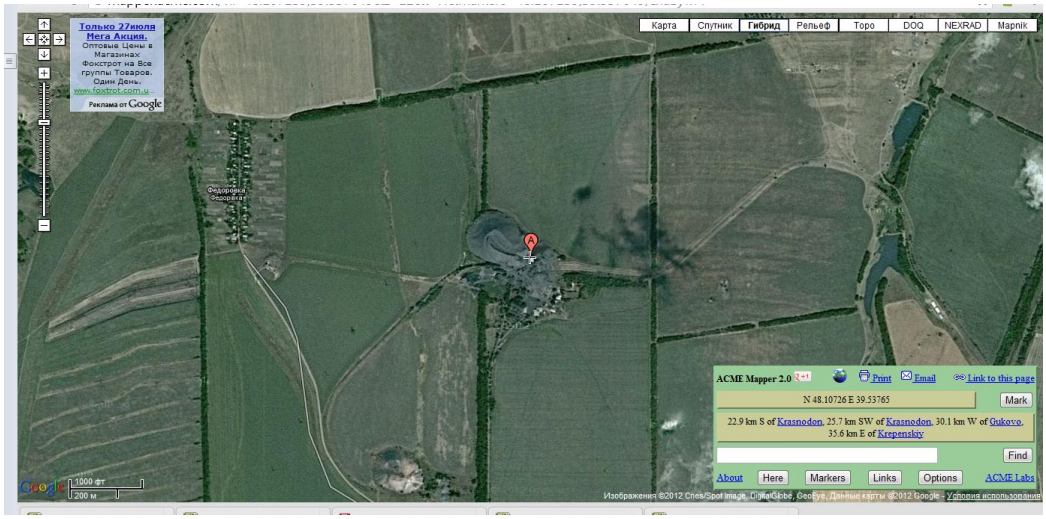

Fig.1 Location of Project site

A.4. Technical description of the project

The proposed project is aimed at the extraction of coal from the waste heaps of underground coal mines. Waste heaps are frequently spontaneously igniting and burning, causing emissions of hazardous substances and green-house gases. The fraction of coal in the waste heaps can be as high as 28-32%[2], so the risk of spontaneous self-heating and burning is very high. If a waste heap has started burning, even if the fire is extinguished, it will continue burning after a while unless the fire is extinguished regularly. Burning waste heaps in Ukraine are very often not taken care of properly, especially when there is no immediate danger to population and property, i.e. if the waste heap is located at a considerable distance from a populated area, or is at the early stages of self-heating. The monitoring of the waste heaps condition is not done on a systematic and timely basis and information is frequently missing. The only way to prevent a waste heap from burning is to extract all the combustible matter, which is generally residual coal from the mining process. This project will reduce the emissions by extracting coal from the waste heap matter and using the remaining rock for land engineering.

The Project envisages high-grade anthracite production for the needs of households energy sector.
The main stages of coal extraction and sorting can be found below.

Enrichment is carried out by the way of gravity in separation method. The coal washing by dense medium cyclone is the very efficient separation process. It is ideally suited for difficult coal separation and cleaning high value coal for domestic and industrial use.

D1%83%D1%82%D0%B8%D1%87&params=48.107259_N_39.537649_E_type:city#.D0.A4.D0.BE.D1.82.D0.BE.D0.B3.D1.80.D0.B0.D1.84.D0.B8.D0.B8

[2] *Geology of Coal Fires: Case Studies from Around the World, Glenn B. Stracher, Geological Society of America, 2007, p. 47*
http://books.google.com.ua/books?id=eJU0WOABSWIC&printsec=frontcover&hl=ru#v=onepage&q&f=false

Fig.2 Beneficiation plant

Technological beneficiation complex consists of:

- Scraper conveyor CP-70M length 50 m, which passes the rock mass on the grate of bunker-batcher, which is placed on set of shelve;
- Belt conveyor with belt width 650mm for transportation (conveyor belt LK 650) of product of grades with length 20m >200мм to storage of this product (on the ground);
- Belt conveyor with belt width 650mm for transportation (conveyor belt LK 650) of product of grades 0-200mm with length 14 m to cribbles GIL-43, for dry preliminary classification of the rock mass before beneficiation in jigging equipment OM10;
- Belt conveyor with belt width 600mm for transportation (conveyor belt LK 650) of product of grades 50-200mm with length 26 m to the storage of this material (on the ground);
- Trenches for the free movement of the masses.;
- Belt conveyor with belt width 600mm for transportation of product of grades 0-50mm to storage of this product (accumulation bunker);
- Jigging machine OM10 with elevator;
- Belt conveyor with belt width 600mm (belt conveyor LK650) with length 18m for transportation of product of grades 13-50mm to storage of this product (accumulation bunker);
- Cribbles GUL-32, for classification and partial dewatering of concentrate of grades 0-50 mm after beneficiation in the jigging machine OM10;
- Cribbles GLKV-1500, for classification and partial dewatering of concentrate of grades 0,5- 6 mm and 6-13 mm after beneficiation in the jigging machine OM10;
- Belt conveyor with belt width 600mm for transportation of product of grades 0,5-25mm to storage of this product (accumulation bunker).

Fig.3 Jigging machine OM10

Technological scheme for processing of raw coal is as follows:

Rock mass from the waste heap is loaded by a shovel loaders to scraper conveyor SR-70 with length 50 m and then by gravity on an inclined chute is fed to a fixed inclined grate with a mesh size 200x200mm, which is a preliminary screening on the two classes of size 200 mm to 200 mm.

Oversize product (200 mm) fed by gravity to a conveyor belt LK 650 with length 20m and transported to the storage capacity of 25m3 breed. Undersize (-200mm) is transported to the bunker-batcher, which is located under the grate, and provides a uniform load on the conveyor belt LK650 14m in length and then to the roar of GIL-43 for dry pre-classification to the enrichment of jigging machine OM10.

Oversize product (50 mm) sieve GIL-43 is sent to the chute to the belt conveyor 650 LC 26m in length, where is manual selection of coal is taking place, rock delivered to the conveyor hopper capacity of 25m3 breed. Belt conveyors that are involved in the processing chain, equipped with braking devices, cleaning devices and tape devices, preventing slippage and descent of the tape. Class 0-50mm is transported by belt conveyor into the hopper and from there drive on an inclined chute with a flat hand screw gate drive is applied to the enrichment in jigs OM10 with the release of the two final products:
- Concentrate;

- The breed.

The set of equipment for the jig includes an elevator for removal of heavy jigging products (species Cl. 0-50mm) 12m long and blower TV 1.6 / 80 with two receivers. Receiving bunker for unloading of commercial products are equipped with flat gates with manual transmission that allows you to adjust the load and an equal amount of material.

The concentrate grade of 0-50mm from a jigging machine is fed to the dewatering roar GIL-32. Oversize product of upper and lower screens (class 13-50, and 6-13 grade) not mixed is fed to the belt conveyor LK650 18m in length with a separator and separately by class size is loaded in two bunkers on the volume of 25m^3 each.

Undersize of the lower sieve (class 0-6mm) is fed with the water to the dewatering roar GLKV-1500, which is located under the roar of GIL-32. Dehydrated commercial product class 0.5-6 mm is fed to the conveyor LK650 length 18m and then to open a warehouse capacity of 25 m^3.

Sludge is supplied by water pump типа CNS to the central septic tank in order to further deposition of sludge particles. The rock from the jig is transported to the elevator and gets transported to a rock mass bunker, dehydrating while in the elevator buckets.

Processing complex consists of 2 parts: dry and wet dressing. Each part of the complex produces finished products and has a capacity of 100 t / hr or 792000 tons / year.

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.

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

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 the 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 2022.

Period	Start date	End date
1	01/01/2008	31/12/2012
2	01/01/2013	31/12/2022

Table.1 Crediting period dates

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

Contact information of the entity and persons responsible:
Mr. Tahir Musayev, Carbon Capital Services Limited,
Email t.musayev@gmail.com Tel/Fax: +38 044 490 6968.

SECTION B. Implementation of the project activity

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. The starting date of a JI project activity is the date of putting into operation beneficial plant - 15/11/2007. The starting date of operation of the project activity and generation the first ERU – 01/01/2008.

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.

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.

If some main project equipment has not been working during monitoring period such as beneficiation plant the calculations for this period will not be made, in accordance with conservative approach the estimated emission reductions for this period will be assumed equal to 0.

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

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.

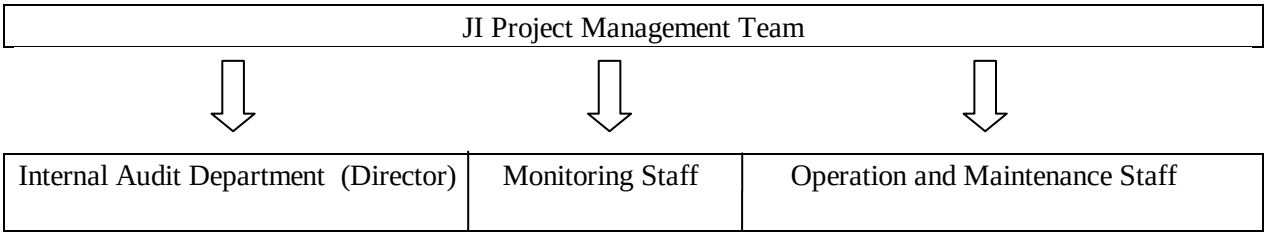

Fig.4 The management structure of the project

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 have 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 monitoring 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 liters rather than in tones the data in liters are converted into tones using the density of 0,85 kg/l[3]. 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 is archived and stored by the project participants. The following documents is 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 is kept for at least two years after the last transfer of ERUs.

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[3] *GOST 305-82 Diesel Fuel. Specifications. 0,85 kg/l is taken as an avearage 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 utilizes 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 ensures 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 was 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 ensures 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 have received training on monitoring procedures and requirements. Personnel of the project host management provide 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_2e/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_2e/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,

[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

	No.62 dated 15.04.2011, No.63 dated 15.04.2011,No.75 dated 12.05.2011
Value(s) :	2008: 1.219; 2009: 1.237; 2010: 1.225; 2011: 1.227; 2012: 1.227
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Project and baseline emission calculations
Additional comment:	

Data / Parameter:	$N^{E}_{Coal,y}$
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) :	2008: 0.0878; 2009: 0.0905; 2010: 0.0926; 2011: 0.0842; 2012: 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) :	2008: 38.60; 2009: 39.20; 2010: 39.70; 2011: 39.80; 2012: 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) :	2008; 2009; 2010; 2011; 2012

[10] http://www.ukrstat.gov.ua/

	8.60	8.20	8.30	8.30	8.30
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Baseline, project emission and leakage 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) :	0.865
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) :	*2008*	*2009*	*2010*	*2011*	*2012*
	21.50	21.80	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) :	*2008*	*2009*	*2010*	*2011*	*2012*
	0.963	0.963	0.962	0.962	0.962
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Baseline emission and leakage calculations				

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

[12] *http://unfccc.int/national_reports/annex_i_ghg_inventories/national_inventories_submissions/items/6598.php*

Additional comment:	

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

2008	*2009*	*2010*	*2011*	*2012*
25.95	25.97	25.99	25.99	25.99

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) :	
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Baseline emission and leakage calculations
Additional comment:	

2008	*2009*	*2010*	*2011*	*2012*
42.20	42.20	42.20	42.20	42.20

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) :	
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Project emission calculations
Additional comment:	

2008	*2009*	*2010*	*2011*	*2012*
0.99	0.99	0.99	0.99	0.99

Data / Parameter:	k^{C}_{diesel}
Data unit:	**tC/TJ**
Description:	Carbon content of diesel fuel
Source of data used:	National Inventory Report of Ukraine 1990-2010
Value(s) :	

2008	*2009*	*2010*	*2011*	*2012*
20.20	20.20	20.20	20.20	20.20

Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Project emission 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:	Weight Report
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)	The electronic strain-measuring car scales 60BA1P Data unit: t Producer: LLC "Company "Vagovimiryuvalni system"[13] Type: The electronic car scales Serial number: 13-036 Accuracy class: Medium (GOST 29329-92) Calibration: 15/09/2009, 01/12/2010, 29/09/2011 Calibration frequency: 1 year Validity: SE «Luhanskstandartmetrologiya» The electronic strain-measuring car scales 40BA1P Data unit: t Producer: LLC "Company "Vagovimiryuvalni system"[14] Type: The electronic car scales Serial number: B-088 Accuracy class: Medium (GOST 29329-92) Calibration: 22/08/2011 Calibration frequency: 1 year Validity: SE «Luhanskstandartmetrologiya»
Measuring/ Reading/ Recording frequency:	Monthly
Calculation method (if applicable):	Direct measurement and calculation according to state standards
QA/QC procedures applied:	Car scales are passed periodic calibration and verification by national standards.

[13] http://www.vis-dnepr.com/vesy_v_dvigenie.html
[14] http://www.vis-dnepr.com/vesy_v_dvigenie.html

Comments	The primary calibration car scales 60BA1P were made at the beginning of usage - 22.11.2006, and according to the conformity certificate № 004071 was valid until 14.09.2009. The primary calibration car scales 40BA1P were made at the beginning of usage - 08.10.2009, and according to the conformity certificate № 005535 valid until 15.09.2012. When purchasing these car scales were made unscheduled calibration - 23.08.2010. Currently, calibration is carried out by an annual schedule.

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/	Annually

Recording frequency:	
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 CA4YU 672M

Data unit	kWh
Producer	Lemz Ltd[15]
Type	CA4YU 672M
Serial number	023925
Accuracy class	2.0
Calibration	21/12/2006 03/02/2010

[15] http://www.lemz.spb.ru/nophp/default.htm

Calibration frequency	6 yr
Validity	"Lugansk Energy Union" Ltd.

Electronic meter LZQJ-XC

Data unit	kWh
Producer	EMH metering GmbH & co[16]
Type	LZQJ-XC
Serial number	3311992
Accuracy class	0.5
Calibration	01/03/2011
Calibration frequency	6 yr
Validity	"Lugansk Energy Union" Ltd.

Electronic meter CA4YU 678

Data unit	kWh
Producer	Lemz Ltd
Type	CA4YU 678
Serial number	450359
Accuracy class	2.0
Calibration	02/09/2006 02/12/2009
Calibration frequency	6 yr
Validity	"Lugansk Energy Union" Ltd.

Electronic meter CA4YU 672M

Data unit	kWh
Producer	Lemz Ltd
Type	CA4YU 672M
Serial number	519940
Accuracy class	2.0
Calibration	21/12/2006 02/12/2009
Calibration frequency	6 yr
Validity	"Lugansk Energy Union" Ltd.

Electronic meter LZQJ-XC

Data unit	kWh
Producer	EMH metering GmbH & co
Type	LZQJ-XC
Serial number	3311986
Accuracy class	0.5
Calibration	01/03/2011
Calibration frequency	6 yr
Validity	"Lugansk Energy Union" Ltd.

Electronic meter ЦЕ6803В

Data unit	kWh
Producer	JSC "Concern Energomera"[17]
Type	ЦЕ6803В
Serial number	008522032319475

[16] http://www.emh-meter.de/en/company/company/

[17] http://www.energomera.ru/products/meters/ce6803v-all

	Accuracy class	1.0
	Calibration	01/02/2010
	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:	$FC_{PJ,Diesel,y}$
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

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 (tCO_2e),
$BE_{WHB,y}$ - baseline emissions due to burning of the waste heaps in period y (tCO_2).

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

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

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 calue of coal, GJ/t.
$OXID_{coal}$ - carbon oxidation factor of coal, ratio.
k^{C}_{coal} - carbon content of coal, tC/TJ.
$44/12$ - ration between molecular mass of CO_2 and C. Reflect oxidation of C to CO_2.

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 percent[18], 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, that came to blending with further combustion in thermal power plants, 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, %;

[18] 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

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

The total baseline emissions are presented in the table below.

		2008	2009	2010	2011	6 months 2012	**Total**
Baseline Emissions due to burning of the waste heaps	tCO_2e	694380	741500	654469	1178654	762565	4031568
Total Baseline emissions during the period 01/01/2008-30/06/2012	tCO_2e	694380	741500	654469	1178654	762565	4031568

Table.2 Total Baseline emissions

E.2. Project emissions calculation

The project emissions are calculated from the CO_2 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:

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

where
PE_y, -project emissions due to project activity in the period *y* (tCO_2e),
$PE_{EL,y}$ - project emissions due to consumption of electricity from the grid by the project activity in the period *y* (tCO_2e),
$PE_{Diesel,y}$ -project emissions due to consumption of diesel fuel by the project activity in the period *y* (tCO_2e).

These, in turn, are calculated as:

$PE_{EL,y} = EC_{PJ,y} * PE_{grid,y}$ (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)

$PE_{Diesel,y} = FC_{PJ,Diesel,y}/1000 * NCV_{Diesel} * OXID_{Diesel} * k^{C}_{Diesel} * 44/12$ (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 CO_2 and C. Reflect oxidation of C to CO_2.

The total project emissions are presented in the table below.

		2008	2009	2010	2011	6 months 2012	**Total**
Project Emissions due to consumption of electricity from the grid by the project activity	tCO_2e	384	408	358	664	455	2269
Project Emissions due to consumption of diesel fuel by the project activity	tCO_2e	473	496	445	800	519	2733
Total Project emissions during period 01/01/2008-30/06/2012	$тCO_2e$	857	904	803	1464	974	5002

Table.3 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 Mt[19]). 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 Guidelines[20] (See Volume 2, Chapter 4, Page 4-11) and also used in CDM approved methodology ACM0009[21] (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 Report[22] 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 mined in these

[19] *http://www.uaenergy.com.ua/c225758200614cc9/0/d465824d78686a04c225787000542600*
[20] *http://www.ipcc-nggip.iges.or.ip/public/2006gl/pdf/2 Volume2/V2 4 Ch4 Fugitive Emissions.pdf*
[21] *http://cdm.unfccc.int/UserManagement/FileStorage/K4P3YG4TNQ5ECFNA8MBK20SMR6HTEM*
[22] *http://unfccc.int/national_reports/annex_i_ghg_inventories/national_inventories_submissions/items/6598.php*

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 data[23], 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 CH_4 emissions from mining activities and CO_2 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 m^3/t) the data provided in the National Inventory Report [24]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, 2002[25].

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:

$$LE_y = LE_{CH4,y} + LE_{EL,y} \quad \text{(Equation 8)}$$

[23] http://www.ukrstat. gov.ua/

[24] *http://unfccc.int/national_reports/annex_i_ghg_inventories/national_inventories_submissions/items/5888.php*

[25] http://www.epa.gov/cmop/docs/inventory2002.pdf

Leakages due to fugitive emissions of methane in the mining activities in the period y (tCO_2e).

$$LE_{CH4,y} = -FC_{BE,Coal,y} * EF_{CH4,CM} * \rho_{CH4} * GWP_{CH4} \quad \text{(Equation 9)}$$

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.
$EF_{CH4,CM}$ - average rate for fugitive methane emissions from coal mining, m^3/t;
ρ_{CH4} - methane density, t/m^3;
GWP_{CH4} - Global Warming Potential of Methane, tCO_2e/tCH_4.

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 consumption[26], so in connection with this, and for reasons of conservatism, take them equal to zero.

		2008	2009	2010	2011	6 months 2012	**Total**
Leakages due to fugitive emissions of methane in the mining activities in the period *y*	tCO_2e	-147173	-154878	-138002	-248533	-160796	-849382
Leakages due to electricity consumption in the mining activities in the period *y*	tCO_2e	-43612	-48005	-43342	-71092	-45995	-252046
Total leakages during the period 01/01/2008-30/06/2012	tCO_2e	-190785	-202883	-181344	-319625	-206791	-1101428

Table.4 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:

[26] www.mishor. esco.co. ua/2005/Thesis/10. doc

ER_y - emissions reductions of the JI project in period y (tCO_2e)

LE_y - leakages in period y (tCO_2e);

BE_y - baseline Emission in period y (tCO_2e);

PE_y - project Emission in period y (tCO_2e).

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)
2008	857	-190785	694380	**884308**
2009	904	-202883	741500	**943479**
2010	803	-181344	654469	**835010**
2011	1464	-319625	1178654	**1496815**
6 months 2012	974	-206791	762565	**968382**
Total (tonnes of CO_2 equivalent)	**5002**	**-1101428**	**4031568**	**5127994**

Table.5 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
2008	793572	**884308**
2009	826904	**943479**
2010	725590	**835010**
2011	1303342	**1496815**
6 months 2012	829135	**968382**
Emission reductions (tCO_2e)	**4478543**	**5127994**

Table.6 Comparison of actual emission reductions with estimates in the JI-PDD

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

Significant differences between the estimated volume of emission reductions in registered PDD is associated with using actual data including of average ash content and moisture of sorted fractions, which is extracted from waste heap, average ash content and moisture of coal, mined in Ukraine, in 2008-2012, also correction factor for the uncertainty of the waste heaps burning process has been changed according to the latest report of scientific research.

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