JOINT IMPLEMENTATION PROJECT

"Reduction of greenhouse gas emissions by stabilization and demolition of Ltd "PROMINVEST-EKOLOHIIA" waste heaps located near Krasnodon city and Izvaryne urban village, Luhansk region"

Position of the head of the organization, institution, body, which prepared the document

Director

CEP Carbon Emissions Partners S.A. _____ **Fabian Knodel**

(position) (signature) (name and patronymic, last name)

PS

Position of the economic entity – owner of the source, where the Joint Implementation Project is planned to be carried out

Director

Ltd «PROMINVEST- EKOLOHIIA" _____ **B.E. Filippov**

(position) (signature) (name and patronymic, last name)

PS

Krasne 2012

JOINT IMPLEMENTATION PROJECT DESIGN DOCUMENT FORM
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CONTENTS

Annexes

SECTION A. General description of the project

A.1. Title of the project:

Reduction of greenhouse gas emissions by stabilization and demolition of Ltd. "PROMINVEST-EKOLOHIIA" waste heaps located near Krasnodon city and Izvaryne urban village, Luhansk region

Sectoral scope:

Sector 3 - Energy demand;

Sector 8 – Mining/mineral production.

PDD Version: 02
Date: 04/12/2012

A.2. Description of the project:

Purposes of the project activity.
The proposed project is aimed at GHG emission reduction by complete demolition of the waste heaps of mines #17, #6 bis "Izvarino", Skhidna Mine, mine #134, mine #5, mine #2, mine #2 bis of Ltd. "Prominvest-Ekolohiia", which are legally owned by the company located in Krasne village of Luhansk region. The project activity will prevent greenhouse gases emissions to the atmosphere.

General description of the sector, company and activities
In the Donetsk Basin there is one of the world's largest coal deposits (Ukraine ranks first in Europe and eighth in the world by geological reserves of fossil coal). Coal in Donbas is produced mostly by underground mining and has a history of 300 years. The basin has the total area of about 60 000 sq. km and covers the territory of Dnipropetrovsk, Donetsk and Luhansk regions. Coal reserves up to a depth of 1800 m are about 140.8 billion tonnes[1].
Coal beds occur at medium (400 - 800 m) and large (over 1000 m) depths and in most cases have small thickness (about 0.6-1.2 m). Coal layers are alternating with rock (shale, sandstone, limestone). Coal mining is accompanied, therefore, by escalation of large amounts of rock. Rock that is stocked in waste heaps is formed by shaft sinking (52%) and repair (48%). This "empty" rock is stocked near mine shafts in the form of spoil tips up to 60-80 m high and vertebral dumps (amounting to 92%); less frequently - flat dumps (8%)[2]. Waste heaps of Donbas cover an area of over 7 000 hectares. Most of coal is produced by large coal-mining unions of various proprietary forms. Alongside, there are small private companies engaged in coal extraction and processing (sorting, beneficiation) and fuel trade. Limited Liability Company "PROMINVEST-EKOLOHIIA" (hereinafter - Ltd. "Prominvest-Ekolohiia") has rich experience of excavation and mining operations, as well as of land re-cultivation. Ltd. "Prominvest-Ekolohiia" operates of the waste heaps of mines #17, #6 bis "Izvarino", Skhidna Mine, mine #134, mine #5, mine #2, mine #2 bis on a lawful basis.

Situation prior to the start of the project
By-product of continuous operation of coal mines is creation of cone-shaped heaps of coal waste - spoil tips. Smouldering and burning waste heaps are the fundamental factor in violation of environmental and economic balance of Donbas mining area, which causes a complicated ecological situation, affecting the atmosphere, soil, water facilities, leading to degradation of natural landscapes and detrimental to people's health and lives. Beneficiation at mines was inefficient and it was considered economically unreasonable to extract 100% of

[1] B.S. Busyhin, Dr. Sc., prof., Ye. L. Serheieva. Monitoring of Donbas heaps by multispectral satellite survey data. ISSN 2071-2227, Naukovyi Visnyk NHU, 2011, No.2

[2] http://www.ipages.ru/index.php?ref_item_id=2607&ref_dl=1

coal from the rock raised. As a result, waste heaps in Donbas, especially those formed in 60s-70s, contain a great amount of coal. Rock in waste heaps examined has an ash content of 57-99%, accounting for an average of 88.5%. Moisture content varies from 0.2% to 11.7%, making an average of 3.4%[3]. However, coal content even within one waste heap undergoes significant fluctuations and is poorly predictable. There is a possibility that much of the rock dump may have small content of coal, while another part has high concentration of coal and increased susceptibility to self-ignition. Over time, almost all coal-containing waste heaps become very susceptible to self-ignition and self-sustained burning. The waste heaps, which are currently burning or at a risk of ignition, are sources of uncontrolled greenhouse gas and harmful substance emissions. Oxidation and burning of rock is accompanied by emission of a wide range of volatile components that stand out from rock mass enriched by coal substance. Hot waste heaps produce steam, which also may contain water and sulphuric acid (sulphate ion), carbon dioxide, nitrogen dioxide (nitrate ion). With a lack of oxygen the vapour and gas emissions contain hydrogen sulphide, hydrocarbons, ammonia, and carbon monoxide. Water erosion of a waste heap causes leakage of toxic components and contamination of soil and groundwater, spreading them over long distances. Thus, waste heaps play an extremely negative part in the regional environment, which is multiplied at their burning. However, an outbreak and its very possibility are difficult to forecast; we can only estimate the probability of ignition, which is very high as per statistical data. Most waste heaps are very likely to ignite sooner or later. The process of carbon combustion in waste heaps is long enough and lasts for 5-7 years[4]. Despite the fact that waste heap owners are obliged to take measures to prevent their burning, immediate extinction of waste heaps is not a common practice in the Donbas region. Fines charged for pollution are much lower than the cost of measures to prevent ignition or extinguish the hot spots.

Baseline scenario.
The baseline scenario assumes that the common practice will continue - there is a certain probability that waste heaps will spontaneously ignite and the process of their burning will continue until all coal burns down. The process of burning is accompanied by the release of carbon dioxide into the atmosphere.

Project scenario.
Proposed project provides a complete demolition of the waste heaps of mines #17, #6 bis “Izvarino”, Skhidna Mine, mine #134, mine #5, mine #2, mine #2 bis. The demolition of waste heaps includes demolition of rock by special machinery, loading onto trucks and further transportation. This product is further sent to boiler houses to be combusted as fuel. Thus, rock in waste heaps will be fully utilized, and coal received will substitute coal, which would be produced by underground mining. As the result of the project, the possibility of self-ignition of waste heaps will be eliminated. This part of the project is unprofitable, so the joint implementation mechanism was one of critical factors of the project from the very beginning, and financial benefits as part of this mechanism were considered one of the reasons why the project was implemented.

Brief history of the project activity

Project milestones	Documentary evidence	Date
Ltd. “Prominvest-Ekolohiia” Management made a decision to launch a joint implementation project	Minutes of the meeting of Ltd. “Prominvest-Ekolohiia” Management	10/01/2008

[3] http://www.ipages.ru/index.php?ref_item_id=2607&ref_dl=1

[4] http://ji.unfccc.int/UserManagement/FileStorage/IE7LK2SZF1NOXRVB4CYG65WQPJMHA3

Preparation and submission of the project idea note to support anthropogenic GHG emission reductions, to the State Environmental Investment Agency of Ukraine.	Supporting materials on potential JI project "Reduction of greenhouse gas emissions by stabilization and demolition of Ltd. "PROMINVEST-EKOLOHIIA" waste heaps located near Krasnodon city and Izvaryne urban village, Luhansk region"	14/11/2012
Obtaining of a Letter of Endorsement from the State Environmental Investment Agency of Ukraine	Letter of Endorsement No.3708/23/7 for the project "Reduction of greenhouse gases by demolition of waste heaps of Ltd. "PROMINVEST-EKOLOHIIA"	03/12/2012

A.3. 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)	• Ltd. "Prominvest-Ekolohiia"	No
Estonia	• LHCarbon OÜ	No
*Please indicate if the Party involved is a host Party.		

Limited Liability Company "Prominvest-Ekolohiia" is an organization that implements the project (Applicant). USREOU Code: 30007492. The type of economic activity according to the standard industrial classification of economic activities: 10.10.1 Coal mining and beneficiation, 10.10.3 Coal sintering. Ltd. "Prominvest-Ekolohiia" will be the responsible entity for all administrative issues of the host party and investor party.

LHCarbon OÜ is a research and engineering organization. It provides consulting services on implementation of joint implementation projects.

A.4. Technical description of the project:

A.4.1. Location of the project:

The proposed project is located at waste heaps of mines #17, #6 bis "Izvarino", Skhidna Mine, mine #134, mine #5, mine #2, mine #2 bis located near Krasnodon city and Izvaryne urban village, Luhansk region, Ukraine, which are legally owned by the Ltd. "Prominvest-Ekolohiia".

Ltd. "Prominvest-Ekolohiia" location is shown in the map of Ukraine (Figure 1).

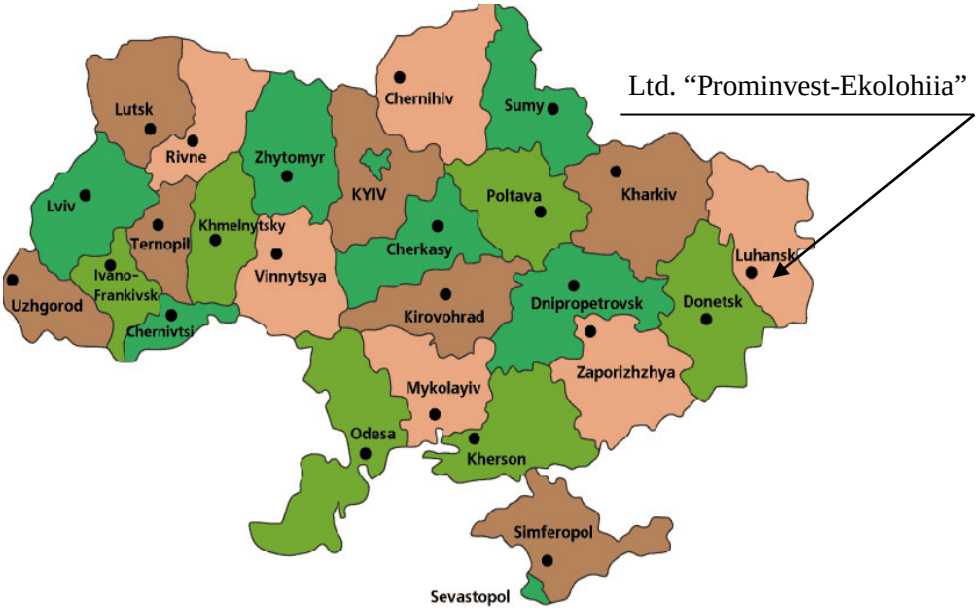

Figure 1. Location of Ltd. "Prominvest-Ekolohiia" facilities on the map of Ukraine

A.4.1.1. Host Party(ies):

The project is located in the territory of Ukraine.
Ukraine is an Eastern European country that ratified the Kyoto Protocol to the UN Framework Convention on Climate Change on February 4, 2004. It is listed in Annex 1 and meets the requirements of participation in Joint Implementation projects[5].

A.4.1.2. Region/State/Province etc.:

Luhansk region

A.4.1.3. City/Town/Community etc.:

Waste heaps are located near Krasnodon city and Izvaryne urban village.

A.4.1.4. Detail of physical location, including information allowing the unique identification of the project (maximum one page):

The project is located in Luhansk region, Ukraine.
Coordinates of the waste heap of mine #17: 48°18'09" N 39°31'55" E
Coordinates of the waste heap of mine #6 bis Izvarino: 48°17'11" N 39°53'12" E
Coordinates of the waste heap of Skhidna Mine: 48°17'26" N 39°51'10" E
Coordinates of the waste heap of mine #134: 48°17'10" N 39°41'33" E
Coordinates of the waste heap of mine #5: 48°18'12" N 39°33'17" E
Coordinates of the waste heap of mine #2: 48°18'24" N 39°33'30" E
Coordinates of the waste heap of mine #2 bis: 48°18'34" N 39°33'41" E

[5] http://zakon.rada.gov.ua/cgi-bin/laws/main.cgi?page=1&nreg=995_801

Figure 2 Location of waste heaps of mines #17, #134, #5, #2 and mine #2 bis, included into the project boundary, on the map of Ukraine

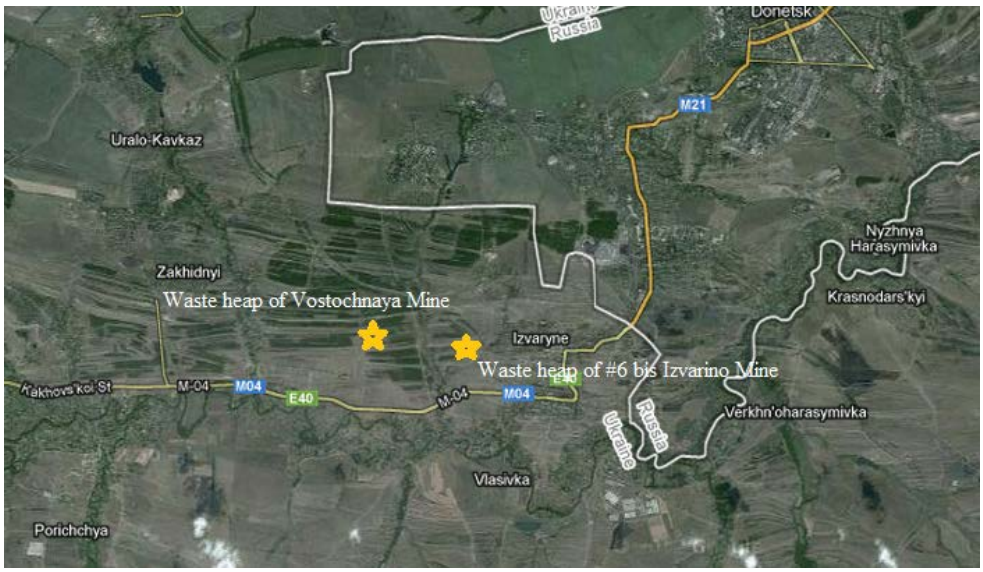

Figure 3 Location of the waste heap of mine #6 bis Izvarino, Skhidna Mine included into the project boundary, on the map of Ukraine

A.4.2. Technology(ies) to be employed, or measures, operations or actions to be implemented by the project:

The proposed project is aimed at the reduction of anthropogenic emissions. Emissions are reduced due to:
- Removal of GHG emission sources associated with waste heap combustion by demolition of waste heaps;
- Reduction of uncontrolled emissions of methane due to replacement of coal that would have been extracted by underground mining;
- Lower electricity consumption during waste heap demolition against electricity consumption during coal mining.

The project provides for the most rational scheme of waste heap demolition in terms of capital costs, which includes the application of special equipment for demolition of rock and loading the material on vehicles for further delivery to a beneficiation factory. Excavators, bulldozers, and cargo vehicles (trucks) are involved in demolition of waste heaps. This waste heap demolition scheme with the use of auxiliary technologies complies with all modern requirements of global practice on utilization of mining consequences and does not require any technological changes in project implementation.

The demolition is carried out in accordance with NPAOP 10.0-5.21-04 "Manual on self-ignition prevention, extinction and demolition of waste heaps"[6], under the following combined technology: Bulldozers rise to the top of a waste heap along its tail section. Demolition of the waste heap by bulldozers T-170[7] (operational power of 132 kW, specific fuel consumption at operational power is 218 g/kWh) is conducted by horizontal layers. After the height of the waste heap lowers to 25-30 m, demolition by slope (up to 15°) layers is allowed.

Figure 4 Mining equipment. T-170 Bulldozer.

A combined method of waste heap demolition is used, when after layerwise lowering by bulldozer to the height, at which entrance road can be constructed, further demolition is carried out by EO-5126 excavator (1.8 m3 bucket capacity, operational power of 132 kW, specific fuel consumption for operating power 220 kg/kW) with direct load of rock into vehicles (trucks KAMAZ 55111[8], carrying capacity 13 tonnes, 162 kW engine power, fuel consumption 39 l/100 km). Designed capacity of demolition complex is 5 million tonnes of rock per year.

[6] http://document.ua/instrukcija-iz-zapobigannja-samozapalyuvannyu-gasinnja-ta-ro-nor2799.html

[7] http://kgm74.ru/productID_1201416884.html

[8] http://www.ais.com.ua/car_det/?id=45

At the second stage, rock is supplied to a special beneficiation factory. The rock is first fed to an inertial screening sifter[9] for pre-classification of 100 mm grade. After the pre-classification, the coal is delivered to the preparatory screening to sifter HYL-52a (in dry or wet mode). Beneficiation of large grade material +13 mm is made on heavy media separator SKV-20[10], and beneficiation of small grade material 3-13 mm - at hydrocyclone GT-710[11]. Next, suspension is washed out of beneficiation products and dehydrating products by dressing screens and centrifuge, regeneration of the suspension at electromagnetic separator takes place. Thus water in this process is used in a closed loop. Beneficiation products (coal concentrate) are transported by conveyor belt into bins for further shipment to the consumer. Waste is transported to a flat dump.

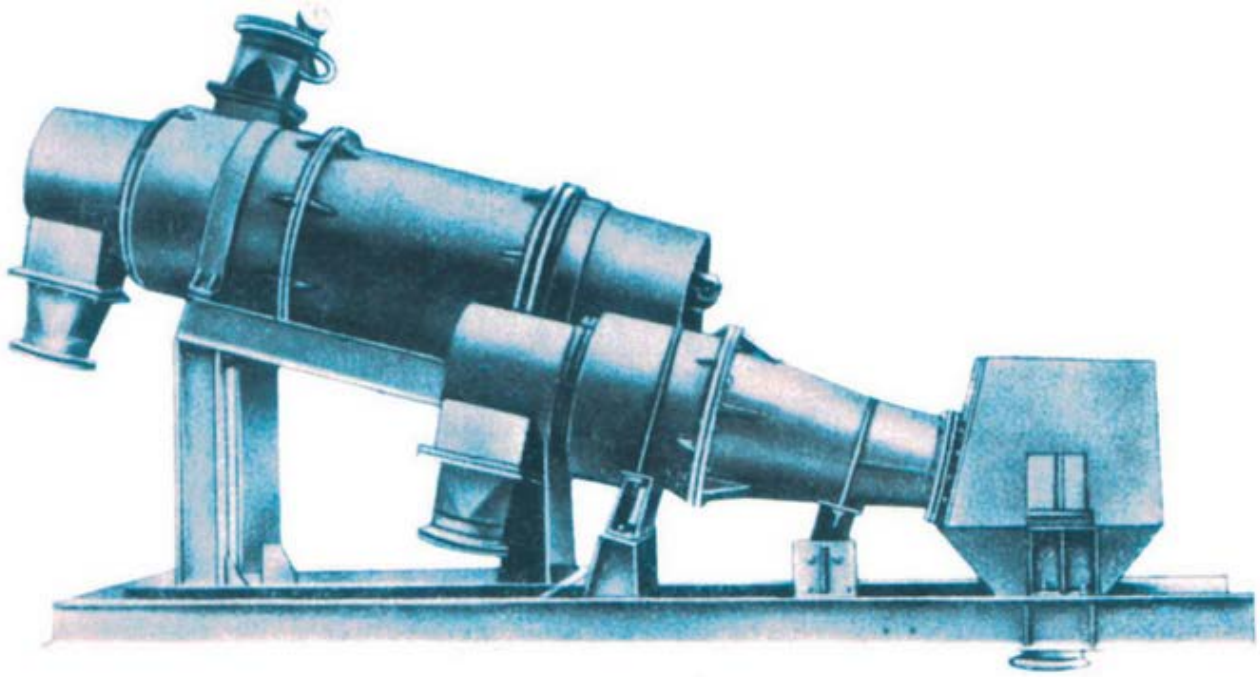

Figure 5 GT-710 Hydrocyclone

The first stage of the project - demolition of waste heaps - began on January 10, 2008.

Title of the company	Start of waste heap demolition	End of waste heap demolition

[9] http://www.zaoplatov.ru/equipment/miner?n=213

[10] http://www.vumrmz.biz/products/hcyclons/hcyclons_20_hard/hydro_710_hard.html

[11] http://gmu.com.ua/sep_skv.html

Waste heap of mine #17	18/01/2010	31/12/2014
Waste heap of mine #6 bis Izvarino	21/05/2008	31/12/2012
Waste heap of Skhidna Mine	12/02/2010	31/12/2014
Waste heap of mine #134	20/02/2009	31/12/2013
Waste heap of mine #5	10/01/2008	31/12/2012
Waste heap of mine #2	26/03/2008	31/12/2012
Waste heap of mine #2 bis	29/04/2008	31/12/2012

There is no intensive preliminary training the project calls for. As many staff members as needed can undergo basic training on the site where the project is carried out. The staff, particularly heavy equipment operators, truck and excavator drivers, mechanics and electrician, work on the site of project implementation. Local resources are used to meet the project needs for maintenance – the company's workers who service its equipment as well as repair contractors. The project provides that practical courses are done. All staff members must be certificated to do the work, regularly be given instructions on safety norms, and take examinations.

Waste from the beneficiation complex (empty rock) may be used in road construction and for development of the territory of abandoned open pits for their re-utilizing. This part of the project is unprofitable, so the joint implementation mechanism was one of critical factors of the project from the very beginning, and financial benefits as part of this mechanism were considered one of the reasons why the project was implemented.

Technological process is ecologically substantiated and does not require application of hazardous materials.

A.4.3. Brief explanation of how the anthropogenic emissions of greenhouse gases by sources are to be reduced by the proposed JI project, including why the emission reductions would not occur in the absence of the proposed project, taking into account national and/or sectoral policies and circumstances:

Proposed project is aimed at a complete demolition of the waste heaps of mines #17, #6 bis "Izvarino", Skhidna Mine, mine #134, mine #5, mine #2, mine #2 bis in order to prevent GHG emissions into the atmosphere and obtaining of additional amount of coal. Rock is supplied to a beneficiation factory for steam coal extraction and subsequent combustion at boiler houses. Maximum demolition rates are planned to be hit in the crediting period under the Kyoto Protocol.

The issue of waste heaps is currently crucial for Donbas. Waste heaps not only exclude considerable land area from economic turnover and lead to disruption of ecological balance of natural biological community, but also are a source of high environmental hazard. Even in non-burning condition heap is a source of pollution of air, soil, nearby water facilities and groundwater. This risk multiplies for burning waste heaps[12]. The only way to eliminate the harmful effects of waste heaps on the environment is their complete demolition. However, waste heap demolition is a very money-consuming process, whose economic benefit does not offset possible costs. In addition there are significant risks associated with the impossibility to timely determine coal content in the total volume of waste heap. Demolition is followed by the renewal of fertile soil layer and reclamation of land area, which also requires major expenses. This leads to a situation where demolition of waste heap faces financial difficulties, and it is necessary for its successful implementation to search additional sources of funding. Receipt of additional income from the sale of quotas under the Joint Implementation project provides a powerful incentive for successful completion of this project.

The absence of project activity would provide for the continuation of the situation existing at the beginning of the project activity, where the probability of waste heap ignition is high. Therefore, greenhouse gas emission reductions will not occur in this case.

A.4.3.1. Estimated amount of emission reductions over the crediting period:

[12] http://terrikon.donbass.name/ter_s/290-model-samovozgoraniya-porodnyx-otvalov-ugolnyx-shaxt-donbassa.html

Table 1 Estimated emission reductions for the first commitment period (2008-2012)

	Years
Length of the crediting period	5
Year	Estimate of annual emission reductions in tonnes of CO_2 equivalent
2008	1 788 416
2009	1 980 920
2010	2 128 556
2011	1 848 271
2012	1 848 271
Total estimated emission reductions over the crediting period (tonnes of CO_2 equivalent)	**9 594 434**
Annual average of estimated emission reductions over the crediting period (tonnes of CO_2 equivalent)	1 918 887

Table 2 Estimated emission reductions for the period following the first commitment period (2013-2014)

	Years
Length of the crediting period	2
Year	Estimate of annual emission reductions in tonnes of CO_2 equivalent
2013	1 848 271
2014	1 848 271
Total estimated emission reductions over the crediting period (tonnes of CO_2 equivalent)	**3 696 542**
Annual average of estimated emission reductions over the crediting period (tonnes of CO_2 equivalent)	1 848 271

For more details refer to Supporting Document 1.
For the description of the formula used for calculation of emission reductions see Sections D.1.1.2., D.1.1.4. and D.1.4.

A.5. Project approval by the Parties involved:

Project Idea Note (PIN) was submitted to the Designated Coordinating Centre (State Environmental Investment Agency) on November 14, 2012. Letter of Endorsement #3708/23/7 was issued on 03/12/2012 by SEIA that supports further development of the proposed project. It is expected to obtain a Letter of Approval from SEIA and a Letter of Approval from a foreign country in 2012.

SECTION B. Baseline

B.1. Description and justification of the baseline chosen:

The baseline for a JI project should be brought into compliance with Annex B to Decision 9/CMP.1 ("Guidelines for the implementation of Article 6 of the Kyoto Protocol")[13], and according to the "Guidance on Criteria for Baseline Setting and Monitoring, Version 0.3"[14] (hereinafter - the "Guidelines") issued by the supervisory JI (JISC).

According to the Guidance, the baseline is the scenario that reasonably represents the anthropogenic emissions by sources or removal by sinks of GHGs that would occur in the absence of the proposed project. According to paragraph 9 of the Guidance, project participants may select either: an approach for baseline setting and monitoring developed in accordance with appendix B of the JI guidelines, or a methodology for baseline setting and monitoring approved by the Executive Board of the clean development mechanism (CDM). Paragraph 11 reads that project participants that select a JI-specific approach may use selected elements or combinations of approved CDM baseline and monitoring methodologies or approved CDM methodological tools.

The following stepwise approach is used for baseline setting and justification:

Step 1: Identification and description of the selected approach for the baseline setting.

The baseline for the proposed project has been established based on the project-specific basis in accordance with paragraph 21 of the JISC Guidance. Neither multi-project emission factor nor sectoral baseline can be applied, because the project is one of the few of its kind, both in the sector (coal extraction from waste heaps in Ukraine) as well as among JI projects.

In line with paragraph 9 of the JISC Guidance, option A was chosen for baseline setting:

(a) an approach for baseline setting and monitoring developed in accordance with appendix B of the JI guidelines (JI-specific approach);

Under Article 11 of the Guidance on Criteria for Baseline Setting and Monitoring, the project uses the latest version of the current methodology chosen for the project "Waste heaps demolition with the aim of decreasing the greenhouse gases emissions into the atmosphere", which is published on the website of the UNFCCC.[15]

Taking into account the JI-specific approach chosen for baseline setting pursuant to paragraph 24 of the JISC Guidance, the baseline shall be identified by listing and describing plausible scenarios on the basis of conservative assumptions and selecting the most plausible one.

The most plausible scenario shall be identified by analysing whether the alternatives comply with the current legislation and regulations as well as barrier analysis. If two alternatives are left one of which is a project scenario without the JI mechanism, the Clean Development Mechanism (CDM) "Tool for the demonstration and assessment of additionality"[16] shall be applied to prove that the project scenario cannot be considered the most plausible one.

[13] http://unfccc.int/resource/docs/2005/cmp1/eng/08a02.pdf

[14] http://ji.unfccc.int/Ref/Documents/Baseline_setting_and_monitoring.pdf

[15] http://ji.unfccc.int/UserManagement/FileStorage/IE7LK2SZF1NOXRVB4CYG65WQPJMHA3

[16] http://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-01-v06.0.0.pdf

Step 2. Application of the approach chosen.

Alternative scenarios are identified to set the baseline.

Sub-Step 2a. Identification and list of alternative scenarios.

Scenario 1. Continuation of the current situation.

Currently, waste heaps are not utilized. Waste heap self-ignition and combustion is a common practice with extinction activities held from time to time. Burning waste heaps are sources of uncontrolled greenhouse gas emissions. Coal is not extracted from the waste heaps. Coal is produced by underground mines of the region and used for energy production or other purposes. Coal mining activities cause emissions of fugitive methane and also the formation of new waste heaps.

Scenario 2. Direct energy production from the heat generated by a burning waste heap.

Waste heaps are not extinguished and not monitored properly. Some burning heaps are used to produce energy by direct insertion of heat exchangers into the waste heap[17]. This captures a certain amount of heat energy for direct use or conversion into electricity. Coal is not extracted from the waste heaps. Coal is produced by underground mines of the region and used for energy production or other purposes. Mining activities cause fugitive GHG emissions and the formation of new waste heaps.

Scenario 3. Production of construction materials from waste heaps.

Waste heaps are being processed in order to produce construction materials (bricks, panels, etc.). Coal in the waste heap matter is burnt during the sintering process[18]. Coal is produced by underground mines of the region and used for energy production or other purposes. Mining activities cause fugitive GHG emissions and the formation of new waste heaps.

Scenario 4. Coal extraction from waste heaps without JI incentives

This scenario is similar to the project scenario except in this case the project does not benefit from being implemented as a JI project. In this scenario waste heaps are processed in order to extract coal and used it the energy sector. Less coal is produced by underground mines of the region.

Scenario 5. Systematic monitoring of waste heaps condition and regular fire prevention and extinguishing measures

Waste heaps are systematically monitored and their thermal condition is researched. Regular fire prevention measures are taken. In case of a burning waste heap, the fire is extinguished and measures are taken to

[17] http://masters.donntu.edu.ua/2004/fgtu/zayanchukovskaya/library/artcl3.htm

[18] Opportunities for international best practice use in coal mining waste heap utilization of Donbas, Matveeva N.G., Ecology: Collection of Scientific Papers, Eastern Ukrainian National University, Luhansk, #1 2007 http://www.nbuv.gov.ua/portal/natural/Ecology/2007_1/Article_09.pdf

prevent burning in the future. Coal is not extracted from the waste heaps. Coal is produced by underground mines of the region and used for energy production or other purposes. Mining activities cause fugitive GHG emissions and the formation of new waste heaps.

Sub-Step 2b. Barrier analysis

Scenario 1. Continuation of the current situation.
This scenario does not provide for any activities, so it has no barriers.

Scenario 2. Direct energy production from the heat generated by a burning waste heap.
Technological barriers: This scenario is based on the highly experimental technology, which has not been applied even in a pilot project. It is also not suitable for all waste heaps as the project owner will have to balance the energy resource availability (i.e. waste heap location) and the location of the energy consumer. On-site generation of electricity addresses this problem but requires additional interconnection engineering. In general this technology has yet to prove its viability. In addition it does not allow the control and management of the emitted gases. This technology is suitable only for waste heaps with advanced hot spots. Even if the possibility of ignition is very high, it is currently impossible to predict the time of its ignition and thus to forecast the start of activities on utilizing the heat generated during the waste heap burning.
Investment barriers: Investment into unproven technology is highly risky. In case of Ukraine, which carries a high country risk, investment into such unproven energy projects are less likely to attract investors than some other opportunities in the energy sector with higher returns. The pioneering character of the project may appeal to development programmes and governmental incentives but cost of the produced energy is likely to be much higher than alternatives.

Scenario 3. Production of construction materials from waste heaps.
Technological barriers: This scenario is based on a known technology, however, this technology is not currently available in Ukraine and there is no evidence that such projects will be implemented in the near future. It is also not suitable for all types of waste heaps as the content of waste heap has to be predictable in order for project owner to be able to produce quality materials. High contents of sulphur and moisture can reduce the suitability of the waste heap for processing. A large scale deep exploration of the waste heap has to be performed before the project can start.

Scenario 4. Coal extraction from waste heaps without JI incentives
Investment barriers: This scenario is financially unattractive and has barriers. For more details please refer to Section B.2. of this PDD.

Scenario 5. Systematic monitoring of waste heaps condition and regular fire prevention and extinguishing measures
Investment barriers: This scenario does not represent any revenues but anticipates additional costs for waste heaps owners. Monitoring of waste heaps is not conducted systematically, and all activities are at the discretion of waste heap owners. Basically waste heaps are in ownership of mines or regional coal associations. Coal mines of Ukraine suffer from limited investment, which often leads to security problems due to severe conditions of production and financial difficulties, including the wages of miners often delayed for several months. In this case waste heaps are considered an additional burden, but mines usually do not make even minimum measures required. Self-ignition and burning of waste heaps are very common. Exact statistical data are not always available. From a commercial view point the fines that are usually levied by the authorities are considerably lower than costs of all the measures outlined by this scenario.

Sub-step 2c. Identification of baseline

All scenarios, except ***Scenario 1*** - Continuation of existing situation, face prohibitive barriers. Therefore, continuation of existing situation is the most plausible future scenario and is the baseline scenario.

This baseline scenario was chosen according to the criteria of the JISC Guidance[19]: 1) On a project-specific basis. The project is among the first projects of this kind. So, other options could not be used;

2) In a transparent way as regards the choice of approaches, assumptions, methodologies, parameters, sources of data and key factors. All the parameters and data are either to be monitored by the project's participants or to be taken from the sources that provide verified data for every parameter. Project participants use the approaches proposed by the JISC Guidance and methodological tools of the CDM Executive Board[20];

3) Taking into account relevant national and/or sectoral policies and circumstances, such as sectoral reform initiatives, local fuel availability, power sector expansion plans, and the economic situation in the project sector. The above analysis shows that the selected baseline is the most likely future scenario, considering the present circumstances of the coal sector of Luhansk region;

4) Thus, emission reduction units (ERU) cannot be obtained due to lower activity beyond the project boundary or due to force-majeure circumstances. According to the proposed approach, emission reduction units will be obtained only if coal will be extracted from waste heaps within the project framework.

5) Uncertainty and conservative assumptions are taken into account. A number of measures are adopted to explain uncertainty and ensure provision of conservatism:

a. If possible, the approaches used in calculation of baseline emission levels and emissions resulting from the project implementation are the same as the approaches in the "National inventory report of anthropogenic emissions by sources and removals by sinks of greenhouse gases in Ukraine". In the National inventory report, emission coefficients peculiar to the country and corresponding to the values set by Intergovernmental Panel on Climate Change (IPCC) are used;

b. Baseline emissions are calculated based on the lower value of parameters, and emissions resulting from the project implementation – on the upper value of parameters;

c. If possible, typical values are used in order to reduce uncertainty and provide conservative data for calculations.

Estimated baseline emissions

To calculate emissions according to the baseline, the following assumptions were made:

1) The project will produce coal concentrate, which contains steam coal that will substitute the same amount of the same type of coal in the baseline scenario;

2) The coal that is substituted in the baseline scenario and the coal that is generated in the project activity are used for the same type of purpose and are stationery combusted;

3) The coal that is displaced in the baseline scenario is produced by the underground mines of the region and as such causes fugitive emissions of methane;

4) The technology of production coal in the mine involves using a large amount of electricity;

5) Coal production in mine is accompanied by consumption of other energy sources (gas, diesel, fuel oil), but their share in compare with electricity are small[21];

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[19] http://ji.unfccc.int/Ref/Documents/Baseline_setting_and_monitoring.pdf

[20] http://ji.unfccc.int/Ref/Documents/Baseline_setting_and_monitoring.pdf

[21]The effective method of electricity consumption control at coal mines. B.A.Gryaduschy, Doctor of Technical. Science, DonUGI, G.N.Lisovoy, V.I.Myalkovsky, Chehlaty NA, Cand. Science, NIIGM named M.M.Fedorov, Donetsk, Ukraine www.mishor.esco.co.ua/2005/Thesis/10.doc

6) Waste-heaps of the region are vulnerable to spontaneous self-heating and burning and at some point in time will burn;
7) Probability of the waste heap burning at any point in time is determined 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;
8) Coal burning in waste heaps leads to CO2 emissions, unless prevention measures are taken.

Baseline emissions come from two major sources:
- Carbon dioxide emissions that occur during combustion of energy coal. These are calculated as stationery combustion emissions from mining coal in the equivalent of the amount of coal that is extracted from the waste heaps in the project scenario. These emissions in the baseline scenario are exactly equal to the same emissions in the project scenario, thus are excluded from the calculation;
- Carbon dioxide emissions resulting from waste heap burning. These emissions are calculated as emissions of carbon dioxide generated by burning waste heaps, the equivalent amount of coal extracted from the waste heap in the project scenario, adjusted for the probability of burning dumps at any time.

As the baseline suggests that the current situation is preserved regarding the waste heaps burning, it is assumed that for any given waste heap, actual burning will occur in some point in time. This probability of burning is established by the study in a similar JI project UA1000329 “Demolition of waste heap #2 at mine #22 “LISOVA”.
Baseline emissions are calculated as follows:

$$BE_y = BE^b_{WHB,y} \quad \text{(B1)}$$

BE_y - GHG emissions in the baseline scenario in year *y*, t CO_2;

$BE^b_{WHB,y}$ - GHG emissions in the baseline scenario due to waste heap burning in year *y*, t CO_2;

$[b]$ - index for baseline scenario;

$[WHB]$ - index for waste heap burning;

$[y]$ - index for the year of monitoring period.

$$BE^b_{WHB,y} = \frac{FC^b_{coal,y}}{1000} \times \rho_{WHB} \times NCV_{coal,y} \times OXID_{coal,y} \times EF_{C,coal,y} \times \frac{44}{12} \quad \text{(B2)}$$

$FC^b_{coal,y}$ - amount of coal produced by underground mining in the baseline scenario and combusted for energy generation, equivalent to the amount of coal extracted from the waste heaps because of the project activity in year *y*, t;

ρ_{WHB} - probability of waste heap burning, relative units;

$NCV_{coal,y}$ - net calorific value of coal for year *y*, TJ/ ths t;

$OXID_{coal,y}$ - carbon oxidation factor for year *y*, relative units;

$EF_{C,coal,y}$ - carbon content in coal for year *y*, t C/TJ;

$\frac{1}{1000}$ - tonnes to thousand tonnes conversion factor;

$\frac{44}{12}$ - stoichiometric ratio of carbon dioxide and carbon molecular weight, t CO_2/t C;

[*b*] - index for baseline scenario;
[*WHB*] - index for waste heap burning;
[*y*] - - index for the year of monitoring period;
[*coal*] - index for coal;
[*C*] - index for carbon.

Leakage

Leakage is the net change of anthropogenic emissions by sources and/or removals by sinks of GHGs, which could have occurred beyond the project boundary, and which can be measured and are directly attributable to the JI project.

This project will result in a net change in methane emissions due to the coal mining activities, as well as a net change in carbon dioxide emissions from additional electricity consumption during the mining activities.

The baseline scenario provides for coal extracted by means of underground mining, which causes non-controlled methane emissions. These are calculated as standard country specific emission factor applied to the amount of coal extracted from the waste heaps in the project scenario (which is the same as the amount of coal that would have been mined in the baseline scenario).

Source of the leakage is fugitive methane emissions due to underground coal mining. These emissions are specific to the coal produced by underground mines. Coal produced by the project activity is not mined but extracted from the waste heap through the demolition and beneficiation. Therefore, coal produced by the project activity substitutes the coal that 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. As reliable and accurate national data on fugitive CH_4 emissions associated with the production of coal are available, project participants used this data to calculate the amount of fugitive CH_4 emission as described below.

This leakage is measurable: through the same procedure as used in 2006 IPCC Guidelines[22] (See Volume 2, Chapter 4, Page 4-11) and also used in CDM approved methodology ACM0009[23] (Page 8). Activity data (in this case amount of coal extracted from waste heaps which is monitored directly) is multiplied by emission factor (sourced from the relevant national study – National Inventory Report of Ukraine under the Kyoto Protocol) and some conversion factors.

Electricity consumption and associated greenhouse gas emissions due to demolition of waste heap will be taken into account in project leakage calculation on the basis of calculations by the beneficiation plant of electricity consumption per tonne of coal received by the processing of rock from the waste heap. Carbon dioxide emissions from electricity consumption during the coal mining in an amount equivalent to the project amount of coal is leakage that can be calculated on the basis of data of the State Statistics Committee[24], on specific electricity consumption at coal mines in Ukraine in the relevant year.

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 reasoning: steam 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 types of coal of identical quality can substitute one another. The project activity cannot influence demand for coal in the market and ensure sales of coal extracted

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

[23] http://cdm.unfccc.int/UserManagement/FileStorage/K4P3YG4TNQ5ECFNA8MBK2QSMR6HTEM

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

from the waste heaps. In the baseline scenario demand for coal will stay unchanged and will be met from the traditional sources – underground mines of the region.
Thus, 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. According to this approach equivalent product supplied within the project activity (with lower greenhouse gas emissions associated) will substitute the baseline product (with higher greenhouse gas emissions associated). This methodological approach is very common and is applied in all renewable energy projects (substitution of grid electricity with renewable-source electricity), projects in cement production industry (e.g. JI0144 Slag usage and switch from wet to semi-dry process at Volyn-Cement, Ukraine[25]), projects in metallurgical sector (e.g. UA1000181 Implementation of Arc Furnace Steelmaking Plant "Electrostal" in Kurakhovo, Donetsk Region[26]), and others.
These leakages are significant and will be included in the calculation of project emission reductions.
Procedure for ex ante estimate and quantification of this source of leakage is provided below:

Baseline leakage in year *y* is calculated as follows:

$$LE_y = LE_{CH4,y} + LE_{ELEC,y} \quad \text{(B3)}$$

LE_y - leakage in year *y*, t CO_2eq;

$LE_{CH4,y}$ - leakage from non-controlled methane emissions in mines in year *y*, t CO_2eq;

$LE_{ELEC,y}$ - leakage from electricity consumption from the grid during mining in year *y*, t CO_2eq;

$[y]$ - index for the year of monitoring period;

$[CH4]$ - index for methane;

$[ELEC]$ - index for electricity.

Leakage due to non-controlled methane emissions in mines in the baseline in year *y* is calculated as follows:

$$LE_{CH4,y} = -FC^b_{coal,y} \times EF_{CH4} \times \rho_{CH4} \times GWP_{CH4} \quad \text{(B4)}$$

$FC^b_{coal,y}$ - amount of coal produced by underground mining in the baseline scenario and combusted for energy generation, equivalent to the amount of coal extracted from the waste heaps because of the project activity in year *y*, t;

EF_{CH4} - emission factor for non-controlled methane emissions from coal mining, , m^3/t;

ρ_{CH4} - methane density, t/m^3;

GWP_{CH4} - global warming potential for methane, t CO_2/t CH_4;

$[CH4]$ - index for methane;

$[ELEC]$ - index for electricity.

$[b]$ - index for baseline scenario;

$[y]$ - index for the year of monitoring period.

$$LE_{ELEC,y} = -FC^b_{coal,y} \times N^b_{ELEC,coal,y} \times EF_{CO2,ELEC,y} \quad \text{(B5)}$$

$FC^b_{coal,y}$ - amount of coal produced by underground mining in the baseline scenario and combusted

[25] http://ji.unfccc.int/JI_Projects/DB/P1QYRYMBQCEQOT0HOQM60MBQ0HXNYU/Determination/Bureau%20Veritas%20Certification1266348915.6/viewDeterminationReport.html

[26] http://ji.unfccc.int/JIITLProject/DB/4THB9WT0PK6F721UQA5H6PTHZEXT4C/details

for energy generation, equivalent to the amount of coal extracted from the waste heaps because of the project activity in year *y*, t;

$N^{b}_{ELEC,coal,y}$ - average electricity consumption per tonne of coal produced in Ukraine in year *y*, MWh/t;

$EF_{CO2,ELEC,y}$ - carbon dioxide emission factor for electricity generation at TPPs and for its consumption, t CO_2/MWh;

$[coal]$ - index for coal;

$[CO2]$ - index for carbon dioxide;

$[ELEC]$ - index for electricity.

$[b]$ - index for baseline scenario;

$[y]$ - index for the year of monitoring period.

Leakage due to consumption of other types of energy carriers in coal mines are insignificant compared to the emissions due to electricity consumption[27]; therefore and due to conservative reasons we take them equal to zero.

Key information and data used to establish the baseline are provided below in tabular form:

Data/Parameter	$FC^{b}_{coal,y}$
Data unit	t
Description	Amount of coal produced by underground mining in the baseline scenario and combusted for energy generation, equivalent to the amount of coal extracted from the waste heaps because of the project activity in year *y*
Time of determination/monitoring	Annual monitoring
Source of data (to be) used	Owner of the project
Value of data applied (for ex ante calculations/determinations)	Owner of the project
Justification of the choice of data or description of measurement methods and procedures (to be) applied	Measured for the commercial purposes on site
QA/QC procedures (to be) applied	According to the project owner policy.
Any comment	No

Data/Parameter	$NCV_{coal,y}$
Data unit	TJ/ths t
Description	Net calorific value of coal for year *y*
Time of determination/monitoring	Annually

[27]The effective method of electricity consumption control at coal mines. B.A.Gryaduschy, Doctor of Technical. Science, DonUGI, G.N.Lisovoy, V.I.Myalkovsky, Chehlaty NA, Cand. Science, NIIGM named M.M.Fedorov, Donetsk, Ukraine

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

Source of data (to be) used	National inventory report of anthropogenic emissions by sources and removals by sinks of greenhouse gases in Ukraine for 1990-2010, p.458, 462, 468 (the value may change at the monitoring stage)
Value of data applied (for ex ante calculations/determinations)	2008-21.5 2009-21.8 2010-21.6 2011-21.6 2012-21.6
Justification of the choice of data or description of measurement methods and procedures (to be) applied	Standard value set according to the National Inventory.
QA/QC procedures (to be) applied	According to the National Inventory.
Any comment	No

Data/Parameter	$OXID_{coal,y}$
Data unit	Relative units
Description	Carbon oxidation factor for year *y*
Time of determination/monitoring	Annually
Source of data (to be) used	National inventory report of anthropogenic emissions by sources and removals by sinks of greenhouse gases in Ukraine for 1990-2010[28], p.459, 465, 471 (the value may change at the monitoring stage)
Value of data applied (for ex ante calculations/determinations)	2008-0.963 2009-0.963 2010-0.962 2011-0.962 2012-0.962
Justification of the choice of data or description of measurement methods and procedures (to be) applied	Standard value set according to the National Inventory.
QA/QC procedures (to be) applied	According to the National Inventory.
Any comment	No

Data/Parameter	$EF_{C,coal,y}$
Data unit	t C/TJ
Description	Carbon content in coal for year *y*
Time of determination/monitoring	Annually
Source of data (to be) used	National inventory report of anthropogenic emissions by sources and removals by sinks of greenhouse gases in Ukraine for 1990-

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

	2010, p.458, 464, 470 (the value may change at the monitoring stage)
Value of data applied (for ex ante calculations/determinations)	2008-25.95 2009-25.97 2010-25.99 2011-25.99 2012-25.99
Justification of the choice of data or description of measurement methods and procedures (to be) applied	Standard value set according to the National Inventory.
QA/QC procedures (to be) applied	According to the National Inventory.
Any comment	No

Data/Parameter	ρ_{WHB}
Data unit	Relative units
Description	Probability of waste heap burning
Time of determination/monitoring	Fixed ex ante
Source of data (to be) used	PDD of JI project UA1000329[29]
Value of data applied (for ex ante calculations/determinations)	0.83
Justification of the choice of data or description of measurement methods and procedures (to be) applied	Value set according to the determined JI project
QA/QC procedures (to be) applied	According to the determined JI project
Any comment	No

Data/Parameter	GWP_{CH_4}
Data unit	t CO_2eq/t CH_4
Description	Global Warming Potential of methane
Time of determination/monitoring	Throughout the crediting period
Source of data (to be) used	IPCC Second Assessment Report: Climate Change 1995 (SAR) and approved by COP. GWP of methane is available at the UNFCCC website[30]
Value of data applied (for ex ante calculations/determinations)	21
Justification of the choice of data or description of measurement methods and procedures (to be) applied	N/A

[29] http://www.carbonunitsregistry.gov.ua/en/publication/content/1023.htm

[30] http://unfccc.int/ghg_data/items/3825.phphttp://unfccc.int/ghg_data/items/3825.php

QA/QC procedures (to be) applied	Project developer will monitor any changes in Global Warming Potential of methane published by IPCC and Approved by COP
Any comment	Data allowing of calculation of GHG emissions in the baseline scenario will be archived in paper and electronic format.

Data/Parameter	ρ_{CH4}
Data unit	t/m^3
Description	Methane density
Time of determination/monitoring	Once at the beginning of the project
Source of data (to be) used	Physical properties of methane (at room temperature 20°C and 1 ATM)[31]
Value of data applied (for ex ante calculations/determinations)	0.000668
Justification of the choice of data or description of measurement methods and procedures (to be) applied	N/A
QA/QC procedures (to be) applied	N/A
Any comment	Information on methane density is the basis for greenhouse gas emission calculation, to be archived in paper and electronic form.

Data/Parameter	EF_{CH4}
Data unit	m^3/t
Description	Emission factor for non-controlled methane emissions from coal mining.
Time of determination/monitoring	Once at the beginning of the project
Source of data (to be) used	National inventory report of anthropogenic emissions by sources and removals by sinks of greenhouse gases in Ukraine for 1990-2009[32], p.90 (the value may change at the monitoring stage)
Value of data applied (for ex ante calculations/determinations)	25.67
Justification of the choice of data or description of measurement methods and procedures (to be) applied	Standard value set according to the National Inventory.
QA/QC procedures (to be) applied	According to the National Inventory.
Any comment	No

Data/Parameter	$N^b_{ELEC,coal,y}$

[31] http://www.engineeringtoolbox.com/gas-density-d_158.html

[32] http://unfccc.int/files/national_reports/annex_i_ghg_inventories/national_inventories_submissions/application/zip/ukr-2011-nir-08jun.zip

Data unit	MWh/t
Description	Average electricity consumption per tonne of coal produced in Ukraine in year *y*
Time of determination/monitoring	Annually
Source of data (to be) used	Fuel and energy resources of Ukraine, Statistical Yearbook, State Statistics Committee of Ukraine, Kiev 2009-2011[33] (the value may change at the monitoring stage)
Value of data applied (for ex ante calculations/determinations)	2008 – 0.0878 2009 – 0.0905 2010 – 0.0926 2011 – 0.0905 2012 – 0.0905
Justification of the choice of data or description of measurement methods and procedures (to be) applied	No
QA/QC procedures (to be) applied	If new inventory reports come into effect, new values will be set and ERUs will be recalculated for any reporting period in accordance with the monitoring plan.
Any comment	No

Data/Parameter	$EF_{CO2,ELEC}$
Data unit	t CO_2/MWh
Description	Carbon dioxide emission factor for electricity generation at TPPs and for its consumption in year *y*
Time of determination/monitoring	Annually
Source of data (to be) used	Decree No.62 of the National Environmental Investment Agency of Ukraine (hereinafter NEIAU) dated 15/04/2011 "On approval of carbon dioxide emission factors for 2008"[34]; Carbon dioxide emission factors for 2009 are sourced from Decree No.63 of the National Environmental Investment Agency of Ukraine (hereinafter NEIAU) dated 15/04/2011 "On approval of carbon dioxide emission factors for 2009"[35] Carbon dioxide emission factors for 2010 are sourced from the NEIAU Decree No.43 of 28/03/2011 "On approval of carbon dioxide specific emission values in 2010"[36] Carbon dioxide emission factors for 2011 are sourced from the NEIAU Decree No.75 of 12/05/2011 "On approval of carbon dioxide specific emission values in 2011"[37] If other carbon dioxide emission factors are adopted for Ukraine, the baseline will be recalculated for any reporting period in

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

[34] http://www.neia.gov.ua/nature/doccatalog/document?id=127171

[35] http://www.neia.gov.ua/nature/doccatalog/document?id=127172

[36] http://www.neia.gov.ua/nature/doccatalog/document?id=126006

[37] http://www.neia.gov.ua/nature/doccatalog/document?id=127498

	accordance with the monitoring plan.
Value of data applied (for ex ante calculations/determinations)	2008 – 1.219 2009 – 1.237 2010 – 1.225 2011 – 1.227 2012 – 1.227
Justification of the choice of data or description of measurement methods and procedures (to be) applied	Only officially approved factors are used in calculations.
QA/QC procedures (to be) applied	National carbon dioxide emission factors are used in the Joint Implementation project development.
Any comment	No

B.2. Description of how the anthropogenic emissions of greenhouse gases by sources are reduced below those that would have occurred in the absence of the JI project:

The following step-wise approach is used to demonstrate that the project provides for emission reductions by sources that are additional to any that would otherwise occur:

Additionality of the project

Additionality of the project activity is demonstrated and assessed below using the "Tool for the demonstration and assessment of additionality"[38] (Version 06.0.0). This tool was originally developed for CDM projects but it is also applicable to JI projects.

Step 1. Identification of alternatives to the project activity and their consistency with current laws and regulations

Sub-step 1a. Definition of alternatives to the project activity

Alternative 1.1. Continuation of the current situation.

Alternative 1.2. Direct energy production from the heat generated by a burning waste heap.

Alternative 1.3. Production of construction materials from waste heaps.

Alternative 1.4. Coal extraction from waste heaps without JI incentives

Alternative 1.5. Systematic monitoring of waste heaps condition and regular fire prevention and extinguishing measures

Barrier analysis provided in Section B.1. of the PDD shows that only Alternative 1.1. can be considered the most favourable for the company.

Sub-Step 2b. Legal consistency.

Under the laws and regulations currently effective in Ukraine, waste heaps are considered the sources of possible harmful emissions into the atmosphere. It is therefore necessary to extinguish the fire in waste heaps and take measures to prevent hot spots from appearing in future. However, as waste heaps are large in number and enormous in size, mine owners, whose resources are limited, do not usually take even minimum measures that include the necessity of regular monitoring. Even when it is known that the heap is burning (and the currently effective legislation provides that extinction measures are to be taken in such cases), mine owners

[38] http://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-01-v06.0.0.pdf

mostly prefer to pay fines for air pollution rather than take extinction measures. Monitoring of waste heaps is not conducted systematically, and all activities are at the discretion of waste heap owners. Basically waste heaps are in ownership of mines or regional coal associations. Coal mines of Ukraine suffer from limited investment, which often leads to security problems due to severe conditions of production and financial difficulties, including the wages of miners often delayed for several months. In this case waste heaps are considered an additional burden, but mines usually do not make even minimum measures required. Self-ignition and burning of waste heaps are very common.
Under such circumstances, it is believed that all the scenarios are consistent with current laws and regulatory acts.

Therefore, Step 1 is satisfied.
According to the "Tool for the demonstration and assessment of additionality"[39] (Version 06.0.0), further justification of additionality shall be performed by means of barrier analysis.

Step 2 – Investment analysis.

Since the "Tool for the demonstration and assessment of additionality" version 06.0.0 provides the choice to carry out either investment analysis or barrier analysis, the barrier analysis was chosen to demonstrate additionality.

Step 3 – Barrier Analysis.

Sub-step 3a – Identification of barriers that would prevent the implementation of the proposed JI Project activity.

The Project is the first project of such type for Ltd. "Prominvest-Ekolohiia", and in this connection a few types of barriers arose at the beginning of the Project implementation. Ltd. "Prominvest-Ekolohiia" faced serious financial barriers, and the problem of insufficient experience of personnel in data collection, calculations, or the use of new waste heap demolition technologies under the Project, including:

- Organizational barrier.

Insufficient potential of labor and technical resources of Ltd. "PROMINVEST-EKOLOHIIA" for implementation and carrying out of this project. This is due to the absence of qualified personnel: the absence of knowledge associated with waste heap demolition and organizational structure.

- Absence of special technical knowledge.

At the beginning of the Project available qualified personnel did not have experience in waste heap demolition provided by the Project. Therefore, the Project implementation requires time to gain practical experience in waste heap demolition and operation of the equipment included into the project boundary.

- Financial barrier.

Additional costs of the Project implementation include those for:

- purchase and operation of modern mining equipment (T-170 Bulldozer);
- purchase and operation of modern mining equipment (EO-5126 Excavator);
- purchase and operation of modern vehicles (KAMAZ 55111 dump trucks);

[39] http://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-01-v6.0.0.pdf

further beneficiation at a beneficiation plant. Application of the JI mechanisms to this Project does these measures economically attractive and is the only way of their introduction.

Outcome of Sub-Step 3a: We may conclude that this Project is economically not attractive without registration of the Project as a JI Project. This proves additionality of this Project.

Sub-step 3b: Demonstrate that the identified barriers would not prevent the implementation of at least one of the alternatives (but for the proposed Project activity):
There is only one alternative with no real barriers: Alternative 1.1. Continuation of the existing situation. Continuation of the existing practice at Ltd. "Prominvest-Ekolohiia" does not require any additional measures, so it faces no barriers.

Step 4: Common practice analysis
Sub-step 4a: Analysis of other activities similar to the proposed Project activity:

Analysis similar activities demonstrated the absence of similar projects in Ukraine implemented without the JI mechanism. The absence of financial incentives is typical not only for Ltd. "Prominvest-Ekolohiia", but also for other companies engaged in coal mining. Therefore the existing practice for burning of waste heaps represented in the baseline scenario selected for this Project is the common one for Ukraine. Due to the current practice, all expenses associated with the issue of waste heaps shall be borne by the company engaged in coal mining, and there is no incentive to dismantle waste heaps to cover the expenses.

B.3. Description of how the definition of the project boundary is applied to the project:

Project implementation will take place only on waste heaps, which are legally owned by Ltd. "Prominvest-Ekolohiia":

- waste heap of mine #17;
- waste heap of mine #6 bis Izvarino;
- waste heap of Skhidna Mine, mine #134;
- waste heap of mine #5;
- waste heap of mine #2;
- waste heap of mine #2 bis.

At the same time, according to the baseline, emissions are generated by an average conventional mine producing coal substituted by the coal from demolition of waste heap. The specific of energy consumption at coal mines is determined by the following main components: power consumption, heat consumption, air consumption, consumption of natural gas and other types of fuel and water, sewage discharges, sewage treatment. The works conducted[40] revealed that about 90% of the total consumption of energy in coal mines is electricity.
There are several greenhouse gases emission sources at the mine:
- non-controlled methane emissions due to operation of coal industry in Ukraine;
- carbon dioxide emissions from electricity consumption at the mine;

[40]The effective method of electricity consumption control at coal mines. B.A.Gryaduschy, Doctor of Technical. Science, DonUGI, G.N.Lisovoy, V.I.Myalkovsky, Chehlaty NA, Cand. Science, NIIGM named M.M.Fedorov, Donetsk, Ukraine

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

- carbon dioxide emissions from consumption of other types of fuel at the mine (given the small amount and for reasons of conservatism not considered);

Carbon dioxide emissions from consumption of electricity generated by fossil fuel combustion at owner plants and non-controlled methane emissions during mine operation are leakage.

Table 3 provides an overview of all emission sources under the baseline and the project scenario. The project boundary is depicted in accordance with Paragraphs 14, 16, 17 of JISC Guidelines[41].

Table 3 Sources of emissions in the baseline and project scenario

	Source	Gas	Included/ Excluded	Substantiation /explanation
Baseline scenario	Waste heap combustion	CO_2	Included	Primary source of emissions
	Coal consumption	CO_2	Excluded	This coal is substituted in the project scenario by coal extracted from the waste heaps.
Project scenario	Consumption of fossil fuel (diesel fuel) for coal extraction from waste heaps	CO_2	Included	Primary source of emissions
	Coal consumption	CO_2	Excluded	Coal is extracted from waste heap.
Leakage	Methane emissions due to operation of coal industry in Ukraine	CH_4	Included	These leakage occurs in the baseline scenario and is associated with uncontrolled leakage of methane at the mine
	Electricity consumption for coal mining	CO_2	Included	Leakage due to baseline activity
	Consumption of other types of energy resources for mining	CO_2	Excluded	This leakage is insignificant[42]; excluded from consideration for conservative reasons.
	Electricity consumption for coal beneficiation	CO_2	Included	Leakage due to project activity

Baseline scenario
The baseline is continuation of the current situation. Coal is mined in underground mines, which causes uncontrolled methane emissions. Electricity and other fuels are consumed during coal mining. Coal is used for power generation. Waste heaps often heat and ignite, which causes carbon dioxide emissions into the atmosphere. Sources of emissions for the baseline scenario are:

[41] http://ji.unfccc.int/Ref/Documents/Baseline_setting_and_monitoring.pdf

[42]The effective method of electricity consumption control at coal mines. B.A.Gryaduschy, Doctor of Technical. Science, DonUGI, G.N.Lisovoy, V.I.Myalkovsky, Chehlaty NA, Cand. Science, NIIGM named M.M.Fedorov, Donetsk, Ukraine

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

- Carbon dioxide emissions from consumption of coal for energy generation (identical for both baseline and project scenarios);
- Carbon dioxide emissions resulting from waste heap burning.

Project scenario

Under the project scenario waste heaps are dismantled, and all combustible materials are removed. Thus, emissions due to ignition and burning of waste heaps are reduced. Project implementation includes additional diesel fuel combustion to supply the rock from waste heaps to a separation site. Electricity is used for coal beneficiation and production of coal concentrate. Additional amount of coal obtained from the project, reduces the need for its production in mines.

Sources of emissions for the project scenario are:

- Carbon dioxide emissions from the use of fuel for operation of the project equipment (machinery);
- Carbon dioxide emissions from consumption of coal for energy generation (identical for both baseline and project scenarios).

Leakage

Main sources of leakage are:

- Uncontrolled methane emissions due to coal mining in mines;
- Carbon dioxide emissions resulting from electricity and other energy resource consumption at the mine when coal is extracted.
- Emissions of carbon dioxide associated with electricity consumption at beneficiation plant for coal concentrate production from the rock.

The following figures show the project boundaries and sources of emissions in the baseline and project scenarios:

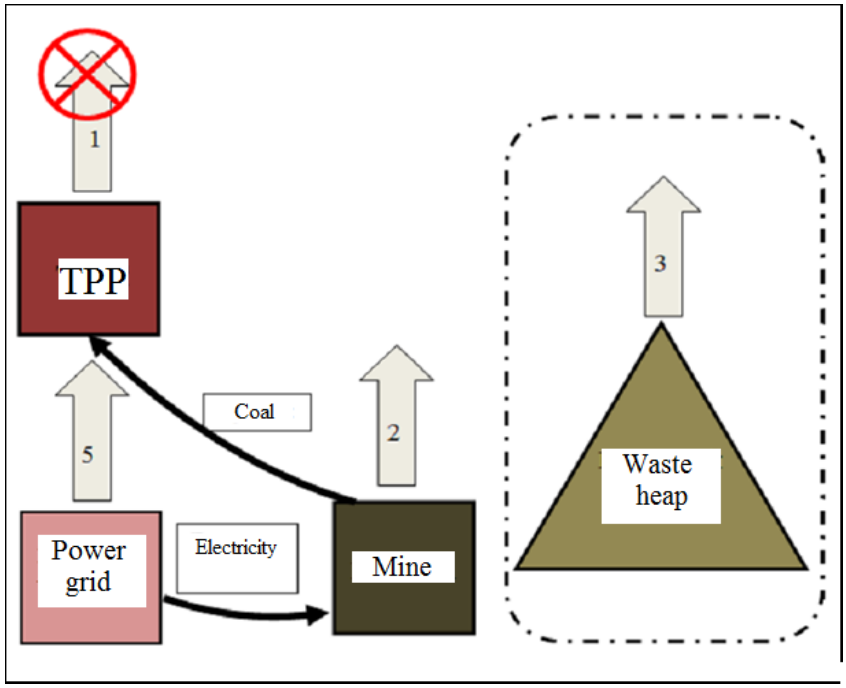

Figure 6 Project boundary and sources of emissions in the baseline scenario

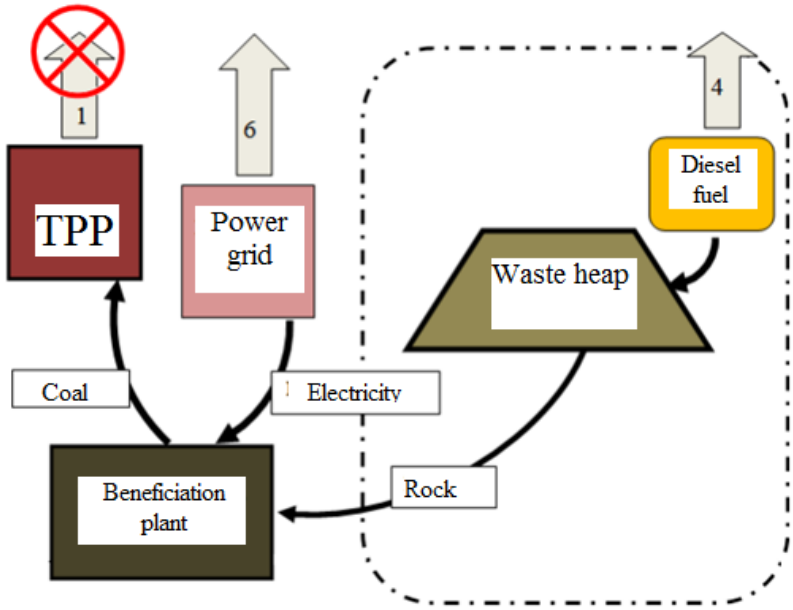

Figure 7 Project boundary and sources of emissions in the project scenario

Sources of greenhouse gas emissions at schemes:
1. Carbon dioxide emissions from coal combustion (excluded).
2. Methane leakage from coal mining.
3. Carbon dioxide emissions from waste heap combustion.
4. Carbon dioxide emissions from diesel fuel combustion during equipment operation.
5. Carbon dioxide emissions from consumption of electricity from the grid during mine operation.
6. Carbon dioxide emissions from consumption of electricity from the grid during rock beneficiation.

B.4. Further baseline information, including the date of baseline setting and the name(s) of the person(s)/entity(ies) setting the baseline:

Date of baseline setting: 05/11/2012
The baseline was set by the project owner - Ltd. “Prominvest-Ekolohiia».

The monitoring plan was set by the project owner - Ltd. “Prominvest-Ekolohiia».

Organisation:	Limited Liability Company “PROMINVEST-EKOLOHIIA"
Street:	Zarichna St.
Building	6
City	Krasne village.
State/region	Luhansk region
Postal code	94471
Country	Ukraine
Phone:	+38 (0642) 49 08 83
Fax:	+38 (0642) 49 08 83
E-mail	promekolog@yandex.ru
Web-site	
Represented by	
Title	Director
Salutation	
Last Name	Filipov
Middle name	Yehorovych

First name	Borys
Department	
Phone:	
Fax:	
Phone:	
E-mail	

SECTION C. Duration of the project / crediting period

C.1. Starting date of the project:

The starting date of the project is deemed 10/01/2008, when Ltd. "Prominvest-Ekolohiia" made a decision to implement a Joint Implementation Project.

C.2. Expected operational lifetime of the project:

Project lifetime is from 10/01/2008 to 31/12/2014 (7 years, or 84 months).
The forecasted duration of waste heap demolition works for the JI project is 7 years, or 84 months.

C.3. Length of the crediting period:

The duration of the crediting period in years and months is 7 years, or 84 months.
The starting date of the crediting period is on the date when the first emission reductions are expected, namely January 10, 2008. ERU generation belongs to the first commitment period of 5 years (January 10, 2008 – December 31, 2012). Prolongation of the crediting period beyond 2012 is subject to approval by the Host Party and estimation of emission reductions is presented separately for those until 2012 and those after 2012.
If after the first commitment period under the Kyoto protocol it is prolonged, the crediting period under the project will be prolonged by 2 years until December 31, 2014.

SECTION D. Monitoring plan

D.1. Description of monitoring plan chosen:

In order to provide a detailed description of the monitoring plan chosen, a step-wise approach is used:

Step 1. ***Indication and description of the approach chosen for realizing of monitoring.***
Option a provided by the Guidelines for Users of the Joint Implementation Project Design Document Form, Version 04[43] is used: JI specific approach is used in this project and therefore will be used for establishment of monitoring plan.
Among other things, the monitoring plan includes the following:

- Collecting and archiving all relevant data needed for evaluation and measurement of anthropogenic emissions by sources of emissions that occur within the project during the crediting period;
- Collecting and archiving all relevant data necessary for determining the baseline of anthropogenic emissions by sources of GHGs within the project during the crediting period;
- Identify all potential sources and collect and archive data regarding the enhancement the level of anthropogenic emissions by sources of emissions outside the project, which is significant and which can be attributed to the project during the crediting period.
- Procedures to ensure quality control and process monitoring;
- Procedures for periodic calculation reductions of anthropogenic emissions from sources in the proposed JI project, and procedures for calculating the effects of leakage, if any.

Step 2. ***Application of the approach chosen.***
All data collected during monitoring should be archived and stored for at least 2 years after the last transfer of ERUs. These should be checked, unless otherwise indicated in the following sections. All measurements must be executed with calibrated measurement equipment according to industry standards for the branch.

Baseline scenario
The baseline is continuation of the current situation. Coal is mined in underground mines, which causes uncontrolled methane emissions. Electricity and other fuels are consumed during coal mining.
Coal is used for power generation.
Waste heaps often heat and ignite, which causes carbon dioxide emissions into the atmosphere.
Sources of emissions for the baseline scenario are:

- Carbon dioxide emissions from consumption of coal for energy generation;

[43] http://ji.unfccc.int/Ref/Documents/Guidelines.pdf

- Carbon dioxide emissions resulting from waste heap burning;

Sources of emissions for the baseline scenario are:

- Uncontrolled methane emissions due to coal mining in mines;
- Carbon dioxide emissions resulting from electricity and other energy resource consumption at the mine when coal is extracted.

Project scenario

Under the project scenario waste heaps are dismantled, and all combustible materials are removed. Thus, emissions due to ignition and burning of waste heaps are reduced. Project implementation includes additional diesel fuel combustion to supply the rock from waste heaps to a beneficiation site. Electricity is consumed for operation of equipment at the beneficiation plant. Additional amount of coal obtained from the project, reduces the need for its production in mines.

Sources of emissions for the project scenario are:

- Carbon dioxide emissions from the use of fuel for operation of the project equipment (mining machinery);
- Emissions of carbon dioxide from the use of coal extracted from waste heap for energy generation (equal to emissions from burning an equivalent amount of coal produced in mines in the baseline scenario, so they are excluded from the calculation in both scenarios).

Sources of leakage for the project scenario are:

- Emissions of carbon dioxide associated with electricity consumption at beneficiation plant for operation of coal beneficiation equipment.

Data on the following parameters should be collected and recorded for every monitoring period:

1. **Diesel fuel consumed in the relevant period as a result of project activity.**

To determine this parameter, commercial data of the company are used. To confirm the consumed amount of fuel checks and other accounting documents are used. Fuel consumption related to the project activity is taken into account. Information summary report is based on accounts. At the industrial site there is no additional equipment, but if such equipment is used, fuel consumption by this equipment is also considered. If the data in these documents are in litres instead of tonnes, these data should be converted using factor of 0.85 kg/l[44]. For control purposes a theoretical calculation of diesel fuel consumption is made on basis of technical specifications and actual record of machinery operation.

2. **Coal extracted from the waste heap in the respective period and combusted for generation of power used for project activities, equal to the amount of coal that would have been produced by mining and combusted for energy generation in the baseline scenario.**

To determine this parameter, commercial data of the company are used. To confirm the amount of coal checks and documents from customers are used. Only production shipped to the customer is taken into account and attributable to the project activity.

Weighing takes place on site using certified scales. Regular cross-inspections with customers are executed. Information of summarized reports is based on these delivery data.

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[44] GOST 305-82 Diesel fuel. Specifications. 0.85 kg/l is taken as an average for two types of fuel: summer and winter.

http://elarum.ru/info/standards/gost-305-82/

Metering equipment

The method of measurement chosen for this project is based on the measurement of some parameters to be monitored - coal extracted, and the study of accounting documents and reports on other parameters (fuel consumption).

The following equipment is used in the project for coal weighing:

- electronic truck gage scales BTA-60, produced by JV "Ukrestmarkinvest" accuracy "Medium" (III) (measurement error with standard truck load of + / - 0.25%), calibration frequency 12 months.

Archiving and storage of data and document management procedure

Documents and reports with the data that is to be monitored will be archived and stored by the project's participants. The following documents will be stored: primary accounting documents on monitored parameters in hard copy; intermediate reports, orders
and other monitoring documents in hard copy and electronic form; documents on measurement devices in hard copy and electronic form. These documents and other monitoring data that need to be determined and verified, as well as any other data related to the project are to be stored during at least two years after ERU generation is last reported.

Training of staff engaged to monitor waste heap condition

The technology that requires skills and knowledge of operation of heavy machinery and electric equipment will be used in the project. The local system of professional training ensures that the staff acquires the necessary skills and knowledge. The system is controlled by the government in Ukraine. The employees who are trained get a standard certificate of professional education. The workers who have the required skill level can operate the equipment. The management of the company where the project is implemented is to ensure that the staff is trained until fully skilled, which will allow the workers to run the corresponding equipment. Instructions on safety norms are compulsory and are to be given to all the staff members under the local legislation. The procedure of giving instructions on safety norms includes training volume, training intervals, training methods, examination. The management of the company where the project is implemented is to ensure that registration entries for this training and regular examinations are made.

Activities that are directly related to the monitoring do not require specific training other than provided by the professional education. Thus, monitoring personnel will receive training on monitoring procedures and requirements and consultations on Kyoto Protocol, JI projects and monitoring from the project participant - LHCarbon OÜ.

Procedures adopted for adjustment actions aimed at more precise monitoring and reporting in future

In case of any mistakes, careless actions or contradictions that the management of the company where the project is implemented will detect during monitoring, a committee will be set up to conduct investigation into such cases and to issue an order that will include regulations on necessary adjustment actions to be taken and to help avoid such situations in future.

The management of the company where the project is implemented is to establish connection that will make it possible that any person engaged to monitor waste heap condition can submit proposals, suggest improvements and contribute ideas for more precise monitoring in future.

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.

Data and parameters that are monitored throughout the crediting period in Table 4:

Table 4 Data and parameters that are monitored throughout the crediting period:

$FC^{p}_{coal,y}$	Amount of coal extracted from the waste heaps during the project implementation, t
$FC^{p}_{diesel,y}$	Amount of diesel fuel consumed under the project scenario, t
GWP_{CH4}	Global warming potential for methane, t CO_2/t CH_4
NCV_{coal}	Net calorific value of coal, TJ/ths t
NCV_{diesel}	Net calorific value of diesel fuel, TJ/ths t
$OXID_{coal}$	Carbon oxidation factor for coal, relative units
$OXID_{diesel}$	Carbon oxidation factor for diesel fuel, relative units
$EF_{C,coal}$	Carbon content in coal, t C/TJ
$EF_{C,diesel}$	Carbon content in diesel fuel, t C/TJ
$N^{b}_{ELEC,coal}$	Average electricity consumption per tonne of coal produced in Ukraine, MWh/t
$N^{p}_{ELEC,coal}$	Average electricity consumption per tonne of coal enriched at a beneficiation plant in Ukraine, MWh/t
$EF_{CO2,ELEC}$	Carbon dioxide emission factor for electricity generation at TPPs and for its consumption, MWh/t
ρ_{WHB}	Probability of waste heap burning, relative units

Data and parameters not controlled throughout the crediting period but determined only once (and remain unchanged throughout the crediting period) and are available at the stage of determination, are provided in Table 5 below:

Table 5 Data and parameters not controlled throughout the crediting period but determined only once and remain unchanged throughout the crediting period

ρ_{CH4}	Methane density, t/m^3
EF_{CH4}	Emission factor for non-controlled methane emissions from coal mining, m^3/t

Data and parameters not subject to monitoring during the crediting period but identified only once and are not available at the PDD development stage: none.

D.1.1. Option 1 – Monitoring of the emissions in the project scenario and in the baseline scenario:

D.1.1.1. Data to be collected in order to monitor emissions from the project, and how these data will be archived:

ID number *(Please use numbers to ease cross-referencing to D.2.)*	Data variable	Source of data	Data unit	Measured (m), calculated (c), estimated (e)	Recording frequency	Proportion of data to be monitored	How will the data be archived? (electronic/ paper)	Comment
*P*1	$FC^{p}_{diesel,y}$ - *Diesel fuel consumption in the project in year y*	*Company documents*	*t*	*m*	*annually*	*P*1	$FC^{p}_{diesel,y}$ - *Diesel fuel consumption in the project in year y*	*Company documents*
*P*2	$NCV_{diesel,y}$ - *Net calorific value of diesel fuel for year y*	*Reference value National inventory report of anthropogenic emissions by sources and removals by sinks of greenhouse gases in Ukraine for*	*TJ/ths t*	*e*	*annually*	*P*2	$NCV_{diesel,y}$ - *Net calorific value of diesel fuel for year y*	*Reference value National inventory report of anthropogenic emissions by sources and removals by sinks of greenhouse gases in Ukraine for*

		1990-2010[45]						*1990-201046*
*P*3	$OXID_{diesel,y}$ - *Carbon oxidation factor for diesel fuel for year y*	*Reference value National inventory report of anthropogenic emissions by sources and removals by sinks of greenhouse gases in Ukraine for 1990-2010*[47]	*relative units*	*e*	*annually*	*P*3	$OXID_{diesel,y}$ - *Carbon oxidation factor for diesel fuel for year y*	*Reference value National inventory report of anthropogenic emissions by sources and removals by sinks of greenhouse gases in Ukraine for 1990-2010*[48]
*P*4	$EF_{C,diesel,y}$ - *Carbon content in diesel fuel for year y*	*Reference value National inventory report of anthropogenic emissions by sources and removals by sinks of greenhouse gases in*	*t C/TJ*	*e*	*annually*	*P*4	$EF_{C,diesel,y}$ - *Carbon content in diesel fuel for year y*	*Reference value National inventory report of anthropogenic emissions by sources and removals by sinks of greenhouse gases in Ukraine for 1990-2010*[50]

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

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

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

		Ukraine for 1990-2010[49]						

D.1.1.2. Description of formulae used to estimate project emissions (for each gas, source etc.; emissions in units of CO_2 equivalent):

Project emissions are calculated as follows:

$$PE_y = PE^{p}_{diesel,y} \quad (1)$$

PE_y - GHG emissions in the project scenario in year *y*, t CO_2;

$PE^{p}_{diesel,y}$ - GHG emissions in the project scenario due to diesel fuel consumption as a result of project implementation in year *y*, t CO_2;

$[p]$ - index for project scenario;

$[diesel]$ - index for diesel fuel;

$[y]$ - index for the year of monitoring period.

$$PE^{p}_{diesel,y} = \frac{FC^{p}_{diesel,y}}{1000} \times NCV_{diesel,y} \times OXID_{diesel,y} \times EF_{C,diesel,y} \times \frac{44}{12} \quad (2)$$

$FC^{p}_{diesel,y}$ - diesel fuel consumption in year *y* of the project scenario, t;

$NCV_{diesel,y}$ - net calorific value of coal for year *y*, TJ/ ths t;

$OXID_{diesel,y}$ - carbon oxidation factor for diesel fuel for year *y*, relative units;

$EF_{C,diesel,y}$ - carbon content in diesel fuel for year *y*, t C/TJ;

$\frac{1}{1000}$ - tonnes to thousand tonnes conversion factor;

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

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

$\frac{44}{12}$ - stoichiometric ratio of carbon dioxide and carbon molecular weight, t CO_2/t C;

$[p]$ - index for project scenario;

$[y]$ - index for the year of monitoring period;

$[diesel]$ - index for diesel fuel;

$[C]$ - index for carbon.

D.1.1.3. Relevant data necessary for determining the baseline of anthropogenic emissions of greenhouse gases by sources within the project boundary, and how such data will be collected and archived:								
ID number *(Please use numbers to ease cross-referencing to D.2.)*	Data variable	Source of data	Data unit	Measured (m), calculated (c), estimated (e)	Recording frequency	Proportion of data to be monitored	How will the data be archived? (electronic/ paper)	Comment
*B*1	$FC^{b}_{coal,y}$ - amount of coal produced by underground mining in the baseline scenario and combusted for energy generation in year *y*	*Company documents*	*t*	*m*	*annually*	*100%*	*Hard copy and electronic form*	Equals to amount of coal extracted from the waste heap. To determine this parameter, commercial data of the company are used.

*B*2	$NCV_{diesel,y}$ - *Net calorific value of diesel fuel for year y*	*Reference value National inventory report of anthropogenic emissions by sources and removals by sinks of greenhouse gases in Ukraine for 1990-2010*[51]	*TJ/ths t*	*e*	*annually*	*100%*	*Electronic form*	None
*B*3	$OXID_{diesel,y}$ - *Carbon oxidation factor for diesel fuel for year y*	*Reference value National inventory report of anthropogenic emissions by sources and removals by sinks of greenhouse gases in Ukraine for 1990-2010*[52]	*relative units*	*e*	*annually*	*100%*	*Electronic form*	None

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

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

*B*4	$EF_{C,diesel,y}$ - *Carbon content in diesel fuel for year y*	*Reference value National inventory report of anthropogenic emissions by sources and removals by sinks of greenhouse gases in Ukraine for 1990-2010*[53]	*t C/TJ*	*e*	*annually*	*100%*	*Electronic form*	None
*B*5	ρ_{WHB} - *Probability of waste heap burning*	*Ref. to Section D.1. Fixed ex-ante*	*relative units*	*e*	*Fixed ex-ante*	*100%*	*Electronic form*	None

D.1.1.4. Description of formulae used to estimate baseline emissions (for each gas, source etc.; emissions in units of CO_2 equivalent):

Baseline emissions are calculated as follows:

$$BE_y = BE^b_{WHB,y} \quad (3)$$

BE_y - GHG emissions in the baseline scenario in year *y*, t CO_2;

$BE^b_{WHB,y}$ - GHG emissions in the baseline scenario due to waste heap burning in year *y*, t CO_2;

[b] - index for baseline scenario;

[*WHB*] - index for waste heap burning;

[y] - index for the year of monitoring period.

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

$$BE^{b}_{WHB,y} = \frac{FC^{b}_{coal,y}}{1000} \times \rho_{WHB} \times NCV_{coal,y} \times OXID_{coal,y} \times EF_{C,coal,y} \times \frac{44}{12} \quad ()$$

$FC^{b}_{coal,y}$ - amount of coal produced by underground mining in the baseline scenario and combusted for energy generation, equivalent to the amount of coal extracted from the waste heaps because of the project activity in year *y*, t;

ρ_{WHB} - probability of waste heap burning, relative units;

$NCV_{coal,y}$ - net calorific value of coal for year *y*, TJ/ ths t;

$OXID_{coal,y}$ - carbon oxidation factor for year *y*, relative units;

$EF_{C,coal,y}$ - carbon content in coal for year *y*, t C/TJ;

$\frac{1}{1000}$ - tonnes to thousand tonnes conversion factor;

$\frac{44}{12}$ - stoichiometric ratio of carbon dioxide and carbon molecular weight, t CO_2/t C;

[*b*] - index for baseline scenario;

[*WHB*] - index for waste heap burning;

[*y*] - index for the year of monitoring period;

[*coal*] - index for coal;

[*C*] - index for carbon.

D. 1.2. Option 2 – Direct monitoring of emission reductions from the project (values should be consistent with those in section E):

D.1.2.1. Data to be collected in order to monitor emission reductions from the project, and how these data will be archived:								
ID number *(Please use numbers to ease cross-referencing to D.2.)*	Data variable	Source of data	Data unit	Measured (m), calculated (c), estimated (e)	Recording frequency	Proportion of data to be monitored	How will the data be archived? (electronic/ paper)	Comment

N/A

D.1.2.2. Description of formulae used to calculate emission reductions from the project (for each gas, source etc.; emissions/emission reductions in units of CO_2 equivalent):

N/A

D.1.3. Treatment of leakage in the monitoring plan:

The result of this project is the net change (reduction) of uncontrolled methane emissions from mine operation. The baseline scenario provides for coal extracted by means of underground mining, which causes non-controlled methane emissions. These are calculated as standard country specific emission factor applied to the amount of coal extracted from the waste heaps in the project scenario (which is the same as the amount of coal that would have been mined in the baseline scenario). Carbon dioxide emissions from electricity consumption during the coal mining in an amount equivalent to the project amount of coal is leakage that can be calculated on the basis of data of the State Statistics Committee[54], on specific electricity consumption at coal mines in Ukraine in the relevant year. Carbon dioxide emissions from electricity consumption during beneficiation of coal at a beneficiation factory in the project scenario are leakage that is calculated on the basis of standard calculation of specific electricity consumption in the technological process of beneficiation.
This leakage is significant and will be included in the monitoring plan and calculation of emission reductions for the project.

D.1.3.1. If applicable, please describe the data and information that will be collected in order to monitor leakage effects of the project:

ID number *(Please use numbers to ease cross-referencing to D.2.)*	Data variable	Source of data	Data unit	Measured (m), calculated (c), estimated (e)	Recording frequency	Proportion of data to be monitored	How will the data be archived? (electronic/ paper)	Comment
*B*1	$FC^{b}_{coal,y}$ - *amount of coal produced by undergro*	*Company documents*	*t*	*m*	*annually*	*100%*	*Hard copy and electronic form*	*Equals to amount of coal extracted from the waste heap. To determine this*

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

	und mining in the baseline scenario and combusted for energy generation in year y							*parameter, commercial data of the company are used.*
*L*1	$EF_{CO2,ELEC}$ *- Carbon dioxide emission factor for electricity generation at TPPs and for its consumption.*	*Reference value. National inventory report of anthropogenic emissions by sources and removals by sinks of greenhouse gases in Ukraine for 1990-2010*[55]	*t CO_2/MWh*	*e*	*annually*	*100%*	*Electronic form*	*None*
*L*2	GWP_{CH4} *- Global warming*	*B.1. Fixed ex-ante*	*t CO_2/t CH_4*	*e*	*annually*	*100%*	*Electronic form*	*None*

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

	potential for methane							
L3	EF_{CH4} - *Emission factor for non-controlled methane emissions from coal mining in year y*	*JI PDD UA1000329*[56]	m^3/t	*e*	*annually*	*100%*	*Electronic form*	*None*
L4	ρ_{CH4} - *Methane density*	*Fixed ex-ante*	t/m^3	*e*	*Fixed ex-ante*	*100%*	*Electronic form*	*None*
L5	$N^b_{ELEC,coal,y}$ - *Average electricity consumption per tonne of coal produced in Ukraine in year y*	*Fuel and energy resources of Ukraine, Statistical Yearbook, State Statistics Committee of Ukraine, Kiev 2009-2011*[57] *(the value may change at the monitoring stage)*	*MWh/t*	*e*	*annually*	*100%*	*Electronic form*	*None*

[56] http://www.carbonunitsregistry.gov.ua/en/publication/content/1023.htm

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

L6	$N^{p}_{ELEC,coal}$ *- Average electricity consumption per tonne of coal enriched at a beneficiation plant in Ukraine*	*Fuel and energy resources of Ukraine, Statistical Yearbook, State Statistics Committee of Ukraine, Kiev 2009-2011*[58] *(the value may change at the monitoring stage)*	*MWh/t*	*e*	*annually*	*100%*	*Electronic form*	*None*

D.1.3.2. Description of formulae used to estimate leakage (for each gas, source etc.; emissions in units of CO_2 equivalent):

Baseline leakage in year *y* is calculated as follows:

$$LE_y = LE^b_y + LE^p_y \quad (5)$$

LE_y - emissions in year *y*, t CO_2eq;

LE^b_y - baseline emissions in year *y*, t CO_2eq;

LE^p_y - leakage in the project scenario in year *y*, t CO_2eq;

$[b]$ - index for baseline scenario;

$[p]$ - index for project scenario;

$[y]$ - index for the year of monitoring period.

Baseline leakage in year *y* is calculated as follows:

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

$$LE_y^b = LE_{CH4,y}^b + LE_{ELEC,y}^b \quad (6)$$

$LE_{CH4,y}^b$ - leakage associated with uncontrolled methane emissions at mines in year *y*, t CO_2eq;

$LE_{ELEC,y}^b$ - leakage from electricity consumption from the grid during mining in year *y*, t CO_2eq;

$[b]$ - index for baseline scenario;

$[CH4]$ - index for methane;

$[ELEC]$ - index for electricity;

$[y]$ - index for the year of monitoring period.

Leakage due to non-controlled methane emissions in mines in the baseline in year *y* is calculated as follows:

$$LE_{CH4,y}^b = -FC_{coal,y}^b \times EF_{CH4,y} \times \rho_{CH4} \times GWP_{CH4} \quad (7)$$

$FC_{coal,y}^b$ - amount of coal produced by underground mining in the baseline scenario and combusted for energy generation in year *y*, *t;*

$EF_{CH4,y}$ - emission factor for non-controlled methane emissions from coal mining in year *y*, m^3/t;

ρ_{CH4} - methane density, t/m^3;

GWP_{CH4} - global warming potential, t CO_2/t CH_4;

$[b]$ - index for baseline scenario;

$[CH4]$ - index for methane;

$[coal]$ - index for coal;

$[y]$ - index for the year of monitoring period.

Leakage from electricity consumption from the grid during mining in year *y* are calculated as follows:

$$LE_{ELEC,y}^b = -FC_{coal,y}^b \times N_{ELEC,coal,y}^b \times EF_{CO2,ELEC} \quad (8)$$

$FC_{coal,y}^b$ - amount of coal produced by underground mining in the baseline scenario and combusted for energy generation in year *y*, t;

$N_{ELEC,coal,y}^b$ - average electricity consumption per tonne of coal produced in Ukraine in year *y*, m^3/t;

$EF_{CO2,ELEC}$ - methane density, t/m^3;

$[ELEC]$ - index for electricity;

$[b]$ - index for baseline scenario;

$[CO2]$ - index for carbon dioxide;

$[coal]$ - index for coal;

$[y]$ - index for the year of monitoring period.

Project leakage in year *y* is calculated as follows:

$$LE_y^p = LE_{ELEC,y}^p \quad (9)$$

$LE_{ELEC,y}^p$ - leakage associated with uncontrolled methane emissions at mines in year *y*, t CO_2eq;

$[ELEC]$ - index for electricity;

$[p]$ - index for project scenario;

$[y]$ - index for the year of monitoring period.

Leakage from electricity consumption from the grid during coal beneficiation at a beneficiation plant in year *y* are calculated as follows:

$$LE_{ELEC,y}^p = FC_{coal,y}^p \times N_{ELEC,coal,y}^p \times EF_{CO2,ELEC} \quad (10)$$

$FC_{coal,y}^p$ - amount of coal produced by underground mining in the baseline scenario and combusted for energy generation in year *y*, t;

$N_{ELEC,coal,y}^p$ - average electricity consumption per tonne of coal enriched at a beneficiation plant in Ukraine in year *y*, MWh/t;

$EF_{CO2,ELEC}$ - Carbon dioxide emission factor for electricity generation at TPPs and for its consumption, t CO_2/MWh;

$[ELEC]$ - index for electricity;

$[b]$ - index for baseline scenario;

$[CO2]$ - index for carbon dioxide;

$[coal]$ - index for coal;

$[y]$ - index for the year of monitoring period.

D.1.4. Description of formulae used to estimate emission reductions for the project (for each gas, source etc.; emissions/emission reductions in units of CO_2 equivalent):

Emission reductions in year *y* are calculated under the formula that follows:

$$ER_y = BE_y - PE_y - LE_y \quad (11)$$

ER_y - GHG emission reductions in year *y*, t CO_2eq;

BE_y - baseline emissions in year *y* of the baseline scenario, t CO_2eq;

PE_y - GHG emissions in the project scenario in year *y*, t CO_2eq;

LE_y - emissions in year *y*, t CO_2eq;

$[y]$ - index for the year of monitoring period.

D.1.5. Where applicable, in accordance with procedures as required by the host Party, information on the collection and archiving of information on the environmental impacts of the project:

Collection and archiving of the information on the environmental impacts of the project will be done based on the approved EIA in accordance with the Host Party legislation - State Construction Standard DBN A.2.2.-1-2003: "Structure and Contents of the Environmental Impact Assessment Report (EIR) for Designing and Construction of Production Facilities, Buildings and Structures"[59] State Committee of Ukraine on Construction and Architecture, 2004 (see Section F.1).

D.2. Quality control (QC) and quality assurance (QA) procedures undertaken for data monitored		
Data *(Indicate table and ID number)*	Uncertainty level of data (high/medium/low)	Explain QA/QC procedures planned for these data, or why such procedures are not necessary.
*B*1	Low	These data are used in commercial activities of the company. The weights will be calibrated according to the procedures of the Host Party. Calibration interval is 1 year.

[59] http://document.ua/proektuvannja.-sklad-i-zmist-materialiv-ocinki-vpliviv-na-na-nor3146.html

$B2-B4$	Low	These data are fixed values and standard constants taken from regular sources.
$B5$	Average	These data are fixed values and standard constants taken from regular sources.
$P1$	Low	These data are used in commercial activities of the company. Accounting documentation will be used.
$P2-P4$	Low	These data are fixed values and standard constants taken from regular sources.
$L1-L5$	Low	These data are fixed values and standard constants taken from regular sources.
$L6$	Low	These data represent the standard calculation of beneficiation plant and used in the commercial activity of the company.

D.3. Please describe the operational and management structure that the project operator will apply in implementing the monitoring plan :

Ltd. "Prominvest-Ekolohiia" is the owner of the project, which will implement the provisions of this monitoring plan using its organizational and management structure. Company administration headed by the director of the company is responsible for performance of monitoring, data collection, registration, visualization, storage and reporting of data that were monitored, and periodic inspection of measuring instruments. Detailed structure and senior staff members of the Management Group will be submitted in the monitoring before the initial and first periodic verification. The basic structure demonstrated by the following block diagram:

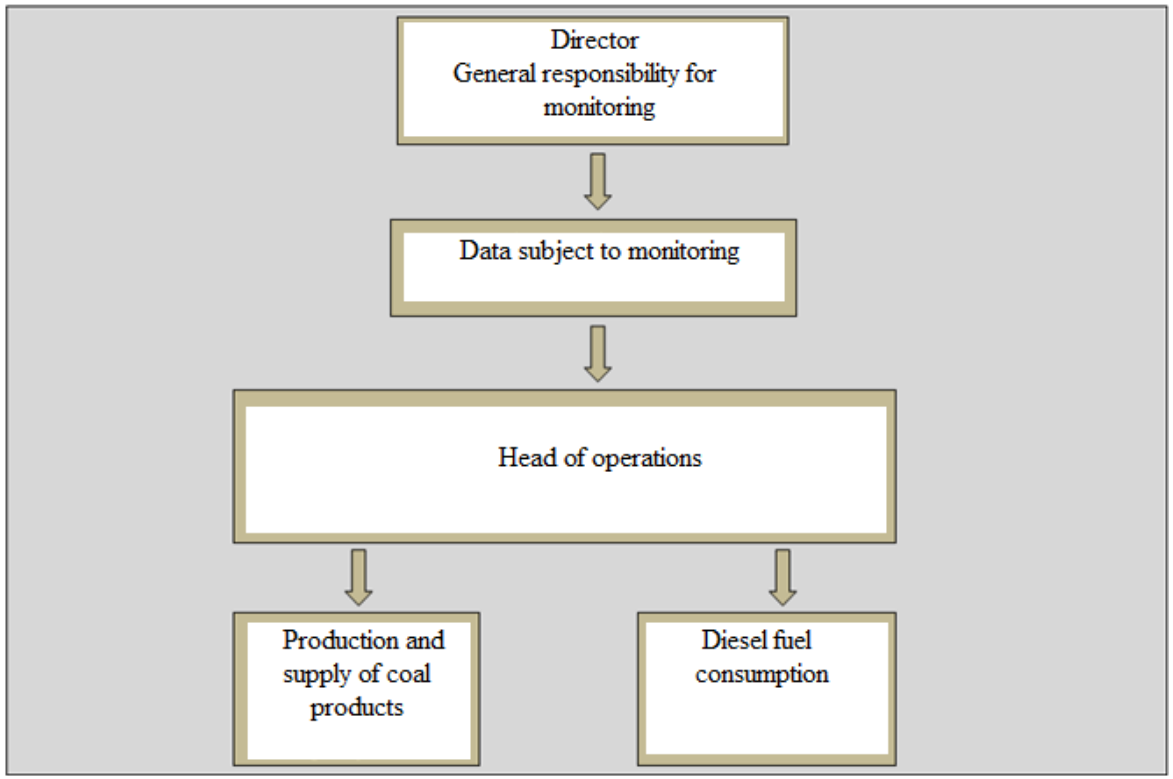

Figure 8 Monitoring flowchart

D.4. Name of person(s)/entity(ies) establishing the monitoring plan:

The monitoring plan was set by the project owner - Ltd. “Prominvest-Ekolohiia».

Organisation	Limited Liability Company “PROMINVEST-EKOLOHIIA"
Street/P.O.Box	Zarichna St.
Building	6

City	Krasne village.
State/Region	Luhansk region
Postal code	94471
Country	Ukraine
Phone	+38 (0642) 49 08 83
Fax	+38 (0642) 49 08 83
E-mail	promekolog@yandex.ru
Website	
Represented by	
Title	Director
Salutation	
Last name	Filipov
Middle name	Yehorovych
First name	Borys
Department	
Phone (direct)	
Fax (direct)	
Cell phone	
Personal e-mail	

SECTION E. Estimation of greenhouse gas emission reductions

E.1. Estimated project emissions:

Project emissions were estimated in accordance with the formulae given in Section D.1.1.2.
Results of the calculations are provided in the tables below. The calculations are provided in Supporting Document 1 annexed to the PDD.

For the period of 2008-2011, ex-post data on company output are used, while for the period of 2012-2014, ex-ante data are used taken from the waste heap demolition plan.

Table 6 Estimated project emissions for the period of January 10, 2008 – December 31, 2012

Year	Estimate of annual project emissions in tonnes of CO_2 equivalent
2008	12 177
2009	11 173
2010	15 349
2011	10 802
2012	10 802
Total estimated project emissions over the crediting period (tonnes of CO_2 equivalent)	**60 303**

Table 7 Estimated project emissions for the period of January 1, 2013 – December 31, 2014

Year	Estimate of annual project emissions in tonnes of CO_2 equivalent
2013	10 802
2014	10 802
Total estimated project emissions over the crediting period (tonnes of CO_2 equivalent)	**21 604**

E.2. Estimated leakage:

Project leakage was estimated in accordance with the formulae given in Section D.1.1.2.

For the period of 2008-2011, ex-post data on company output are used, while for the period of 2012-2014, ex-ante data are used taken from the waste heap demolition plan.

Table 8 Estimated leakage for the period of January 10, 2008 – December 31, 2012

Year	Leakage from uncontrolled methane emissions during mining activity	Leakage from electricity consumption from the grid during mining	Leakage due to consumption of electricity from the grid at a beneficiation plant	Total
2008	-311 133	-92 475	15 799	-387 809
2009	-339 540	-105 558	17 496	-427 602
2010	-367 853	-115 878	18 771	-464 960
2011	-320 532	-91 962	16 383	-396 111
2012	-320 532	-91 962	16 383	-396 111
Total estimated leakage over the	**-1 659 590**	**-497 835**	**84 832**	**-2 072 593**

crediting period (tonnes of CO_2 equivalent)				

Table 9 Estimated leakage for the period of January 1, 2013 – December 31, 2014

Year	Leakage from uncontrolled methane emissions during mining activity	Leakage from electricity consumption from the grid during mining	Leakage due to consumption of electricity from the grid at a beneficiation plant	Total
2013	-320 532	-91 962	16 383	-396 111
2014	-320 532	-91 962	16 383	-396 111
2013-2014	**-641 064**	**-183 924**	**32 766**	**-792 222**

Leakage is negative because it is attributable to the baseline scenario.

E.3. The sum of E.1. and E.2.:

Table 10 Estimated total project emissions for the period of January 10, 2008 – December 31, 2012

Year	Project emissions (t CO_2 equivalent)
2008	-375 632
2009	-416 429
2010	-449 611
2011	-385 309
2012	-385 309
Total project emissions in 2008-2012 (t CO_2 equivalent)	**-2 012 290**

Table 11 Estimated total project emissions for the period of January 1, 2013 – December 31, 2014

Year	Project emissions (t CO_2 equivalent)
2013	-385 309
2014	-385 309
Total project emissions in 2013-2014 (t CO_2 equivalent)	**-770 618**

E.4. Estimated baseline emissions:

Baseline emissions were estimated in accordance with the formulae given in Section D.1.1.4.

Results of the calculations are provided in the tables below. The calculations are provided in Supporting Document 1 annexed to the PDD.

For the period of 2008-2011, ex-post data on company output are used, while for the period of 2012-2014, ex-ante data are used taken from the waste heap demolition plan.

Table 12 Estimated baseline emissions for the period of January 10, 2008 – December 31, 2012

Year	Estimated baseline emissions (t CO_2 equivalent)
2008	1 412 784
2009	1 564 491

2010	1 678 945
2011	1 462 962
2012	1 462 962
Total estimated baseline emissions over the crediting period (tonnes of CO_2 equivalent)	**7 582 144**

Table 13 Estimated baseline emissions for the period of January 1, 2013 – December 31, 2014

Year	Estimate of baseline emissions in tonnes of CO_2 equivalent
2013	1 462 962
2014	1 462 962
Total estimated baseline emissions over the crediting period (tonnes of CO_2 equivalent)	**2 925 924**

E.5. Difference between E.4. and E.3. representing the emission reductions of the project:

Emission reductions are calculated according to formula (11) given in Section D.1.4. Results of the calculations are provided in the tables below. The calculations are provided in Supporting Document 1 annexed to the PDD.

Table 14 Estimated emission reductions for the period of January 10, 2008 – December 31, 2012

Year	Estimate of annual emission reductions in tonnes of CO_2 equivalent
2008	1 788 416
2009	1 980 920
2010	2 128 556
2011	1 848 271
2012	1 848 271
Total estimated emission reductions over the crediting period (tonnes of CO_2 equivalent)	**9 594 434**

Table 15 Estimated emission reductions for the period of January 1, 2013 – December 31, 2014

Year	Estimate of annual emission reductions in tonnes of CO_2 equivalent
2013	1 848 271
2014	1 848 271
Total estimated emission reductions over the crediting period (tonnes of CO_2 equivalent)	**3 696 542**

E.6. Table providing values obtained when applying formulae above:

Table 16 Table containing results of estimation of emission reductions for the period from January 10, 2008 to December 31, 2012

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	12 177	-387 809	1 412 784	1 788 416
2009	11 173	-427 602	1 564 491	1 980 920
2010	15 349	-464 960	1 678 945	2 128 556
2011	10 802	-396 111	1 462 962	1 848 271
2012	10 802	-396 111	1 462 962	1 848 271
Total (tonnes of CO_2 equivalent)	**60 303**	**-2 072 593**	**7 582 144**	**9 594 434**

Table 17 Table containing results of estimation of emission reductions for the period from January 1, 2013 to December 31, 2014

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)
2013	10 802	-396 111	1 462 962	1 848 271
2014	10 802	-396 111	1 462 962	1 848 271
Total (tonnes of CO_2 equivalent)	**21 604**	**-792 222**	**2 925 924**	**3 696 542**

SECTION F. Environmental impacts

F.1. Documentation on the analysis of the environmental impacts of the project, including transboundary impacts, in accordance with procedures as determined by the host Party:

All the required documents for the environmental impact assessment are as follows:

- Law of Ukraine No.1264-XII "On environmental protection" dated 25/06/1991[60];
- Law of Ukraine No.2707-XII "On atmospheric air protection" dated 16/10/1992[61];
- "Standards of maximum permissible emissions of pollutants from stationary sources" approved by the Ministry of Environmental Protection of Ukraine dated 27/06/2006, No.309 and registered in the Ministry of Justice of Ukraine dated 01/09/2006, No.912/12786[62].

A full-scale EIA in accordance with the legislation of Ukraine was performed for the proposed project in 2008. The main outcomes of that EIA follow:

- The main impact of the project activity on the environment is the impact on air. Project activity will cause additional coal dust and coal concentrate dust emissions. However, a study of emission levels and pollutant distribution charts shows that the impact will not exceed maximum allowable concentration;
- Impact on water is insignificant. The closed circuit water systems will be applied during the project implementation, and no waste water will be discharged.
- The impact on flora and fauna is ambiguous. Project activity will cause changes in the existing landscape, yet the aggregate ultimate impact is positive. Grass and trees will be planted on the re-cultivated areas. No rare or endangered species will be impacted. The project activity will be done in the area remote from national parks or protected zones.
- The noise impact is limited. The distance between the main source of noise and residential districts will be as short as allowed, and the operation of movable noise sources (motor vehicles) will comply with local regulations;
- Impact on land use is positive. Considerable land area will be spared from the waste heaps and become available for development;
- No transboundary impact has been detected. Implementation of the project, all of which is physically located in Ukraine, exerts no environmental impact on any other country.

F.2. If environmental impacts are considered significant by the project participants or the host Party, please provide conclusions and all references to supporting documentation of an environmental impact assessment undertaken in accordance with the procedures as required by the host Party:

A full-scale EIA in accordance with the legislation of Ukraine was performed for the proposed project in 2008. The main outcomes of that EIA are provided in Section F.1 above. The report was verified by a commission of environmental experts which made a conclusion on the compliance of the project documents to environmental legislation. Environmental impact of the project is not seen as harmful or prohibited. In line with Ukrainian laws and regulations, preparation of EIA reports and positive Opinions of the State Administration of Environment and Natural Resources constitute the environmental impact assessment procedure.

[60] http://zakon2.rada.gov.ua/laws/show/1264-12

[61] http://zakon2.rada.gov.ua/laws/show/2707-12

[62] http://zakon2.rada.gov.ua/laws/show/z0912-06

SECTION G. Stakeholders' comments

G.1. Information on stakeholders' comments on the project, as appropriate:

The project meets the applicable standards and requirements set forth in Ukraine. The Host Party does not put forward the requirement to consult with stakeholders to JI projects. Stakeholders' comments will be collected during the publication of the project documents on the Internet during the determination process.

Annex 1

CONTACT INFORMATION ON PROJECT PARTICIPANTS

Owner of the project: Ltd. "PROMINVEST-EKOLOHIIA"

Organisation	Limited Liability Company "PROMINVEST-EKOLOHIIA"
Street/P.O.Box	Zarichna St.
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Fax	+38 (0642) 49 08 83
E-mail	promekolog@yandex.ru
Website	
Represented by	
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Salutation	
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Middle name	Yehorovych
First name	Borys
Department	
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Fax (direct)	+38 (0642) 49 08 83
Cell phone	
Personal e-mail	

Technical consultant of the project

Organisation	LHCarbon OÜ
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State/Region	
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Country	Estonia
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Fax	+372 51 41 800
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Website	
Represented by	
Title	Director
Salutation	Mr
Last name	Lamp
Middle name	
First name	Hannu
Department	

Phone (direct)	+372 51 41 800
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Personal e-mail	hannu@online.ee

Technical consultant and ERU buyer

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Represented by	-
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Cell phone	-
Personal e-mail	0709bp@gmail.com

Annex 2

BASELINE INFORMATION

A baseline is the scenario that reasonably represents the anthropogenic emissions by sources of GHGs that would occur in the absence of the proposed project. The baseline should be established in accordance with the requirements of the "Guidance on criteria for baseline setting and monitoring," Version 03[63]. In line with the "Guidelines for users of the joint implementation project design document form," Version 04,[64] a stepwise approach is used for baseline description and justification:

Data/Parameter	$FC^{b}_{coal,y}$
Data unit	t
Description	Amount of coal produced by underground mining in the baseline scenario and combusted for energy generation, equivalent to the amount of coal extracted from the waste heaps because of the project activity in year *y*
Time of determination/monitoring	Annual monitoring
Source of data (to be) used	Owner of the project
Value of data applied (for ex ante calculations/determinations)	Owner of the project
Justification of the choice of data or description of measurement methods and procedures (to be) applied	Measured for the commercial purposes on site
QA/QC procedures (to be) applied	According to the project owner policy.
Any comment	No

Data/Parameter	$NCV_{coal,y}$
Data unit	TJ/ths t
Description	Net calorific value of coal for year *y*
Time of determination/monitoring	Annually
Source of data (to be) used	National inventory report of anthropogenic emissions by sources and removals by sinks of greenhouse gases in Ukraine for 1990-2010, p.462, 468 (the value may change at the monitoring stage)
Value of data applied (for ex ante calculations/determinations)	2008-21.5 2009-21.8 2010-21.6 2011-21.6 2012-21.6
Justification of the choice of data or description of measurement methods and	Standard value set according to the National Inventory.

[63] http://ji.unfccc.int/Ref/Documents/Baseline_setting_and_monitoring.pdf

[64] http://ji.unfccc.int/Ref/Documents/Guidelines.pdf

procedures (to be) applied	
QA/QC procedures (to be) applied	According to the National Inventory.
Any comment	No

Data/Parameter	$OXID_{coal,y}$
Data unit	Relative units
Description	Carbon oxidation factor for year *y*
Time of determination/monitoring	Annually
Source of data (to be) used	National inventory report of anthropogenic emissions by sources and removals by sinks of greenhouse gases in Ukraine for 1990-2010[65], p.459, 465, 471 (the value may change at the monitoring stage)
Value of data applied (for ex ante calculations/determinations)	2008-0.963 2009-0.963 2010-0.962 2011-0.962 2012-0.962
Justification of the choice of data or description of measurement methods and procedures (to be) applied	Standard value set according to the National Inventory.
QA/QC procedures (to be) applied	According to the National Inventory.
Any comment	No

Data/Parameter	$EF_{C,coal,y}$
Data unit	t C/TJ
Description	Carbon content in coal for year *y*
Time of determination/monitoring	Annually
Source of data (to be) used	National inventory report of anthropogenic emissions by sources and removals by sinks of greenhouse gases in Ukraine for 1990-2010, p.458, 464, 470 (the value may change at the monitoring stage)
Value of data applied (for ex ante calculations/determinations)	2008-25.95 2009-25.97 2010-25.99 2011-25.99 2012-25.99
Justification of the choice of data or description of measurement methods and procedures (to be) applied	Standard value set according to the National Inventory.

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

QA/QC procedures (to be) applied	According to the National Inventory.
Any comment	No

Data/Parameter	ρ_{WHB}
Data unit	Relative units
Description	Probability of waste heap burning
Time of determination/monitoring	Fixed ex ante
Source of data (to be) used	PDD of JI project UA1000329[66]
Value of data applied (for ex ante calculations/determinations)	0.83
Justification of the choice of data or description of measurement methods and procedures (to be) applied	Value set according to the determined JI project
QA/QC procedures (to be) applied	According to the determined JI project
Any comment	No

Data/Parameter	GWP_{CH_4}
Data unit	t CO_2eq/t CH_4
Description	Global Warming Potential of methane
Time of determination/monitoring	Throughout the crediting period
Source of data (to be) used	IPCC Second Assessment Report: Climate Change 1995 (SAR) and approved by COP. GWP of methane is available at the UNFCCC website[67]
Value of data applied (for ex ante calculations/determinations)	21
Justification of the choice of data or description of measurement methods and procedures (to be) applied	N/A
QA/QC procedures (to be) applied	Project developer will monitor any changes in Global Warming Potential of methane published by IPCC and Approved by COP
Any comment	Data allowing of calculation of GHG emissions in the baseline scenario will be archived in paper and electronic format.

Data/Parameter	ρ_{CH4}
Data unit	t/m^3
Description	Methane density
Time of determination/monitoring	Once at the beginning of the project

[66] http://www.carbonunitsregistry.gov.ua/en/publication/content/1023.htm

[67] http://unfccc.int/ghg_data/items/3825.phphttp://unfccc.int/ghg_data/items/3825.php

Source of data (to be) used	Physical properties of methane (at room temperature 20°C and 1 ATM)[68]
Value of data applied (for ex ante calculations/determinations)	0.000668
Justification of the choice of data or description of measurement methods and procedures (to be) applied	N/A
QA/QC procedures (to be) applied	N/A
Any comment	Information on methane density is the basis for greenhouse gas emission calculation, to be archived in paper and electronic form.

Data/Parameter	EF_{CH4}
Data unit	m^3/t
Description	Emission factor for non-controlled methane emissions from coal mining.
Time of determination/monitoring	Once at the beginning of the project
Source of data (to be) used	National inventory report of anthropogenic emissions by sources and removals by sinks of greenhouse gases in Ukraine for 1990-2009[69], p.90 (the value may change at the monitoring stage)
Value of data applied (for ex ante calculations/determinations)	25.67
Justification of the choice of data or description of measurement methods and procedures (to be) applied	Standard value set according to the National Inventory.
QA/QC procedures (to be) applied	According to the National Inventory.
Any comment	No

Data/Parameter	$N^{b}_{ELEC,coal,y}$
Data unit	MWh/t
Description	Average electricity consumption per tonne of coal produced in Ukraine in year *y*
Time of determination/monitoring	Annually
Source of data (to be) used	Fuel and energy resources of Ukraine, Statistical Yearbook, State Statistics Committee of Ukraine, Kiev 2009-2011[70] (the value may change at the monitoring stage)
Value of data applied	2008 – 0.0878

[68] http://www.engineeringtoolbox.com/gas-density-d_158.html

[69] http://unfccc.int/files/national_reports/annex_i_ghg_inventories/national_inventories_submissions/application/zip/ukr-2011-nir-08jun.zip

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

(for ex ante calculations/determinations)	2009 – 0.0905 2010 – 0.0926 2011 – 0.0905 2012 – 0.0905
Justification of the choice of data or description of measurement methods and procedures (to be) applied	No
QA/QC procedures (to be) applied	If new inventory reports come into effect, new values will be set and ERUs will be recalculated for any reporting period in accordance with the monitoring plan.
Any comment	No

Data/Parameter	$EF_{CO2,ELEC}$
Data unit	t CO_2/MWh
Description	Carbon dioxide emission factor for electricity generation at TPPs and for its consumption in year *y*
Time of determination/monitoring	Annually
Source of data (to be) used	Decree No.62 of the National Environmental Investment Agency of Ukraine (hereinafter NEIAU) dated 15/04/2011 "On approval of carbon dioxide emission factors for 2008"[71]; Carbon dioxide emission factors for 2009 are sourced from Decree No.63 of the National Environmental Investment Agency of Ukraine (hereinafter NEIAU) dated 15/04/2011 "On approval of carbon dioxide emission factors for 2009"[72] Carbon dioxide emission factors for 2010 are sourced from the NEIAU Decree No.43 of 28/03/2011 "On approval of carbon dioxide specific emission values in 2010"[73] Carbon dioxide emission factors for 2011 are sourced from the NEIAU Decree No.75 of 12/05/2011 "On approval of carbon dioxide specific emission values in 2011"[74] If other carbon dioxide emission factors are adopted for Ukraine, the baseline will be recalculated for any reporting period in accordance with the monitoring plan.
Value of data applied (for ex ante calculations/determinations)	2008 – 1.219 2009 – 1.237 2010 – 1.225 2011 – 1.227 2012 – 1.227
Justification of the choice of data or description of measurement methods and procedures (to be) applied	Only officially approved factors are used in calculations.

[71] http://www.neia.gov.ua/nature/doccatalog/document?id=127171

[72] http://www.neia.gov.ua/nature/doccatalog/document?id=127172

[73] http://www.neia.gov.ua/nature/doccatalog/document?id=126006

[74] http://www.neia.gov.ua/nature/doccatalog/document?id=127498

QA/QC procedures (to be) applied	National carbon dioxide emission factors are used in the Joint Implementation project development.
Any comment	No

Annex 3

MONITORING PLAN

For monitoring plan see Section D of the PDD.