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

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Annexes

SECTION A. General description of the project

A.1. Title of the project:

Dismantling of waste heap at former mine "ROZSYPNYANSKA-1"

Sectoral scope: 8. Mining/mineral production
PDD version 2.0 dated 05/04/2012

A.2. Description of the project:

General description of the sector, company and activities

Dump (waste heap) is an integral part of the landscape of the Donbas region. In the Donetsk Basin there is one of the largest deposits of coal in the world (Ukraine by geological reserves of fossil coal ranks first in Europe and eighth in the world). Coal production in Donbass is carried out mostly by mine way and has 300-year history. The total basin area is about 60 th. km^2 and covers the territory of Dnipropetrovsk, Donetsk and Lugansk regions. Stocks of coal up to a depth of 1800 m are about 140.8 billion tons[1]. Coal beds occur at medium (400 - 800 m) and large (over 1000 m) depths and in most cases have little power (about 0,6-1,2 m). Coal layers are alternating with the usual rock (shale, sandstone, limestone). Coal mining is accompanied, therefore, with lifting to the surface the large amount of rock.

Rocks that are sent into the dump, are formed by shaft sinking (52%) and repair (48%). These "empty" rocks stored near mine shafts in the form of heaps up to 60-80 m and vertebral dumps (amounting to 92%), at least - flat dump (8%)[2]. Dumps of Donbass cover an area of over 7000 hectares.

Most of the coal is produced by large coal-mining unions of different ownership. Along with them there are small private companies involved in coal extraction and its processing (sorting, enrichment) and fuel trade.

PE ICC "Tefida" engaged in wholesale fuel, has considerable experience in excavation and mining, as well as in land reclamation and landscaping. PE ICC "Tefida" uses the dump of former mine "Rozsypnyanska-1" in a legitimate basis.

Situation before the proposed project start

By-product of continuous operation of coal mines is the formation of conic dumps of coal rocks - heaps. Smoldering and burning waste heap is a fundamental factor in violation of environmental and economic balance of Donbass mining areas, causing the formation of a complicated ecological situation, which affects the state of the atmosphere, soil, water objects, leading to degradation of natural landscapes and detrimental to health and people life.

The process of enrichment at the mines was not very effective, there are not considered economically feasible to extract 100% of the coal rocks that rose to the surface. Consequently, the dumps of Donbass, especially formed in 60-70 years, contain large amounts of coal. Examined mine waste heaps mass has an ash content within 57-99%, accounting for an average of 88.5%. Humidity varies from 0.2% to 11.7%, accounting for an average of 3.4%[3]. However, coal content even within the same waste heap undergoes significant fluctuations and poorly predicted. There is a possibility that much of the rock dump may contain a small amount of coal, while another part has a high concentration of coal mass and increased susceptibility to spontaneous combustion. Over time, almost all dumps, that contain coal, are very susceptible to spontaneous ignition and self-sustained combustion. Those dumps, that are currently burning or are at risk of ignition, are the sources of uncontrolled emission of greenhouse gases and
hazardous substances. Oxidation and burning of rocks is accompanied by emission of a wide range of volatile components that stand out from rock mass, enriched by coal substance. Hot waste heaps produce

[1] BS Busygin, Dr. Sc. Sciences, prof., EL Sergeyev. Monitoring data of Donbass heaps by multispectral satellite imagery. ISSN 2071-2227, Naukovy Visnyk of the NGU, 2011, № 2

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

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

steam, which also may contain water and sulfuric acid (sulfate ion), carbon dioxide, nitrogen dioxide (nitrate ion). With a lack of oxygen in the vapour and gas emissions are hydrogen sulfide, hydrocarbons, ammonia, carbon monoxide. Water erosion of heap causes in leaching of toxic components and contamination of soil and groundwater, spreading them over long distances. Thus, the role of waste heaps in the ecology of the region is extremely negative, increasing many times at his burning. However, an outbreak and its very possibility is difficult to forecast, we can only estimate the probability of ignition, which is very high, based on statistics. You can say that most waste heaps, sooner or later ignited. The process of combustion of carbon in the dumps is long enough and lasts 5-7 years[4].

Despite the fact that the owners of waste heaps obliged to take measures to prevent their burning, immediate quenching the rock dumps is not common practice in the Donbass region. Fines paid by pollution costs much less than money spent on measures to prevent ignition or burning. In the baseline scenario assumed that the common practice will be continued - heap may be spontaneously ignited with a certain probability, and the process of burning will continue while the all coal, contained therein, will burn. The process of combustion is accompanied by release the carbon dioxide into the atmosphere.

Proposed project provides a complete dismantling of the dump at former mine "Rozsypnyanska-1", followed by reclamation of land by restoring the fertile layer. During dismantling of dump the rock mass will be sorted, as result it will be divided into factions, which will be used for blending with steam coal, and subsequent supplied to thermal power plants or boiler houses for burning as fuel. Large sorted fraction is used to build and repair of roads. Thus, rock mass of dump will be fully utilized, and the received coal will replace coal, which must be produced by mine way. As the result of project, the opportunity of self-ignition of heap will be eliminated.

An important component of the project is its second phase - complex reclamation of area by restoring its fertile layer and the full restoration of natural ecological community. This part of the project is required, but totally expensive, due to this mechanism of joint implementation was one of the prominent factors of the project from the beginning, and financial benefits as part of this mechanism considered one of the reasons of the project implementation.

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 ICC "Tefida"	No
Republic of Latvia	SIA “Vidzeme Eko”	No

.The role of project participants:
• PE ICC "Tefida" - a legal entity, that operates lawfully the dump of former mine "Rozsypnyanska-1", and introduces the proposed JI project;
• SIA "VidzemeEKO" responsible for the preparation of the PDD, obtaining approvals from the parties, monitoring and transfer of ERUs generated / AAUs.
See detailed information on project participants in Annex 1.

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

A.4. Technical description of the project:

Technical description of the project, as well as detailed information on the location of the project, are given below in sections from A.4.1. to A.4.3.

A.4.1. Location of the project:

Waste heap of former mine “Rozsypnyanska-1”

A.4.1.1. Host Party(ies):

Ukraine

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

Donetsk region, Torez district

Figure 1 - Location of the project on the map of Ukraine

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

Urban village Rozsypne

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

Complex for sorting rock dump is located on the industrial site of the former mine "Rozsypnyanska-1" on the southeast end of u.v. Rozsypne
Location of project: 48 ° 07 '35 "N. Lt. and 38 ° 34' 17" E. Lg.

Figure 2 - The exterior of the waste heap of former mine "Rozsypnyanska-1" under stage of dismantling

Figure 3 - Heap of former mine "Rozsypnyanska-1" under dismantling, the appearance from the satellite

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

The project provides the assembling and installation of sorting rock mass complex of former mine"Rozsypnyanska-1" consisting of:
- Point of loading rock mass on Conveyor SP-202MS[5];
- Point of sorting rock mass in classes 0-30 mm and 30 mm (vibrating inertial sifter GIL-43A[6]);
- Point of storage class 0-30 mm (shed).

Class of 30 mm provided (as required under discharging tray of sifter) to load in the transport and supply for construction and repairing of roads 4-5 category. Class 0-30 mm is loaded in vehicles, held a mandatory procedure of weighing, and sent to the consumer (SPC "Oblpalyvo") for blending and subsequent combustion in thermal power plants or boiler houses. Blending of fraction (0-30) with a steam coal allows to realize the fine finishing of quality the energy coal to the requirements of Standart 4083-2002, without compromising the quality of fuel on the one hand, but resulting in saving valuable energy coal on the other.

Figure 4 - Machinery for sorting rock mass

Technological scheme of the complex as follows:
Mountain mass of disassembly dump delivered to the feeding scraper conveyor SP-202 by Loader TO-28A with a bucket capacity of 2.5 m^3. Before delivering rock mass on the conveyor belt, there are made its humidification (if the humidity of material does not exceed 8%) with sprinklers.
From the scraper conveyor through the handling unit the rock mass fed to the sifter GIL-43 for the sorting into two classes - 0-30 mm and +30 mm. Productivity of sifter on the original product is up to 60 tons / hour. Product of sifter screens +30 mm through the discharge tray, equipped with built-in nozzles for humidification, filled on the intermediate platform without significant accumulation. From the intermediate platform this fraction by the loader Amkodor-342V loaded into trucks and transported to the consumer.

[5] http://www.rpromresurs.ru/konveer/sp202ms.html

[6] http://www.zaoplatov.ru/equipment/miner?n=132

Figure 5 - Machinery involved in the project and weight station

Product of sorting class 0-30 through handling unit of sifter supplied on belt conveyor KLS[7]. From the belt conveyor rock mass of class 0-30 mm through the handling unit of conveyor with built-in nozzles for humidification, emptied on the intermediate platform without significant accumulation, where loader ZL-50F loaded it in trucks or on a platform (warehouse) for storage. Warehouse is used if necessary without long-term storage. From storage the rock mass 0-30 mm by loader is loaded into trucks.
The project capacity of the complex allows to process 300 thousand m^3 of rock per year.

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 project activities aimed at extracting coal from the dumps of the former mine "Rozsypnyanska-1" to prevent emissions into the atmosphere when spontaneous burning of dumps occur and receiving more quantity of coal. Sorted fraction 0-30mm delivered for blending with steam coal and

[7] http://www.sibtenzo.com/vesi/1077_detail.htm

subsequent combustion in power plants or boiler houses. In addition, sorted rock mass of class 30 mm is planned for construction and maintenance roads of 4-5 category. PE ICC "Tefida" does it at their own expense without receiving any material benefit. It is planned to achieve maximum rates of dismantling in the Kyoto period.

After the final sorting of dump it is planned reclamation of land in accordance with the decision Rozsypnyanska village council. It will be used the earth deposit of vegetation layer, shot at laying the rock dump, with volume 15.8 m^3, stowed on the north side of dump. After the restoration of vegetation layer it will be made planting grass, trees and shrubs characteristic for climatic zone of Donbass.

The problem of waste heaps is very crucial at this time in the Donbass. Waste heaps not only derive considerable land area from economic turnover and lead to disruption of ecological balance of natural biological community, but also are a source of high environmental hazard. Even at non-burning condition heap is a source of pollution of air, soil, nearby water bodies and groundwater. This risk is increased many times by burning waste heaps[8]. The only way to eliminate the harmful effects of heap on the environment is its complete dismantling. However, the process of dismantling of heap is a very costly process, which economic benefit is not offset possible costs. In addition there are significant risks associated with the inability to timely determination of coal in total volume of waste heap. Significant costs bears followed after dismantling renewal of fertile layer and reclamation of earth area. This leads to a situation where the process of dismantling of heap facing financial difficulties, and for its successful implementation it is necessary search for additional sources of funding. Receipt of additional income from the sale of quotas under the Joint Implementation project provides a powerful incentive for successful completion of this project.

Processing of these dumps will avoid burning, improve ecological situation in the region, significantly reduce emissions of CO2 and other harmful substances. Dismantling of rock dumps will reduce the probability of groundwater contamination. The area of land for agricultural activities and for other purposes will increase. Also you get an extra amount of coal that does not need to produce, thus able to avoid leaks of methane, which is accompanied by a coal mine way. Emission reductions can be sold as ERUs on the international market of emissions trading.

The proposed project is aimed at reducing anthropogenic emissions. Emission reductions created by:

- Eliminate sources of greenhouse gases associated with burning waste heaps, by extracting coal from the rock dumps;
- Reduce uncontrolled emissions of methane due to replacement of coal that would have been extract mine way;
- Reduce electricity consumption at waste heap dismantling in comparison with electricity consumption at coal mine.

Efforts to stop dumps burning and full their dismantling corresponds to the current legislation of Ukraine on the environmental protection. The proposed project is evaluated positively by local authorities. Detailed description of the baseline and additionality, contained in Section B of the project documentation.

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

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

Table 2 - The total expected emission reductions over the crediting period

	Years
Length of the crediting period	4 years 3 months
Year	Estimate of annual emission reductions in tonnes of CO_2 equivalent
From 01/10/ 2008	79 398
2009	309 622
2010	302 477
2011	300 423
2012	288 641
Total estimated emission reductions over the crediting period (tonnes of CO_2 equivalent)	**1 280 561**
Annual average of estimated emission reductions over the crediting period (tonnes of CO_2 equivalent)	**301 308**

Table 3 - The total expected emission reductions after the crediting period

	Years
Period after 2012, for which emission reductions are estimated	3
Year	Estimate of annual emission reductions in tonnes of CO_2 equivalent
2013	75 979
2014	75 979
2015	50 082
Total estimated emission reductions over the period indicated (tonnes of CO_2 equivalent)	**202 040**
Annual average of estimated emission reductions over the period indicated (tonnes of CO_2 equivalent)	**67 347**

A.5. Project approval by the Parties involved:

Project Idea (PIN) was submitted to the Designated Coordinating Center (National Environmental Investment Agency) at Jan uary 12, 2012. Letter of support number 864/23/7 was given 03/04/2012 by NEIA that supports further development of the proposed project. Expected to get letters of approval from NEIA and letter of approval from a foreign country in April 2012.

SECTION B. Baseline

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

The baseline for a JI project should be brought into compliance with Annex B to Decision 9/CMP.1 ("Guidelines for the implementation of Article 6 of the Kyoto Protocol")[9], and according to the "Guidance On Criteria For Baseline Setting And Monitoring, Version 0.3"[10] (hereinafter - the "Guidelines") issued by the supervisory JI (JISC).

Under the Guidance, the baseline for a JI project is a scenario that objectively represents the anthropogenic emissions of GHG sources or anthropogenic GHG removals by the acquisition, which could occur in the absence of the proposed project. In accordance with paragraph 9 of the Guidance, the project participants may choose either approach the criteria for establishing the baseline and monitoring, designed in accordance with Annex B of the Guidance or method for determining the baseline setting and monitoring adopted by the Executive Committee of the clean development mechanism (CDM).

Article 11 of Guidance allows project participants to choose an approach to JI projects, or use the combination of approved methodologies for CDM baseline or approved CDM methodological tools. For description and justification of the baseline the following step by step approach used:

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

The baseline of this project is defined on a special project basis in accordance with Article 21 of the JISC Guidance. Can not be used multi-project emission factor or sectoral baseline, because the project under consideration is one of the few of its kind, both in the sector (mining of rock dumps in Ukraine) as well as among JI projects.

According to Article 9 of the JISK Guidance, Option A selected for determining the baseline:
(a) An approach for determining the baseline and monitoring designed in accordance with Annex B of JI Guidelines (JI specific approach);

Under Article 11 of Guidance for setting the baseline the latest version of the current methodology is used, which have chosen in the project " Waste heaps dismantling with the aim of decreasing the greenhouse gases emissions into the atmosphere. ", which is published on the website of the UNFCCC[11].

The most likely future scenarios will be identified by checking whether all alternatives to meet the applicable law and regulations, and by analyzing the barriers. If only two alternatives remained, one of which represents the project scenario without the JI incentive, you must use Tools Clean Development Mechanism (CDM) "Tool for demonstration and assessment of additionality" to prove that the project scenario cannot be regarded as the most plausible.

Step 2. Application of the approach chosen

Plausible future scenarios will be identified in order to establish a baseline.

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

Scenario 1. Continuation of existing situation

In the current situation waste heaps are not utilized. 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.

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

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

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

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[12]. 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 rock dumps.

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[13]. 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.

Sub step 2b. Consistency with mandatory applicable 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. 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.

Monitoring of dumps is not conducted systematically, and all activities are at the discretion of the owner of dumps. Basically dumps are in ownership of mines or regional coal association. Coal mines of Ukraine are suffering from limited investment, which often leads to security problems due to severe conditions of production and financial difficulties, including the wages of miners often delayed for several months. In this case dumps are considered as an additional burden, but mine usually do not make even minimum measures required. Ignition and burning heaps are very common, and investigated 373 of the dumps in the

[12] *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://masters.donntu.edu.ua/2004/fgtu/zayanchukovskaya/library/artcl3.htm

[13] *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

Donetsk region, only 22 relatively precisely known, they are not burned, to the same exact data are not always available[14].

In such circumstances it is safe to say that all scenarios do not contradict existing laws and regulations.

Sub step 2c. 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.

Investment barrier: Investment into unproven technology carries a high risk. In case of Ukraine, which carries a high country risk, investment into such unproven energy projects are less likely to attract investors than some other opportunities in the energy sector with higher returns. The pioneering character of the project may appeal to development programmes and governmental incentives but cost of the produced energy is likely to be much higher than alternatives.

Scenario 3. Production of construction materials from waste 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. High contents of sulphur and moisture can reduce the suitability of the waste heap for processing. A large scale deep exploration of the waste heap has to be performed before the project can start.

Scenario 4. Coal extraction from waste heaps without JI incentives

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

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. 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. 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 594 surveyed waste heaps in Donetsk region alone, only 20 are known not to have been burning at sometime, 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.

Sub step 2d. Baseline identification

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

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. This project is the first of its kind and therefore other options could not be used;

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 JISC 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 Donetsk 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 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 carbonaceous fraction (0-30mm), which contains 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) The technology of production coal in the mine involves using a large amount of electricity;

5) Coal production in mine is accompanied by consumption of other energy sources (gas, diesel, fuel oil), but their share in compare with electricity are small[15];

6) Waste-heaps of the region are vulnerable to spontaneous self-heating and burning and at some point in time will burn;

7) Probability of the waste heap burning at any point in time is determined on the basis of the survey of all the waste heaps in the area that provides a ratio of waste heaps that are or have been burning at any point in time to all existing waste heaps;

8) Coal burning in the waste heaps will oxidize to CO_2 completely if allowed to burn uncontrolled. Baseline emissions come from four major sources:

- Carbon dioxide emissions that occur during combustion of energy coal. These are calculated as stationery combustion emissions from mining coal in the equivalent of the amount of coal that is extracted from the waste heaps in the project scenario. These emissions in the baseline scenario is exactly equal to the same emissions in the project scenario, thus are excluded from the calculation;

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

- 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 emission factor applied to the amount of coal that is extracted from the waste heaps in the project scenario;
-Emissions of carbon dioxide due to consumption of electricity and other energy resources at coal mining in the equivalent amount of coal extracted from the rock dump in the project scenario;
- Carbon dioxide emissions from burning waste heaps. These emissions are calculated as emissions of carbon dioxide generated by burning coal dumps, the equivalent amount of coal extracted from the rock dump in the project scenario, adjusted for the probability of burning dumps at any time;

As the baseline suggests that the current situation is preserved regarding the waste heaps burning, it is assumed that for any given waste heap, actual burning will occur in some point in time. This probability of burning is established by the study[16] that assessed the status of all existing waste heaps in Donetsk Region historically. Based on the gathered data it is concluded that 83% of all waste heaps in the Donetsk Region have been, or are now, on fire.

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

Table 4 - List of constants in the calculation of baseline emissions

Data / Parameter	***Data unit***	***Description***	***Data Source***	***Value***
NCV_{Coal}	TJ/kt	Net Calorific Value of coal	National Inventory Report of Ukraine 1990- 2009[17]., p. 393 (in the monitoring period the value can be changed)	in 2008 – 21.5 in 2009 – 21.8
$OXID_{Coal}$	d/l	Carbon Oxidation factor of coal	National Inventory Report of Ukraine 1990- 2009, p. 402(in the monitoring period the value can be changed)	0.963
K^{c}_{coal}	tC/TJ	Carbon content of coal	National Inventory Report of Ukraine 1990- 2009, c. 395(in the monitoring period the value can be changed)	in 2008 – 25.95 in 2009 – 25.97
A_{Coal}	%	The average ash content of coal produced in Donetsk region of Ukraine	Guide of quality, volume of coal production and enrichment products in 2008-2010, Ministry of Coal Industry of Ukraine, State Committee of Ukraine (see Annex 4) (in the monitoring period the value can be changed)	in 2008 – 38.80 in 2009 – 39.50 in 2010 – 38.70
W_{Coal}	%	The average moisture of coal produced in Donetsk region of Ukraine	Guide of quality, volume of coal production and enrichment products in 2008-2010, Ministry of Coal Industry of Ukraine, State Committee of Ukraine (see Annex 4) (in the monitoring period the value can be changed)	in 2008 – 6.90 in 2009 – 6.60 in 2010 – 6.60

[16] *Report on the fire risk of Donetsk Region's waste heaps*, Scientific Research Institute "Respirator", Donetsk, 2012. This is a proprietary study that will be made available to the accredited independent entity.

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

p_{WHB}	d/l	Probability of waste heap burning.	*Report on the fire risk of Donetsk Region's waste heaps*, Scientific Research Institute "Respirator", Donetsk, 2012.	0.83

Emissions in the baseline scenario are calculated as follows:

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

where:

BE_y – baseline Emissions in the year *y* (tCO_2),

$BE_{WHB,y}$ - baseline Emissions due to burning of the waste heaps in the year *y* (tCO_2),

In this project there is no beneficiation of coal, so in order to correctly calculate the amount of energy coal produced in mines and substituted by coal, received by dismantling of waste heap, it is necessary to recount, taking into account different value of ash and moisture content of energy coal and fraction (0-30), obtained by dismantling of the waste heaps. If in the mass of carbonaceous rocks we extract moisture and substances that are not burned during combustion, and turn to ash, we obtain the conditional ideal coal with no moisture and ash content. Therefore, to obtain coal with averaged over Ukraine characteristics it is necessary to add to that ideal coal the averaged moisture and ash content. In addition to moisture and ash, the coal (carbonaceous rocks) also contains sulfur, but its amount does not exceed a few percent[18], content of it in carbonaceous rocks always less than in coal, extracted from the mine, so to calculate the amount produced in coal mine, which replaced by coal from waste heaps, this value can be neglected. For the calculation are used data on ash content and moisture content of steam coal that is mined in the Donetsk region of Ukraine according to the annual Guide of Ministry of Coal Industry[19]

Thus, the amount of coal produced in mines in the baseline scenario is calculated by the formula:

$$FC_{BE,Coal,y} = FR_{Coal,y} \cdot (1 - \frac{A_{Rock,y}}{100} - \frac{W_{Rock,y}}{100}) / \left(1 - \frac{A_{Coal}}{100} - \frac{W_{Coal}}{100}\right), \qquad (2)$$

where:

$FR_{Coal,y}$ - amount of sorted fraction (0-30mm), which is extracted from the dumps because of the project in a year y, that came to blending with further combustion in thermal power plants, t;

$A_{Rock,y}$ -the average ash content of sorted fractions (0-30mm), which is extracted from dump in year y,%

$W_{Rock,y}$ -the average humidity of sorted fractions (0-30mm), which is extracted from dump in year y, %;

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

W_{Coal} -the average humidity of steam coal, mined in Ukraine, %;

100 - conversion factor from percent to fraction, d/l.

Baseline emissions due to burning dumps in year y calculated by the formula:

$$BE_{WHB,y} = \frac{FC_{BE,Coal,y}}{1000} \cdot p_{WHB} \cdot NCV_{Coal} \cdot OXID_{Coal} \cdot K_{Coal}^{c} \cdot 44/12 \qquad (3)$$

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 because of the project activity in the year *y*, t, (calculated by the formula (2));

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[18] http://masters.donntu.edu.ua/2009/feht/semkovskiy/library/article9.htm

[19] Guide of quality, volume of coal production and enrichment products in 2008-2010, Ministry of Coal Industry of Ukraine, State Committee of Ukraine (see Annex 4)

p_{WHB} - probability of waste heap burning , d/l;
NCV_{Coal} - net Calorific Value of coal, TJ/kt;
$OXID_{Coal}$ - carbon Oxidation factor of coal, d/l;
K^c_{Coal} - carbon content of coal, tC/TJ;
1/1000 - conversion factor from tons in kilotonnes, d / l
44/12 - stoichiometric relationship between the molecular weight of carbon dioxide and carbon.

Leakages

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 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. These emissions are specific to the coal that is being mined. Coal produced by the project activity is not mined but extracted from the waste heap through the advanced beneficiation process. Therefore, coal produced by the project activity substitutes the coal would have been otherwise mined in the baseline. Coal that is mined in the baseline has fugitive methane emissions associated with it and the coal produced by the project activity does not have such emissions associated with it.

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[20] (See Volume 2, Chapter 4, Page 4-11) and also used in CDM approved methodology ACM009[21] (Page 8). Activity data (in our case amount of coal extracted from the waste heap which is monitored directly) is multiplied by the emission factor (which is sourced from the relevant national study – National Inventory Report[24] of Ukraine under the Kyoto Protocol) and any conversion coefficients.

Electricity consumption and related greenhouse gas emissions due to dismantling of waste heap to be taken into account in calculating the project emissions. Carbon dioxide emissions due to electricity consumption in the coal mine way in an amount, equivalent to the design of coal - a leakage, that can be taken into account at base of the State Statistics Committee data[22], concerning unit costs of electricity at coal mines in Ukraine in the relevant year.

This leakage is directly attributable to the JI project activity according to the following assumption: the coal produced by the project activity from the waste heap will substitute the coal produced by underground mines of the region in the baseline scenario. This assumption is explained by the following 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

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

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

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

(e.g. JI0144 Slag usage and switch from wet to semi-dry process at Volyn-Cement, Ukraine[23]), projects in metallurgy sector (e.g. UA1000181 Implementation of Arc Furnace Steelmaking Plant "Electrostal" at Kurakhovo, Donetsk Region[24]) and others.
These leakages are 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 5 List of constants used in the calculations of leakage

Data / Parameter	***Data unit***	***Description***	***Data Source***	***Value***
GWP_{CH4}	tCO_2/tCH_4	Global Warming Potential of Methane	IPCC Second Assessment Report[25]	21
ρ_{CH4}	t/m^3	Methane density	Standard (at room temperature 20°C and 1 ATM)[26]	0.000668
EF_{CH4}	m^3/t	Emission factor for fugitive methane emissions from coal mining.	National Inventory Report of Ukraine 1990- 2009, c. 90	25.67
$N^E_{Coal,y}$	MWh/t	average electricity consumption per tonne of coal, produced in Ukraine in the year y	Fuel and energy resources of Ukraine, Statistical Yearbook, State Statistics Committee of Ukraine, Kiev 2009-2011[27]	in 2008 – 0.0878 in 2009 – 0.0905 in 2010 – 0.0926
$EF_{CO2,EL}$	tCO_2/MWh	Specific carbon dioxide emissions due to production of electricity at TPP and by its consumption	Order of State Environmental Investments Agency №62, 63, 43, 75 http://www.neia.gov.ua/nature/doccatalog/document?id=127171, 127172, 126006, 127498	in 2008 – 1.219 in 2009 -1.237 in 2010 – 1.225 in 2011 – 1.227

Leakages in year y calculated as follows:

$$LE_y = LE_{CH4,y} + LE_{EL,y} \quad (4)$$

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

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

[25] *IPCC Second Assessment: Climate Change 1995. A Report of the Intergovernmental Panel on Climate Change*".Bolin, B. et al. (1995). IPCC website. http://www.ipcc.ch/pdf/climate-changes-1995/ipcc-2nd-assessment/2nd-assessment-en.pdf

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

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

where:

LE_y - leakages in year y, (т CO_2e);

$LE_{CH4,y}$ – leakages due to fugitive emissions of methane in the mining activities in the year y, (т CO_2e);

$LE_{EL,y}$ - leakages due to consumption of electricity in the mining activities in the year y,(т CO_2e).

Leakages due to fugitive emissions of methane in the mining activities in the year y calculated as follows:

$$LE_{CH4,y} = -FC_{BE,Coal,y} \cdot EF_{CH4} \cdot \rho_{CH4} \cdot GWP_{CH4} \quad (5)$$

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 because of the project activity in the year y, t, (calculated by the formula (2));

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

ρ_{CH4} - methane density (standard, at room temperature 20 ˚ C and 1 atm), t/m^3;

GWP_{CH4} - global warming potential for methane , тCO_2/ тCH_4.

Leakages due to consumption of electricity in the mining activities in the year y calculated as follows:

$$LE_{EL,y} = -FC_{BE,Coal,y} \cdot N^E_{Coal,y} \cdot EF_{CO2,EL} \quad (6)$$

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 because of the project activity in the year y, t, (calculated by the formula (2));

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

$EF_{CO2,EL}$ - Specific carbon dioxide emissions due to production of electricity at TPP and by its consumption, tCO_2/MW-h

Baseline emissions due to consumption of other types of energy in coal mines are insignificant compared to the emissions due to electricity consumption[28], so in connection with this, and for reasons of conservatism, take them equal to zero.

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

Table 6 - Amount of coal that has been mined in baseline scenario

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 because of the project activity in year y
Time of determination/monitoring	Yearly monitoring.
Source of data (to be) used	Project owner calculations
Value of data applied (for ex ante calculations/determinations)	Provided by project owner
Justification of the choice of data or description of measurement methods and procedures (to be) applied	Calculated by the formula (2) Section B.1.
QA/QC procedures (to be) applied	According to the project owner policy.
Any comment	No

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

Table 7 - Amount of sorted fraction (0-30 mm)

Data/Parameter	$FR_{Coal,y}$
Data unit	t
Description	Amount of sorted fraction (0-30 mm), which is extracted from the dump because of 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)	Provided by 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

Table 8 - Average ash content of sorted fraction (0-30 mm)

Data/Parameter	$A_{Rock,y}$
Data unit	%
Description	Average ash content of sorted fraction (0-30 mm), which is extracted from dump in 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)	Provided by 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

Table 9 - Average humidity of sorted fraction (0-30 mm)

Data/Parameter	$W_{Rock,y}$
Data unit	%
Description	Average humidity of sorted fraction (0-30mm), which is extracted from dump in 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)	Project owner records

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

Table 10 - Net Calorific Value of coal

Data/Parameter	NCV_{Coal}
Data unit	TJ/kt
Description	Net Calorific Value of coal
Time of determination/monitoring	Fixed ex ante.
Source of data (to be) used	National Inventory Report of Ukraine 1990- 2009., p. 393 (in the monitoring period the value can be changed)
Value of data applied (for ex ante calculations/determinations)	In 2008 p – 21.5 In 2009 p – 21.8
Justification of the choice of data or description of measurement methods and procedures (to be) applied	The default value is set according to the National Inventory.
QA/QC procedures (to be) applied	According to the National Inventory.
Any comment	No

Table 11 - Carbon Oxidation factor of coal

Data/Parameter	$OXID_{Coal}$
Data unit	d/l
Description	Carbon Oxidation factor of coal
Time of determination/monitoring	Fixed ex ante.
Source of data (to be) used	National Inventory Report of Ukraine 1990- 2009., p. 402 (in the monitoring period the value can be changed)
Value of data applied (for ex ante calculations/determinations)	0.963
Justification of the choice of data or description of measurement methods and procedures (to be) applied	The default value is set according to the National Inventory.
QA/QC procedures (to be) applied	According to the National Inventory.
Any comment	No

Table 12 - Carbon content of coal

Data/Parameter	K_{coal}^{c}
Data unit	tC/TJ
Description	Carbon content of coal
Time of determination/monitoring	Fixed ex ante.
Source of data (to be) used	National Inventory Report of Ukraine 1990- 2009., p. 395 (in the monitoring period the value can be changed)
Value of data applied (for ex ante calculations/determinations)	in 2008 – 25.95 in 2009 – 25.97
Justification of the choice of data or description of measurement methods and procedures (to be) applied	The default value is set according to the National Inventory.
QA/QC procedures (to be) applied	According to the National Inventory.
Any comment	No

Table 13 - Probability of waste heap burning.

Data/Parameter	p_{WHB}
Data unit	d/l
Description	Probability of waste heap burning.
Time of determination/monitoring	Fixed ex ante.
Source of data (to be) used	*Report on the fire risk of Donetsk Region's waste heaps*, Scientific Research Institute "Respirator", Donetsk, 2012.
Value of data applied (for ex ante calculations/determinations)	0.83
Justification of the choice of data or description of measurement methods and procedures (to be) applied	The default value is set according to the Scientific Research Institute "Respirator"
QA/QC procedures (to be) applied	According to the Scientific Research Institute "Respirator"
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:

To demonstrate that the project provides a reduction in emissions from sources that are additional to those that would have at any other situation, there are used a stepwise approach, described below:
Indication and description of the approach chosen

To demonstrate that anthropogenic greenhouse gas emissions were reduced below levels that would place in any other situation for the project there was used the latest version of the approved "Tool for demonstration and assessment of additionality", Version 06.0.0[29] of CDM Executive Board. Approach (c) was enacted in accordance with paragraph 44 of Annex 1 of JISC " Guidance on Criteria for Baseline Setting and Monitoring " version 03.

Application of the approach chosen

The following steps are performed in accordance with "Tool for demonstration and assessment of additionality", version 06.0.0.

Step 1. Identification of alternatives to the proposed project activity

By following sub-steps, we define realistic and credible alternatives to the project activity:

Sub-step 1a: Define alternatives to the project activity:
We identified two realistic and credible alternatives to the project activity. Other alternatives are faced with barriers (section B.1) and are not realistic.
For the proposed project the following alternatives were offered:

Alternative 1:Coal extraction from waste heaps without JI incentives
This scenario is similar to the project scenario, but in this case the project does not receive benefits from the development as a JI project. In this case dumps are exploited to extract coal and used in the energy sector.

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.
Sub-step 1b: Consistency with mandatory laws and regulations:
Please refer to section B.1. of this document where it is shown that identified alternatives are in compliance with mandatory legislation and regulations taking into account the enforcement of such documents in Ukraine.

Step 2: Investment analysis

The purpose of investment analysis is to determine whether the proposed project activity is:
a) the most economically or financially attractive, or
b) economically or financially feasible without the revenue from the sale of emission reduction. Investment analysis was conducted by the project participants in accordance with Appendix to the Instrument of additionality: " Guidance on the Assessment of Investment Analysis " (Version 06.0.0).

Sub-step 2a: Determine appropriate analysis method

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

Under the CDM additionality tool, Version 06.0.0, Version III, it was chosen a comparative analysis of efficiency. Participants decided to use the net present value of the project (NPV) as the parameter of estimate. To select the correct reference value for comparing the selected indicator, the project participants have assessed options included in the Instrument of additionality. It was chosen approach (d), Version III. Project participants selected average rates of commercial lending with statistics of the National Bank of Ukraine[30], relevant to the decision, taking into account the context of this project. It was taken into account that the commercial lending rate of National Bank considers the specifics of doing business in the country, including the risks involved. At the same time, National Bank lending rate is much lower than such lending rates of commercial banks, and allows to apply the principle of conservatism in the project, because at lower interest rate the net present value ceteris paribus is higher.

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

Net Present Value (NPV) was chosen as criterion of rate return assessment of the project. This means that when a negative value NPV of the project is received, owner would not consider investments to the project as appropriate.

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

Cash flows of the project were calculated using the following assumptions:

• An indicator is the net present value (NPV) of project.

• Calculation of cash flow was performed for the period 2008-2015 years (7 years 6 months) - the period of the project including the second phase of the project - reclamation of land after a full dismantling of rock dump.

• Rates, fees and expenses recorded as of July 1, 2008 - the beginning of the project.

• The real discount rate was calculated using the nominal rate 17.4%

As a result, the NPV of the project amounts **- 240 500 EUR**, without taking into account the profit of JI. If you take into consideration the income of JI, the NPV would be positive + **2 085 741 EUR**. Thus, the project would not be attractive without JI initiatives. Detailed calculations are presented in the supporting materials.

Sub-step 2d: Sensitivity analysis:

The sensitivity analysis is supposed to demonstrate the reliability of preliminary conclusions made in the previous section. As suggested in the Guidance on the Assessment of Investment Analysis contained in the CDM Additionality Tool ver.06.0.0, variations of the key factors in the sensitivity analysis cover a range of +10% and –10%. All influencing factors are included in the analysis and both increase and decrease in value is analyzed to demonstrate stronger reliability. Results of the analysis are provided in the table 3 below.

Table 14 - Sensitivity analysis

	%	Net Present Value, EUR
-Investment costs - Coal price - Fuel price - Electricity tariff	-10%	**- 277 152**
	-5%	**- 258 825**
	0%	**- 240 500**
	5%	**- 222 172**
	10%	**- 203 846**

As we see from the table, the project does not achieve a positive net present value under the following assumptions. Thus, presented above results of sensitivity analysis confirmed the reliability of conclusions made in Sub-step 2c. We can conclude that the project is not financially / economically attractive.

Step 3. Barrier analysis (optional)

not applicable

[30] http://bank.gov.ua/control/uk/publish/category?cat_id=57897 chapter 4.1.1.3

Step 4. Common practice analysis

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

In Ukraine there are no such projects, except those performed with the support of mechanism of joint implementation. Dumps are considered the objects of waste with high risk. Only in rare cases, taking steps to extinguish the fire, but in general measures of security in rock dumps are not used. Dumps, which are rich in coal, are often the objects of unauthorized mining of the local population. Such actions often lead to increased risk of spontaneous combustion and air pollution. Extraction of coal dumps practiced some coke plant, but they extract coal from slime sumps. This activity is very rare.

Sub-step 4b: Discussion of any such existing options:

Implementation of Sub-step 4b regarding the Instrument is needed in cases where the project is widespread and common. The proposed project is not common practice to specified areas (see sub-step 4a). This activity, which we can observe in Ukraine is implemented JI projects, and therefore excluded from analysis. Thus, the sub-stage is not applicable. The facts that were presented above suggest that the proposed JI project is not a common practice in Ukraine. Sub-steps 4a and 4b are satisfied, because such activity is not observed in wide use. Thus, the proposed JI project is not a common practice in Ukraine.

Conclusion: Analysis of additionality demonstrated, that the project reduction of emissions is additional to any reductions that might occur in the absence of the proposed project.

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

Project implementation will take place only on dumps, which officially is in use of PE ICC "Tefida." At the same time, according to baseline, the notional typical mine, which produces coal, replaced by the coal from dismantling of heap, takes part in fugitive emissions. The specific of energy consumption at coal mines is determined by the following main components: power consumption, heat consumption, air consumption, consumption of natural gas and other types of fuel and water, sewage discharges, sewage treatment. As a result of the work[31] is found, that about 90% of the total consumption of energy in coal mines is electricity.
There are several sources of greenhouse gases due to mining:
- Uncontrolled methane emissions as a result of working the coal industry in Ukraine;
- Carbon dioxide emissions due to electricity consumption at the mine;
- Emissions of carbon dioxide due to burning of the new dumps formed due to mining;
- Carbon dioxide emissions due to consumption of other types of fuel at the mine (given the small number and for reasons of conservatism is not considered);

Carbon dioxide emissions due to consumption of electricity produced by burning fossil fuels in power plants of Ukraine and uncontrolled methane emissions as a result of mining activity, are leakages .
The table 10 shows an overview of all sources of emissions in the baseline and project scenarios. The project boundaries depicted in accordance with the provisions of Articles 14, 16, 17 Guidelines Supervisory Committee.

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

Table 15 - Sources of emissions in the baseline and project scenario.

Baseline scenario	**Source**	**Gas**	**Included/ Excluded**	**Justification / Explanation**
	Waste heap burning	CO_2	Included	Main emission source
	Emissions of methane as a result of the coal industry	CH_4	Included	Fugitive emissions. Leakages.
	Coal consumption	CO_2	Excluded	This coal is displaced in the project activity by the coal extracted from the waste heaps.
	Consumption of electricity due to mining	CO_2	Included	Leakages
	Use of other types of energy resources due to mining	CO_2	Excluded	These emissions are not significant[32],and also for reasons of conservatism, they are excluded from consideration.
Project scenario	Coal consumption	CO_2	Excluded	The coal is extracted from waste heap.
	Consumption of electricity due to extracting coal from dump	CO_2	Included	Main emission source.
	Consumption of fossil fuel due to extracting coal from dump	CO_2	Included	Main emission source.

The bastline scenario

The basic scenario is the continuation of the current situation. Coal is mined in underground mines, which causes uncontrolled methane emissions. When coal is consumed electricity and other fuels. Coal is used for energy production. In the process of coal formed a new blade. Dumps heat and often light up, resulting in emissions of carbon dioxide in the atmosphere. The sources of emissions in the baseline
scenario are:
-Emissions of carbon dioxide due to consumption of coal for energy production (identical in baseline and project scenario);
-Emissions of carbon dioxide due to burning of coal dump;
The sources of leakages are:
-Uncontrolled methane emissions due to coal mining in the mines;
-Emissions of carbon dioxide due to consumption of electricity and other forms of energy in coal mining in the mine.

Project scenario

By the project scenario dumps are dismantled, and all combustible materials are removed. Thus, emissions due to ignition and burning dumps are reduced. Project implementation includes additional burning diesel fuel due to supply the rock from dumps to the sorting point of coal. For operation of the equipment the electricity is used. Additional amount of coal obtained from the project, reduced the need for its production in the mines. The sources of emissions in the project scenario are:

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

-Emissions of carbon dioxide from the use of fuel for the operation of the project equipment (tecnics);
-Emissions of carbon dioxide associated with electricity consumption of project equipment;
-Emissions of carbon dioxide from the consumption of coal for energy production (identical in baseline and project scenario).
The following figures show the project boundaries and sources of emissions in the baseline and project scenarios:

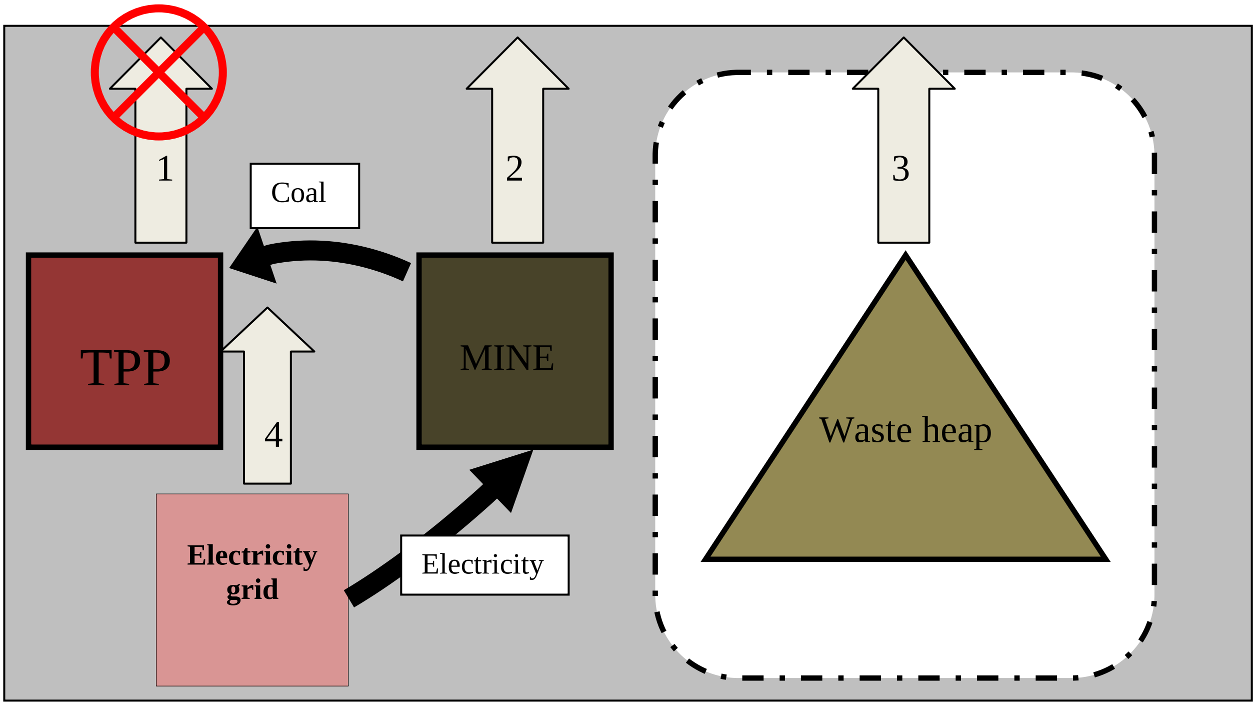


Figure 6 - The boundaries of the project and the sources of emissions in the baseline scenario

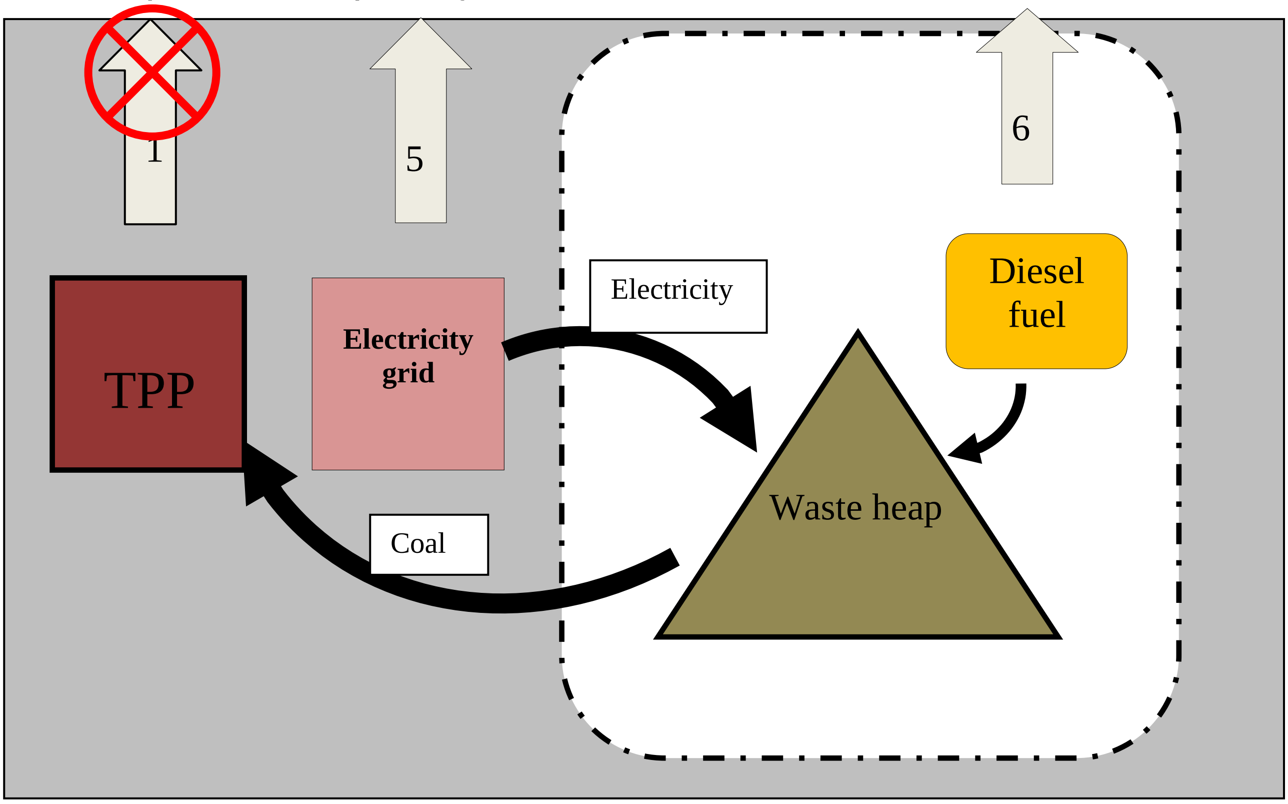
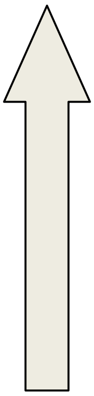


Figure 7 - The boundaries of the project and the source of emissions in the project scenario

Sources of greenhouse gas emissions at schemes



1. Carbon dioxide due to burning of coal

2.Leakages of methane due to mining

3.Carbon dioxide due to burning coal

4.Leakages of carbon dioxide due to consumption of electricity in mine.

5.Carbon dioxide due to consumption of electricity during dismantling the dump.

6. Carbon dioxide due to consumption of diesel fuel during dismantling the dump

 Emissions due to burning of coal excluded from consideration

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 determination the basline scenario: 03/03/2012

Name of person / organization, determining the baseline scenario:

Gennadiy Ivanenko, Project manager at SIA "Vidzeme EKO"
Please, refer to Annex 1 for details and contact information.

SECTION C. Duration of the project / crediting period

C.1. Starting date of the project:

The date of commencement of the project is July 17, 2008. From this date installation of equipment begins. Date of the crediting period - 1 October 2008 (date of equipment start-up).

C.2. Expected operational lifetime of the project:

The life cycle of the project will last until the end of 2015. Thus, the project life cycle is 7 years, 6 months or 90 months.

C.3. Length of the crediting period:

Four years three months (51 months). From 01/10/2008 to 31/12/2012

SECTION D. Monitoring plan

D.1. Description of monitoring plan chosen:

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

Step 1. Indication and description of the approach chosen for realizing of monitoring.

Option *a* provided by the Guidelines For The Users Of The Joint Implementation Project Design Document Form, Version 04[33] is used: JI specific approach is used in this project and therefore will be used for establishment of monitoring plan.

Among other things, the monitoring plan includes the following:

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

Step 2. Application of the approach chosen.

All data collected during monitoring should be archived and stored for at least 2 years after the last application for ERU.

These should be checked, unless otherwise indicated in the following sections. All measurements must be executed with calibrated measurement equipment according to industry standards for the branch.

Baseline scenario

The baseline scenario is the continuation of the current situation. Coal is mined in underground mines, which causes uncontrolled methane emissions. Due to mining the electricity and other types of fuel are consumed. Coal is used for energy production. A new dump formed In the process of coal mining. Dumps are heated and often are ignited, resulting in emissions of carbon dioxide in the atmosphere. The sources of emissions in the baseline

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

scenario are:
-Emissions of carbon dioxide due to consumption of coal for energy production (identical in baseline and project scenario);
-Emissions of carbon dioxide due to burning of coal dump;
The sources of leakages are:
-Uncontrolled methane emissions due to coal mining in the mines;
-Emissions of carbon dioxide due to consumption of electricity and other forms of energy in coal mining in the mine.

Project scenario

In the project scenario dumps are dismantled, and all combustible materials are removed. Thus, emissions due to ignition and burning dumps are reduced. Project implementation includes additional burning diesel fuel to supply the mining of rock dumps to the point of sorting coal. For operation of the equipment the electricity is used. Additional coal obtained from the project, reducing the need for its production in the mines. The sources of emissions in the project scenario are:
- Emissions of carbon dioxide due to consumption of fuel for the operation of the project equipment (mining machinery);
- Emissions of carbon dioxide due to consumption of electricity by project equipment;
- Emissions of carbon dioxide from the use of coal mined from rock dump for energy production (equal to emissions from burning an equivalent amount of coal produced in mines in the baseline scenario, so they are excluded from the calculation in both scenarios).

During any period of monitoring must be collected and recorded data on the following parameters:

1. Additional electricity consumed in the same period as a result of implementation of project activities

To measure this parameter the commercial data of company are used. Also monthly electricity bills are available. This parameter is recorded by means of special energy meters. Counters are located in buildings of substations near the project location. These counters record all electricity consumed in the project because access to the electricity supply is only through them. Indications used for commercial accounts with energetic company. Account checking made on the basis of theoretical calculation of sorting complex power consumption according to the technical characteristics and timing of work time.

2. Amount of diesel fuel was consumed in the appropriate period as a result of a project activity.

To determine this parameter the commercial data of company are used. To confirm the consumed amount of fuel checks and other accounting documents are used. The fuel consumption, which is related to a project activity, is taken into account. Information summary report is based on accounts .In the industrial site there is not any additional equipment, but if such equipment is used, fuel consumption of this equipment is also considered. If the data in these documents are in litres instead of tonnes, these data must be converted using factor of 0.85 kg / l[34]. For purpose of control a theoretical calculation of diesel fuel consumption is made on basis of technical specifications and actual record of machinery work.

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

3. Amount of coal, which is in the appropriate period was extracted from the dump and combusted for obtaining the energy, used for activities under the project, equal to the amount of coal that was in the baseline scenario produced from the mine and combusted for obtaining the energy.

3.1. Amount of fraction (0-30mm).

To determine this parameter the commercial data of company are used. To confirm the amount of fraction (0-30 mm) checks and documents from customers are used. Taken into account and refers to the project activity only product which delivered to the customer. Weighing takes place on site using certified scales. Regular cross-inspections with customers are executed. Information of summurized reports is based on these delivery data.

3.2. Ash content and moisture of fraction (0-30mm).

For sampling for further analysis of ash content and moisture the following procedure is realized:

Selected samples are brought and treated by Technical Control Division (TCD). Sample is treated at upgraded LSM (Laboratory Sample-processing Machine). The sample is crushed to the size of 0-3 mm. Then it is imparted to a conic form and reduced by divisor (this process is carried out three times) until the sample weight becomes below 2-3 kg. Then the sample is pressed to a disk with thickness of 2 cm and covered tightly with bars to divide into squares. Then in a in chessboard order the sample is gathered with weight not less than 500 grams. Then two accompanying certificate are written, which shall include:

- Number of certificate;
- Date;
- Mark, class;
- Supplier;
- Name of the desired analysis.

One certificate is placed in the can with sample. The second is attached to the can using special threads or wires. The lid closed so that the eyes of lid and cans are combined. Wire fastened into two bundles and sealed, so that it has not silted. Usually two cans are used:

- One - into the lab for testing;
- Second - to arbitration for two months storage.

Ash content and moisture of fraction (0-30mm) measured regularly with registration decade reports.

Measuring devices

The method of measurement, chosen for this project, is based on the measurement of some parameters to be monitored - extracted coal and electricity consumed, and the study of accounting documents and reports on other parameters (used fuel). For measuring procedures in the project the following equipment is used:

- For electricity consumed - electronic counter NIK 2303 ARP1,installed at 04/08/2011, device, manufactured by LLC "NIK-electronics" which is a multifunction device for measuring electric power, accuracy 1.0 when measuring active energy in SS GOST 8.391:2008[35], frequency of testing 6 years. Before 04/08/2011 electronic counter CA4-E 5030 was used.

[35] http://lindex.net.ua/shop/bibl/501/doc/4205

- For weighing the sorted fraction (0-30mm) - electronic truck gage scales BTA-60, produced by JV "Ukrestmarkinvest" accuracy "Medium" (III) (measurement error with standard truck load of + / - 0.25%) frequency of testing 12 months;
- To measure the ash content and moisture content of sorted fraction (0-30mm) - procedure due to GOST 11022-95 "Mineral solid fuel. Methods of determination the ash content"[36] ,and GOST 11014-2001 "Brown coal, hard coal and oil shale. Accelerated methods for determining the moisture"[37]. Analysis of ash content and moisture produced in the laboratory. Acceptor unseal the can with sample in laboratory, validates the certificate and puts all data in the "History of taking samples for laboratory tests." Laboratory assistant takes the sample for analytical and work moisture. Evaporation occurs in the low-temperature laboratory furnaces SNOL-67/350 at 160 ° C, weighing is at scales of 4 laboratory accuracy AXIS A-6000. The process occurs in the laboratory furnace SNOL-7, 2/1100 at 815 ° C, weighing is carried out on the scales of 2 laboratory accuracy XAS100 / c.
- To measure the fuel consumption will be using information from the accounting department: receipts for purchased fuel and accounting documents concerning the spent fuel.

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.

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 like. Management of the project host will ensure that personnel of the project have received proper training and are eligible to work with the prescribed equipment.

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

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

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[36] http://vsesnip.com/Data1/16/16768/index.htm

[37] http://vsesnip.com/Data1/40/40907/index.htm

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. These actions occur through close cooperation with SIA "VidzemeEko", external consultant PE ICC "Tefida" on JI projects.

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.

Table 16 - List of constants used in the calculations of emissions

Data / Parameter	***Data unit***	***Description***	***Data Source***	***Value***
GWP_{CH_4}	tCO_2/ tCH_4	Global Warming Potential of Methane	IPCC Second Assessment Report	21
ρ_{CH_4}	t/m^3	Methane density	Standard (at room temperature 20°C and 1 ATM)	0.000668
NCV_{Coal}	TJ/kt	Net Calorific Value of coal	National Inventory Report of Ukraine 1990- 2009., p. 393	in 2008 – 21.5 in 2009 – 21.8
NCV_{Diesel}	TJ/kt	Net Calorific Value of diesel fuel	National Inventory Report of Ukraine 1990- 2009., p. 393	in 2008 – 42.5 in 2009 – 42.3
$OXID_{Coal}$	d/l	Carbon Oxidation factor of coal	National Inventory Report of Ukraine 1990- 2009, p. 402	0.963
$OXID_{Diesel}$	d/l	Carbon Oxidation factor of diesel fuel	National Inventory Report of Ukraine 1990- 2009, p. 402	0.99

K_{coal}^{c}	tC/TJ	Carbon content of coal	National Inventory Report of Ukraine 1990- 2009, c. 395	in 2008 – 25.95 in 2009 – 25.97
K_{Diesel}^{c}	tC/TJ	Carbon content of diesel fuel	National Inventory Report of Ukraine 1990- 2009, c. 395	20.2
EF_{CH4}	m^3/t	Emission factor for fugitive methane emissions from coal mining.	National Inventory Report of Ukraine 1990- 2009, c. 90	25.67
$EF_{CO2,EL}$	tCO_2/MWh	Specific carbon dioxide emissions due to production of electricity at TPP and by its consumption	Order of State Environmental Investments Agency №62, 63, 43, 75 http://www.neia.gov.ua/nature/doccatalog/document?id=127171, 127172, 126006, 127498	in 2008 - 1.219 in 2009 -1.237 in 2010 -1.225 in 2011 - 1.227
A_{Coal}	%	The average ash content of coal produced in Donetsk region of Ukraine	Guide of quality, volume of coal production and enrichment products in 2008-2010, Ministry of Coal Industry of Ukraine, State Committee of Ukraine (see Annex 4)	in 2008 - 38.80 in 2009 -39.50 in 2010 - 38.70
W_{Coal}	%	The average moisture of coal produced in Donetsk region of Ukraine	Guide of quality, volume of coal production and enrichment products in 2008-2010, Ministry of Coal Industry of Ukraine, State Committee of Ukraine (see Annex 4)	in 2008 - 6.90 in 2009 - 6.60 in 2010 - 6.60
p_{WHB}	d/l	Probability of waste heap burning.	*Report on the fire risk of Donetsk Region's waste heaps*, Scientific Research Institute "Respirator", Donetsk, 2012.	0.83
$N_{Coal,y}^{E}$	MWh/t	average electricity consumption per tonne of coal, produced in Ukraine in the year y	Fuel and energy resources of Ukraine, Statistical Yearbook, State Statistics Committee of Ukraine, Kiev, 2009-2011.	in2008 -0.0878 in2009 -0.0905 in2010 -0.0926

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
P1	$EC_{PE,y}$ – Additional amount of electricity, consumed in project in year y	Company records, electricity meters	MWh	*M*	Permanently with monthly total	100%	In paper and electronic form	
P2	$FC_{PE,Diesel,y}$ – Amount of diesel fuel, consumed in project in year y	Company records	t	*M*	Щомісяця	100%	In paper and electronic form	
P3	$EF_{CO2,EL}$ - Emission factor for electricity consumed from grid	See section D.1. Fixed ex ante	тC/MWh	*E*	Fixed ex ante	100%	In electronic form	
P4	NCV_{Diesel} – Net Calorific Value of diesel fuel	See section D.1. Fixed ex ante	TJ/kt	*E*	Fixed ex ante	100%	In electronic form	
P5	$OXID_{Diesel}$ - Carbon Oxidation factor of diesel fuel	See section D.1. Fixed ex ante	d/l	*E*	Fixed ex ante	100%	In electronic form	
P6	K^{c}_{Diesel} - Carbon content of diesel fuel	See section D.1. Fixed ex ante	tC/TJ	*E*	Fixed ex ante	100%	In electronic form	

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

Emissions from the project activity are calculated as follows:

$$PE_y = PE_{EL,y} + PE_{Diesel,,y} \quad (7)$$

where:
PE_y - project Emissions due to project activity in the year *y* (tCO_2 equivalent),
$PE_{EL,y}$ - project Emissions due to consumption of electricity from the grid by the project activity in the year y (tCO_2 equivalent),
$PE_{Diesel,,y}$ - project Emissions due to consumption of diesel fuel by the project activity in the year *y* (tCO_2 equivalent).

The Project Emissions due to consumption of electricity from a grid in a year y are calculated as follows:

$$PE_{EL,y} = EC_{PE,y} \cdot EF_{CO2,EL}; \quad (8)$$

Where:
$EC_{PE,y}$ - additional amount of electricity, consumed in project in year y, MWh;
$EF_{CO2,EL}$ - Specific carbon dioxide emissions due to production of electricity at TPP and by its consumption, tCO_2/MWh;
To calculate the amount of electricity used conservative approach. Its essence is to assess the maximum possible energy consumption of main and auxiliary equipment, involved in the work of dismantling of heap, including lighting and heating facilities (See Supporting documents). Accepted that the equipment is working nonstop in two shifts (16 hours a day) 365 days a year. Thus, following the principle of conservatism, in the calculation of project emissions of greenhouse gases taken the maximum possible theoretical value of power consumption. In financial calculations take into account the actual consumption of electricity in accordance with regulations.

Project Emissions due to consumption of diesel fuel by the project activity in the year y are calculated as follows:

$$PE_{Diesel,y} = \frac{FC_{PE,Diesel,y}}{1000} \cdot NCV_{Diesel} \cdot OXID_{Diesel} \cdot K^c_{Diesel} \cdot 44/12 , \quad (9)$$

Where:
$FC_{PE,Diesel,y}$ - amount of diesel fuel, consumed in project in year y, t;
NCV_{Diesel} - Net Calorific Value of diesel fuel, TJ/kt;
$OXID_{Diesel}$ - carbon Oxidation factor of diesel fuel, d/l;
K^c_{Diesel} - carbon content of diesel, tC/TJ;

1/1000 - conversion factor from tons in kilotonnes, d / l

44/12 - stoichiometric relationship between the molecular weight of carbon dioxide and carbon.

D.1.1.3. Relevant data necessary for determining the baseline of anthropogenic emissions of greenhouse gases by sources within the project boundary, and how such data will be collected and archived:

ID number *(Please use numbers to ease cross-referencing to D.2.)*	Data variable	Source of data	Data unit	Measured (m), calculated (c), estimated (e)	Recording frequency	Proportion of data to be monitored	How will the data be archived? (electronic/ paper)	Comment
B1	$FC_{BE,Coal,y}$ - Amount of coal that has been mined in the baseline scenario and combusted for energy use in year y	Company records	t	*M*	Monthly	100%	In paper and electronic form	Calculated using formulae from D.1.1.4
B2	$FR_{,Coal,y}$ - amount of sorted fraction (0-30mm), which is extracted from the dumps because of the project activity in a year y	Company records, scales	t	*M*	permanently at boot	100%	In paper and electronic form	
B3	NCV_{Coal} – Net Calorific Value of coal	See section D.1. Fixed ex ante	TJ/kt	*E*	Fixed ex ante	100%	In electronic form	
B4	$OXID_{Coal}$ - Carbon Oxidation factor of coal	See section D.1. Fixed ex ante	d/l	*E*	Fixed ex ante	100%	In electronic form	
B5	K_{coal}^{c} - Carbon content of coal	See section D.1. Fixed ex ante	tC/TJ	*E*	Fixed ex ante	100%	In electronic form	

B6	p_{WHB} - Probability of waste heap burning	See section D.1. Fixed ex ante	d/l	*E*	Fixed ex ante	100%	In electronic form	
B7	A_{Coal} - The average ash content of coal produced in Donetsk region of Ukraine	See section D.1. Fixed ex ante	%	*E*	Fixed ex ante	100%	In electronic form	
B8	W_{Coal} - The average humidity of coal produced in Donetsk region of Ukraine	See section D.1. Fixed ex ante	%	*E*	Fixed ex ante	100%	In electronic form	
B9	$A_{Rock,y}$ - The average ash content of sorted fractions (0-30mm), which is extracted from dump in year y	Company records	%	*M*	Monthly	100%	In paper and electronic form	Laboratory data
B10	$W_{Rock,y}$ - The average humidity of sorted fractions (0-30mm), which is extracted from dump in year y	Company records	%	*M*	Monthly	100%	In paper and electronic form	Laboratory data

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

Emissions in the baseline scenario are calculated as follows:

$$BE_y = BE_{WHB,y} \quad , \qquad (10)$$

Where:

BE_y – baseline Emissions in the year *y* (tCO_2),

$BE_{WHB,y}$ - baseline Emissions due to burning of the waste heaps in the year *y* (tCO_2), Baseline emissions due to burning dumps in year y calculated by the formula:

$$BE_{WHB,y} = \frac{FC_{BE,Coal,y}}{1000} \cdot p_{WHB} \cdot NCV_{Coal} \cdot OXID_{Coal} \cdot K^{c}_{Coal} \cdot 44/12 \quad (11)$$

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 because of the project activity in the year *y*, t;

p_{WHB} - probability of waste heap burning , d/l;

NCV_{Coal} - net Calorific Value of coal, TJ/kt;

$OXID_{Coal}$ - carbon Oxidation factor of coal, d/l;

K^{c}_{Coal} - carbon content of coal, tC/TJ;

1/1000 - conversion factor from tons in kilotonnes, d / l

44/12 - stoichiometric relationship between the molecular weight of carbon dioxide and carbon.

The amount of coal produced in mines in the baseline scenario is calculated by the formula:

$$FC_{BE,Coal,y} = FR_{Coal,y} \cdot (1 - \frac{A_{Rock,y}}{100} - \frac{W_{Rock,y}}{100}) / \left(1 - \frac{A_{Coal}}{100} - \frac{W_{Coal}}{100}\right), \quad (12)$$

Where:

$FR_{Coal,y}$ - amount of sorted fraction (0-30mm), which is extracted from the dumps because of the project in a year y, that came to blending with further combustion in thermal power plants, t;

$A_{Rock,y}$ - the average ash content of sorted fractions (0-30mm), which is extracted from dump in year y,%

$W_{Rock,y}$ - the average humidity of sorted fractions (0-30mm), which is extracted from dump in year y, %;

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

W_{Coal} - the average humidity of coal, mined in Donetsk region of Ukraine, %;

100 - conversion factor from percent to fraction, d/l.

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

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:

The result of this project is the net change (reduction) uncontrolled methane emissions due to of mining activity. As in the baseline scenario the supplying of coal is solely from mine, it leads to uncontrolled methane emissions. These emissions are calculated by applying the default emission factor for the country to the amount of coal extracted from the rock dumps in the project scenario (which is the same amount of coal extracted from mines in the baseline scenario). Carbon dioxide emissions due to electricity consumption in the coal mine way in an amount equivalent to the project amount of coal - a leakage, that can be taken into account at the base of State Statistics Committee[38] data on specific consumption of electricity at coal mines in Ukraine in the relevant year.These leakages are significant and will be included in the monitoring plan and calculating emission reductions for the project.

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

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
B1	$FC_{BE,Coal,y}$ - Amount of coal that has been mined in the baseline scenario and combusted for energy use in year y	Company records	t	*M*	Monthly	100%	In paper and electronic form	Calculated using formulae from D.1.1.4
L1	$N^{E}_{Coal,y}$ - Average electricity consumption per tonne of coal, produced in Ukraine in the year y	See section D.1. Fixed ex ante	MWh/t	*E*	Fixed ex ante	100%	In electronic form	
L2	GWP_{CH4} - Global Warming Potential of Methane	See section D.1. Fixed ex ante	tCO_2/ tCH_4	*E*	Fixed ex ante	100%	In electronic form	
L3	EF_{CH_4} -	See section	m^3/t	*E*	Fixed ex ante	100%	In electronic	

	Emission factor for fugitive methane emissions from coal mining.	D.1. Fixed ex ante					form	
L4	ρ_{CH4} - Methane density at standart conditions	See section D.1. Fixed ex ante	t/m^3	*E*	Fixed ex ante	100%	In electronic form	
P3	$EF_{CO2,EL}$ - Specific carbon dioxide emissions due to production of electricity at TPP and by its consumption	See section D.1. Fixed ex ante	тC/MW-h	*E*	Fixed ex ante	100%	In electronic form	

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

Leakages in year y are calculated as follows:

$$LE_y = LE_{CH4,y} + LE_{EL,y} \quad (13)$$

де:
LE_y - leakages in year y, (т CO_2e);
$LE_{CH4,y}$ - leakages due to fugitive emissions of methane in the mining activities in the year *y*, (t CO_2e);
$LE_{EL,y}$ - leakages due to consumption of electricity from a grid at coal mine in a year y,(t CO_2e);
Leakages due to fugitive emissions of methane in the mining activities in the year *y* are calculated as follows:

$$LE_{CH4,y} = -FC_{BE,Coal,y} * EF_{CH4} * \rho_{CH4} * GWP_{CH4} \quad (14)$$

де:

$LE_{CH4,y}$ - leakages due to fugitive emissions of methane in the mining activities in the year *y*, (t CO_2e);
$FC_{BE,Coal,y}$ - 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 because of the project activity in the year *y*, t, calculated as (2);
EF_{CH4} - emission factor for fugitive methane emissions from coal mining., м^3/t;
ρ_{CH4} - methane density at standart conditions t/м^3;
GWP_{CH4} - Global Warming Potential of Methane , tCO_2/ tCH_4.

Leakages due to consumption of electricity from a grid at coal mine in a year y are calculated as follows:

$$LE_{EL,y} = -FC_{BE,Coal,y} * N^{E}_{Coal,y} * EF_{CO2,EL,y} \qquad (15)$$

де:
$LE_{EL,y}$ - leakages due to consumption of electricity from a grid at coal mine in a year y, (t CO_2e);
$FC_{BE,Coal,y}$ - 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 because of the project activity in the year *y*, t, calculated as (2);
$N^{E}_{Coal,y}$ - Average electricity consumption per tonne of coal, produced in Ukraine in the year y, MWh/t;
$EF_{CO2,EL}$ - Specific carbon dioxide emissions due to production of electricity at TPP and by its consumption, tCO_2/МВт`год.

Leakages due to consumption of other types of energy in coal mines are the minor in comparison to the leakages due to electricity consumption[39], so in connection with this, and for reasons of conservatism, take them equal to zero.

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:

$$ER_y = BE_y - PE_y - LE_y, \qquad (16)$$

Where:
ER_y - emissions reductions of the JI project in year y (tCO2 equivalent);
BE_y - baseline Emission in year y (tCO2 equivalent);

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

PE_y - project Emission in year y (tCO2 equivalent).
LE_y - leakages in year y, (tCO2 equivalent)

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"*[40] 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.
B1-B2	Low	These data are used in commercial activities of the company. The weights will be calibrated according to the procedures of the Host Party. Calibration interval is 1 year.
B3-B5	Low	These data are fixed values and standard constants taken from regular sources
B6	Medium	These data are fixed values and standard constants taken from regular sources
B7-B8	Low	These data are fixed values and standard constants taken from regular sources
B9-B10	Low	This data are used in the commercial activity of the company. Laboratory data
P1	Low	The electricity meters are calibrated according to the procedures of the Host Party. Calibration interval is 6 years.
P2	Low	This data are used in the commercial activity of the company. Accounting documentation will be used.
P3-P6	Low	These data are fixed values and standard constants taken from regular sources
L1-L3	Low	These data are fixed values and standard constants taken from regular sources

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

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

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

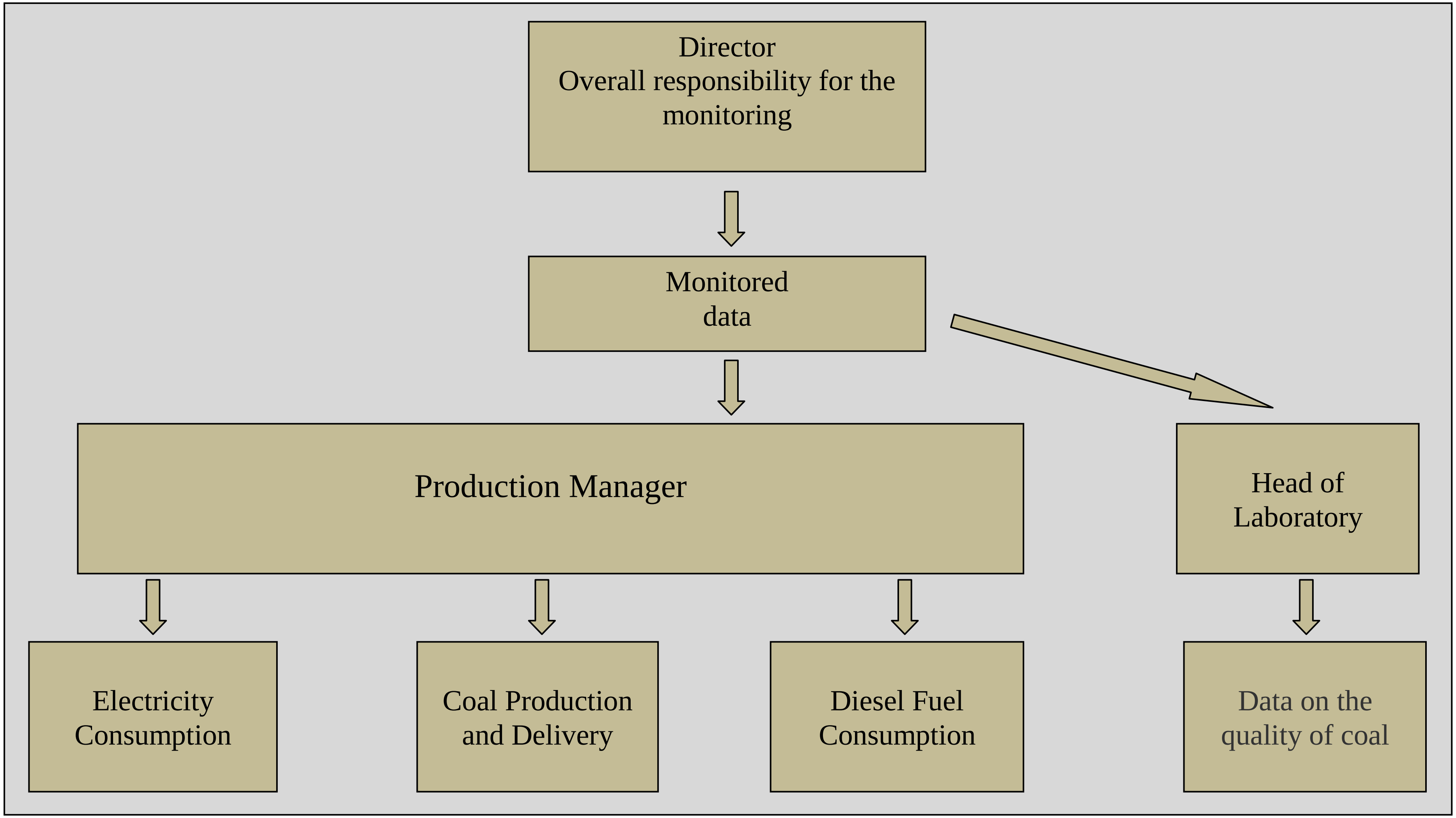

Figure 9 - Monitoring flowchart

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

Gennadiy Ivanenko, tel.+38044 222 61 63, Project manager at SIA “Vidzeme EKO”, ,which is the project participant. Please, refer to Annex 1 for contact details.

SECTION E. Estimation of greenhouse gas emission reductions

This section contains the assessment of GHG emissions reductions. Calculations carried out using the formulas described in detail in Section D of this document.

E.1. Estimated project emissions

Table 17 - Estimated project emissions during the crediting period

			2008	2009	2010	2011	2012	Total
1	Project Emissions due to consumption of electricity from the grid by the project activity	tCO_2	195	592	587	588	588	2550
2	Project Emissions due to consumption of diesel fuel by the project activity	tCO_2	814	1674	1379	1544	1467	6878
	Total for year	tCO_2	1009	2266	1966	2132	2055	9428
	Total for 2008-2012 yy.	tCO_2 equivalent	**9 428**					

Table 18 - Estimated project emissions after the crediting period

			2013	2014	2015	Всього
1	Project Emissions due to consumption of electricity from the grid by the project activity	tCO_2	123	123	123	369
2	Project Emissions due to consumption of diesel fuel by the project activity	tCO_2	397	397	794	1588
	Total for year	tCO_2	520	520	917	1957
	Total for 2013-2015 yy.	tCO_2 equivalent	**1 957**			

E.2. Estimated leakage:

Table 19 – Estimated leakages during crediting period

			2008	2009	2010	2011	2012	Total
1	Leakages due to fugitive emissions of methane in mining activity	tCO_2	-14108	-54596	-53228	-52922	-50902	-225756
2	Leakages due to consumption of electricity from grid in mining activity	tCO_2	-4073	-16487	-16297	-16219	-15580	-68656
	Total	tCO_2	-18181	-71083	-69525	-69141	-66482	-294412
	Total in 2008-2012	tCO_2e	**-294 412**					

Table 20 – Estimated leakages after crediting period

			2013	2014	2015	Total
1	Leakages due to fugitive emissions of methane in mining activity	tCO_2	-13395	-13395	-8930	-35720
2	Leakages due to consumption of electricity from grid in mining activity	tCO_2	-4100	-4100	-2733	-10933
	Total	tCO_2	-17495	-17495	-11663	-46653
	Total in 2013-2015	тCO$_2$e	**-46 653**			

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

Table 21 - Estimated total project emissions during the crediting period

			2008	2009	2010	2011	2012	Total
1	Total Project emissions during the crediting period	tCO_2 equivalent	-17172	-68817	-67559	-67009	-64427	-284984

Table 22 - Estimated total project emissions after the crediting period

			2013	2014	2015	Total
1	Total Project emissions after the crediting period	tCO_2 equivalent	-16975	-16975	-10746	-44696

E.4. Estimated baseline emissions:

Table 23- Estimated baseline emissions during the crediting period

			2008	2009	2010	2011	2012	Total
1	Baseline Emissions due to burning of the waste heaps in the year *y*	tCO_2	62226	240805	234918	233414	224214	995577
	Total for 2008-2012 yy.	tCO_2 equivalent	**995 577**					

Table 24 - Estimated baseline emissions after the crediting period

			2013	2014	2015	Total
1	**Baseline Emissions due to burning of the waste heaps in the year *y***	**tCO_2**	**59004**	**59004**	**39336**	**157344**
	Total for 2013-2015 yy.	**tCO_2 equivalent**	**157 344**			

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

Table 25 - Estimated emission reductions during the crediting period

		2008	**2009**	**2010**	**2011**	**2012**	**Total**
Emission reductions during the crediting period	tCO_2	79398	309622	302477	300423	288641	1 280 561
Total Emission reductions during the crediting period	tCO_2 equivalent	**1 280 561**					

Table 26 - Estimated emission reductions after the crediting period

		2013	**2014**	**2015**	**Total**
Emission reductions after the crediting period	tCO_2	75979	75979	50082	202 040
Total Emission reductions after the crediting period	tCO_2 equivalent	**202 040**			

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

Estimated balance of emissions under the proposed project during the crediting period

Year	Estimated Project Emissions (tonnes CO_2 equivalent)	Estimated Leakage (tonnes CO_2 equivalent)	Estimated Baseline Emissions (tonnes CO_2 equivalent)	Estimated Emissions Reductions (tonnes CO_2 equivalent)
2008	1009	-18181	62226	79398
2009	2266	-71083	240805	309622
2010	1966	-69525	234918	302477
2011	2132	-69141	233414	300423
2012	2055	-66482	224214	288641
Total (tCO_2 equivalent)	**9 428**	**-294 412**	**995 577**	**1 280 561**

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

Year	Estimated Project Emissions (tonnes CO_2 equivalent)	Estimated Leakage (tonnes CO_2 equivalent)	Estimated Baseline Emissions (tonnes CO_2 equivalent)	Estimated Emissions Reductions (tonnes CO_2 equivalent)
2013	520	-17495	59004	75979
2014	520	-17495	59004	75979
2015	917	-11663	39336	50082
Total (tCO_2 equivalent)	**1 957**	**-46 653**	**157 344**	**202 040**

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:

Activity of Private Firm "Tefida" is undertaken under the current legislation of Ukraine, in particular, according to the Laws of Ukraine "On Environmental Protection", "On Ecological Expertise" , "On Air Protection", "On Waste" and other applicable rules and regulations[41].

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.-1-200347 (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 in 2008 by the local developer CE "Ukrinvestproekt". 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;

41 http://www.budinfo.com.ua/dbn/8.htm

• 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 recultivate 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:

Assessment of impact on the environment under the laws of Ukraine was held for the proposed project in 2008 by local developer CE "Ukrinvestproekt."

According to Ukrainian laws and regulations, preparation of reports on evaluation of environmental impact and the positive conclusions of the State Department of Environment and Natural Resources in Donetsk region is the procedure of environmental impact assessment.

SECTION G. Stakeholders' comments

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

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

Annex 1

CONTACT INFORMATION ON PROJECT PARTICIPANTS

Organisation:	PE ICC "Tefida"
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Mobile:	+371 29518171
Personal e-mail:	

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URL:	http://www.holdings.lv
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First name:	Aleksandrs
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Organisation:	SIA "Vidzeme Eko"
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First name:	Viktor
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Annex 2

BASELINE INFORMATION
Section B in PDD

Annex 3

MONITORING PLAN

See section D in PDD for monitoring plan description

Annex 4

AN EXTRACT OF "GUIDE OF QUALITY, VOLUME OF COAL PRODUCTION AND ENRICHMENT PRODUCTS IN 2008-2010"

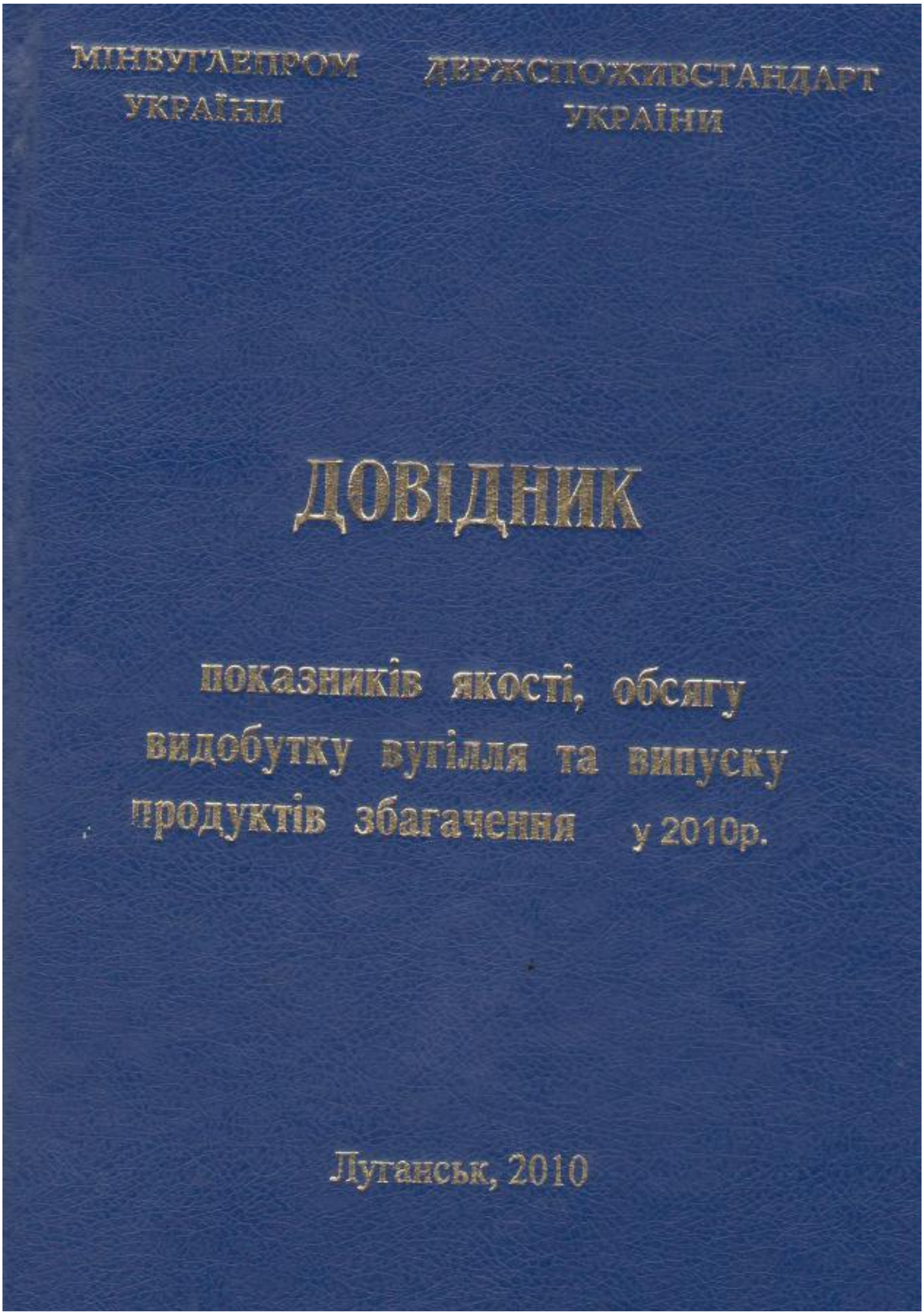

Table 20 – Coal production at mines and open-casts in 2009

I ВИДОБУТОК ВУГІЛЛЯ ШАХТАМИ ТА РОЗРІЗАМИ

Найменування шахти	Дольова участь пластів у видобутку вугілля по шахті у 2010 році, %	Марка вугілля ДСТУ 3472-96		Фактичний видобуток рядового вугілля у 2009 році		Видобуток рядового вугілля, що планується у 2010 році				Класифікаційні параметри			
		кокс.	енерг.	тис. т	Зольність A^d, %	тис. т	Зольність A^d, %	Сірка S^d_t, %	Волога W^r_t, %	Середній показник відбиття вітриніту R_o, %	Товщина пластичного шару Y, мм	Вихід летких речовин на сухий стан V^{daf}, %	Вища теплота згорання Q_s^{daf}, ккал/кг
МІНВУГЛЕПРОМ УКРАЇНИ				72522,5	38,6	76204,5	38,9	2,0	7,7	-	-	26,5	8166
у тому числі:													
енергетичне вугілля				50458,0	39,2	52135,8	38,9	2,0	8,2	-	-	24,5	8025
			Д	273,2	49,0	200,0	42,1	2,4	13,5	0,57	0	39,5	7487
			ДГ	13663,1	39,9	15455,7	39,4	1,7	11,7	0,58	8	41,5	8089
			Г	12929,9	42,5	12775,1	41,4	2,7	7,6	0,77	12	38,4	7586
			Ж	435,1	35,3	316,0	43,0	3,3	4,0	0,88	23	36,1	8365
			П	7806,1	35,2	8303,0	36,4	2,8	5,5	2,43	0	8,4	8520
			А	15350,6	37,6	15086,0	37,7	1,3	6,6	4,55	0	3,7	8059
коксівне вугілля				22064,5	37,2	24068,7	39,0	2,1	6,7	-	-	30,9	8470
		ДГ		567,4	32,8	53,3	33,2	1,2	10,2	0,61	9	39,6	8210
		Г		2855,0	34,9	4532,7	36,1	2,2	6,9	0,77	14	38,3	8364
		Ж		8388,1	37,5	9807,7	39,0	2,4	6,6	0,96	22	33,0	8383
		К		9430,9	38,1	8694,0	40,8	1,6	6,7	1,23	18	26,1	8605
		ПС		823,1	35,3	981,0	35,7	2,8	6,4	1,61	10	18,2	8650

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Найменування шахти	Дольова участь пластів у видобутку вугілля по шахті у 2010 році, %	Марка вугілля ДСТУ 3472-96		Фактичний видобуток рядового вугілля у 2009 році		Видобуток рядового вугілля, що планується у 2010 році				Класифікаційні параметри			
		кокс.	енерг.	тис. т	Зольність A^d, %	тис. т	Зольність A^d, %	Сірка S^d_t, %	Волога W^r_t, %	Середній показник відбиття вітриніту R_o, %	Товщина пластичного шару Y, мм	Вихід летких речовин на сухий стан V^{daf}, %	Вища теплота згорання Q_s^{daf}, ккал/кг
Підпорядковані Мінвуглепрому				38395,5	39,6	39066,0	39,7	2,1	7,1	-	-	21,0	8193
у тому числі:													
енергетичне вугілля				31265,0	40,0	32171,0	40,0	2,1	7,2	-	-	19,4	8123
			Д	273,2	49,0	200,0	42,1	2,4	13,5	0,6	0	39,5	7487,0
			ДГ	2748,8	43,1	3205,0	41,2	2,6	9,9	0,61	8	40,6	7915
			Г	9645,4	43,6	10332,0	43,5	2,8	7,4	0,78	12	38,1	8174
			Ж	435,1	35,3	316,0	43,0	3,3	4,0	0,90	23	36,1	8365
			П	2811,9	36,8	3032,0	37,9	2,7	6,6	2,30	0	8,6	8503
			А	15350,6	37,6	15086,0	37,7	1,3	6,6	4,55	0	3,7	8059
коксівне вугілля				7130,5	37,8	6895,0	38,5	2,5	6,7	-	-	28,2	8523
		Г		1452,5	35,5	1360,0	37,0	1,8	6,6	0,80	14	36,6	8385
		Ж		2358,0	35,4	2150,0	37,2	2,6	6,8	1,02	21	32,4	8437
		К		2496,9	42,1	2404,0	41,7	2,7	6,7	1,33	21	23,6	8625
		ПС		823,1	35,3	981,0	35,7	2,8	6,4	1,61	10	18,2	8650
Непідпорядковані Мінвуглепрому				34127,0	37,4	37138,5	38,1	1,9	8,3	-	-	32,4	8136
у тому числі:													
енергетичне вугілля				19193,0	37,9	19964,8	37,2	1,9	9,8	-	-	32,7	7867
			ДГ	10914,3	39,0	12250,7	38,9	1,4	12,2	0,6	8	41,8	8135
			Г	3284,5	39,3	2443,1	32,5	2,6	8,3	0,7	11	39,6	5096
			П	4994,2	34,4	5271,0	35,5	2,8	4,9	2,5	0	8,3	8530
коксівне вугілля				14934,0	36,9	17173,7	39,1	2,0	6,7	-	-	32,0	8449
				567,4	32,8	53,3	33,2	1,2	10,2	0,6	9	39,6	8210
		ДГ		1402,5	34,3	3172,7	35,6	2,4	7,1	0,7	13	39,0	8355
		Г		6030,1	38,3	7657,7	39,5	2,3	6,5	0,9	22	33,1	8368
		Ж		6934,0	36,6	6290,0	40,5	1,3	6,7	1,2	18	27,0	8597
		К		34127,0	37,4	37138,5	38,1	1,9	8,3	-	-	32,4	8136

7

Найменування шахти	Дольова участь пластів у видобутку вугілля по шахті у 2010 році, %	Марка вугілля ДСТУ 3472-96		Фактичний видобуток рядового вугілля у 2009 році		Видобуток рядового вугілля, що планується у 2010 році				Класифікаційні параметри			
		кокс.	енерг.	тис. т	Зольність A^d, %	тис. т	Зольність A^d, %	Сірка S^d_t, %	Волога W^r_t, %	Середній показник відбиття вітриніту R_o, %	Товщина пластичного шару Y, мм	Вихід летких речовин на сухий стан V^{daf}, %	Вища теплота згорання Q_s^{daf}, ккал/кг
Донецька область				32159,6	38,1	32038,5	38,3	2,2	6,9	-	-	25,6	8389
у тому числі													
Підпорядковані Мінвуглепрому				17919,6	40,0	18344,0	39,9	2,4	7,1	-	-	27,6	8307
Непідпорядковані Мінвуглепрому				14240,0	35,6	13694,5	36,2	2,0	6,6	-	-	22,9	8499
у тому числі:													
енергетичне вугілля				16921,1	39,5	18025,0	38,7	2,4	6,6	-	-	22,3	8294
			Д	273,2	49,0	200,0	42,1	2,4	13,5	0,57	0	39,5	7487
			ДГ	1460,3	44,7	1575,0	41,8	2,6	8,7	0,63	8	41,2	8017
			Г	6431,7	42,1	6906,0	40,1	2,5	7,3	0,80	12	37,8	8194
			П	7074,8	35,1	7458,0	36,3	2,7	5,4	2,44	0	8,4	8519
			А	1681,1	42,3	1886,0	40,2	1,0	6,6	4,17	0	3,5	8091
коксівне вугілля				15238,5	36,4	14013,5	37,9	2,0	7,2	-	-	29,7	8511
		Г		2037,5	35,1	1985,8	36,6	2,5	6,8	0,79	17	35,3	8408
		Ж		4497,7	34,6	4757,7	36,2	2,4	7,4	0,99	21	33,6	8476
		К		7944,3	37,9	6394,0	39,7	1,4	7,2	1,20	17	26,7	8551
		ПС		759,0	35,9	876,0	36,5	2,7	6,3	1,58	10	18,4	8643
Луганська область				23401,7	38,8	25802,0	39,3	2,1	6,9	-	-	17,6	7873
у тому числі													
Підпорядковані Мінвуглепрому України				17246,7	38,3	17502,0	38,4	1,9	7,3	-	-	11,1	8062
Непідпорядковані Мінвуглепрому України				6155,0	40,4	8300,0	41,1	2,5	6,0	-	-	31,3	7473

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Найменування шахти	Дольова участь пластів у видобутку вугілля по шахті у 2010 році, %	[illegible]		[illegible]		[illegible]				[illegible]			
		кокс.	[illegible]	тис. т	[illegible]	тис. т	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
у тому числі:													
енергетичне вугілля				17960,6	38,4	18347,0	38,1	1,9	7,4	-	-	12,7	7641
			ДГ	812,5	43,1	1040,0	42,5	3,0	12,0	0,56	8	41,8	7792
			Г	2747,3	44,1	3262,0	40,1	3,7	9,2	0,66	11	40,7	5690
			П	731,3	36,7	845,0	36,7	3,3	6,7	2,36	0	9,0	8531
			А	13669,5	37,1	13200,0	37,3	1,4	6,6	4,61	0	3,7	8055
коксівне вугілля				5441,1	40,2	7455,0	42,2	2,4	5,6	-	-	29,7	8443
		Ж		3890,4	40,8	5050,0	41,7	2,3	5,8	0,93	22	32,4	8295
		К		1486,6	39,2	2300,0	43,9	2,4	5,2	1,29	22	24,4	8755
		ПС		64,1	29,2	105,0	29,3	3,6	7,6	1,81	8	17,0	8705
Дніпропетровська область				13732,0	38,0	15144,0	38,2	1,6	11,2	-	-	41,5	8172
у тому числі													
енергетичне вугілля				12347,1	38,5	12543,8	38,8	1,5	12,1	-	-	41,7	8140
			ДГ	10914,3	39,0	12250,7	38,9	1,4	12,2	0,57	8	41,8	8135
			Г	1432,8	34,4	293,1	33,0	2,1	7,9	0,75	10	40,1	8334
коксівне вугілля				1384,9	33,8	2600,2	35,5	2,0	7,0	-	-	40,6	8326
		Г		567,4	32,8	53,3	33,2	1,2	10,2	0,61	9	39,6	8210
		ДГ		817,5	34,5	2546,9	35,6	2,0	7,0	0,75	11	40,6	8329
Волинська область													
енергетичне вугілля			ДГ	476,0	38,2	590,0	37,2	2,1	9,3	0,64	7	37,1	7857
Львівська область													
енергетичне вугілля				2753,2	45,0	2630,0	47,6	2,3	5,8	-	-	36,7	8348
			Г	2318,1	46,8	2314,0	48,3	2,2	6,1	0,9	14	36,8	8345
			Ж	435,1	35,3	316,0	43,0	3,3	4,0	0,9	21	36,1	8365

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Table 21 - Coal production at mines and open-casts in 2011

І ВИДОБУТОК ВУГІЛЛЯ ШАХТАМИ ТА РОЗРІЗАМИ

Найменування шахти	Дольова участь пластів у видобутку вугілля по шахті у 2007 році, %	Марка вугілля ДСТУ 3472-96		Фактичний видобуток рядового вугілля у 2007 році		Видобуток рядового вугілля, що планується у 2008 році				Класифікаційні параметри			
		кокс.	енерг.	тис. т	Зольність A^d, %	тис. т	Зольність A^d, %	Сірка S^d_t, %	Волога W^r_t, %	Середній показник відбиття вітриніту R_o, %	Товщина пластичного шару Y, мм	Вихід летких речовин на сухий стан V^{daf}, %	Вища теплота згорання Q_s^{daf}, ккал/кг
МІНВУГЛЕПРОМ УКРАЇНИ				75095,4	38,1	78343,6	38,4	2,1	8,0	-	-	28,1	8243
у тому числі													
Підпорядковані Мінвуглепрому				42152,3	40,1	46000,0	39,2	2,2	7,1	-	-	24,0	8195
Непідпорядковані Мінвуглепрому				32943,1	35,5	32343,6	37,2	2,1	9,4	-	-	33,9	8311
у тому числі:													
енергетичне вугілля				49145,3	39,0	53103,0	38,6	2,1	8,6	-	-	25,8	8153
			Д	270,2	48,9	365,0	40,5	2,4	13,0	0,50	0	41,2	7700
			ДГ	8241,5	41,6	8465,0	40,1	1,9	11,2	0,61	8	42,6	8011
			Г	16608,8	41,8	18780,0	41,8	2,6	8,4	0,76	10	40,7	8176
			Ж	290,5	28,6	165,0	33,5	2,9	5,4	0,87	23	36,0	8377
			П	7012,4	34,5	7183,0	34,4	2,7	5,6	2,40	0	10,1	8543
			А	16502,5	37,0	17290,0	36,8	1,3	6,5	4,10	0	5,6	8088
			Б	219,4	24,9	855,0	24,5	3,8	55,6	0,35	0	60,6	6999
коксівне вугілля				25950,1	36,3	25240,6	37,9	2,2	6,7	-	-	33,0	8449
		Г		3228,4	35,4	3600,0	36,3	1,6	7,5	0,72	12	40,9	8386
		Ж		11878,0	35,5	12657,6	37,3	2,8	6,5	0,93	25	35,0	8480
		К		10141,9	37,5	8103,0	39,6	1,5	6,8	1,24	19	27,8	8400
		ПС		701,8	38,6	880,0	36,3	3,0	6,8	1,65	10	20,0	8613

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Найменування шахти	Дольова участь пластів у видобутку вугілля по шахті у 2007 році, %	Марка вугілля ДСТУ 3472-96		Фактичний видобуток рядового вугілля у 2007 році		Видобуток рядового вугілля, що планується у 2008 році				Класифікаційні параметри			
		кокс.	енерг.	тис. т	Зольність A^d, %	тис. т	Зольність A^d, %	Сірка S^d_t, %	Волога W^r_t, %	Середній показник відбиття вітриніту R_o, %	Товщина пластичного шару Y, мм	Вихід летких речовин на сухий стан V^{daf}, %	Вища теплота згорання Q_s^{daf}, ккал/кг
Донецька область				33790,3	38,6	34598,6	38,2	2,3	7,0	-	-	28,5	8341
у тому числі													
Підпорядковані Мінвуглепрому				19249,1	42,1	22270,0	39,8	2,4	7,1	-	-	31,1	8292
Непідпорядковані Мінвуглепрому				14541,2	34,1	12328,6	35,3	2,1	6,8	-	-	24,0	8430
у тому числі:													
енергетичне вугілля				16282,4	40,4	19033,0	38,8	2,4	6,9	-	-	26,1	8280
			Д	270,2	48,9	365,0	40,5	2,4	13,0	0,50	0	41,2	7700
			ДГ	2088,3	48,5	2265,0	41,9	2,2	8,9	0,69	8	41,6	7950
			Г	5758,2	41,7	7760,0	40,7	2,7	7,4	0,85	13	39,9	8221
			П	6302,3	35,1	6403,0	34,7	2,6	5,6	2,42	0	10,0	8540
			А	1863,4	43,9	2240,0	40,6	1,0	6,3	3,73	0	6,5	8172
коксівне вугілля				17507,9	37,0	15565,6	37,5	2,1	7,1	-	-	31,5	8416
		Г		657,0	37,2	870,0	35,0	1,2	6,0	0,92	12	39,0	8365
		Ж		7133,9	36,6	6867,6	36,0	2,8	7,3	0,99	25	35,3	8457
		К		9064,9	37,1	7003,0	39,3	1,5	7,0	1,24	17	28,2	8360
		ПС		652,1	39,0	825,0	36,4	3,0	6,7	1,66	10	20,2	8607
Луганська область				25208,7	36,7	27075,0	37,7	2,1	6,8	-	-	18,6	8192
у тому числі													
Підпорядковані Мінвуглепрому України				19387,6	37,1	20185,0	37,2	1,9	7,2	-	-	13,7	8075
Непідпорядковані Мінвуглепрому України				5821,1	35,0	6890,0	39,3	2,6	5,5	-	-	33,1	8531

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