JOINT IMPLEMENTATION PROJECT DESIGN DOCUMENT FORM
Version 01 - in effect as of: 15 June 2006

CONTENTS

Annexes

SECTION A. General description of the project

A.1. Title of the project:

Waste Heap Dismantling in Luhansk Region of Ukraine by PE “SNABTEHMONTAZH” with the Aim of Reduction Greenhouse Gases Emissions to Atmosphere

Sectoral scope: 8. Mining/mineral production

Version of the document: 3.3

Date of the document: 21th of February 2012.

A.2. Description of the project:

The project is aimed at achieving GHG emission reductions through processing waste heaps of old coal mines in Luhansk region of Ukraine. As a result of implementation of the proposed project activity burning of the waste heaps will be prevented, and the extracted coal will be supplied to thermal power plants where it will substitute the mined coal, production of which is associated with GHG emissions.

Situation before the project

The Ukrainian coal mining industry is a complex business system that integrates around 167 active coal mines and 3 coal strip mines, mines at the decommissioning stage, coal washing, transportation and other enterprises. Ukraine is the largest coal mining region in Europe and is among top eight in the world. The main coal mining area is Donbas that is located in Donetsk and Luhansk regions for the most part.

Coal is found in the area of Donbas at the average depth of 400-800 m. The average thickness of coal-bed is 0.6-1.2 m. Therefore coal in Donbas is produced mostly by mining. Most mines operate on the depth of 400-800 m but there are 35 mines in Donbas that extract coal from the 1000-1300 m level. Coal-beds in Donetsk basin are interleaved with rock and are usually found every 20-40 m. Mining activities in such conditions result in vast amounts of matter being extracted and brought to the surface. Coal is separated from rock and this non-coal matter forms huge waste heaps of tailings found almost everywhere in Donbas. Separation process on the mines was not and sometimes is not entirely efficient. For a long period of time it was not economically feasible to extract 100% of coal from the rock that had been mined. That is why waste heaps of Donbas contain considerable masses of coal. In the course of time those waste heaps are vulnerable to spontaneous ignition and slow combustion. According to different estimates the rock that is mined contains only up to 65-70% of coal only, the rest is barren rock. Up to 60% of this rock is put into waste heaps. According to specialists' research, percentage of combustible material in waste heaps is 15-30%, meanwhile there can be from 7% to 28-32% of coal[1]. Waste heaps that are burning or are close to spontaneous ignition are sources of uncontrolled greenhouse gas and hazardous substances emissions. The latter include sulphurous anhydride that transforms into sulphur acid and is the reason for acid rains, hydrogen sulphide and carbon oxide. Ground water is contaminated with solid particles, becomes hard and acid when it contacts a waste heap. Erosion processes that often destroy the integrity of the waste heaps are responsible for contamination of nearby areas with particles that contain hazardous materials (like sulphur). Erosion can lead overtime to the total destruction of a waste heap in a massive landslide that is dangerous both in terms of direct hazard to population and property and massive emissions of particles and hazardous substances into the

[1] *Geology of Coal Fires: Case Studies from Around the World,* Glenn B. Stracher, Geological Society of America, 2007, p. 47

atmosphere. Erosion also helps to intensify the process of spontaneous combustion. Combustion of coal in the waste heap is rather long-term and lasts from 5 to 7 years.

The waste heaps also take up large space areas. As of 2002 the waste heaps in Donbas occupied 7190 hectares of land. And this figure keeps growing.

Despite the dangers caused by the burning waste heaps, it is common in the area of Donbas to not extinguish the fires immediately. The owners that are responsible for the waste heaps receive relatively small fines for the air pollution, therefore there is little incentive for them to deal with the problem, and extinguishing those heaps that are currently alight can be postponed indefinitely.

Baseline scenario

In the baseline scenario it is assumed that this common practice will continue and waste heaps will be burning and emitting GHG into the atmosphere until the coal is consumed. The equivalent amount of coal, which under project scenario is reclaimed from the waste heap, under baseline scenario would be mined, causing fugitive emissions of methane during the mining process.

Project scenario

This Project is aimed at coal extraction from the mine's waste heaps near Volodarsk village, Luhansk Region, Ukraine. These waste heaps have been accumulated some time before the start of the project activity from the mining waste of underground mines. Project activity will prevent greenhouse gas emissions into the atmosphere during combustion of the heaps and will contribute an additional amount of coal, without the need for mining. The Project includes the installation of coal extraction units and the grading of the extracted coal. Extracted coal is then sold for heat and power production.

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

Realisation of the project activity is environmentally and socially beneficial. The technological process does not require the use of hazardous materials and is an important contribution to solving waste heap problem in Donbas region. It also creates work places and improves economic wellbeing of the local population.

History of the project

Brief summary of the history of the project: The project has been initiated in the early 2007. Construction works were started and completed in May, 2009; and operations at the facility have started on the 1^{st} of October 2009. The JI was one of the drivers for the project from the start and financial benefits provided by the JI mechanism were considered as one of the reasons to start the project and are crucial in the decision to start the operations.

A.3. Project participants:

Table 1 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)	• PE “SNABTEHMONTAZH”	No
Netherlands	• Global Carbon B.V.	No

PE “SNABTEHMONTAZH” is the project owner. PE “Snabtehmontazh” is performing the dismantling of the waste heaps, processing waste heap matter with the dense medium cyclone technology. PE “Snabtehmontazh” does not operate or own any coal mines.

Global Carbon B.V. is a leading expert on environmental consultancy and financial brokerage services in the international greenhouse emissions trading market under the Kyoto Protocol. Global Carbon has developed the first JI project that has been registered at the United Nations Framework Convention on Climate Change (UNFCCC). The first verification under JI mechanism was also completed for Global Carbon B.V. project. The company focuses on Joint Implementation (JI) project development in Ukraine, Russia. Global Carbon B.V. is responsible for the preparation of the investment project as a JI project including PDD preparation, obtaining Party approvals, monitoring and transfer of ERUs. Global Carbon B.V. is a potential buyer of the ERUs generated under the proposed project. Global Carbon B.V. is a project participant.

A.4. Technical description of the project:

A.4.1. Location of the project:

A.4.1.1. Host Party(ies):

Ukraine

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

Luhansk region

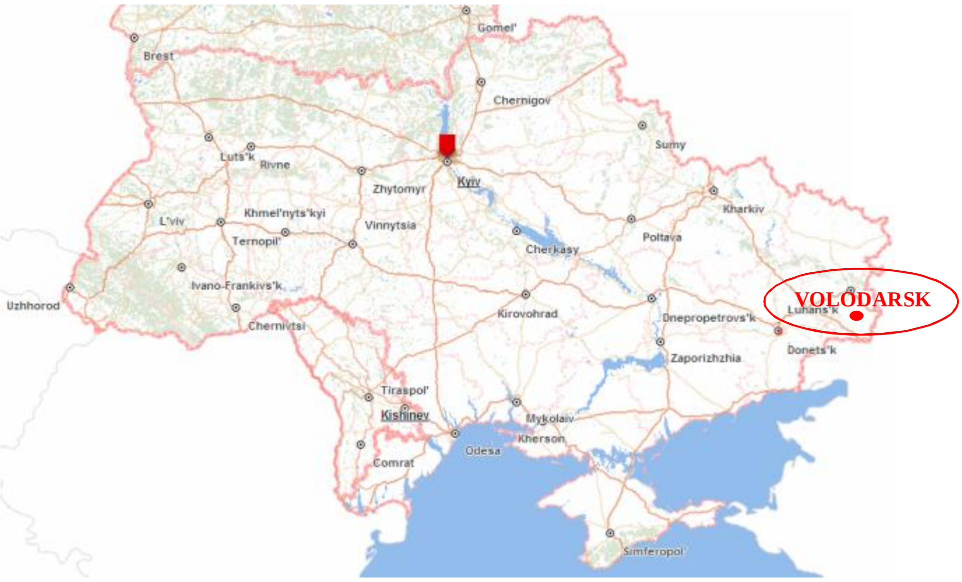

Figure 1. Project location.

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

Volodarsk village

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

This project is implemented within Luhansk region of Ukraine where waste heaps processing facility and waste heaps are located:

At the moment PE "SNABTEHMONTAZH" owns one waste heap of the former Mine #40. It is located at industrial Site of the former Mine #40, located near village Volodarsk, railway station Izotovo, and town of Sverdlovsk, Luhansk Region, Ukraine. Industrial facilities are located at one site. Land area under the beneficiation plant equals to 1,7 ha.

The geographic coordinates of the site are: 39°35′20 E and 48°06′19″ N. The satellite image of the site is shown below.

During the lifetime of the project lifetime other waste heaps will be purchased. Data on new waste heaps will be included in the appropriate monitoring report.

Figure 2 Satellite photo of the project location.

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

Generally, the coal beneficiation plant is a four-floored construction which includes such equipment as separators, thickeners, hydrocyclones, cribbles, bend conveyors, pumps, feeders, sieves, centrifuges, tanks, sump basins and other facilities. The equipment is interconnected by wiring and pipeline. The beneficiation process is controlled from the control room.

The beneficiation complex consists of the following facilities: beneficiation plant, stationary sorting complex with equipment for processing anthracite of 0-40 mm, mobile sorting unit, bunker, gallery, feeding house, storage areas for coal and rock substance, wastewater treatment facilities, pumping station, administrative buildings, garages and vehicle parking lots. Technological scheme for waste heap processing can be presented as follows:

- Transportation of rock mass and its storage: Rock substance is being transported from the waste heaps to the storage by trucks KAMAZ 5511;
- Rock mass processing: Supplied rock mass is sorted into +40 mm and -40 mm grades at the cribble. Grades +40 mm are sorted out manually; 0-40 mm grades are desludged and supplied to the mixer where mixed with water and magnetite to obtain pulp;
- Coal washing: The obtained pulp is supplied to the hydrocyclone where separated into bare rock and coal concentrate. Sludge is supplied to separation equipment where separated into coal concentrate and bare sludge.

- Separation of coal: The coal concentrate is dried and separated into 1-6 mm, 6-13 mm and 13-40 mm products. The sludge beneficiation produces 0.1-1 mm product.
- Coal storage: Coal products of different grades are stored separately.
- Waste treatment. Magnetite is washed off from the bare rock and recycled for coal beneficiation. Bare rock is transferred to the reshaped waste heap. Bare sludge is separated into bare rock and waste water. Waste water is regenerated and recycled in the beneficiation complex.

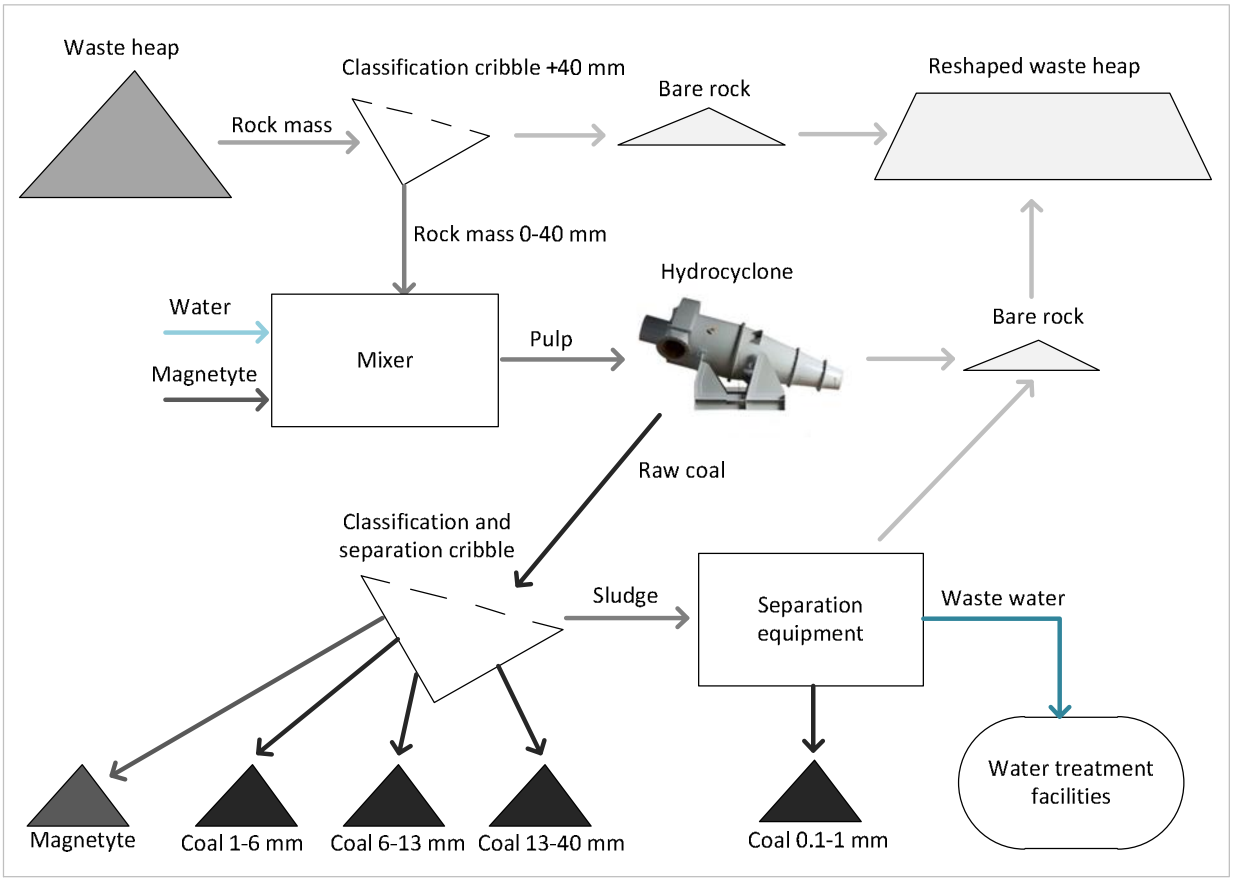

Figure 3. Simplified flowchart of a coal extraction process at the plant.

Rock mass is loaded into the bunker, and then directed by the feeder to Cribble #1 which separates the substance into 0-40 mm grade and +40 mm grade. The product +40 mm is sent to a manual coal extraction and afterwards to the waste heap. The product 0-40 mm class is mixed with water and transported to Cribble #2, where separation of sludge of class 0-1.0 mm is being carried out.

The desludged material is supplied to the mixer to be mixed with the magnetite suspension. The obtained pulp is pumped from the mixer to the hydrocyclone which separates the rock mass into the heavy (bare rock) and light (coal concentrate) fractions.

The coal concentrate fraction is directed to the arc sieve and then to Cribble #3. At this stage the water suspension is separated and supplied to the regenerator; the magnetite is washed away from the beneficiation products; the products are dehydrated and sorted into 1.0-6 mm and 6-40 mm classes.

Washed and dehydrated concentrate of 6-40 mm class is sent to Cribble #4 for classification into sorts 6-13 mm and 13-40 mm. Concentrates of 0.25-1.0 mm and 1.0-6 mm classes are directed for the final dehydration in a centrifuge. Beneficiated products are transported to the storage.

The rock fraction from hydrocyclone is washed from magnetite, dehydrated and sent to a heap. Washout water containing magnetite is directed to magnetic separators for regeneration.

The sludge obtained during the beneficiation process undergoes gradual separation into concentrate, magnetite, water and waste products by use of magnetic separators, spiral separators, hydrocyclones, centrifuge, cribbles and sieves.

Coal beneficiation plant of PE “Snabtehmontazh” operates the following types of equipment:

- Two-product hydrocyclone Cavex manufactured by Wier Minerals Turope;
- Cribbles GIS (of different modifications) manufactured by Shidno-Ukrayinske promyslove tovarystvo company;
- Belt conveyer SP manufactured by Shidno-Ukrayinske promyslove tovarystvo company;
- Pumps Warman (of different modifications) manufactured by Wier Minerals Turope;
- Sepatator EBM-80/170P manufactured by Komsomolets PP Engineering Plant.

The activities implemented within the project reflect current good practice: the installed equipment is modern and efficient; it maintains continuous and accurate process of coal beneficiation. However since the working conditions of the equipment are hard, it can be replaced by analogues if damaged or worn-out.

As a result, beneficiation plant processes waste heaps with effective separation of the material into bare rock mass and high quality anthracite coal suitable for further utilization for energy generation purposes. The rock mass is stored into heaps and can be used for in various ways: construction of dams; filling of open pits and deep basins of river channels and reservoirs; earthworks and road construction. Technological process is environmentally sound and does not require any use of hazardous materials.

Decision making about the project implementation was done in 2008. Project development, purchase of equipment, construction and mounting works, and commissioning works were held from January 2009 to September 2009. On 24th of September, 2009 the order for preparation of the plant to commissioning has been issued. Since then the beneficiation complex has been extracting anthracite coal and contributing to reduction of greenhouse gas emissions into the atmosphere[2].

Table 2 Schedule of the project implementation

Milestones of the JI Project	Start date	End date
Decision making	January 2008	January 2009
Project design, construction works, and commissioning of the plant	January 2009	September 2009
Operation of the project	October 2009	September[3] 2024

[2] Amount of coal extracted during the testing period in September, 2009 is neglected. Emission reductions are calculated starting from 1st of October, 2009.

[3] Till the end of September 2024.

A waste heap is shown in the picture below:

Figure 4. Waste heap of the former mine #40.

The project does not require extensive initial training. The required workforce can get basic industrial profession training locally. Most of the required personnel such as heavy machinery operators, trucks and excavator drivers, electric and mechanical maintenance workers are locally available. Maintenance needs are covered by the local capacities: in-house maintenance workers and outsourced maintenance and repair subcontractors. The project makes provisions for training needs. All workers are required to have a valid professional education certificate and pass periodical safety trainings and exams. Professional education can be obtained locally in the Luhansk region in all of the professional areas covered by the project.

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:

The proposed project is aimed at the extraction of coal from the waste heaps of underground coal mines. Waste heaps are frequently spontaneously igniting and burning, causing emissions of hazardous substances and green-house gases. The fraction of coal in the waste heaps can be as high as 28-32%[4], so the risk of spontaneous self-heating and burning is very high. The survey[5] shows that 69% of waste heaps in the Luhansk Region are, or have been burning at some point in time. If a waste heap has started burning, even if the fire is extinguished, it will continue burning after a while unless the fire is extinguished regularly. Burning waste heaps in Ukraine are very often not taken care of properly, especially when there is no immediate danger to population and property, i.e. if the waste heap is located

4 *Geology of Coal Fires: Case Studies from Around the World,* Glenn B. Stracher, Geological Society of America, 2007, p. 47

5 *Analysis on the fire risk of Luhansk Region's waste heaps*, Scientific Research Institute "Respirator", Donetsk, 2010

at a considerable distance from a populated area, or is at the early stages of self-heating. The monitoring of the waste heaps condition is not done on a systematic and timely basis and information is frequently missing. The only way to prevent a waste heap from burning is to extract all the combustible matter, which is generally residual coal from the mining process. This project will reduce the emissions by extracting coal from the waste heap matter and using the remaining rock for land engineering.

Coal extracted from the waste heaps will substitute the coal from the mines and will be used mainly for energy production purposes at coal-fired power plants. Coal mining is a source of the fugitive emissions of methane, therefore, the project activity will reduce methane emissions by reducing the amount of coal required to be mined.

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

- Removing the source of green-house gas emissions from the combustion of waste heaps by the extraction of coal from the waste-heaps;
- Negative leakage through reduced fugitive emissions of methane due to the replacement of coal that would have been mined.

Waste heaps are sources of uncontrolled green-house gas emissions, hazardous substances emissions, particle emissions, ground water contamination. Addressing problems of waste heaps is costly and is not addressed in a systematic way in Ukraine. Efforts to stop burning of waste heaps and break them down completely are in line with the existing environmental legislation of Ukraine. The proposed project is positively evaluated by local authorities.

Detailed description on the baseline setting and full additionality test can be found in section B of this PDD.

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

Table 3 Estimated amount of emission reductions during the crediting period

	Years
Length of the crediting period	4[6]
Year	Estimate of annual emission reductions in tonnes of CO_2 equivalent
Year 2009	18 769
Year 2010	137 778
Year 2011	186 016
Year 2012	216 341
Total estimated emission reductions over the crediting period (tonnes of CO_2 equivalent)	558 904
Annual average of estimated emission reductions over the crediting period (tonnes of CO_2 equivalent)	171 970

[6] Exact duration of the crediting period (number of full years and month) is stated in the part C of this PDD: 3 years and 3 months, or 39 months. Annual average of estimated emission reductions over the crediting period was calculated in the following way: 558 904/39*12=171 970 (rounded to the integer).

Table 4 Estimated amount of emission reductions after the crediting period

	Years
Period after 2012, for which emission reductions are estimated	12[7]
Year	Estimate of annual emission reductions in tonnes of CO_2 equivalent
Year 2013	216 341
Year 2014	216 341
Year 2015	216 341
Year 2016	216 341
Year 2017	216 341
Year 2018	216 341
Year 2019	216 341
Year 2020	216 341
Year 2021	216 341
Year 2022	216 341
Year 2023	216 341
Year 2024	162 256
Total estimated emission reductions over the period indicated (tonnes of CO_2 equivalent)	2 542 007
Annual average of estimated emission reductions over the period indicated (tonnes of CO_2 equivalent)	216 341

B.

A.5. Project approval by the Parties involved:

Letter of Endorsement No. 3541/23/7 was issued on 1/12/2011 by State Environmental Investment Agency. Letter of Approval 2011JI43 by Ministry of Economic Affairs, Agriculture and Innovation of the Netherlands was received on 19th of January 2012. The project approval by the Host Party is expected after completion of the determination process.

[7] Exact duration of the crediting period (number of full years and month) is stated in the part C of this PDD: 11 years and 9 months, or 141 months. Annual average of estimated emission reductions over the period indicated was calculated in the following way: 2 542 007/141*12=216 341 (rounded to the integer).

SECTION B. Baseline

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

A baseline for the JI project has to be set in accordance with Appendix B to decision 9/CMP.1 (JI guidelines)[8], and with further guidance on baseline setting and monitoring developed by the Joint Implementation Supervisory Committee (JISC). In accordance with the Guidance on Criteria for Baseline Setting and Monitoring (version 3)[9] (hereinafter referred to as Guidance), the baseline for a JI project is the scenario that reasonably represents the anthropogenic emissions by sources or anthropogenic removals by sinks of GHGs that would **occur in the absence of the proposed project**. In accordance with the Paragraph 9 of the Guidance the project participants may select either: an approach for baseline setting and monitoring developed in accordance with appendix B of the JI guidelines (JI specific approach); or a methodology for baseline setting and monitoring approved by the Executive Board of the clean development mechanism (CDM), including methodologies for small-scale project activities, as appropriate, in accordance with paragraph 4(a) of decision 10/CMP.1, as well as methodologies for afforestation/reforestation project activities. Paragraph 11 of the Guidance allows project participants that select a JI specific approach to use selected elements or combinations of approved CDM baseline and monitoring methodologies or approved CDM methodological tools, as appropriate; or an approach for baseline setting and monitoring already taken in comparable JI cases.

Description and justification of the baseline chosen is provided below in accordance with the "Guidelines for users of the Joint Implementation Project Design Document Form", version 04[10], using the following step-wise approach:

Step 1. Indication and description of the theoretical approach chosen regarding baseline setting

Project participants have chosen the following approach regarding baseline setting, defined in the Guidance (Paragraph 9):

- An approach for baseline setting and monitoring already taken in comparable JI cases.

The Guidance applies to this project as the above indicated approach is selected as mentioned in the Paragraph 12 of the Guidance. The detailed theoretical description of the baseline in a complete and transparent manner, as well as a justification in accordance with Paragraph 23 through 29 of the Guidance should be provided by the project participants.

The project “Processing of waste heaps at Monolith-Ukraine” is selected as the comparable JI project. Accredited independent entity has already positively determined that it would result in a reduction of anthropogenic emissions by sources or an enhancement of net anthropogenic removals by sinks that is additional to any that would otherwise occur. This determination has already been deemed final by the JISC. Appropriate documentation such as PDD and Determination Report regarding this project is available traceably and transparently on the UNFCCC JI Website: http://ji.unfccc.int/JI_Projects/DB/IPT7L3CLGIZTGGX27T2101W7XCUCWW/Determination/DNV-CUK1315829182.27/viewDeterminationReport.html

Demonstration of comparability of the identified project to the project implemented under comparable circumstances:

1) Both projects propose **same GHG mitigation measure:** The proposed GHG mitigation measure under both projects is coal extraction from the mine’s waste heaps. This will prevent greenhouse

[8] http://unfccc.int/resource/docs/2005/cmp1/eng/08a02.pdf#page=2

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

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

gas emissions into the atmosphere during combustion of the heaps and will contribute an additional amount of coal, without the need for mining.

2) Both projects are implemented within the **same geography and time**: The proposed project and identified comparable project are both located in Ukraine. Both projects were initiated in 2008.
3) Both projects have **similar scale**: Both projects are large scale JI projects. Both projects process waste heaps of comparable scale. The proposed project consists of one site that will operate during a certain period of time while the comparable project also consists of one site. The difference between the proposed project and the comparable project's is less than 50 per cent in terms of the projects' output (average annual coal production is about 90 000 and 110 000 tonnes respectively). Both projects utilize similar technology: in both projects the waste heap is dismantled using standard excavators and bulldozers. Trucks are used to move the waste heap matter to the processing facility. The processing facility in both projects is the coal beneficiation plant that utilizes gravity separation method to separate coal from the rest of the matter.
4) Since the proposed project and the comparable project were implemented in 2009 (construction phase), the **regulatory framework has not changed** in a manner that would affect the baseline of these projects.

Therefore the criteria identified by the Guidance are satisfied and the identified project is a comparable project implemented under comparable circumstances.

Justification why determination for a comparable project is relevant for the project at hand

The project "Processing of waste heaps at Monolith-Ukraine" and the proposed project are both implemented within the same geographic region of Ukraine – the Donbas coal mining region. The implementation timeline is quite similar. Both projects will share the same investment profile and market environment. These two projects are implemented by private companies with no utilization of public funds. The investment climate will be comparable in both cases with the coal sector being an almost non-profitable sector in Ukraine[11] burdened by many problems. The market for the extracted coal will also be similar for both projects as these are small private companies that will not be able to sell coal in big quantities under long-term contracts. Ukrainian coal sector is largely state-controlled. Energy and Coal Ministry of Ukraine decides production level of state mines, based on their performance. After this, state controlled mines sell their coal to the state Trading Company "Coal of Ukraine". This company also buys coal from private mines and arranges supply of coal to thermal electricity companies. Prices for coal mines differ significantly for public and private mines[12].

Both projects also share the investment climate of Ukraine which is far from being favourable. Ukraine is considered to be a high risk country for doing business and investing in. Almost no private capital is available from domestic or international capital markets for mid to long term investments, and any capital that is available has high cost. The table below represents risks of doing business in Ukraine according to various international indexes and studies.

[11] http://www.necu.org.ua/wp-content/plugins/wp-download_monitor/download.php?id=126

[12] http://www.ier.com.ua/files/publications/Policy_papers/German_advisory_group/2009/PP_09_2009_ukr.pdf

Table 5. International ratings of Ukraine[13]

Indicators	2008	Note
Corruption index of Transparency International	134 position from 180	Index of corruption
Rating of business practices of The World Bank (The Doing Business)	139 position from 178	Rating of conduct of business (ease of company opening, licensing, staff employment, registration of ownership, receipt of credit, defence of interests of investors)
The IMD World Competitiveness Yearbook	54 position from 55	Research of competitiveness (state of economy, efficiency of government, business efficiency and state of infrastructure)
Index of Economic Freedom of Heritage Foundation	133 position from 157	Determination of degrees of freedom of economy (business, auction, financial, monetary, investment, financial, labour freedom, freedom from Government, from a corruption, protection of ownership rights)
Global Competitiveness Index of World Economic Forum	72 position from 134	Competitiveness (quality of institutes, infrastructure, macroeconomic stability, education, development of financial market, technological level, innovative potential)

The data above shows that both real and perceived risks of investing in Ukraine are in place and influence the availability of capital in Ukraine both in terms of size of the investments and in terms of capital costs. The comparison of commercial lending rates in Ukraine and in Eurozone for the loans over 5 years in EUR is presented in a figure below:

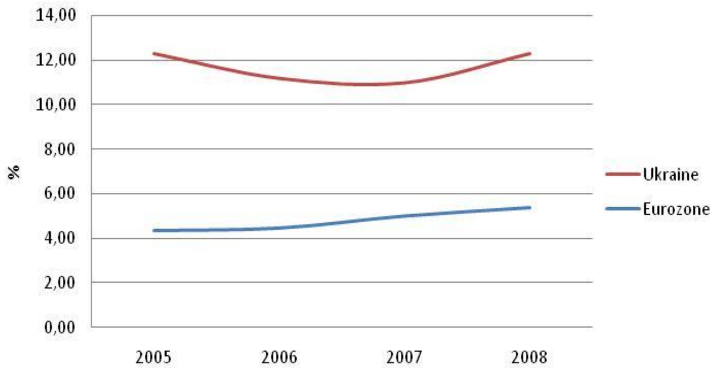

Figure 5. Commercial lending rates, EUR, over 5 years[14]

Cost of debt financing in Ukraine is at least twice as high as in the Eurozone. The risks of investing into Ukraine are additionally confirmed by the country ratings provided by the Moody's international rating agency and the associated country risk premium. The table below compares country risk premiums for Russia and Ukraine[15]:

Total Risk Premium, %	2003	2004	2005	2006	2007	2008	2009	2010
Russia	7.0	7.02	6.6	6.64	6.52	8	6.9	7.25
Ukraine	11.57	11.59	10.8	10.16	10.04	14.75	12.75	12.5

[13] Data by the State Agency of Ukraine for Investments and Innovations

[14] Data for Ukraine from National Bank of Ukraine http://www.bank.gov.ua/files/4-Financial_markets(4.1).xls

[15] Data from Aswath Damodaran, Ph.D., Stern School of Business NYU http://pages.stern.nyu.edu/~adamodar/

As it is demonstrated by this table, Russia, while offering a comparable set of investment opportunities, is a significantly less risky country for investing in than Ukraine.

As stated at the OECD Roundtable on Enterprise Development and Investment Climate in Ukraine, the current legal basis is not only inadequate, but to a large extent it sabotages the development of market economy in Ukraine. Voices in the western press can basically be summarized as follows: The reforms in the tax and legal systems have improved considerably with the adoption of the commercial Code, Civil Code and Customs Code on 1 January 2004 but still contain unsatisfactory elements and pose a risk for foreign investors[16]. Ukraine is considered to be heading in the right direction with significant reforms having been put into action but still has a long way to go to realize its full potential. Frequent and unpredictable changes in the legal system along with conflicting and inconsistent Civil and Commercial Codes do not allow for a transparent and stable enforced legal business environment. This is perceived as a great source of uncertainty by international companies, which make future predictions of business goals and strategy risky.

The conclusion from the abovementioned is as follows: the investment climate of Ukraine is risky and unwelcoming, private capital is not available from domestic or international sources or available at prohibitively high cost due to real and perceived risks of doing business in Ukraine as shown by various sources. Alternatives markets, such as Russia, offer similar profile of investment opportunities with lower risk and better business environment.

Taking into account the information provided above it is possible to conclude that the determination of the project “Processing of waste heaps at Monolith-Ukraine” is relevant for the project at hand.

Step 2. Application of the approach chosen

The baseline for the comparable project “Processing of waste heaps at Monolith-Ukraine” was established in accordance with appendix B of the JI guidelines. Furthermore, the baseline was identified by listing and describing plausible future scenarios on the basis of conservative assumptions and selecting the most plausible one. The most plausible future scenario was identified by performing a barrier analysis. When only two alternatives remained, of which one alternative represented the project scenario with the JI incentive, the CDM Tool “Tool for the demonstration and assessment of additionality” was used to prove that the project scenario cannot be regarded as the most plausible one. Key factors that affect the baseline such as sectoral reform policies and legislation, economic situation/growth and socio-demographic factors in the relevant sector as well as resulting predicted demand, suppressed and/or increasing demand that will be met by the project, availability of capital, local availability of technologies/techniques, skills and know-how and availability of best available technologies/techniques in the future, fuel prices and availability, national and/or subnational expansion plans for the energy sector, were taken into account while formulating the plausible feature scenarios.

Below is the justification of the baseline scenario chosen in the comparable project.

Plausible future scenarios were identified in order to establish a baseline.

Sub step 2a. Identifying and listing plausible future scenarios.

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[16] Foreign Direct Investment in Ukraine – Donbass, Philip Burris, Problems of foreign economic relations development and attraction of foreign investments: regional aspect., ISSN 1991-3524, Donetsk, 2007. p. 507-510

Scenario 1. Continuation of existing situation

In the current situation when waste heaps are not utilised. Spontaneous self-heating and subsequent burning of waste heaps is very common and measures to extinguish fire are taken sporadically. 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 energy of 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. The 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, resulting in fugitive gas release, and the formation of more waste-heaps.

Scenario 3. Production of construction materials from waste heap matter

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

Scenario 4. Coal extraction from waste heaps without JI incentives

This scenario is similar to the project activity only in this case the project does not benefit from the possible development as a joint implementation 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 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, resulting in fugitive gas release, and the formation of more waste-heaps.

[17] *Method to utilize energy of the burning waste heaps*, Melnikov S.A., Zhukov Y.P., Gavrilenko B.V., Shulga A.Y., State Committee Of Ukraine For Energy Saving, 2004 (http://www.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

Sub step 2b. Barrier analysis

Scenario 1. Continuation of existing situation

This scenario does not anticipate any activities and therefore does not face any barriers.

Scenario 2. Direct energy production from the heat energy of burning waste heap

Technological barrier: This scenario is based on the highly experimental technology, which has not been implemented 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 user. 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 has been proposed only in theory and has not reached implementation phase. Researches admit that "development of the real-world heat pump that will utilize the heat of the waste heap mass is hindered by a lot of serious problems"[19].

Investment barrier: Investment into unproven technology carries a high risk. In case of Ukraine, which carries a high country risk[20], 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 heap matter

Technological barrier: This scenario is based on 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[21]. 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. Pilot projects of this kind have been realized only through the support of public financing[22]. One of the first such activities has been started in Rostov region of Russia with the support of governmental financing. The resulting product is construction small stone used in road construction. It is also of lesser quality than the regular construction material.

Scenario 4. Coal extraction from waste heaps without JI incentives

Investment barrier: This scenario is financially unattractive and faces barriers. Please refer to section B.2 for details.

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[19] *Research of application opportunity of geothermal pumps with ground warmth for autonomic heating supply* S.I. Monah, R.E. Baphtalovsky, Donbas National Academy of Civil Engineering and Architecture, Modern Industrial and Civil Construction, Vol. 4, N3, 2008, p. 113-118 http://www.nbuv.gov.ua/portal/natural/spcb/2008-3/SPGS2008-3/01_Monakh.pdf

[20] AMB Country Risk Report: Ukraine October 29, 2010 http://www3.ambest.com/ratings/cr/reports/Ukraine.pdf

[21] *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

[22] http://www.rostovstroy.ru/archive/articles/1164.html

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

Investment barrier: This scenario does not represent any revenues but anticipates additional costs for waste heaps owners. Monitoring of the waste heap status is not done systematically and in general actions are left to the discretion of the individual owners. Waste heaps are mostly owned by mines or regional coal mining associations[23]. Coal mines in Ukraine suffer from limited investment resulting often in safety problems due to complicated mining conditions and financial constraints, with miners' salaries often being delayed by few months.[24] Waste heaps in this situation are considered as additional burdens and mines often do not even perform minimum required maintenance. Spontaneous self-heating and subsequent burning of waste heaps is very common and among 176 surveyed waste heaps in Luhansk region alone, only 51 are known not to have been burning[25] at the same time, exact 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. Some experts admit that "There is no proven way to totally extinguish a burning waste heap"[26].

Sub step 2d. Baseline identification

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 has been established according to the criteria outlined in the JISC Guidance:

1) On a project specific basis;
2) In a transparent manner with regard to the choice of approaches, assumptions, methodologies, parameters, data sources and key factors. All parameters and data are either monitored by the project participants or are taken from sources that provide a verifiable reference for each parameter. Project participants use approaches suggested by the Guidance and methodological tools provided by the CDM Executive Board;
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. It is demonstrated by the above analysis that the baseline chosen clearly represents the most probable future scenario given the circumstances of modern day Donbas coal sector;
4) In such a way that emission reduction units (ERUs) cannot be earned for decreases in activity levels outside the project activity or due to force majeure. According to the proposed approach emission reductions will be earned only when project activity will generate coal from the waste heaps, so no emission reductions can be earned due to any changes outside of project activity.
5) Taking account of uncertainties and using conservative assumptions. A number of steps have been taken in order to account for uncertainties and safeguard conservativeness:
    a. Same approaches as used for the calculation of emission levels in the National Inventory Reports (NIRs) of Ukraine are used to calculate baseline and project emissions when

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[23] *Analysis on the fire risk of Luhansk Region's waste heaps,* Scientific Research Institute "Respirator", Donetsk, 2010.

[24] *Coal Sector of Ukraine: Problems and Sustainable Development Perspectives,* Yuri Makogon, National Institute For Strategic Research, 2008 (http://www.niss.gov.ua/Monitor/desember08/5.htm)

[25] *Analysis on the fire risk of Luhansk Region's waste heaps,* Scientific Research Institute "Respirator", Donetsk, 2010.

[26] http://terrikon.donbass.name/ter_s/327-kak-terrikony-ni-tushi-oni-vse-ravno-goryat.html

possible. NIRs use the country specific approaches and country specific emission factors that are in line with default IPCC values;

b. Lower range of parameters is used for calculation of baseline emissions and higher range of parameters is used for calculation of project activity emissions;

c. Default values were used to the extent possible in order to reduce uncertainty and provide conservative data for emission calculations.

Baseline Emissions

In order to calculate baseline emissions following assumptions were made:

1) The project will produce energy coal that will displace the same amount of the same type of coal in the baseline scenario;

2) The coal that is displaced in the baseline scenario and the coal that is generated in the project activity are used for the same type of purpose and is 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) Waste-heaps of the region are vulnerable to spontaneous self-heating and burning and at some point in time will burn;

5) The waste heaps that the project is processing are categorized as being at risk of ignition. This means that they will self-heat and start burning under normal circumstances. Coal burning in the waste heaps will oxidize to CO_2 completely if allowed to burn uncontrolled.

6) The processed rock is not vulnerable to self-heating and spontaneous ignition after the coal has been removed during the processing.

7) The correction factor is applied in order to address the uncertainty of the waste heaps burning process. This factor is defined on the basis of the survey of all the waste heaps in the area that provides a ratio of waste heaps that are or have been burning at any point in time to all existing waste heaps;

Baseline emissions come from two major sources:

1) Carbon dioxide emissions that occur during combustion of energy coal. These are calculated as stationery combustion emissions from coal in the equivalent of the amount of coal that is extracted from the waste heaps in the project scenario. This emission source is also present in the project scenario and the emissions are assumed to be equal in both project and baseline scenario. Therefore, this emission source is not included into consideration both in the project and the baseline scenario.

2) Carbon dioxide emissions from burning waste heaps. These are calculated as stationery combustion emissions from coal in the equivalent of the amount of coal that is extracted from the waste heaps in the project scenario, adjusted by the probability of a waste heap burning at any point in time. As the baseline suggests that the current situation is preserved regarding the waste heaps burning, and the waste heaps in question are at risk of burning it is assumed that actual burning will occur. The correction factor is applied in order to address the uncertainty of the waste heaps burning process. This factor is defined on the basis of the survey of all the waste heaps in the area that provides a ratio of waste heaps that are or have been burning at any point in time to all existing waste heaps.

The table below provides values for constant parameters used to determine the baseline emissions.

Table 6 List of constants used in the calculations of baseline emissions

Data / Parameter	*Data unit*	*Description*	*Data Source*	*Value*
NCV_{Coal}	TJ/kt	Net Calorific Value of coal in 2011 and after	Plant specific data. Weighted average of data obtained by measurements in the certified laboratory.	29.00
NCV_{Coal}	TJ/kt	Net Calorific Value of coal from 2009 till 2011	National Inventory Report of Ukraine 1990-2009, p. 399 (value for stationary combustion, power and heat production, 2009)	21.8
$OXID_{Coal}$	ratio	Carbon Oxidation factor of coal	National Inventory Report of Ukraine 1990-2009, p. 402 (value for stationary combustion, power and heat production, 2009)	0.963
k^{C}_{Coal}	tC/TJ	Carbon content of coal	National Inventory Report of Ukraine 1990-2009, p. 401 (value for stationary combustion, power and heat production, 2009)	25.97

Emissions in the baseline scenario are calculated as follows:

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

Where:

BE_y - Baseline Emissions in year *y*, (tCO_2e);

$BE_{WHB,y}$ - Baseline Emissions due to burning of the waste heaps in year *y*, (tCO_2e).

These, in turn, are calculated as:

$$BE_{WHB,y} = \frac{FC_{BE,Coal,y}}{1000} \cdot p_{WHB} \cdot NCV_{Coal} \cdot OXID_{Coal} \cdot k^{C}_{Coal} \cdot 44/12, \qquad \text{(Equation 2)}$$

where:

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

p_{WHB} Correction factor for the uncertainty of the waste heaps burning process. This factor is defined on the basis of the survey of all the waste heaps in the area that provides a ratio of waste heaps that are or have been burning at any point in time to all existing waste heaps. This number is taken from the study[27] of waste heaps in Luhansk region and is defined as the ratio of waste heaps that are or have been on fire historically to all existing waste heaps of Luhansk region. This ratio is equal to 0.699 according to this study, ratio;

NCV_{Coal} Net calorific value of coal, TJ/kt,

$OXID_{Coal}$ Carbon Oxidation factor of coal, ratio,

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[27] *Analysis on the fire risk of Luhansk Region's waste heaps,* Scientific Research Institute "Respirator", Donetsk, 2010.

k_{Coal}^{C} Carbon content of coal, tC/TJ,

$44/12$ Ratio between molecular mass of CO_2 and C. Reflect oxidation of C to CO_2.

Leakage

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

This project will result in a net change in fugitive methane emissions due to the mining activities. As coal in the baseline scenario is only coming from mines it causes fugitive emissions of methane. These are calculated as standard country specific carbon dioxide emission factor applied to the amount of coal that is 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 are **the fugitive methane emissions** due to coal mining. Coal produced by the project activity is not mined but extracted from the waste heap through the advanced beneficiation process. Therefore, coal produced by the project activity substitutes the coal would have been otherwise mined in the baseline. Coal that is mined in the baseline has fugitive methane emissions associated with it and the coal produced by the project activity does not have such emissions associated with it.

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[28] (See Volume 2, Chapter 4, Page 4-11) and also used in CDM approved methodology ACM0009[29] (Page 8). Activity data (in our case amount of coal extracted from the waste heap which is monitored directly) is multiplied by the emission factor (which is sourced from the relevant national study – National Inventory Report[30] of Ukraine under the Kyoto Protocol) and any conversion coefficients. It is important to mention that IPCC and relevant National Inventories take into account raw amount of coal that is being mined in these calculations whereas in the PDD coal extracted from the waste heaps is high quality coal concentrate. Therefore, approach taken in the PDD is conservative as in coal mining more raw coal should be mined causing more fugitive methane emissions to produce equivalent amount of high quality coal concentrate.

This leakage is directly attributable to the JI project activity according to the following assumption: the coal produced by the project activity from the waste heap will substitute the coal produced by underground mines of the region in the baseline scenario. This assumption is explained by the following logic: Energy coal market is demand driven as it is not feasible to produce coal without demand for it. Coal is a commodity that can be freely transported to the source of demand and coal of identical quality can substitute some other coal easily. The project activity cannot influence demand for coal on the market and supplies coal extracted from the waste heaps. In the baseline scenario demand for coal will stay the same and will be met by the traditional source – underground mines of the region. Therefore, the coal supplied by the project in the project scenario will have to substitute the coal mined in the baseline scenario. According to this approach equivalent product supplied by the project activity (with lower associated specific green-house gas emissions) will substitute the baseline product (with higher associated specific green-house gas emissions). This methodological approach is very common and is applied in all renewable energy projects (substitution of grid electricity with renewable-source electricity), projects in cement sector (e.g. JI0144 Slag usage and switch from wet to semi-dry process at

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

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

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

Volyn-Cement, Ukraine[31]), projects in metallurgy sector (e.g. UA1000181 Implementation of Arc Furnace Steelmaking Plant "Electrostal" at Kurakhovo, Donetsk Region[32]) and others.

This leakage is significant and will be included in the calculation of the project emission reductions. Procedure for ex ante estimate and quantification of this source of leakage is provided below:

Table 7 List of constants used in the calculations of leakage

Data / Parameter	Data unit	Description	Data Source	Value
GWP_{CH4}	tCO_2e/tCH_4	Global Warming Potential of Methane	Climate Change 1995. The Science of Climate Change[33]	21
ρ_{CH4}	t/m^3	Methane density	2006 IPCC Guidelines for National Greenhouse Gas Inventories, Volume 2: Energy, Chapter 4: Fugitive Emissions, p. 4.12. Measurement units have been converted from $Gg \cdot m^{-3}$ to t/m^3. IPCC Standard (t=293.15 K; p= 101.325 kPa)	0.00067
$EF_{CH_4,CM}$	m^3/t	Emission factor for fugitive methane emissions from coal mining	National Inventory Report of Ukraine 1990-2009, p. 90	25.67

Leakages in the year y are calculated as follows:

$$LE_y = -LE_{CH_4,y} \qquad \text{(Equation 3)}$$

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

$$LE_{CH_4,y} = FC_{BE,Coal,y} \cdot EF_{CH_4,CM} \cdot \rho_{CH_4} \cdot GWP_{CH_4}, \qquad \text{(Equation 4)}$$

where:

$FC_{BE,Coal,y}$ - Amount of coal that has been mined in the baseline scenario and combusted for energy use, equivalent to the amount of coal extracted from the waste heaps in the project activity in year y, (t).

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

32 http://ji.unfccc.int/JIITLProject/DB/4THB9WT0PK6F721UQA5H6PTHZEXT4C/details

33 IPCC Fourth Evaluation Report, RG1, Section 2, Table 2.14, 2007. http://www.ipcc.ch/publications_and_data/ar4/wg1/en/ch2s2-10-2.html#table-2-14

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

Data/Parameter	$FC_{BE,Coal,y}$
Data unit	t
Description	Amount of coal that has been mined in the baseline scenario and combusted for energy use, equivalent to the amount of coal extracted from the waste heaps in the project activity in the year *y*.
Time of determination/monitoring	Yearly monitoring.
Source of data (to be) used	Project owner records
Value of data applied (for ex ante calculations/determinations)	As provided by the project owner
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	$EF_{CH_4,CM}$
Data unit	m^3/t
Description	Carbon dioxide emission factor for fugitive methane emissions from coal mining.
Time of determination/monitoring	Fixed ex ante.
Source of data (to be) used	*National Inventory Report of Ukraine 1990-2009*, p.90
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	Default carbon dioxide emission factor established according to the national report.
QA/QC procedures (to be) applied	According to the annual National Inventory Report.
Any comment	No

Data/Parameter	p_{WHB}
Data unit	ratio
Description	Correction factor for the uncertainty of the waste heaps burning process
Time of determination/monitoring	Fixed ex ante.
Source of data (to be) used	Scientific study
Value of data applied (for ex ante	0.699

calculations/determinations)	
Justification of the choice of data or description of measurement methods and procedures (to be) applied	This factor is defined on the basis of the survey of all the waste heaps in the area that provides a ratio of waste heaps that are or have been burning at any point in time to all existing waste heaps. This number is taken from the study of waste heaps in Luhansk region and is defined as the ratio of waste heaps that are or have been on fire historically to all existing waste heaps of Luhansk region. This ratio is equal to 0.699 according to this study.
QA/QC procedures (to be) applied	In accordance with procedures of scientific research.
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 reductions in emissions by sources that are additional to any that would otherwise occur:

Step 1. Indication and description of the approach applied

As suggested by Paragraph 44 (b) of the Annex 1 to Guidance on criteria for baseline setting and monitoring, Version 03, additionality can be demonstrated by provision of traceable and transparent information showing that the same approach for additionality demonstration has already been taken in cases for which determination is deemed final and which can be regarded as comparable, using the criteria outlined for baseline determination in paragraph 12 of the Guidance. It was decided to refer to positively determined project "Processing of waste heaps at Monolith-Ukraine" (ITL Project ID: UA2000034) which was proven to be comparable to the current project in the Section B.1. of this document. Thus, an approach for additionality demonstration already taken in comparable case is used.

Step 2. Application of the approach chosen

The project "Processing of waste heaps at Monolith-Ukraine" is selected as the comparable JI project. Accredited independent entity has already positively determined that it would result in a reduction of anthropogenic emissions by sources or an enhancement of net anthropogenic removals by sinks that is additional to any that would otherwise occur. This determination has already been deemed final by the JISC. Appropriate documentation such as PDD and Determination Report regarding this project is available traceably and transparently on the UNFCCC JI Website: http://ji.unfccc.int/JI_Projects/DB/IPT7L3CLGIZTGGX27T2101W7XCUCWW/Determination/DNV-CUK1315829182.27/viewDeterminationReport.html

Below is the summary of additionality reasoning provided to demonstrate that the comparable project provides reductions in emissions by sources that are additional to any that would otherwise occur:

Step 1. Indication and description of the approach applied

"Tool for the demonstration and assessment of additionality" approved by the CDM Executive Board version 05.2[34] was used to demonstrate additionality of the project activity.

Step 2. Application of the approach chosen

Step 1: Identification of alternatives to the project activity consistent with current laws and regulations

Sub-step 1a: Define alternatives to the project activity

The following alternatives to the proposed project were identified:

Alternative 1. Coal extraction from waste heaps without JI incentives

This scenario is similar to the project activity, only in this case, the project is not benefiting from the possible development as a joint implementation 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.

[34] http://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-01-v5.2.pdf

Alternative 2. Continuation of existing situation

In the current situation waste heaps are not utilised. The spontaneous self-heating and subsequent burning of waste heaps is very common and measures to extinguish fire are taken sporadically. Burning waste heaps are sources of uncontrolled green-house 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.

Outcome of Step 1a: We have identified realistic and credible alternative scenarios to the project activity.

Sub-step 1b: Consistency with mandatory laws and regulations

Existing Ukrainian laws and regulations treat waste heaps as sources of possible dangerous emissions into the atmosphere. In general burning waste heaps should be extinguished and measures must be taken to prevent fires in the future. This is regulated by the "Rules of Safety in Coal Mines"[35]. Enforcement of this document is quite weak and for the most part is regulated by the Code of Administrative Offences of Ukraine which foresees only a small fine for such offence[36] (up to approximately 17 EUR). However, due to the large numbers of waste heaps and their substantial sizes, combined with the limited resources of the owners, they typically do not even undertake the minimum required regular monitoring. Even when informed of a burning waste heap, and measures have to be taken under existing legislation, it is more typical to accept the fine for air contamination, rather than take action to extinguish the burning waste heap itself. Burning waste heaps are quite usual[37][38][39] and no improvement of this situation is foreseen. Some experts even claim that due to the constant lack of financing the system of control over the waste heaps has been lost in Ukraine[40].

In such circumstances it is obvious that identified alternatives do not contradict existing laws and regulations taking into account the enforcement of such in Ukraine.

Outcome of Step 1b: We have identified realistic and credible alternative scenarios to the project activities that are in compliance with mandatory legislation and regulations taking into account the enforcement in Ukraine.

Step 2. Investment Analysis

Sub-step 2a: Determine appropriate analysis method

In principle, there are three methods applicable for an investment analysis: simple cost analysis, investment comparison analysis and benchmark analysis.

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[35] Chapter IX, Article 7, NPAOP 10.0-1.01-10 Rules of Safety in Coal Mines. Order #62 of the State Committee of Ukraine on Industrial Safety, Labour Security and Mining Supervision – 22/03/2010 http://zakon1.rada.gov.ua/cgi-bin/laws/main.cgi?nreg=z0398-10

[36] Article 41 of the Code of Administrative Offences of Ukraine - http://zakon1.rada.gov.ua/cgi-bin/laws/main.cgi?page=2&nreg=80731-10

[37] *Burning waste heaps of Luhansk region* http://lugansk.comments.ua/article/2010/04/05/125206.html

[38] *Waste heaps of Donbass are on the verge of explosion* http://terrikon.donbass.name/ter_s/283-donbasskie-terrikony-na-grani-vzryva-iz-za-zhary.html

[39] *Burning waste heap poisons the whole town* http://kp.ua/daily/161010/248204/

[40] *Waste heap of the Mine named after Kirov is burning* http://makeevka.ws/?p=1662

A simple cost analysis (Option I) shall be applied if the proposed JI project and the alternatives identified in step 1 generate no financial or economic benefits other than JI related income. The proposed JI project results in sales revenues due to the extraction of coal from the waste heaps. Thus, this analysis method is not applicable.

An investment comparison analysis (Option II) compares suitable financial indicators for realistic and credible investment alternatives. As only plausible alternative represents the continuation of existing situation, a benchmark analysis (Option III) is applied.

Sub-step 2b: Option III. Apply benchmark analysis

For the benchmark analysis of the project the indicator of Net Present Value (NPV) was used. The goal of analysis will be to show that the project activity not undertaken as a joint implementation project would not be financially attractive and would lead to negative value of NPV.

Sub-step 2c: Calculation and comparison of financial indicators

The financial analysis refered to the time of investment decision-making. The data provided by the project participant were used to perform calculations with the following assumptions:

1) Investment decision date was taken as 15th of January 2009. Prices, tariffs and costs for the analysis were taken as of that date;
2) Project lifetime is 2010-2024 based on the physical expected depletion of the waste heaps that will be processed;
3) All calculations were done in local currency – UAH.
4) Discount rate for NPV calculation was taken as the National Bank of Ukraine discount rate which was 12% at the time of analysis date.

The project activity resulted in negative NPV under the conservative discount rate applied. This means that any investor wishing to invest into such project would lose value of his investment instead of increasing it. Hence, the project could not be considered as a financially attractive course of action.

Sub-step 2d: Sensitivity analysis

Variations of the key factors for the range of +10% and –10% were applied. The project did not reach positive NPV under any of the varying assumptions. Thus, the sensitivity analysis demonstrated that project activity is unlikely to be financially/economically attractive.

Outcome of Step 2: After the sensitivity analysis it was concluded that the proposed JI project activity was unlikely to be financially/economically attractive.

Step 3: Barrier analysis
In line with the Additionality Tool no barrier analysis is needed when investment analysis is applied.

Step 4: Common practice analysis

Sub-step 4a: Analyse other activities similar to the proposed project activity:

No activities similar to the proposed project activity were observed in Ukraine except for those that are implemented with the support of JI mechanism[41]. Waste heaps are considered as increased safety risk waste objects. In only a limited number of cases some minor fire extinguishing measures are taken but generally no actions are taken to secure the coal mining waste heaps. Waste heaps rich in coal are often target for uncontrolled amateur coal extraction by local population. These activities lead to increased fire risk and expose local population to increased air pollution. Extracting coal from wastes is practiced by

[41] http://ji.unfccc.int/JI_Projects/DB/VOZK3HERSNQGFLCY0YZ3AX5W676M5R/Determination/Bureau%20Veritas%20Certification1277814730.41/viewDeterminationReport.html

some coke beneficiation plants but they extract coal from organized slurry ponds and those activities are scarce.

Sub-step 4b: Discuss any similar Options that are occurring:

The proposed JI project does not represent a widely observed practice in the area considered (see Sub-step 4a). Similar activities that can be observed in Ukraine are implemented as JI projects and, therefore, are excluded from the analysis. So, this sub-step is not applied. The facts mentioned above allow concluding that the proposed JI project is not common practice in Ukraine.

Sub-steps 4a and 4b were satisfied, i.e. similar activities cannot be widely observed. Thus proposed project activity was not a common practice.

Conclusion: Thus the additionality analysis demonstrates that project emission reductions were additional to any that would otherwise occur**.**

Outcome of the analysis: We have provided traceable and transparent information that an accredited independent entity has already positively determined that a comparable project "Processing of waste heaps at Monolith-Ukraine" (ITL Project ID: UA2000034) implemented under comparable circumstances (same GHG mitigation measure, same country, similar technology, similar scale) would result in a reduction of anthropogenic emissions by sources or an enhancement of net anthropogenic removals by sinks that is additional to any that would otherwise occur and have provided justification why this determination is relevant for the project at hand. Therefore, this project is additional.

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

The project activities are physically limited to the waste heaps in the legal use of PE "SNABTECHMONTAZH". At the same time, some sources of GHG emissions are indirect – fugitive methane emissions as the result of coal mining in Ukraine, carbon dioxide emissions due to the consumption of power from the Ukrainian electricity grid, as a result of electricity generation using fossil fuels. Fugitive methane emissions as the result of coal mining in Ukraine are treated as leakage.

The table below shows an overview of all emission sources in the baseline and project scenarios. Project boundary has been delineated in accordance with provisions of Paragraphs 11, 12, 13 of the Guidance.

Table 8 Sources of emissions in the baseline and project scenarios

	Source	Gas	Included/Excluded	Justification / Explanation
Baseline	Waste heap burning	CO_2	Included	Main emission source
	Coal consumption	CO_2	Excluded	This coal is displaced in the project activity by the coal extracted from the waste heaps. This emission source is equal to the one present in the project scenario and, therefore is excluded from consideration.
Project scenario	Coal consumption	CO_2	Excluded	This coal is extracted from the waste heaps. This emission source is equal to the one present in the baseline scenario and, therefore is excluded from consideration.

	Electricity use for the process of coal extraction from the waste heap	CO_2	Included	Main emission source
	Fossil fuel (diesel) consumption for the process of coal extraction from the waste heap	CO_2	Included	Main emission source

Baseline scenario

The baseline scenario is the continuation of the existing situation. Coal is produced by the underground mines and is used for energy generation. Waste heaps are often self-heating and burning causing carbon dioxide emissions into the atmosphere. Emission sources in the baseline that are included into the project boundary are:

- Carbon dioxide emissions from the burning of coal in the waste heaps.

Project scenario

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

- Carbon dioxide emissions from the use of fuel to run part of the project equipment (motor cars),
- Carbon dioxide emissions associated with the electricity consumption by the project equipment.

Carbon dioxide emissions that occur during the combustion of energy coal. These are calculated as stationery combustion emissions from coal in the equivalent of the amount of coal that is extracted from the waste heaps in the project scenario. This emission source is also present in the project scenario and the emissions are assumed to be equal in both project and baseline scenario. Therefore, this emission source is not included into consideration both in the project and the baseline scenario.

Leakage

This project will result in a net change (reduction) in fugitive methane emissions due to the mining activities. As coal in the baseline scenario is only coming from mines it causes fugitive emissions of methane. These are calculated as standard country specific carbon dioxide emission factor applied to the amount of coal that is 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.

The following figures show the project boundaries and sources of emissions in the baseline scenario and in the project scenario.

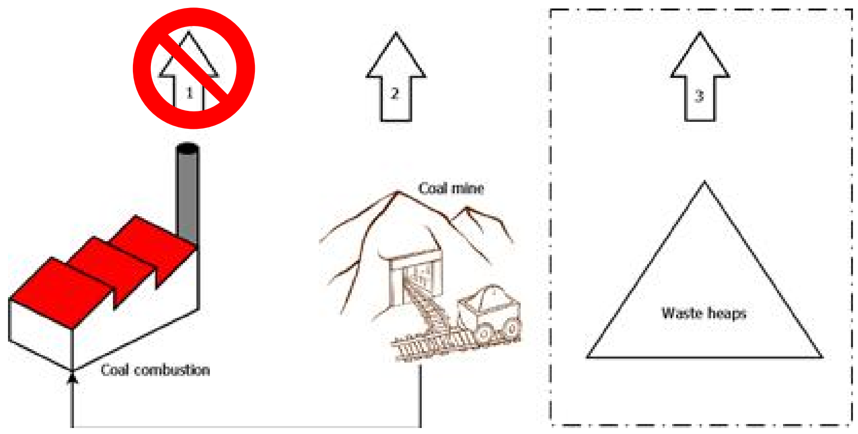

Figure 6. Project boundaries in the baseline scenario

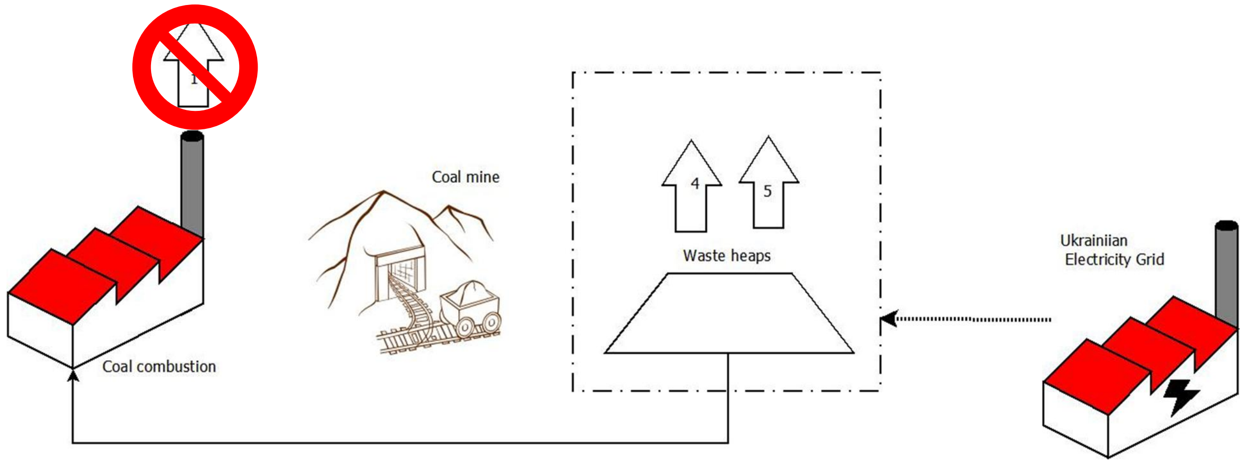

Figure 7. Project boundaries in the project scenario

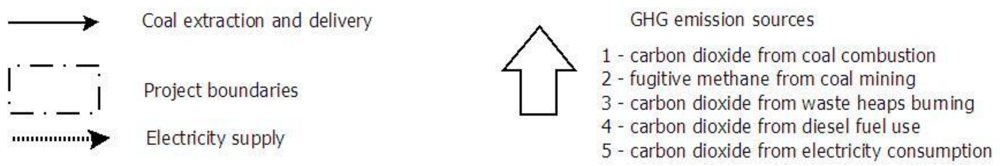

Figure 8 Legend for project boundary schematics

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: 07/10/2011

Name of person/entity setting the baseline:
Anna Voldemarivna Vilde
Phone: +38 050 410 25 98; Fax: +38 044 272 08 87
E-mail: vilde@global-carbon.com
Global Carbon BV Contact information is in the Annex 1.
Anna Voldemarivna Vilde is not a project participant. Global Carbon BV is a project participant.

SECTION C. Duration of the project / crediting period

C.1. Starting date of the project:

Starting date of the project is 12th of January 2009. This is the date when the contract for waste heap processing was signed.

C.2. Expected operational lifetime of the project:

The lifetime of the project is estimated to last until the end of September, 2024. Thus, the operational lifetime of the project will be 15 years or 180 months.

C.3. Length of the crediting period:

Start of the crediting period: 01/10/2009. This is the date when first month of operation started.
End of the crediting period: 30/09/2024

Length of the part of crediting period within the first commitment period of the Kyoto Protocol: 3 years and 3 months or 39 months (01/10/2009-31/12/2012).

Length of the part of crediting period after the first commitment period of the Kyoto Protocol: 11 years and 9 month or 141 months (01/01/2012-30/09/2024).

The status of emission reductions or enhancements of net removals generated by JI projects before the beginning or after the end of the first commitment period of the Kyoto Protocol may be determined by any relevant agreement under the UNFCCC.

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 regarding monitoring

Option *a* provided by the Guidelines for the Users of the Joint Implementation Project Design Document Form, Version 04[42] is used: JI specific approach is used in this project and therefore will be used for establishment of monitoring plan.

Step 2. Application of the approach chosen

Baseline scenario

The baseline scenario is the continuation of the existing situation. Coal is produced by the underground mines and is used for energy generation. Waste heaps are often self-heating and burning causing carbon dioxide emissions into the atmosphere. Emission sources in the baseline that are included into the project boundary are:

- Carbon dioxide emissions from the burning of coal in the waste heaps.

Project scenario

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

- Carbon dioxide emissions from the use of fuel to run part of the project equipment (motor cars),
- Carbon dioxide emissions associated with the electricity consumption by the project equipment.

Carbon dioxide emissions that occur during the combustion of energy coal. These are calculated as stationery combustion emissions from coal in the equivalent of the amount of coal that is extracted from the waste heaps in the project scenario. This emission source is also present in the project scenario and the emissions

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

are assumed to be equal in both project and baseline scenario. Therefore, this emission source is not included into consideration both in the project and the baseline scenario.

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

- Removing the source of green-house gas emissions from the combustion of waste heaps by the extraction of coal from the waste-heaps;
- Negative leakage from the reduced fugitive emissions of methane due to the replacement of coal that would have been mined, by the project.

For any monitoring period the following parameters have to be collected and registered:

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

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

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

   For the metering of this parameter the commercial data of the company are used. Receipts and other accounting data are used in order to confirm the amount of fuel consumed. All fuel consumption is taken into account and is attributed to the project activity. If the data in the commercial documents mentioned are provided in litres rather than in tonnes the data in litres are converted into tonnes using the density of 0,85 kg/l[43]. Regular cross-checks with the suppliers are performed. The monthly and annual reports are based on these data.

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

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

Data and parameters that are not monitored throughout the crediting period, but are determined only once (and thus remain fixed throughout the crediting period), and that are available already at the stage of determination regarding the PDD are provided in the table below:

[43] DSTU 3868-99 Diesel Fuel. Specifications. Section 4, Table 1. 0,85 kg/l is taken as an average between two suggested types of diesel: summer and winter.

Table 9 List of constants used in the calculations of emissions

Data / Parameter	*Data unit*	*Description*	*Data Source*	*Value*
GWP_{CH4}	$tCO_2e/t\ CH_4$	Global Warming Potential of Methane	Climate Change 1995. The Science of Climate Change. Edited by J. T. Houghton and other (1996), p. 22, Table 4[44]	21
ρ_{CH4}	t/m^3	Methane density	2006 IPCC Guidelines for National Greenhouse Gas Inventories, Volume 2: Energy, Chapter 4: Fugitive Emissions, p. 4.12[45] . Measurement units have been converted from $Gg \cdot m^{-3}$ to t/m^3. Standard (t=293.15 K; p= 101.325 kPa)	0.00067
p_{WHB}	ratio	Correction factor for the uncertainty of the waste heaps burning process	Scientific study - Analysis on the fire risk of Luhansk Region's waste heaps, Scientific Research Institute "Respirator", Donetsk, 2010	0.699

Setup of measurement installation

The measurement method selected for the project is based on measuring some monitored parameters – coal produced and electricity consumed – and relying on accounting documents and reports for other parameters (fuel used). The measurement setup will be based on the following meters: for electricity consumed - the electronic meter which is a multifunction device for measurement of electric energy; for coal produced – electronic automobile scales. For the measurement of fuel consumption information from accounting department will be used: receipts for the fuel purchased; reports on the fuel used and accounting documents for fuel usage.

Archiving, data storage and record handling procedure

Documents and reports on the data that are monitored will be archived and stored by the project participants. The following documents will be stored: primary documents for the accounting of monitored parameters in paper form; intermediate reports, orders and other monitoring documents in paper and electronic form; documents on measurement devices in paper and electronic form. These documents and other data monitored and required for determination and verification, as well as any other data that are relevant to the operation of the project will be kept for at least two years after the last transfer of ERUs. If expected monitoring data on coal production is not available (used for calculation of baseline and leakage emissions), they will not be taken into account and emission reductions will

[44] http://www.ipcc.ch/ipccreports/sar/wg_I/ipcc_sar_wg_I_full_report.pdf

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

not be claimed. If data is missing on parameters used for calculating project emissions: electricity or diesel consumption, average specific consumption data for the previous periods will be applied. This is conservative.

Training of monitoring personnel

The project will utilize technology that requires skills and knowledge in heavy machinery operation, coal washing technology operation, electric equipment operation etc. This kind of skills and knowledge is available locally through the system of vocational training and education. This system is state-supervised in Ukraine. Professionals who graduate from vocational schools receive a standard certificate in the field of their professional study. Only workers with proper training can be allowed to operate industrial equipment. Management of the project host will ensure that personnel of the project have received proper training and are eligible to work with the prescribed equipment.
Training on safety issues is mandatory and must be provided to all personnel of the project as required by local regulations. Procedure for safety trainings includes the scope of the trainings, training intervals, forms of training, knowledge checks etc. The project host management will maintain records for such trainings and periodic knowledge check-ups.
Activities that are directly related to the monitoring do not require specific training other than provided by the professional education. However, monitoring personnel will receive training on monitoring procedures and requirements. Personnel of the project host management will receive necessary training and consultations on Kyoto Protocol, JI projects and monitoring from the project participant – Global Carbon BV.

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

In cases if any errors, fraud or inconsistencies will be identified during the monitoring process special commission will appointed by project host management that will conduct a review of such case and issue an order that must also include provisions for necessary corrective actions to be implemented that will ensure such situations are avoided in future.
The project host management will also establish a communication channel that will make it possible to submit suggestions, improvement proposals and project ideas for more accurate future monitoring for every person involved in the monitoring activities. Such communications will be delivered to the project host management who is required to review these communications and in case it is found appropriate implement necessary corrective actions and improvements. Project participant – Global Carbon BV – will conduct periodic review of the monitoring plan and procedures and if necessary propose improvements to the project participants.

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.

D.1.1. Option 1 – Monitoring of the emissions in the project scenario and 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
1	$EC_{PJ,y}$ - Additional electricity consumed in year y as a result of the implementation of the project activity	Company records, electricity meters	MWh	m	continuously with monthly totals	100%	Electronic and paper	This parameter is registered with a specialized electricity meters.
2	$FC_{PJ,Diesel,y}$ - Amount of diesel fuel that has been used for the project activity in the year y	Company records	t	m	monthly	100%	Electronic and paper	For the metering of this parameter the commercial data of the company are used. Receipts and other accounting data are used in order to confirm the amount of fuel consumed.

3	$EF_{CO2,EL,y}$ - carbon dioxide emission factor for 2nd voltage class grid connected power consumption [46] in year y.	Official information of Ukrainian DFP	tCO_2/MWh	e	Ex-post as provided by the Ukrainian DFP on the annual basis	100%	Electronic and paper	This carbon dioxide emission factor is the latest emission factor for consumption of electricity from Ukrainian electricity grid approved by the DFP of Ukraine.
4	$NCV_{Diesel,y}$ - Net Calorific Value of diesel fuel in year y	National Inventory Reports (value for mobile combustion, off-road)	TJ/kt	e	Ex-post as provided by the Ukrainian DFP on the annual basis	100%	Electronic and paper	Latest country specific data available
5	$OXID_{Diesel,y}$ - Carbon Oxidation factor of diesel fuel in year y	National Inventory Reports (value for mobile combustion, off-road)	ratio	e	Ex-post as provided by the Ukrainian DFP on the annual basis	100%	Electronic and paper	Latest country specific data available
6	$k^{C}_{Diesel,y}$ - Carbon content of diesel fuel in	National Inventory Reports (value for mobile	tC/TJ	e	Ex-post as provided by the Ukrainian DFP on the annual	100%	Electronic and paper	Latest country specific data available

[46] Factor of specific indirect emissions of carbon dioxide for consumption of electricity by 2nd-class consumers in accordance with Procedure for determining consumer classes approved by Resolution of National Energy Regulating Commission No 1052 on 13 August 1998.

	year y	combustion, off-road)			basis			

The table above includes data and parameters that are monitored throughout the crediting period.

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

Results of the emissions calculations are presented in metric tons of carbon dioxide equivalent (tCO_2e), 1 metric ton of carbon dioxide equivalent is equal to 1 metric ton of carbon dioxide (tCO_2), i.e. 1 tCO_2e = 1 tCO_2.

Emissions from the project activity are calculated as follows:

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

where:

PE_y, - Project Emissions due to project activity in the year y (tCO_2e),

$PE_{EL,y}$ - Project Emissions due to consumption of electricity from the grid by the project activity in the year y (tCO_2e),

$PE_{Diesel,y}$ - Project Emissions due to consumption of diesel fuel by the project activity in the year y (tCO_2e).

These, in turn, are calculated as:

$$PE_{EL,y} = EC_{PJ,y} \cdot EF_{CO2,EL,y}, \qquad \text{(Equation 6)}$$

where:

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

$EF_{CO2,EL,y}$ - Relevant carbon dioxide emission factor for consumption of electricity from the grid in the year y, (tCO_2e/MWh).

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

where:

$FC_{PJ,Diesel,y}$ - Amount of diesel fuel that has been used for the project activity in the year y, (tonnes),

$NCV_{Diesel,y}$ - Net Calorific Value of diesel fuel in the year *y*, (TJ/kt),

$Oxid_{Diesel,y}$ - Carbon Oxidation factor of diesel fuel in the year *y*, (ratio),

$k^{C}_{Diesel,y}$ - Carbon content of diesel fuel in the year *y*, (tC/TJ),

$44/12$ - Ratio between molecular mass of CO_2 and C. Reflects oxidation of C to CO_2.

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
7	$FC_{BE,Coal,y}$ - Amount of coal that has been mined in the baseline scenario and combusted for energy use, equivalent to the amount of coal extracted from the waste heaps in the project activity in the year y	Company records, scales	t	m	monthly	100%	Electronic and paper	For the metering of this parameter the commercial data of the company are used. This parameter is registered with a specialized scales.
8	$NCV_{Coal,y}$ - Net Calorific Value of coal in the year y	Certificates of sampling and testing	TJ/kt	m and c	On sampling basis	On sampling basis	Electronic and paper	Weighted average over the monitoring period will be used.

9	$OXID_{Coal,y}$ - Carbon Oxidation factor of coal in the year y	National Inventory Reports (value for stationary combustion, power and heat production)	ratio	e	Ex-post as provided by the Ukrainian DFP on the annual basis	100%	Electronic and paper	Latest country specific data available
10	$k^{C}_{Coal,y}$ - Carbon content of coal in the year y	National Inventory Reports (value for stationary combustion, power and heat production)	tC/TJ	e	Ex-post as provided by the Ukrainian DFP on the annual basis	100%	Electronic and paper	Latest country specific data available

The table above includes data and parameters that are monitored throughout the crediting period.

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

Results of the emissions calculations are presented in metric tons of carbon dioxide equivalent (tCO_2e), 1 metric ton of carbon dioxide equivalent is equal to 1 metric ton of carbon dioxide (tCO_2), i.e. 1 tCO_2e = 1 tCO_2.

Emissions in the baseline scenario are calculated as follows:

$$BE_y = BE_{WHB,y},$$ (Equation 8)

where:

BE_y, - Baseline Emissions in the year *y* (tCO_2e),

$BE_{WHB,y}$ - Baseline Emissions due to burning of the waste heaps in the year *y* (tCO_2e).

These, in turn, are calculated as:

$$BE_{WHB} = \frac{FC_{BE,Coal,y}}{1000} \cdot p_{WHB} \cdot NCV_{Coal,y} \cdot OXID_{Coal,y} \cdot k^{C}_{Coal,y} \cdot 44/12,$$ (Equation 9)

where:

$FC_{BE,Coal,y}$ - Amount of coal that has been mined in the baseline scenario and combusted for energy use, equivalent to the amount of coal extracted from the waste heaps in the project activity in the year y, (tonnes).

p_{WHB} - Correction factor for the uncertainty of the waste heaps burning process. This factor is defined on the basis of the survey of all the waste heaps in the area that provides a ratio of waste heaps that are or have been burning at any point in time to all existing waste heaps. This number is taken from the study[47] of waste heaps in Luhansk region and is defined as the ratio of waste heaps that are or have been on fire historically to all existing waste heaps of Luhansk region. This ratio is equal to 0.699 according to this study, (ratio).

$NCV_{Coal,y}$ - Net Calorific Value of coal in the year *y*, (TJ/kt),

$OXID_{Coal,y}$ - Carbon Oxidation factor of coal in the year *y*, (ratio)

$k^{C}_{Coal,y}$ - Carbon content of coal in the year *y*, (tC/TJ),

$44/12$ - Ratio between molecular mass of CO_2 and C. Reflect oxidation of C to CO_2.

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

This section is left blank on purpose

[47] *Analysis on the fire risk of Luhansk Region's waste heaps,* Scientific Research Institute "Respirator", Donetsk, 2010.

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

This section is left blank on purpose

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):

This section is left blank on purpose

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

This project will result in a net change in fugitive methane emissions due to the mining activities. As coal in the baseline scenario is only coming from mines it causes fugitive emissions of methane. These are calculated as standard country specific carbon dioxide emission factor applied to the amount of coal that is 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).

This leakage is significant and will be included in the monitoring plan and calculation of the project emission reductions.

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
11	$FC_{BE,Coal,y}$ - Amount of coal that has been mined in the baseline scenario and combusted for energy use, equivalent to the amount of coal extracted from the waste heaps in the project activity in the year y	Company records, scales	t	m	monthly	100%	Electronic and paper	For the metering of this parameter the commercial data of the company are used. This parameter is registered with a specialized scales.
12	$EF_{CH_4,CM,y}$ - Carbon dioxide emission factor for fugitive methane emissions from coal mining in the year y	National Inventory Reports	m^3/t	e	Ex-post as provided by the Ukrainian DFP on the annual basis	100%	Electronic and paper	Latest country specific data available

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

Results of the emissions calculations are presented in metric tons of carbon dioxide equivalent (tCO_2e), 1 metric ton of carbon dioxide equivalent is equal to 1 metric ton of carbon dioxide (tCO_2), i.e. 1 tCO_2e = 1 tCO_2.

Leakages in the year y are calculated as follows:

$$LE_y = -LE_{CH_4,y}$$ (Equation 10)

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

$$LE_{CH_4,y} = FC_{BE,Coal,y} \cdot EF_{CH_4,CM,y} \cdot \rho_{CH_4} \cdot GWP_{CH_4},$$ (Equation 11)

$FC_{BE,Coal,y}$ - Amount of coal that has been mined in the baseline scenario and combusted for energy use, equivalent to the amount of coal extracted from the waste heaps in the project activity in the year y, (t),

$EF_{CH_4,CM,y}$ - Carbon dioxide emission factor for fugitive methane emissions from coal mining in the year *y*, (m^3/t),

ρ_{CH4} - Methane density, (t/m^3),

GWP_{CH4} - Global Warming Potential of Methane, ($tCO_2e/t\ CH_4$).

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):

The annual emission reductions are calculated as follows:

$$ER_y = BE_y - LE_y - PE_y$$ (Equation 12)

where:

ER_y - Emissions reductions of the JI project in year y (tCO_2e)

LE_y – Leakages in the year y (tCO_2e);

BE_y - Baseline Emission in year y (tCO_2e);

PE_y - Project Emission in year y (tCO_2e);

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"* 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.
D.1.1.1. – ID 1	Low	The electricity meters are calibrated according to the procedures of the Host Party. Calibration interval is 8 years.
D.1.1.1. – ID 2	Low	These data are used in the commercial activity of the company. Accounting documentation will be used.
D.1.1.1. – ID 3	Low	The carbon dioxide emission factor is calculated by Ukrainian DFP on the annual basis and made public.
D.1.1.1. – ID 4	Low	The parameter is calculated by Ukrainian DFP on the annual basis and made public.
D.1.1.1. – ID 5	Low	The parameter is calculated by Ukrainian DFP on the annual basis and made public.
D.1.1.1. – ID 6	Low	The parameter is calculated by Ukrainian DFP on the annual basis and made public.
D.1.1.3. – ID 7	Low	These data are used in commercial activities of the company. The scales are calibrated according to the procedures of the Host Party. Calibration interval is 1 year.
D.1.1.3. – ID 8	Low	These data are used in the commercial activity of the company. Certificates of sampling and testing provided by a certified laboratory will be used.
D.1.1.3. – ID 9	Low	The parameter is calculated by Ukrainian DFP on the annual basis and made public.
D.1.1.3. – ID 10	Low	The parameter is calculated by Ukrainian DFP on the annual basis and made public.
D.1.3.1. – ID 11	Low	These data are used in commercial activities of the company. The scales will be calibrated according to the procedures of the Host Party. Calibration interval is 1 year.
D.1.3.1. – ID 12	Low	The parameter is calculated by Ukrainian DFP on the annual basis and made public.

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

The project owner – PE "SNABTEHMONTAZH" will implement provisions of this monitoring plan into its organizational and quality management structure. For monitoring, collection, registration, visualization, archiving, reporting of the monitored data and periodical checking of the measurement devices the management team headed by the Director of the company is responsible. A detailed structure of the team and team members will be established in the Monitoring Report prior to initial and first verification. The principle structure presents on the following flow-chart:

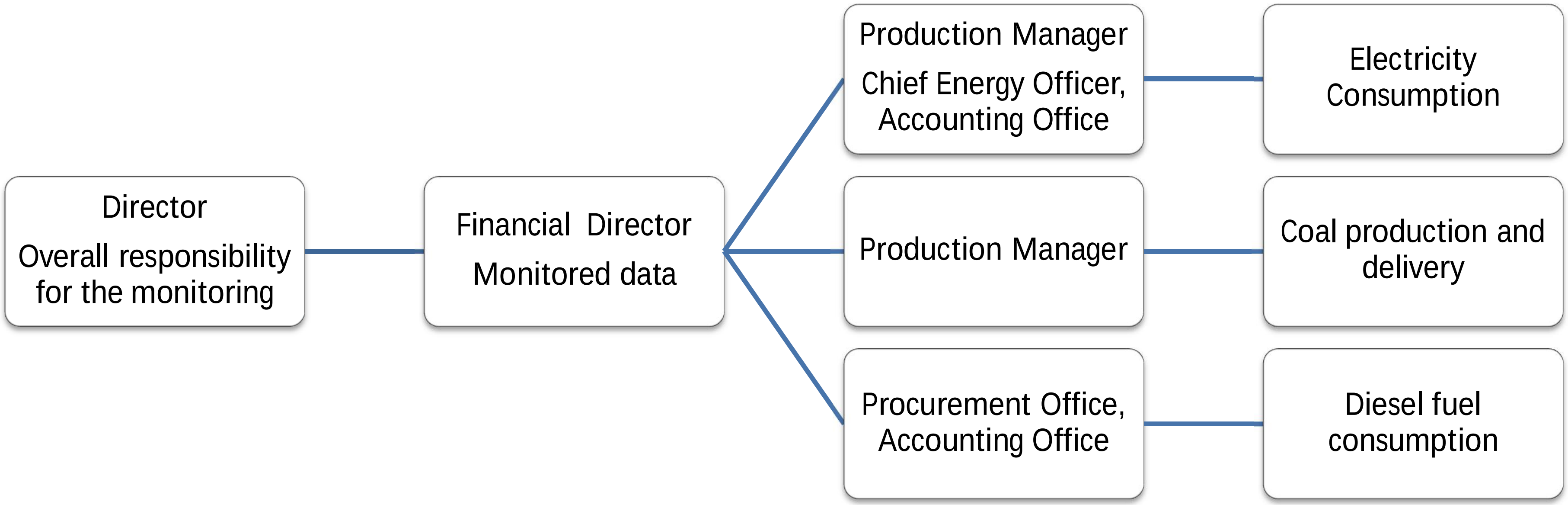

Figure 9 Monitoring flowchart.

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

Anna Voldemarivna Vilde
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Global Carbon BV Contact information is in the Annex 1.
Anna Voldemarivna Vilde is not a project participant. Global Carbon BV is a project participant.

SECTION E. Estimation of greenhouse gas emission reductions

E.1. Estimated project emissions:

Table 10 Estimated project emissions during the crediting period

		2009	2010	2011	2012	Total
Project Emissions due to consumption of electricity from the grid by the project activity	tCO_2	622	3 123	3 345	3 984	**11 074**
Project Emissions due to consumption of diesel fuel by the project activity	tCO_2	179	1 366	1 440	1 678	**4 663**
Total Project emissions during the crediting period	tCO_2	**801**	**4 489**	**4 785**	**5 662**	**15 737**

Table 11 Estimated project emissions after the crediting period

		2013-2023	2024	Total
Project Emissions due to consumption of electricity from the grid by the project activity	tCO_2	3 984	2 988	**46 812**
Project Emissions due to consumption of diesel fuel by the project activity	tCO_2	1 678	1 258	**19 716**
Total Project emissions after the crediting period	tCO_2	**5 662**	**4 246**	**66 528**

E.2. Estimated leakage:

Table 12 Estimated leakages during the crediting period

		2009	2010	2011	2012	Total
Leakages due to fugitive emissions of methane in the mining activities in the year *y*	tCO_2	-4 019	-29 220	-31 041	-36 118	**-100 398**
Total leakages during the crediting period	tCO_2	-4 019	-29 220	-31 041	-36 118	**-100 398**

Table 13 Estimated leakages after the crediting period

		2013-2023	2024	Total
Leakages due to fugitive emissions of methane in the mining activities in the year *y*	tCO_2	-36 118	-27 088	**-424 386**
Total leakages after the crediting period	tCO_2	**-36 118**	**-27 088**	**-424 386**

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

Table 14 Estimated total project emissions during the crediting period

		2009	2010	2011	2012	Total
Total Project emissions during the crediting period	tCO_2	**-3 218**	**-24 731**	**-26 256**	**-30 456**	**-84 661**

Table 15 Estimated total project emissions after the crediting period

		2013-2023	2024	Total
Total Project emissions after the crediting period	tCO_2	**-30 456**	**-22 842**	**-357 858**

E.4. Estimated baseline emissions:

Table 16 Estimated baseline emissions during the crediting period

		2009	2010	2011	2012	Total
Baseline Emissions due to burning of the waste heaps	tCO_2	15 551	113 047	159 760	185 885	**474 243**
Baseline emissions during the crediting period	tCO_2	**15 551**	**113 047**	**159 760**	**185 885**	**474 243**

Table 17 Estimated baseline emissions after the crediting period

		2013-2023	2024	Total
Baseline Emissions due to burning of the waste heaps	tCO_2	185 885	139 414	**2 184 149**
Baseline emissions after the crediting period	tCO_2	**185 885**	**139 414**	**2 184 149**

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

Table 18 Estimated emission reductions during the crediting period

		2009	2010	2011	2012	Total
Emission reductions during the crediting period	tCO2	**18 769**	**137 778**	**186 016**	**216 341**	**558 904**

Table 19 Estimated emission reductions after the crediting period

		2013-2023	2024	Total
Emission reductions after the crediting period	tCO_2	**216 341**	**162 256**	**2 542 007**

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

Table 20 Estimated balance of emissions under the proposed project over the crediting period

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)
Year 2009	801	-4 019	15 551	18 769
Year 2010	4 489	-29 220	113 047	137 778
Year 2011	4 785	-31 041	159 760	186 016
Year 2012	5 662	-36 118	185 885	216 341
Total (tonnes of CO_2 equivalent)	**15 737**	**-100 398**	**474 243**	**558 904**

Table 21 Estimated balance of emissions under the proposed project after the crediting period

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)
Year 2013	5 662	-36 118	185 885	216 341
Year 2014	5 662	-36 118	185 885	216 341
Year 2015	5 662	-36 118	185 885	216 341
Year 2016	5 662	-36 118	185 885	216 341
Year 2017	5 662	-36 118	185 885	216 341
Year 2018	5 662	-36 118	185 885	216 341
Year 2019	5 662	-36 118	185 885	216 341
Year 2020	5 662	-36 118	185 885	216 341
Year 2021	5 662	-36 118	185 885	216 341
Year 2022	5 662	-36 118	185 885	216 341
Year 2023	5 662	-36 118	185 885	216 341
Year 2024	4 246	-27 088	139 414	162 256
Total (tonnes of CO2 equivalent)	**66 528**	**-424 386**	**2 184 149**	**2 542 007**

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:

The Host Party for this project is Ukraine. Environmental Impact Assessment (EIA) is the part of the Ukrainian project planning and permitting procedures. Implementation regulations for EIA are included in the Ukrainian State Construction Standard DBN A.2.2.-1-2003[48] (Title: "Structure and Contents of the Environmental Impact Assessment Report (EIR) for Designing and Construction of Production Facilities, Buildings and Structures").

Annex F of this standard contains a list of "types of projects or activities which constitute higher environmental risk" for which full EIA is mandatory, and the Ministry of Environment being the competent authority. Project activity, which is the utilization of coal mining waste and production of coal, is included in this list.

The full scope EIA in accordance with the Ukrainian legislation has been conducted for the proposed project. Key findings of this EIA are summarized below:

- Impact on air is the main environmental impact of the project activity. Dust emissions due to the erosion and project activity such as loading and offloading operations of input rock and processed coal will be limited. Also emissions from transport will be present during the project operation stage. The impact will not exceed maximum allowable concentration at the edge of the sanitary zone;
- Impact on water is minor. The project activity will use water in a closed cycle without discharge of waste water. The possible discharge of the processed water will not have negative impact on the quality of water in the surface reservoirs;
- Impacts on flora and fauna are insignificant. The design documentation demands re-cultivation of the landscape. Grass and trees will be planted on the re-cultivated areas in order to prevent flora and fauna degradation. No rare or endangered species will be impacted. Project activity is not located in the vicinity of national parks or protected areas;
- Noise impact is limited. Main source of noise will be located at the minimum required distance from residential areas, mobile noise sources (automobile transport) will be in compliance with local standards;
- Impacts on land use are positive. Significant portions of land will be freed from the waste heaps and will be available for development. Fertile soil will be used to re-cultivate the land lot;
- Transboundary impacts are not observed. There are no impacts that manifest within the area of any other country and that are caused by a proposed project activity which wholly physically originates within the area of Ukraine.

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:

First EIA activity was completed in 2008 by SPE “Firma Priroda”. This study tackled environmental impacts by waste hips dismantling. However, upon completion of project documentation in 2009 the

[48] 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" State Committee Of Ukraine On Construction And Architecture, 2004

scope of the EIA has to be widened to include waste heap processing complex. The full scope EIA in accordance with the Ukrainian legislation has been conducted for the proposed project by Donbass State Technical University in 2010. The findings of the report are summarized in the section F.1. above. The EIA has gone through Environmental Expertise and on 2nd of June 2011 received positive conclusion No. 12/21.04.2011-092 by Environmental Expertise Department of State Committee of Environmental Protection in Luhansk Oblast. The environmental impact of the project has not been considered significant or prohibitive. Completion of Environmental Impact Assessment reports and positive findings of the competent state authority finalise the procedure of the environmental impact assessment according to the Ukrainian laws and regulations.

SECTION G. Stakeholders' comments

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

No stakeholder consultation process for the JI projects is required by the Host Party. Stakeholder comments will be collected during the time of this PDD publication in the internet during the determination procedure.

As part of the EIA the stakeholders should be informed through the mass media about the proposed project as suggested by the *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"* State Committee Of Ukraine On Construction And Architecture, 2004. Information in accordance with the before mentioned standard has been made public through the local newspaper "Vostochny Ekspres" No.28 (658) on 14th of July 2010. No comments were received.

Annex 1

CONTACT INFORMATION ON PROJECT PARTICIPANTS

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Fax:	+38-064-42-9-12-17
E-mail:	ong_ter@mail.ru
URL:	-
EDRPOU code:	35413288
KVED[49] types of economic activities:	37.20.0 Processing of non-metallic waste and scrap; 10.10.1 Mining and beneficiation of coal; 51.19.0 Mediation in a trade of a wide range of products; 51.51.0 Wholesale trade of fuel; 51.90.0 Other types of wholesale trade; 63.40.0 Organization of cargo transportation.
Represented by:	
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Represented by:	

[49] Types of economic activities in accordance with Classification of types of economic activities DK 009:2005 valid till 31/12/2012 in accordance with Order of State Committee of Ukraine on Technical Regulation and Consumery Policy No. 457 from 11/10/2010. Available at: http://zakon.nau.ua/doc/?code=v0457609-10. Last access 19/04/2012.

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Annex 2

BASELINE INFORMATION

Table containing the key elements of the baseline

#	Parameter	Data unit	Source of data
1	$FC_{BE,Coal,y}$ - Amount of coal that has been mined in the baseline scenario and combusted for energy use, equivalent to the amount of coal extracted from the waste heaps in the project activity in the year y	t	Data of project owner
2	p_{WHB} Correction factor for the uncertainty of the waste heaps burning process.	ratio	Scientific study - Analysis on the fire risk of Luhansk Region's waste heaps, Scientific Research Institute "Respirator", Donetsk, 2010
3	NCV_{Coal} Net Calorific Value of coal (in and after 2011)	TJ/kt	Certificates of testing
4	NCV_{Coal} Net Calorific Value of coal (before 2011)	TJ/kt	National Inventory Report of Ukraine 1990-2009, p. 399 (value for stationary combustion, power and heat production, 2009)[50]
5	$OXID_{Coal}$ Carbon Oxidation factor of coal	ratio	National Inventory Report of Ukraine 1990-2009, p. 402 (value for stationary combustion, power and heat production, 2009)
6	k^{C}_{Coal} Carbon content of coal	tC/TJ	National Inventory Report of Ukraine 1990-2009, p. 401 (value for stationary combustion, power and heat production, 2009)

[50] This source of data was used for preliminary estimation of baseline emissions for the future period, for which certificates of testing did not existed at the time of PDD development. According to the monitoring plan, this data source will not be used for calculating baseline emissions at the monitoring stage.

Annex 3

MONITORING PLAN

For the monitoring plan please refer to section D of this PDD.

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