

JOINT IMPLEMENTATION PROJECT

“SECONDARY PROCESSING OF THE COAL MINING WASTES WITH THE AIM OF REDUCING GREENHOUSE GAS EMISSION INTO THE ATMOSPHERE”

(project name)

Position of the head of
organization, institution,
facility – document developer

**Financial Director
SIA “Vidzeme Eko”**

(position)



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Position of the manager of the
business – emission source
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implementation project is
planned to be realized

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JOINT IMPLEMENTATION PROJECT DESIGN DOCUMENT FORM
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**SECTION A. General description of the project****A.1. Title of the project:**

Secondary processing of the coal mining wastes with the aim of reducing greenhouse gas emission into the atmosphere

Sectoral scope: 8. Mining/mineral production

PDD version: PDD, version 2.0

dated 25/09/2012

A.2. Description of the project:*General description of the sector, company and activities*

Dumps (waste heaps) are 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. km² 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 tons¹. 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.

"TANDEM TORG TPK" Ltd. is engaged in wholesale fuel, has considerable experience in excavation and mining "TANDEM TORG TPK" Ltd. uses dumps, considered in the project, on 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 steam,

¹ BS Busygin, Dr. Sc. Sciences, prof., EL Sergeev. 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



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.

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.

In the baseline scenario assumed that the common practice will be continued – heap can spontaneously ignite, and the process of burning will continue till all coal, contained there, will be burned. The process of combustion is accompanied by release the carbon dioxide into atmosphere.

Proposed project provides a complete dismantling of waste heaps of “TANDEM TORG TPK” Ltd. During the dump dismantling, the rock mass will be dismantled by special equipment, loaded into dump trucks, and transported to the enrichment plant “Continent-2” for further enrichment, during this process the coal concentrate will be obtained. This product is further directed to boiler houses for burning as the fuel. Thus, rock mass of the dump will be fully utilized, and the received coal will replace coal, which must be produced through mining. As the result of the project, the opportunity of self-ignition of the heap will be eliminated.

Brief history of the project: The project was initiated in June 2011. Waste heaps dismantling started on 02/09/2011. From the beginning, the project is considered as JI project (according to the order #2 from 15/07/2011). Project idea (PIN) was submitted to assigned Coordinated Center (State Agency of Environmental Investments) on 21/08/2012.

A.3. Project participants:

Table 1 - Project participants

<u>Party involved</u>	<u>Legal entity project participant</u> (as applicable)	Please indicate if the <u>Party involved</u> wishes to be considered as <u>project participant</u> (Yes/No)
Ukraine (Host party)	“TANDEM TORG TPK” Ltd.	No
Republic of Latvia	SIA “Vidzeme Eko”	No

.The role of project participants:

- “TANDEM TORG TPK” Ltd.- a legal entity, that operates lawfully dumps which are situated in Rovenky area, 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.

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:

Figure 1-Waste heaps #1 and #2 at Vahrusheva mine. View from satellite.

A.4.1.1. Host Party(ies):

Ukraine

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

Lugansk region, Rovenky town



Figure 2 - Location of the project on the map of Ukraine

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

Novodaryivka village of Rovenky borough council

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

Dismantling is carried out at two waste heaps in Rovenky town area, Lugansk region. Waste heaps characteristics are specified in Table 2.

Table 2 - Waste heaps characteristics involved in the project.

#	Name of the waste heap	Volume, th.m ³	Height, m	Area thousand. m ²	year of foundation	coordinates
1	Waste heap #1of Vahrusheva mine	1 130	65	52	1955	48 ° 9 '38.40 "N. Lt 39 ° 11' 4.35" E.Ln.
2	Waste heap #2of Vahrusheva mine	1 721	45	97	1955	48 ° 9 '47.29 "N. Lt 39 ° 11' 9.25" E.Ln.

Waste heaps were closed in 1976

Enrichment Plant "Continent-2", where the process of the rock mass enrichment is carried out, is located in Novodaryivka village. Geographical coordinates of the plant: 48°4'50.92" N. Lt, 39°27'37.91" E.Ln.



Figure 3 - The exterior of the waste heap#1 at Vahrusheva mine under dismantling stage

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

The project provides the most rational in terms of capital costs scheme for the dump dismantling, that involves only special equipment for the waste heap dismantling and loading carbonaceous rock mass into vehicles for further delivery to the enrichment plant.

Excavators, bulldozers, and cargo vehicles (dump trucks) are involved in the dump dismantling.

Dismantling of the dump is made according to NPAOP 10.0-5.21-04 "Instruction to prevent spontaneous combustion, fire and dismantling dumps"⁴ with the following combined technology:

Bulldozers rise to the top of the dump on its tail section. Dismantling of dump with bulldozers T-170 (operational capacity of 132 kW, the specific fuel consumption at operation capacity - 218 g / kWh)⁵ is carried by horizontal layers, after lowering the height of dump to 25-30 m, allowed dismantling by slope (15 °) layers. A combined method for the dump dismantling is used, when after decline by bulldozers to lower layer height, in which entrance road can be constructed, further dismantling is carried out by excavators EO-5126 (bucket capacity-1.8 m³, operational capacity - 132 kW, the specific fuel consumption at operational capacity, 220 g / kWh)⁶ with direct loading rock into vehicles (trucks KAMAZ 55111, carrying capacity - 13 tons, engine power - 162 kW, fuel consumption - 39 l/100 km)⁷.

⁴ <http://document.ua/instrukcija-iz-zapobigannja-samozapalyvannyu-gasinnja-ta-ro-nor2799.html>

⁵ http://www.stroygruz.ru/arenda-tex/buldozer_t_170.html

⁶ http://www.uraltehnika.ru/opisanie/ekskavatory/eo_5126

⁷ <http://www.politechsnaab.ru/kamaz/kamaz55102.php>

On the second stage, the rock mass is delivered to the enrichment plant “Continent-2” for further enrichment.



Figure 4 – Enrichment plant “Continent-2” involved in the project.

The rock mass is supplied to the inertial screening sifter for the pre-classification by class of 100 mm. After the pre-classification, the coal mass delivered to the preparatory screening to sifter GIL-52a⁸ by dry or wet mode. Benefication of large class 13 mm is made on heavy media separator STK 32-550⁹, and benefication of small class 3-13 mm - at hydrocyclone GTSM-630¹⁰. Next, washing of the suspension of benefication products and dehydrating products by dressing screens and centrifuge take place, regeneration suspension at electromagnetic separator. Thus the water in this process is used in closed loop. Benefication products (coal concentrate) are transported by conveyor belt into bins for further shipment to the consumer. Waste is transported to the flat dump

⁸ <http://www.zaoplatov.ru/equipment/miner?n=213>

⁹ http://ukrimpexgroup.com/separatory_kolesnye_tipa_svk_i_stk

¹⁰ <http://www.vumrmz.biz/products/hcyclons/hydro630.html>



Figure 5 - Hydrocyclone GTSM-630

The project capacity of the complex allows to process 900 000 tonnes of the 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 are aimed at extraction of coal from the dump of “TANDEM TORG TPK” Ltd. to prevent emissions into the atmosphere when spontaneous ignitions of dumps occur and receiving more quantity of coal. The Rock mass is delivered for beneficiation to the enrichment plant with the aim to receive steam coal and subsequent combustion at boiler houses.

The problem of waste heaps is very crucial nowadays 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 and groundwater. This risk is increased in many times by burning waste heap¹¹. 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 expensive 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. This leads to a situation where the process of dismantling of heap facing financial difficulties, and for its successful implementation it is necessary to 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 their burning, improve ecological situation in the region, and significantly reduce CO₂ emissions 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, extra amount of coal will be obtained that does not require mining, thus it is

¹¹ http://terrikon.donbass.name/ter_s/290-model-samovozgoraniya-porodnyx-otvalov-ugolnyx-shaxt-donbassa.html



possible to avoid leakages of methane, which accompanies coal mining. 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:

- Elimination of greenhouse gases sources associated with waste heaps burning, by extracting coal from the rock dumps;
- Reduction of uncontrolled methane emissions due to replacement of coal that would have been extracted through mining;
- Reduction of electricity consumption at waste heap dismantling in comparison to 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.

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

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

	Years
Length of the <u>crediting period</u>	1 year 4 months
Year	Estimate of annual emission reductions in tonnes of CO ₂ equivalent
2011	671001
2012	1772260
Total estimated emission reductions over the <u>crediting period</u> (tonnes of CO ₂ equivalent)	2 443 261
Annual average of estimated emission reductions over the <u>crediting period</u> (tonnes of CO ₂ equivalent)	1 832 445

Duration of the crediting period - 1 year 4 months (16 months).



Table 4 - The total expected emission reductions after the crediting period

	Years
Length of the <u>crediting period</u>	5 years
Year	Estimate of annual emission reductions in tonnes of CO ₂ equivalent
2013	1772260
2014	1772260
2015	1772260
2016	1772260
2017	1772260
Total estimated emission reductions over the <u>crediting period</u> (tonnes of CO ₂ equivalent)	8 861 300
Annual average of estimated emission reductions over the <u>crediting period</u> (tonnes of CO ₂ equivalent)	1 772 260

Duration after the crediting period - 5 years (60 months).

A.5. Project approval by the Parties involved:

Project Idea (PIN) was given to the Designated Coordinating Center (State Environmental Investment Agency) on 21/08/2012. Letter of endorsement #№2561/23/7 was received on 12/09/2012. It is planned to get a letter of approval from SEIA and a letter of approval from a foreign country in October 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")¹², and according to the "Guidance On Criteria For Baseline Setting And Monitoring", Version 03¹³ (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 JISC 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 UNFCCC¹⁴.

Taking in account JT-specific-approach for determining the baseline according to Article 24 of the JISC Guidance, the baseline is identified by a list and description of possible future scenarios based on conservative assumptions and choosing one of the most likely.

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

¹² <http://unfccc.int/resource/docs/2005/cmp1/eng/08a02.pdf>

¹³ http://ji.unfccc.int/Ref/Documents/Baseline_setting_and_monitoring.pdf

¹⁴ <http://ji.unfccc.int/UserManagement/FileStorage/IE7LK2SZF1NOXRVB4CYG65WQPJMHA3>



heaps are sources of uncontrolled greenhouse gas emissions. Coal is not extracted from the waste heaps. Coal is produced by underground mines of the region and used for energy production or other purposes. Coal mining activities cause emissions of fugitive methane and also the formation of new waste-heaps.

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

Waste heaps are not extinguished and not monitored properly. Some burning heaps are used to produce energy by direct insertion of heat exchangers into waste heaps¹⁵. 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 process¹⁶. 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

¹⁵ *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>

¹⁶ *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, Lugansk, #1 2007
http://www.nbu.gov.ua/portal/natural/Ecology/2007_1/Article_09.pdf



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 only concerning 48 out of 237 waste heaps, which were investigated in Lugansk region, was exactly known that they didn't burn, also exact data are not always available¹⁷.

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. This technology can be applied only if the waste heap has an advanced combustion unit. Even if the probability of ignition terricons is very high, it is currently impossible to predict the time of its outbreak and therefore predict the start of the use of thermal energy released during its combustion

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 well 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

¹⁷ *Report on the analyzing the fire danger of waste heaps in Lugansk region.*, Scientific Research Institute "Respirator", Donetsk, 2012. This report will be provided to an independent expert organization.



perform minimum required maintenance. Spontaneous self-heating and subsequent burning of waste heaps are very common, 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

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 coal concentrate, 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 stationary 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 small¹⁸;
- 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;

¹⁸ 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

- 8) Coal burning in the waste heaps will oxidize to CO₂ completely if allowed to burn uncontrolled.
 9) Carbonaceous rocks are delivered to the consumer without significant accumulation on the intermediate storage, therefore, these methane emissions of enriched rocks can be neglected.
 10) Sorted rocks mass has a low content of coal and has no tendency to spontaneous ignition.

Baseline emissions come from two major sources:

- Carbon dioxide emissions that occur during combustion of energy coal. These are calculated as stationary 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;
- 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 at some point in time. This probability of burning is established by the study¹⁹ that assessed the status of all existing waste heaps in Lugansk region historically. Based on the gathered data it is concluded that 78% of all waste heaps in the Lugansk region have been, or are now, on fire.

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

Table 5 - List of constants in the calculation of baseline emissions

<i>Data / Parameter</i>	<i>Data unit</i>	<i>Description</i>	<i>Data Source</i>	<i>Value</i>
NCV_{Coal}	TJ/kt	Net Calorific Value of steam coal	National Inventory Report of Ukraine 1990- 2010, ²⁰ p. 468 (during the monitoring period the value can be changed)	2011-21.6 2012-21.6
$OXID_{Coal}$	d/l	Carbon Oxidation factor of steam coal	National Inventory Report of Ukraine 1990- 2010, p. 471(in the monitoring period the value can be changed)	2011-0.962 2012-0.962
K_{coal}^c	tC/TJ	Carbon content of steam coal	National Inventory Report of Ukraine 1990- 2010, p. 470(in the monitoring period the value can be changed)	2011-25.99 2012-25.99
A_{Coal}	%	The average ash content of steam coal produced in Luhansk 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)	2011 – 38.10 2012 – 38.10
W_{Coal}	%	The average moisture of steam coal produced in Luhansk 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)	2011 – 7.40 2012 – 7.40
p_{WHB}	d/l	Probability of waste heap burning.	<i>Report on the analyzing the fire danger of waste heaps in Lugansk region</i> , Scientific Research Institute “Respirator”, Donetsk, 2012.(This report will be provided to an independent expert organization.)	0.78

Emissions in the baseline scenario are calculated as follows:

¹⁹ *Report on the analyzing the fire danger of waste heaps in Lugansk region*, Scientific Research Institute “Respirator”, Donetsk, 2012. This report will be provided to an independent expert organization.

²⁰

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

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

where:

BE_y – baseline emissions in the year y (tCO₂ e),

$BE_{WHB,y}$ - baseline emissions due to burning of the waste heap in the year y (tCO₂ e),

In this project, coal enrichment process takes place, so in order to correctly calculate the amount of energy coal produced in mines and substituted by coal, received by waste heap dismantling, it is necessary to recount, taking into account different value of ash and moisture content of energy coal and coal concentrate, obtained by enrichment process at enrichment plant. 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 percent²¹, 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 heap, 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 Luhansk region of Ukraine according to the annual Guide of Ministry of Coal Industry²²

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

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

where:

$FC_{BE,Coal,y}$ - Amount of coal that has been mined in the baseline scenario and combusted for energy use in year y

$FR_{Coal,y}$ - amount of coal, 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;

$A_{Conc,y}$ - The average ash content of coal concentrate, that is obtained during enrichment process at enrichment plant in a year y

$W_{Conc,y}$ - The average humidity of coal concentrate, that is obtained during enrichment process at enrichment plant in a year y

A_{Coal} - the average ash content of steam coal, mined in Luhansk region in year y , % ;

W_{Coal} - the average humidity of steam coal, mined in Luhansk region in year y , % ;

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

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

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

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));

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

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

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

²¹ <http://masters.donntu.edu.ua/2009/feht/semkovskiy/library/article9.htm>

²² 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)



K_{Coal}^c - carbon content of coal, tC/TJ;
1/1000 - conversion factor from tons in kilotonnes, d / 1
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 CH₄ emissions associated with the production of coal are available, project participants used this data to calculate the amount of fugitive CH₄ emission as described below.

This leakage is measurable: through the same procedure as used in 2006 IPCC Guidelines²³ (See Volume 2, Chapter 4, Page 4-11) and also used in CDM approved methodology ACM0009²⁴ (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 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 leakages when implementing the project on the basis of calculations beneficiation plant for electricity consumption per tonne of coal received at the processing of rock from dump. 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 data²⁵, 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 (e.g. JI0144 Slag usage and switch from wet to semi-dry process at Volyn-Cement, Ukraine²⁶), projects in

²³ http://www.ipcc-nggip.iges.or.jp/public/2006gl/pdf/2_Volume2/V2_4_Ch4_Fugitive_Emissions.pdf

²⁴ <http://cdm.unfccc.int/UserManagement/FileStorage/K4P3YG4TNQ5ECFNA8MBK2QSMR6HTEM>

²⁵ <http://www.ukrstat.gov.ua/>

²⁶

http://ji.unfccc.int/JI_Projects/DB/P1OYRYMBOCEQOT0HOQM60MBQ0HXNYU/Determination/Bureau%20Veritas%20Certification1266348915.6/viewDeterminationReport.html

metallurgy sector (e.g. UA1000181 Implementation of Arc Furnace Steelmaking Plant "Electrostal" at Kurakhovo, Donetsk Region²⁷) and others.

These leakages are significant and will be included in the calculation of the project emission reductions. Procedure for ex ante estimation and quantification of this source is similar to the procedure made in the project, that was determined – “Dismantling of waste heap at former mine "ROZSYPNYANSKA-1” (Project ITL UA1000317)²⁸ are given below:

Table 6 List of constants used in the calculations of leakage

<i>Data / Parameter</i>	<i>Data unit</i>	<i>Description</i>	<i>Data Source</i>	<i>Value</i>
GWP_{CH_4}	tCO ₂ /tCH ₄	Global Warming Potential of Methane	IPCC Second Assessment Report ²⁹	21
ρ_{CH_4}	t/m ³	Methane density	Standard (at room temperature 20°C and 1 ATM) ³⁰	0.000668
EF_{CH_4}	m ³ /t	Emission factor for fugitive methane emissions from coal mining.	National Inventory Report of Ukraine 1990- 2009, ³¹ p. 90 (On monitoring stage value can be changed)	25.67
$N_{B,Coal,y}^E$	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 ³² (during monitoring period value can be changed)	2011 – 0.0842 2012 – 0.0842
$EF_{CO_2,EL}$	tCO ₂ /MWh	Specific carbon dioxide emissions due to production of electricity at TPP and by its consumption	Order of State Environmental Investments Agency № 63, 43, 75 http://www.neia.gov.ua/nature/doccatalog/document?id=127171, 127172, 126006, 127498 (On monitoring stage value can be changed)	2011 – 1.227 2012 – 1.227

²⁷ <http://ji.unfccc.int/JIITLProject/DB/4THB9WT0PK6F721UQA5H6PTHZEXT4C/details>

²⁸ <http://ji.unfccc.int/JIITLProject/DB/0ROXGLUAS7ETAGMUQZWFQPJLN1SIAW/details>

²⁹ 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>

³⁰ http://www.engineeringtoolbox.com/gas-density-d_158.html

³¹

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

³² <http://www.ukrstat.gov.ua/>

Leakages in year y calculated as follows:

$$LE_y = LE_{CH_4,y} + LE_{EL,y} \quad (4)$$

where:

LE_y - leakages in year y, (t CO₂e);

$LE_{CH_4,y}$ - leakages due to fugitive emissions of methane in the mining activities in the year y, (t CO₂e);

$LE_{EL,y}$ - leakages due to consumption of electricity in the mining activities in the year y, (t CO₂e).

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

$$LE_{CH_4,y} = - FC_{BE,Coal,y} \cdot EF_{CH_4} \cdot \rho_{CH_4} \cdot GWP_{CH_4} \quad (5)$$

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_{CH_4} - emission factor for fugitive methane emissions from coal mining, m³/t;

ρ_{CH_4} - methane density (standard, at room temperature 20 ° C and 1 atm), t/m³;

GWP_{CH_4} - global warming potential for methane, tCO₂e / tCH₄.

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

$$LE_{EL,y} = - FC_{BE,Coal,y} \cdot N_{B,Coal,y}^E \cdot EF_{CO_2,EL,y} \quad (6)$$

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));

$N_{B,Coal,y}^E$ - average electricity consumption per tonne of coal, produced in Ukraine in the year y, MWh/t

$EF_{CO_2,EL}$ - Specific carbon dioxide emissions due to production of electricity at TPP and by its consumption, tCO₂e /MWh

Baseline emissions due to consumption of other types of energy in coal mines are insignificant compared to the emissions due to electricity consumption³³, so, due to this fact and for reasons of conservatism, take them equal to zero.

³³ *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*



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

Table 7 - 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 <u>determination/monitoring</u>	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	Measured for the commercial purposes on site
QA/QC procedures (to be) applied	According to the project owner policy.
Any comment	No

Table 8 - Amount of coal concentrate

Data/Parameter	$FR_{Coal,y}$
Data unit	t
Description	Amount of coal concentrate, which is obtained during the rock mass enrichment of the project activity in the year y
Time of <u>determination/monitoring</u>	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 ash content of sorted fraction

Data/Parameter	$A_{Conc,y}$
Data unit	%
Description	Average ash content of coal concentrate that was obtained during beneficiation process at the enrichment plant in year y
Time of <u>determination/monitoring</u>	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 10 - Average humidity of sorted fraction

Data/Parameter	$W_{Conc,y}$
Data unit	%
Description	Average humidity of coal concentrate that was obtained during beneficiation process at the enrichment plant in year y
Time of <u>determination/monitoring</u>	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 11 - Net Calorific Value of coal

Data/Parameter	<i>NCV_{Coal}</i>
Data unit	TJ/kt
Description	Net Calorific Value of coal
Time of determination/ <u>monitoring</u>	Fixed ex ante.
Source of data (to be) used	National Inventory Report of Ukraine 1990- 2010., p. 468 (during the monitoring period the value can be changed)
Value of data applied (for ex ante calculations/determinations)	2011-21.6 2012-21.6
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 Oxidation factor of coal

Data/Parameter	<i>OXID_{Coal}</i>
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- 2010., p. 471 (during the monitoring period the value can be changed)
Value of data applied (for ex ante calculations/determinations)	2011-0.962 2012-0.962
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 - 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- 2010., p. 470 (during the monitoring period the value can be changed)
Value of data applied (for ex ante calculations/determinations)	2011-25.99 2012-25.99
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 14 - 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 analyzing the fire danger of waste heaps in Lugansk region, Scientific Research Institute "Respirator", Donetsk, 2012.
Value of data applied (for ex ante calculations/determinations)	0.78
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:

Step 1. Indication and description of the approach chosen

According to Paragraph 44 (b) of the Annex 1 of JISC " Guidance on Criteria for Baseline Setting and Monitoring", Version 03, the approach to demonstrate additionality will consist of provision of traceable and transparent information that an accredited independent entity has already positively determined that a comparable project (to be) implemented under comparable circumstances (same GHG mitigation measure, same country, similar technology, similar scale) would result in a reduction of anthropogenic emissions by sources or an enhancement of net anthropogenic removals by sinks that is additional to any that would otherwise occur and a justification why this determination is relevant for the project at hand.

Step 2. Application of the approach chosen

The following steps are taken in order to demonstrate additionality of this project:

Step 1: Identify comparable project where an accredited independent entity has already positively determined that it would result in a reduction of anthropogenic emissions by sources or an enhancement of net anthropogenic removals by sinks that is additional to any that would otherwise occur.

The project "Dismantling of waste heap #2 at mine #22 "LISOVA"(Project ITL UA1000329)³⁴ is selected as the comparable JI project. Accredited independent entity has already positively determined that it would result in a reduction of anthropogenic emissions by sources or an enhancement of net anthropogenic removals by sinks that is additional to any that would otherwise occur. This determination has already been deemed final by the JISC. Appropriate documentation such as PDD and Determination Report regarding this project is available traceably and transparently on the UNFCCC JI Website³⁵

Step 2: Demonstrate that the identified project is a comparable project (to be) implemented under comparable circumstances:

1) Both projects propose **same GHG mitigation measure:** The proposed GHG mitigation measure under both projects is coal extraction from the mine's waste heaps. This will prevent greenhouse gas emissions into the atmosphere during combustion of the heaps and will contribute an additional amount of coal, without the need for mining.

2) Both projects are implemented within the **same country at the same time period:** The proposed project and identified comparable project are both located in Ukraine. The time interval between the start of two projects is about 2 years (proposed project started in September 2011, comparable project started in October 2009) therefore meets the criteria of Article 12 (b) "Guidance On Criteria For Baseline Setting And Monitoring", Version 03

3) Both projects utilize **similar technology:** The technology utilized by the proposed project and identified comparable project is similar. In both projects the waste heap is dismantled using standard excavators and bulldozers. Trucks are used to move the waste heap matter to the processing facility. The processing facility in both projects is the coal washing plant that utilizes several technologies to separate coal from the rest of the matter. Both technologies use gravity separation method. Gravity separation is an industrial method of separating two components from a suspension or any other homogeneous mixture where separating the components with gravity is sufficiently practical. So both technologies are similar.

³⁴ <http://ji.unfccc.int/JIITLProject/DB/YOG1RHBX2UD6R5ZG9QTB84MT26WITY/details>

³⁵

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



4) Both projects have **similar scale**: Both projects are large scale JI projects. Both projects process waste heaps of comparable scale. The proposed and comparable projects consist of one site that will operate during all project period. The scale of remote coal is limited by content of coal in dumps and the size of dump and similar to the proposed and comparable projects. The average monthly processing volume in both projects differ but not more than 50%, therefore satisfies Guidance criteria.

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

Step 3: Provide justification why determination for a comparable project is relevant for the project at hand.

The project "Dismantling of waste heap #2 at mine #22 "LISOVA"(Project ITL UA1000329) and the proposed project are both implemented within the same geographic region of Ukraine – the Donbas coal mining region. The implementation timeline is quite similar: Kyoto period (2008-2012) is a period where a most extensive work in both projects is carried out.

Both projects will share the same investment profile and market environment. These two projects are implemented by private companies with no utilization of public funds. The investment climate will be comparable in both cases with the coal sector being an almost non-profitable sector in Ukraine³⁶ burdened by many problems. The market for the extracted coal will also be similar for both projects as these are small private companies that will not be able to sell coal in big quantities under long-term contracts. Ukrainian coal sector is largely state-controlled. Energy and Coal Ministry of Ukraine decides production level of state mines, based on their performance. After this, state controlled mines sell their coal to the state Trading Company "Coal of Ukraine". This company also buys coal from private mines and arranges supply of coal to thermal electricity companies. Prices for coal mines differ significantly for public and private mines. In general, prices of state mines are more than 60% higher than the prices for private enterprises³⁷. Both projects also share the investment climate of Ukraine which is far from being favourable. Ukraine is considered to be a high risk country for doing business and investing in. Almost no private capital is available from domestic or international capital markets for mid to long term investments, and any capital that is available has high cost. The table below represents risks of doing business in Ukraine according to various international indexes and studies.

Table 15 - International ratings of Ukraine³⁸

Organization, which provides rating	Name of rating	Ukraine's place in the rating	Number of countries in the rating
Fung Heritage (2010)	Economic Freedom Rating	162	179
Pro UN (2009)	The Human Development Index	85	182
Transparency International (2009)	Index of corruption	146	180
Freedom House (2009)	freedom of Speech	115	195
World Bank, The International Finance Corporation and the Audit Company Price Waterhouse Coopers (2010)	Rating of ease of paying taxes	181	183
World Economic Forum (Davos) (2009-2010)	Rating of global competitiveness	82	133
World Economic Forum (Davos) (2009)	Financial strength rating	55	55

³⁶ http://www.necu.org.ua/wp-content/plugins/wp-download_monitor/download.php?id=126

³⁷ http://www.ier.com.ua/files/publications/Policy_papers/German_advisory_group/2009/PP_09_2009_ukr.pdf

³⁸ http://sd.net.ua/2010/06/11/ukraine_ratings.html

“Alliance for Property Rights” (USA)	Rating of property rights protection	58	70
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The data above shows that both real and perceived risks of investing in Ukraine are in place and influence the availability of capital in Ukraine both in terms of size of the investments and in terms of capital costs. The comparison of commercial lending rates in Ukraine and in Eurozone for the loans over 5 years in EUR is presented in a figure below:

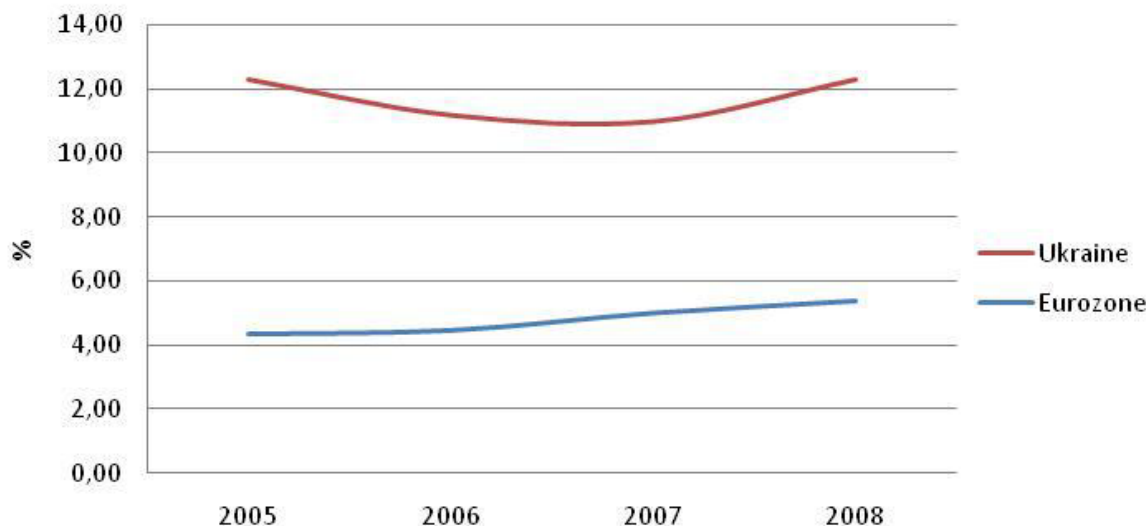


Figure 6 - Commercial lending rates, EUR, over 4 years³⁹

Cost of debt financing in Ukraine is at least twice as high than in the Eurozone. The risks of investing into Ukraine are additionally confirmed by the country ratings provided by the Moody’s international rating agency and the associated country risk premium. The table below compares country risk premiums for Russia and Ukraine⁴⁰:

Table 16 - Sovereign Awards for Russia and Ukraine in 2004-2006

Total Risk Premium, %	2004	2005	2006
Russia	7.02	6.6	6.64
Ukraine	11.59	10.8	10.16

As stated at the OECD Roundtable on Enterprise Development and Investment Climate in Ukraine, the current legal basis is not only inadequate, but to a large extent it sabotages the development of market economy in Ukraine. Voices in the western press can basically be summarized as follows: The reforms in the tax and legal systems have improved considerably with the adoption of the commercial Code, Civil Code and Customs Code on 1 January 2004 but still contain unsatisfactory elements and pose a risk for foreign investors⁴¹. Ukraine is considered to be heading in the right direction with significant reforms having been put into action but still has a long way to go to realize its full potential. Frequent and

³⁹ Data for Ukraine from National Bank of Ukraine

[http://www.bank.gov.ua/Statist/Electronic%20bulletin/data/4-Financial%20markets\(4.1\).xls](http://www.bank.gov.ua/Statist/Electronic%20bulletin/data/4-Financial%20markets(4.1).xls)

⁴⁰Data from Aswath Damodaran, Ph.D., Stern School of Business NYU <http://pages.stern.nyu.edu/~adamodar/>

⁴¹ Foreign Direct Investment in Ukraine – Donbass, Philip Burris, Problems of foreign economic relations development and attraction of foreign investments: regional aspect., ISSN 1991-3524, Donetsk, 2007. p. 507-510



unpredictable changes in the legal system along with conflicting and inconsistent Civil and Commercial Codes do not allow for a transparent and stable enforced legal business environment. This is perceived as a great source of uncertainty by international companies, which make future predictions of business goals and strategy risky.

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

Taking into account the information provided above it is possible to conclude that the determination of the project "Dismantling of waste heap #2 at mine #22 "LISOVA"(Project ITL UA1000329) is relevant for the project at hand.

Outcome of the analysis: We have provided traceable and transparent information that an accredited independent entity has already positively determined that a comparable project "Dismantling of waste heap #2 at mine #22 "LISOVA"(Project ITL UA1000329) implemented under comparable circumstances (same GHG mitigation measure, same country, similar technology, similar scale) would result in a reduction of anthropogenic emissions by sources or an enhancement of net anthropogenic removals by sinks that is additional to any that would otherwise occur and have provided justification on why this determination is relevant for the project at hand. Therefore, this project is additional.

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

Project implementation will take place only on dump, which officially is in use "TANDEM TORG TPK" Ltd. 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 work⁴² 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;
- 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 17 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.

⁴² The effective method of electricity consumption control at coal mines. B.A.Gryaduschy, Doctor of Technical. Science, DonUGI, G.N.Lisovoy, V.I.Myalkovsky, Chehlaty NA, Cand. Science, NIIGM named M.M.Fedorov, Donetsk, Ukraine www.mishor.esco.co.ua/2005/Thesis/10.doc

Table 17 - 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
	Coal consumption	CO ₂	Excluded	This coal is displaced in the project activity by the coal extracted from the waste heaps.
Project scenario	Coal consumption	CO ₂	Excluded	The coal is extracted from waste heap.
	Consumption of fossil fuel due to extracting coal from dump	CO ₂	Included	Main emission source.
Leakages	Emissions of methane as a result of the coal industry	CH ₄	Included	These leaks are taking place in the baseline scenario associated with the uncontrolled leakage of methane in the mine
	Consumption of electricity due to mining	CO ₂	Included	Leakages due to baseline activity
	Use of other types of energy resources due to mining	CO ₂	Excluded	These emissions are not significant ⁴³ , and also for reasons of conservatism, they are excluded from consideration.
	Consumption of electricity due to beneficiation of coal from dump	CO ₂	Included	Leakages due to project activity

The baseline 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;

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:

- Emissions of carbon dioxide from the use of fuel for the operation of the project equipment (technics);
- Emissions of carbon dioxide associated with electricity consumption at beneficiation plant for receiving the coal concentrate from rock material of dump.

⁴³ 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 consumption of coal for energy production (identical in baseline and project scenario).

Leakages:

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.

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

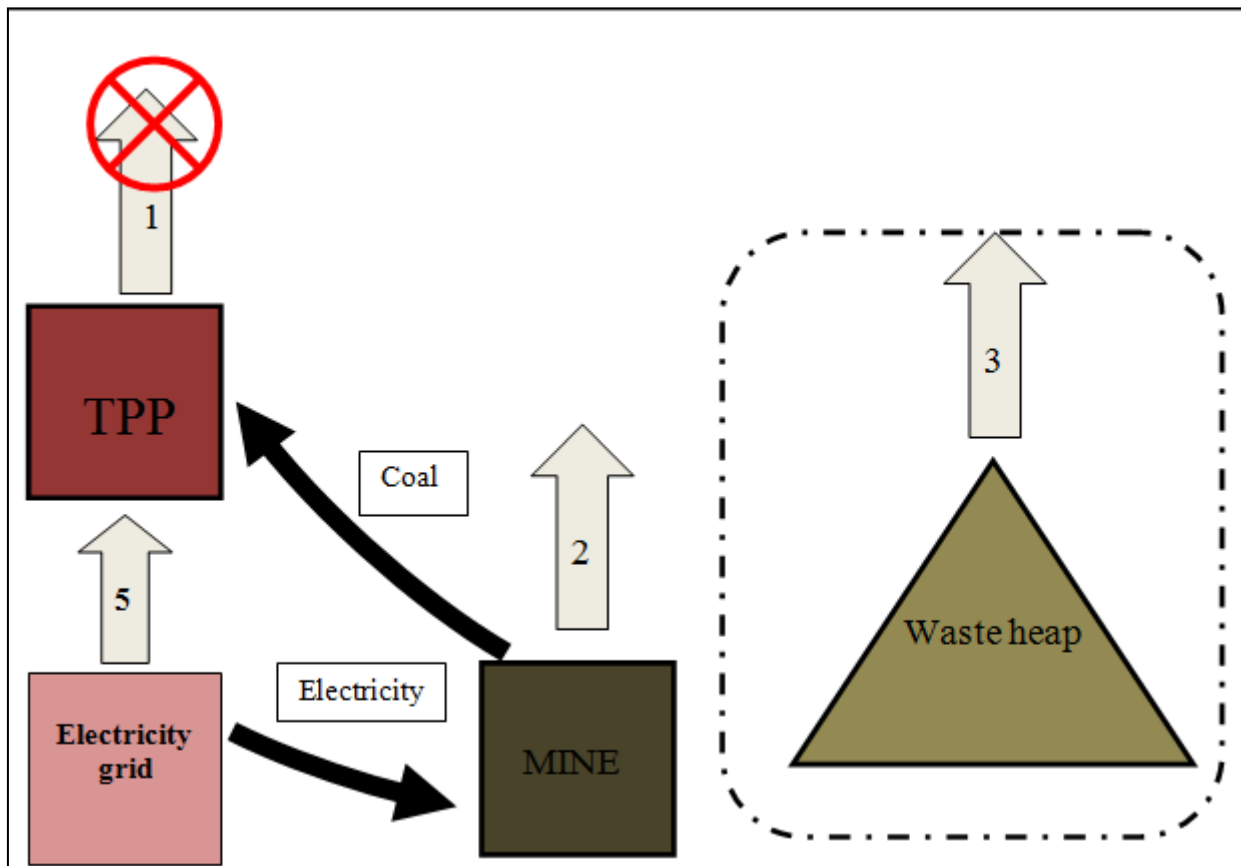


Figure 7 - The boundaries of the project and the sources of emissions in the baseline scenario

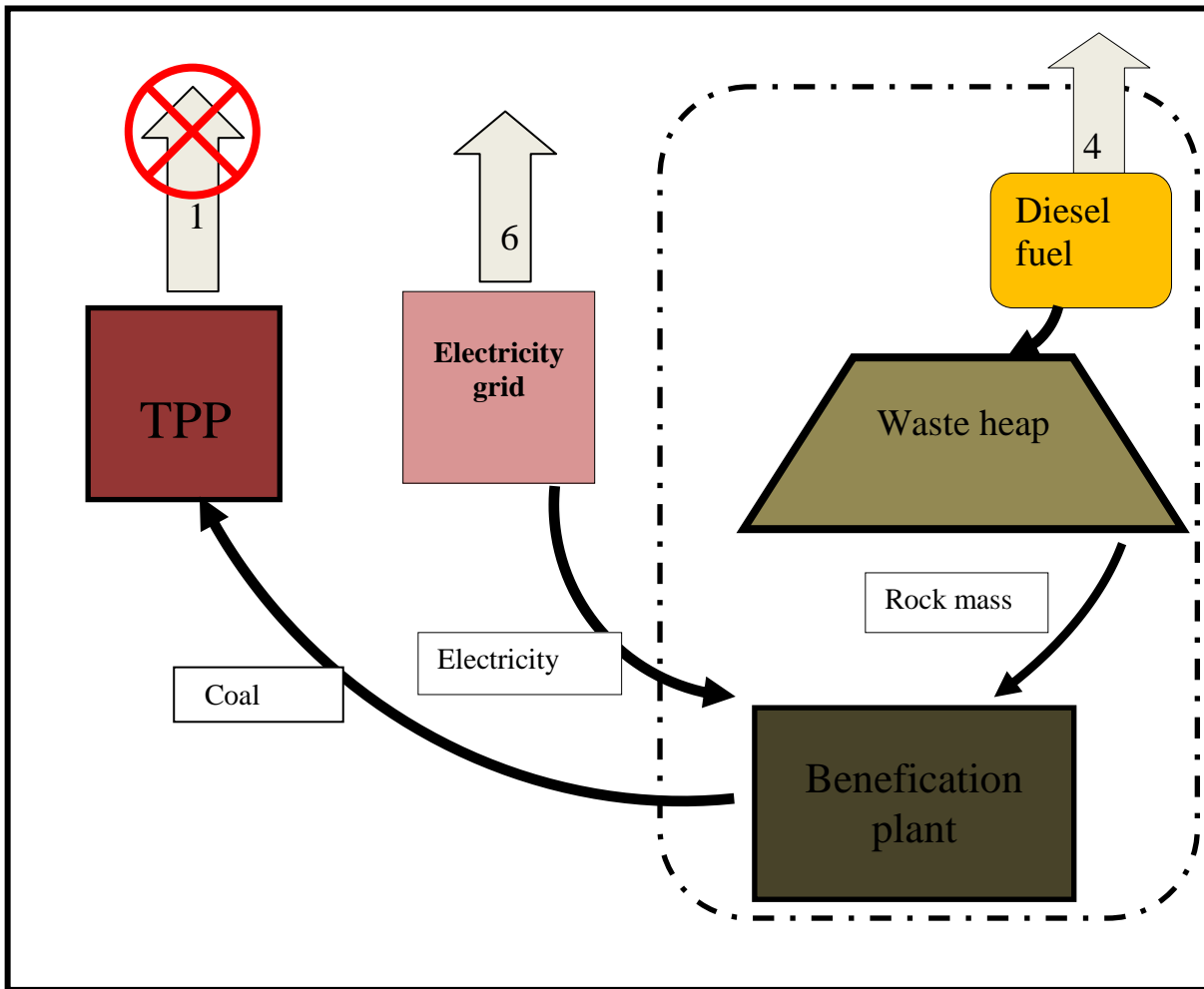



Figure 8 - The boundaries of the project and the source of emissions in the project scenario

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 of waste heap
 - 4. Carbon dioxide due to consumption of diesel fuel during dismantling the dump
 - 5. Carbon dioxide due to consumption of electricity in mine
 - 6. Carbon dioxide due to consumption of electricity during beneficiation of rock mass from 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 baseline scenario: 12/09/2012

Name of person / organization, determining the baseline scenario:

Gints Klavinsh, Project manager at SIA “Vidzeme EKO”, tel: .+371-29228458, e-mail: siltisilti@gmail.lv
“Vidzeme Eko” – project participant , contact details are available in Annex 1.

**SECTION C. Duration of the project / crediting period****C.1. Starting date of the project:**

The date of the project commencement is 02/09/2011. From this date the dismantling of waste heap begins.

C.2. Expected operational lifetime of the project:

The life cycle of the project will last from 02/09/2011 to 31/12/2017.

C.3. Length of the crediting period:

Length of crediting period - from 02/09/2011 to 31/12/2012. On 02/09/2011 generation of first emission reductions in the project begins. Emission Reduction Units received after the crediting period can be used in accordance with an appropriate mechanism under the UNFCCC. Crediting period can be extended, if it is approved by host Party. Taking into consideration such possible extension, the duration of the crediting period with the start date on 02/09/2011 will be 6 years 4 months or 76 months

**SECTION D. Monitoring plan****D.1. Description of monitoring plan chosen:**

The proposed monitoring procedures coincide with standard procedures in projects that were determined: Limited Society “Anthracite”, “Monolith” Ltd., “Temp” Ltd and others. The projects developer is Global Carbon BV.

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 04⁴⁴ 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 scenario are:

⁴⁴ <http://ji.unfccc.int/Ref/Documents/Guidelines.pdf>



- Emissions of carbon dioxide due to coal consumption for energy production;
- Emissions of carbon dioxide due to burning of coal dump;

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 beneficiation of coal. The electricity is used for operation of the equipment of beneficiation plant. 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 the equipment of beneficiation plant;
- 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).

Leakages

The sources of Leakages:

- 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.

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 special energy meter. Meter is located in the buildings of substation near the project location. The meter records all electricity consumed in the project because access to the electricity supply is only through it. Indications used for commercial accounts with energetic company. Account checking is 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 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 / l⁴⁵. For purpose of control a theoretical calculation of diesel fuel consumption is made on basis of technical specifications and actual record of machinery work.

⁴⁵ <http://elarum.ru/info/standards/gost-305-82/>



3. Amount of coal concentrate, 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.

To determine this parameter the commercial data of company are used. To confirm the amount of coal 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 summarized reports is based on these delivery data.

4. Ash content and moisture of coal concentrate.

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

On-site interim storage at achieving coal concentrate volume of about 100 tons sampling is made around the perimeter of the accumulated volume. Total volume of the collected sample is approximately 10-15 kg. Selected sample is 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 chessboard order the sample is gathered with weight not less than 500 grams. Then two accompanying certificate are written, which will 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 coal concentrate measured regularly with registration decade reports.

To measure the ash content and humidity of coal concentrate- is used procedure in GOST 11022-95 " Solid mineral fuel. Methods for determining the ash content"⁴⁶, and GOST 11014-2001 " Brown coal, hard coal and oil shale. Rapid method for determination of humidity "⁴⁷. Analysis of ash content and is made in the laboratory.

Acceptance inspector opens bank sample in the laboratory, verifies the identity and puts down all data in the "Journal of receiving samples for laboratory testing ".

Laboratory technician takes a sample on the analytical work, and humidity. Evaporation occurs in the low-temperature laboratory furnaces SNOL-100/350 at 160 ° C, weighing – at the laboratory electronic scales grade 4 accuracy AXIS A-2500. The process of ashing occurs in the high laboratory furnace SNOL-7, 2/1100 at 815 ° C, weighing - on the laboratory electronic scales grade 2 accuracy ANG-200C.

⁴⁶ <http://vsesnip.com/Data1/16/16768/index.htm>

⁴⁷ <http://vsesnip.com/Data1/40/40907/index.htm>



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 LZQM321.02.534, produced by "Elgama-Electro", Lithuania, which is a multifunction device for measuring electric power, accuracy 1.0 when measuring active energy in SS GOST 8.391:2008⁴⁸, frequency of testing 6 years.
- For weighing of coal concentrate - electronic truck gage scales VA-60E-1, produced "Vesoprostor" Ltd. 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 coal concentrate - procedure due to GOST 11022-95 "Mineral solid fuel. Methods of determination the ash content"⁴⁹, and GOST 11014-2001 "Brown coal, hard coal and oil shale. Accelerated methods for determining the moisture"⁵⁰. 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-100/350 at 160 ° C, weighing is at scales of 4 laboratory accuracy AXIS A-2500. 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 ANG-200C.
- 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.

⁴⁸ <http://lindex.net.ua/shop/bibl/501/doc/4205>

⁴⁹ <http://vsesnip.com/Data1/16/16768/index.htm>

⁵⁰ <http://vsesnip.com/Data1/40/40907/index.htm>



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".

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 "TANDEM TORG TPK" Ltd. 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 18 - List of constants used in the calculations of emissions

<i>Data / Parameter</i>	<i>Data unit</i>	<i>Description</i>	<i>Data Source</i>	<i>Value</i>
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- 2010., p. 456, 462, 468	2008-21.5 2009-21.8 2010-21.6 2011-21.6



				2012-21.6
NCV_{Diesel}	TJ/kt	Net Calorific Value of diesel fuel	National Inventory Report of Ukraine 1990- 2010., p. 473,476, 479	2008-42.2 2009-42.3 2010-42.5 2011-42.5 2012-42.5
$OXID_{Coal}$	d/l	Carbon Oxidation factor of coal	National Inventory Report of Ukraine 1990- 2010, p. 459, 465, 471	2008-0.963 2009-0.963 2010-0.962 2011-0.962 2012-0.962
$OXID_{Diesel}$	d/l	Carbon Oxidation factor of diesel fuel	National Inventory Report of Ukraine 1990- 2010, p. 475, 478, 481	2008-0.99 2009-0.99 2010-0.99 2011-0.99 2012-0.99
K_{coal}^c	tC/TJ	Carbon content of coal	National Inventory Report of Ukraine 1990- 2010, p. 458,464, 470	2008-25.95 2009-25.97 2010-25.99 2011-25.99 2012-25.99
K_{Diesel}^c	tC/TJ	Carbon content of diesel fuel	National Inventory Report of Ukraine 1990- 2010, p. 474, 477, 480	2008-20.2 2009-20.2 2010-20.2 2011-20.2 2012-20.2
EF_{CH_4}	m ³ /t	Emission factor for fugitive methane emissions from coal mining.	National Inventory Report of Ukraine 1990- 2009, p. 90	25.67



$EF_{CO_2,EL}$	tCO ₂ /MWh	Specific carbon dioxide emissions due to production of electricity at TPP and by its consumption	Order of State Environmental Investments Agency № 63, 43, 75 http://www.neia.gov.ua/nature/doccatalog/document?id=127171, 127172, 126006, 127498	2008 – 1.219 2009 – 1.237 2010 – 1.225 2011 – 1.227 2012 – 1.227
A_{Coal}	%	The average ash content of coal produced in Luhansk 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) (during the monitoring period the value can be changed)	2008-37.20 2009-38.40 2010-38.10 2011-38.10 2012-38.10
W_{Coal}	%	The average moisture of coal produced in Luhansk 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) (during the monitoring period the value can be changed)	2008-7.20 2009-7.40 2010-7.40 2011-7.40 2012-7.40
p_{WHB}	d/l	Probability of waste heap burning.	<i>Report on the analyzing the fire danger of waste heaps in Lugansk region</i> , Scientific Research Institute “Respirator”, Donetsk, 2012.	0.78
$N_{B,Coal,y}^E$	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.	2008 – 0.0878 2009 – 0.0905 2010 – 0.0926 2011 – 0.0842 2012 – 0.0842

**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	Monthly	100%	In paper and electronic form	
P2	$FC_{PE,Diesel,y}$ – Amount of diesel fuel, consumed in project in year y	Company records	t	C	Monthly	100%	In paper and electronic form	
P3	$EF_{CO_2,EL}$ - Specific carbon dioxide emissions due to production of electricity at TPP and by its consumption	See section D.1. Fixed ex ante	tC/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_{Diesel}^C - 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 CO₂ 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 (tCO₂ equivalent),

$PE_{EL,y}$ - project emissions due to consumption of electricity from the grid by the project activity in the year y (tCO₂ equivalent),

$PE_{Diesel,y}$ - project emissions due to consumption of diesel fuel by the project activity in the year y (tCO₂ 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, tCO₂/MWh;

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

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

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_{Diesel}^c - carbon content of diesel, tC/TJ;

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

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



D.1.1.3. Relevant data necessary for determining the <u>baseline</u> of anthropogenic emissions of greenhouse gases by sources within the project boundary, and how such data will be collected and archived:								
ID number <i>(Please use numbers to ease cross-referencing to D.2.)</i>	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
<i>B1</i>	$FC_{BE,Coal,y}$ - Amount of coal that has been mined in the baseline scenario and combusted for energy use in year y	Company records	t	<i>C</i>	Annually	100%	In paper and electronic form	Equil $FC_{PE,Coal,y}$ Calculated using formula (2)
<i>B2</i>	$FR_{Coal,y}$ - amount of coal concentrate, which is extracted from the dumps because of the project activity in a year y	Company records, scales	t	<i>M</i>	Permanently at boot	100%	In paper and electronic form	
<i>B3</i>	NCV_{Coal} - Net Calorific Value of coal	Company records	TJ/kt	<i>P</i>	Annually	100%	In paper and electronic form	Calculated using formula (14)
<i>B4</i>	$OXID_{Coal}$ - Carbon Oxidation factor of coal	See section D.1. Fixed ex ante	d/l	<i>E</i>	Fixed ex ante	100%	In electronic form	



<i>B5</i>	K_{Coal}^C - Carbon content of coal	See section D.1. Fixed ex ante	tC/TJ	<i>E</i>	Fixed ex ante	100%	In electronic form	
<i>B6</i>	p_{WHB} - Probability of waste heap burning	See section D.1. Fixed ex ante	d/l	<i>E</i>	Fixed ex ante	100%	In electronic form	
<i>B7</i>	A_{Coal} - The average ash content of coal produced in Luhansk region of Ukraine	See section D.1. Fixed ex ante	%	<i>E</i>	Fixed ex ante	100%	In electronic form	
<i>B8</i>	W_{Coal} - The average humidity of coal produced in Luhansk region of Ukraine	See section D.1. Fixed ex ante	%	<i>E</i>	Fixed ex ante	100%	In electronic form	
<i>B9</i>	$A_{Conc,y}$ - The average ash content of coal concentrate, which is extracted from the dumps because of the project activity in a year y	Company records	%	<i>M</i>	Monthly	100%	In paper and electronic form	Laboratory data
<i>B10</i>	$W_{Conc,y}$ - The average moisture of coal concentrate, which is extracted from the dumps because of the project activity in a year y	Company records	%	<i>M</i>	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 CO₂ equivalent):

Emissions in the baseline scenario are calculated as follows:

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



Where:

BE_y – baseline emissions in the year y (tCO₂ equivalent),

$BE_{WHB,y}$ - baseline emissions due to burning of the waste heap in the year y (tCO₂ equivalent),

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

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

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 heap 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_{Coal}^c - 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:

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

where:

$FC_{BE,Coal,y}$ - Amount of coal that has been mined in the baseline scenario and combusted for energy use in year y

$FR_{Coal,y}$ - amount of coal concentrate, 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;

$A_{Conc,y}$ - The average ash content of coal concentrate, that is obtained during enrichment process at enrichment plant in a year y , %;

$W_{Conc,y}$ - of coal concentrate, that is obtained during enrichment process at enrichment plant in a year y ,%;

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

W_{Coal} - the average humidity of coal, mined in Luhansk 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 CO₂ 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 Committee⁵¹ data on specific consumption of electricity at coal mines in Ukraine in the relevant year. Carbon dioxide emissions due to electricity consumption due to beneficiation of coal at beneficiation factory in the project scenario - a leakage that is considered on the base of standard calculation of specific energy consumption in the technological process of beneficiation.

These leakages are significant and will be included in the monitoring plan and calculating emission reductions for the project.

⁵¹ <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	Equal to amount of coal extracted from dump. To measure this parameter using commercial data. Amount of coal confirmed by acts of acceptance from customers.
L1	$EF_{CO_2,EL}$ - specific carbon dioxide emissions due to production of electricity at TPP and by its consumption	See section D.1. Fixed ex ante	tC/MWh	E	Fixed ex ante	100%	In electronic form	
L2	GWP_{CH_4} - 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} - Emission factor for fugitive methane emissions from coal mining.	See section D.1. Fixed ex ante	m^3/t	E	Fixed ex ante	100%	In electronic form	
L4	ρ_{CH_4} - Methane density at standart conditions	See section D.1. Fixed ex ante	t/m^3	E	Fixed ex ante	100%	In electronic form	
L5	$N_{Coal,y}^E$ Average electricity consumption per tonne of extracted coal in Ukraine in year y	See section D.1. Fixed ex ante	MWh/t	C	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 CO₂ equivalent):

Leakages in year y are calculated as follows:

$$LE_{B,y} = LE_{CH_4,y} + LE_{B,EL,y} \quad (13)$$

де:

$LE_{B,y}$ - leakages in year y, (т CO₂e);

$LE_{CH_4,y}$ - leakages due to fugitive emissions of methane in the mining activities in the year y, (т CO₂e);

$LE_{B,EL,y}$ - leakages due to consumption of electricity from a grid at coal mine in a year y, (т CO₂e);

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



$$LE_{CH_4,y} = - FC_{BE,Coal,y} \cdot EF_{CH_4} \cdot \rho_{CH_4} \cdot GWP_{CH_4} \quad (14)$$

де:

$LE_{CH_4,y}$ - leakages due to fugitive emissions of methane in the mining activities in the year y, (t CO₂e);

$FC_{BE,Coal,y}$ - 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;

EF_{CH_4} - emission factor for fugitive methane emissions from coal mining., M³/t;

ρ_{CH_4} - methane density at standart conditions t/M³;

GWP_{CH_4} - Global Warming Potential of Methane , tCO₂/ tCH₄.

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

$$LE_{B,EL,y} = - FC_{BE,Coal,y} \cdot N_{B,Coal,y}^E \cdot EF_{CO_2,EL,y} \quad (15)$$

де:

$LE_{B,EL,y}$ - leakages due to consumption of electricity from a grid at coal mine in a year y, (t CO₂e);

$FC_{BE,Coal,y}$ - 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;

$N_{B,Coal,y}^E$ - Average electricity consumption per tonne of coal, produced in Ukraine in the year y, MWh/t;

$EF_{CO_2,EL}$ - Specific carbon dioxide emissions due to production of electricity at TPP and by its consumption, tCO₂/ MWh.

Leakages due to consumption of other types of energy in coal mines are the minor in comparison to the leakages due to electricity consumption⁵², so in connection with this, and for reasons of conservatism, take them equal to zero.

Leakages in baseline scenario year y are calculated as follows:

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 CO₂ equivalent):

The annual emission reductions are calculated as follows:

⁵² 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



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

Where:

ER_y - emissions reductions of the JI project in year y (tCO₂ equivalent);

BE_y - baseline Emission in year y (tCO₂ equivalent);

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"*⁵³ 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	Low	These data are used in commercial activities of the company. Calculated on the basis of parameters that were taken from regular sources.
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, B7,B8	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
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-L5	Low	These data are fixed values and standard constants taken from regular sources

⁵³ <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:**

“TANDEM TORG TPK” Ltd. is 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:

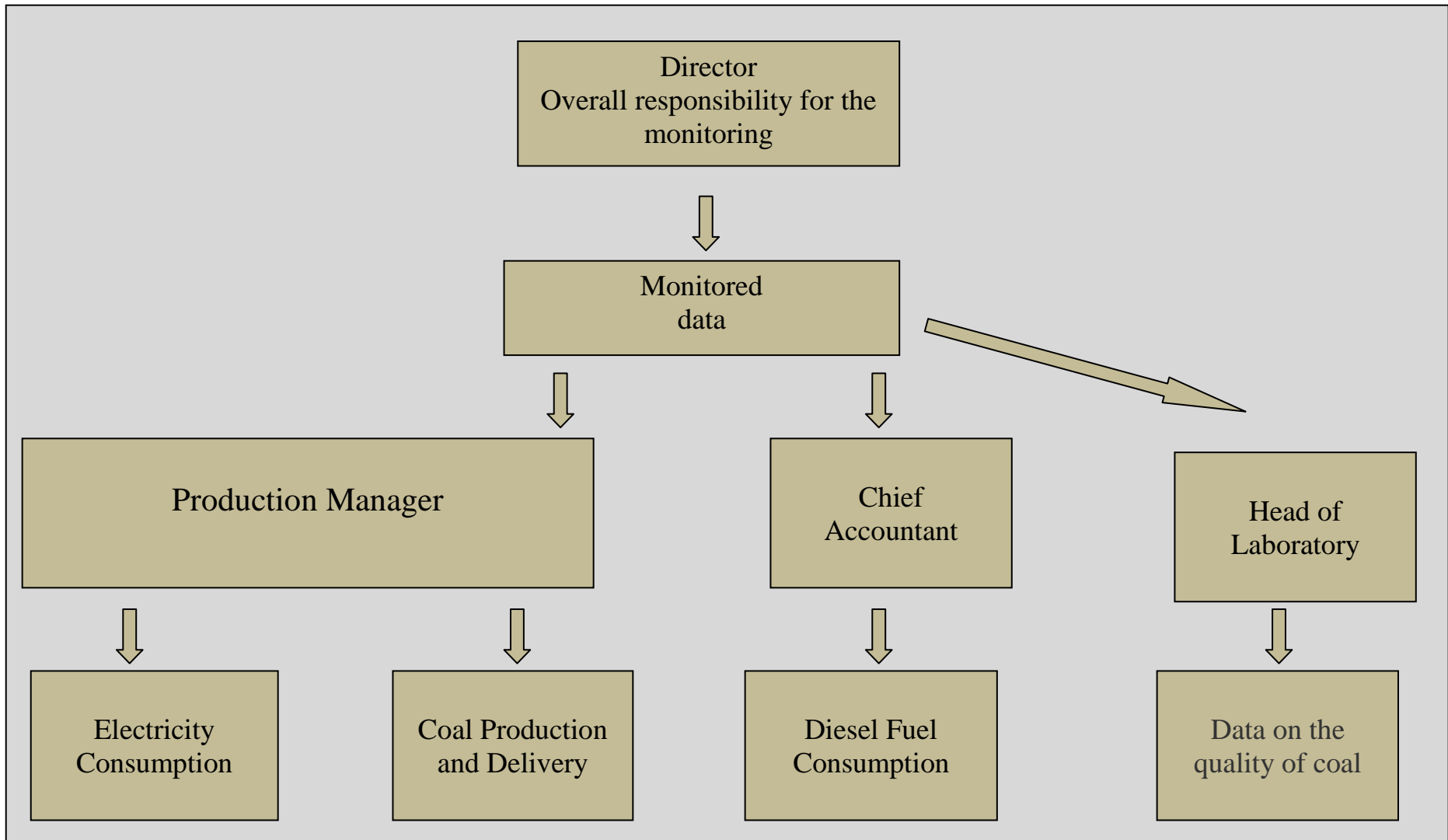


Figure 9 - Monitoring flowchart



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

Klavinsh Gints, Project manager at SIA “Vidzeme EKO”, ,which is the project participant. , tel+371-29228458, e-mail: siltisilti@gmail.lv,
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 19 - Estimated project emissions during the crediting period

			2011	2012	Total
1	Project Emissions due to consumption of electricity from the grid by the project activity	tCO ₂ e	3003	9271	12274
2	Project Emissions due to consumption of diesel fuel by the project activity	tCO ₂ e	3618	9571	13189
	Total	tCO ₂ e	6621	18842	25463
	Total for 2011-2012	tCO ₂ e	25 463		

Table 20 - Estimated project emissions after the crediting period

			2013	2014	2015	2016	2017	Total
1	Project Emissions due to consumption of electricity from the grid by the project activity	tCO ₂ e	9271	9271	9271	9271	9271	46355
2	Project Emissions due to consumption of diesel fuel by the project activity	tCO ₂ e	9571	9571	9571	9571	9571	47855
	Total	tCO ₂ e	18842	18842	18842	18842	18842	94210
	Total for 2013-2017	tCO ₂ e	94 210					

E.2. Estimated leakage:

Table 21 – Estimated leakages during the crediting period

			2011	2012	Total
1	Leakages due to fugitive emissions of methane in mining activity	tCO ₂ e	-121820	-321997	-443817
2	Leakages due to consumption of electricity from grid in mining activity	tCO ₂ e	-34846	-92106	-126952
	Total	tCO ₂ e	-156666	-414103	-570769
	Total for 2011-2012	tCO ₂ e	-570 769		

Table 22 – Estimated leakages after the crediting period

			2013	2014	2015	2016	2017	Total
1	Leakages due to fugitive emissions of methane in mining activity	tCO ₂ e	-321997	-321997	-321997	-321997	-321997	-1609985
2	Leakages due to consumption of electricity from grid in mining activity	tCO ₂ e	-92106	-92106	-92106	-92106	-92106	-460530
	Total	tCO ₂ e	-414103	-414103	-414103	-414103	-414103	-2070515
	Total for 2013-2017	tCO ₂ e	-2 070 515					

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

Table 23 - Estimated total project emissions during the crediting period

			2011	2012	Total
1	Total Project emissions during the crediting period	tCO ₂ e	-150045	-395261	-545306



Table 24 - Estimated total project emissions after the crediting period

			2013	2014	2015	2016	2017	Total
1	Total Project emissions during the crediting period	tCO ₂ e	-395261	-395261	-395261	-395261	-395261	-1976305

E.4. Estimated <u>baseline</u> emissions:
--

Table 25 - Estimated baseline emissions during the crediting period

		2011	2012	Total
Baseline Emissions due to burning of the waste heap in the year y	tCO ₂ e	520956	1376999	1897955
Total for 2011-2012	tCO ₂ e	1 897 955		

Table 26 - Estimated baseline emissions after the crediting period

		2013	2014	2015	2016	2017	Total
Baseline Emissions due to burning of the waste heap in the year y	tCO ₂ e	1376999	1376999	1376999	1376999	1376999	6884995
Total for 2013-2017	tCO ₂ e	6 884 995					

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

Table 27 - Estimated emission reductions during the crediting period

		2011	2012	Total
Emission reductions during the crediting period	tCO ₂ e	671001	1772260	2443261
Total Emission reductions during the crediting period	tCO ₂ e	2 443 261		

Table 28 - Estimated emission reductions after the crediting period

		2013	2014	2015	2016	2017	Total
Emission reductions during the crediting period	tCO ₂ e	1772260	1772260	1772260	1772260	1772260	8861300
Total Emission reductions during the crediting period	tCO ₂ e	8 861 300					

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

Table 29 - 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)
2011	6621	-156666	520956	671001
2012	18842	-414103	1376999	1772260
Total (tCO₂ equivalent)	25 463	-570 769	1 897 955	2 443 261
Average expected emission reductions over the <u>crediting period</u> (tCO ₂ equivalent)			1 832 445	

Table 30 - 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	18842	-414103	1376999	1772260
2014	18842	-414103	1376999	1772260
2015	18842	-414103	1376999	1772260
2016	18842	-414103	1376999	1772260
2017	18842	-414103	1376999	1772260
Total (tCO₂ equivalent)	94 210	-2 070 515	6 884 995	8 861 300
Average expected emission reductions after the <u>crediting period</u> (tCO ₂ equivalent)			1 772 260	

**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 "TANDEM TORG TPK" Ltd. 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 regulations⁵⁴.

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 beneficiation factory "Continent-2" in 2005 by the project designer SPE "Firma "Pryroda". Key findings of this EIA are summarized below:

- Impact on air is the main environmental impact of the project activity. Dust emissions due to the erosion and project activity such as loading and offloading operations of input rock and processed coal will be limited. Also emissions from transport will be present during the project operation stage. The impact will not exceed maximum allowable concentration at the edge of the sanitary zone;
- Impact on water is minor. The project activity will use water in a closed cycle without discharge of waste water. The possible discharge of the processed water will not have negative impact on the quality of water in the surface reservoirs;
- Impacts on flora and fauna are insignificant. As a result of the project activity the existing landscape will change, but the final total impact is positive. 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 for enrichment plant. 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 Lugansk region is the procedure of environmental impact assessment.

⁵⁴ <http://www.budinfo.com.ua/dbn/8.htm>

**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**

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Middle name:	Yuryevych
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Annex 2**BASELINE INFORMATION**

See Section B in PDD

Table 31 – The key elements of the baseline (including variables, parameters and data sources)

#	<i>Parameter</i>	Data unit	Data sources
1	$FC_{BE,Coal,y}$ - Amount of coal that has been mined in the baseline scenario and combusted for energy use in year y	t	Customer data, calculated using formula (2), Section B.1)
2	$FR_{Coal,y}$ - Amount of coal concentrate, which is extracted from the dumps because of the project activity in a year y	t	Customer data (weight scales)
3	$A_{Conc,y}$ - The average ash content of coal concentrate, that is obtained during enrichment process at enrichment plant in a year y	%	Customer data (laboratory)
4	$W_{Conc,y}$ - The average moisture of coal concentrate, that is obtained during enrichment process at enrichment plant in a year y	%	Customer data (laboratory)
5	A_{Coal} - The average ash content of coal produced in Luhansk 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)
6	W_{Coal} - The average moisture of coal produced in Luhansk 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)
7	NCV_{Coal} – Net Calorific Value of coal	TJ/kt	State Standard 4083-2002. Coal and anthracite for powdered combustion in thermal power plants. Kyiv. State Standard of Ukraine 2002. The standard will be provided by an independent expert organization.
8	$OXID_{Coal}$ - Carbon Oxidation factor of coal	d/l	National Inventory Report of Ukraine 1990- 2010, p.459,465,471
9	K_{Coal}^c - Carbon content of coal.	tC/TJ	National Inventory Report of Ukraine 1990- 2010, p.458, 464, 470
10	p_{WHB} – Probability of waste heap burning	d/l	<i>Report on the analyzing the fire danger of waste heap in Lugansk region</i> , Scientific Research Institute “Respirator”, Donetsk, 2012.

Annex 3**MONITORING PLAN**

Table 32 - Data on measuring geares of the project:

Parameter	measuring geare	Data unit	Producer	The type	serial number	Accu racy class	The date of instalation	He date of the last calibration
Consumption of electricity	LZQM 321.02.534	kWh	«Elgama-Electro» Lithuania	Electronic meter of electricity consumption	910472	±1%	08/11/2011	04/08/2011
The amount of coal	Automobile scales VA-60E-1	t	"Ukrestmarkinvest" Ltd	Automobile Scales-tensometric	0059	±25 kg	24/12/2007	15/07/2012

See section D in PDD



Annex 4

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

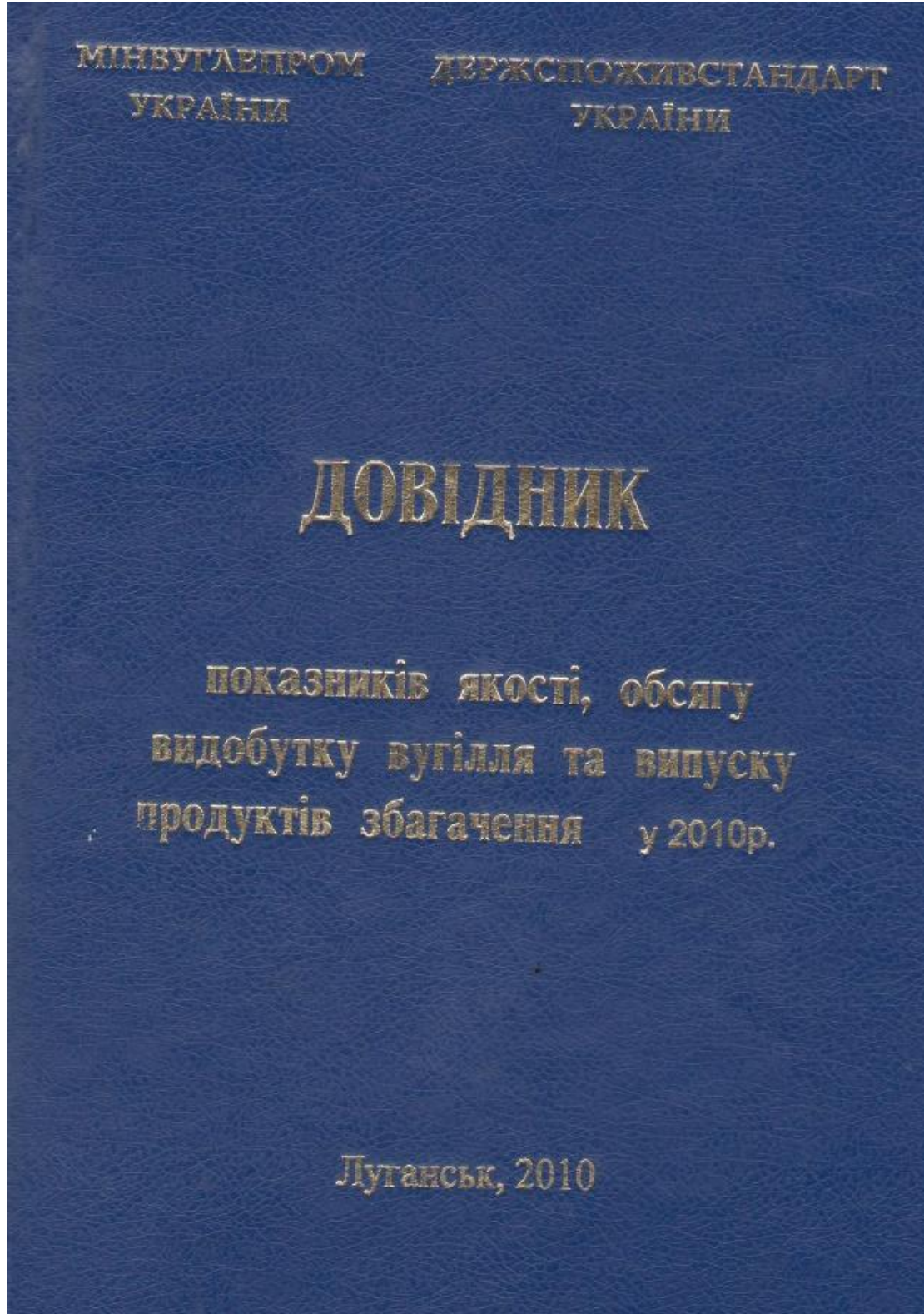




Table 33- Coal mined at mines and sections - 2010.

I ВИДОБУТОК ВУГІЛЛЯ ШАХТАМИ ТА РОЗРІЗАМИ

Найменування шахти	Дольова участь в видобутку вугілля по шахті у 2010 році, %	Марка вугілля ДСТУ 3472-96		Фактичний видобуток родового вугілля у 2009 році		Видобуток родового вугілля, що планується у 2010 році				Класифікаційні параметри			
		кокс.	енерг.	тис. т	Зольність А ⁴ , %	тис. т	Зольність А ⁴ , %	Сірка S ⁴ , %	Волога W ⁴ , %	Середній показник відбиття втриниті R _с , %	Товщина пластичного шару Y, мм	Вміст летючих речовин на сухий стан V ⁴ , %	Вміст теплоти згорання Q _с , ккал/кг
МІНВУГЛЕПРОМ УКРАЇНИ				72522,5	38,6	76204,5	38,9	2,0	7,7	-	-	26,5	8166
<i>у тому числі:</i>													
<i>енергетичне вугілля</i>				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
<i>коксівне вугілля</i>				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

Найменування шахти	Дольова участь в видобутку вугілля по шахті у 2010 році, %	Марка вугілля ДСТУ 3472-96		Фактичний видобуток родового вугілля у 2009 році		Видобуток родового вугілля, що планується у 2010 році				Класифікаційні параметри			
		кокс.	енерг.	тис. т	Зольність А ⁴ , %	тис. т	Зольність А ⁴ , %	Сірка S ⁴ , %	Волога W ⁴ , %	Середній показник відбиття втриниті R _с , %	Товщина пластичного шару Y, мм	Вміст летючих речовин на сухий стан V ⁴ , %	Вміст теплоти згорання Q _с , ккал/кг
Підпорядковані Мінвуглепрому				38396,5	39,6	39066,0	39,7	2,1	7,1	-	-	21,0	8193
<i>у тому числі:</i>													
<i>енергетичне вугілля</i>				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
<i>коксівне вугілля</i>				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
<i>у тому числі:</i>													
<i>енергетичне вугілля</i>				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
				14934,0	36,9	17173,7	39,1	2,0	6,7	-	-	32,0	8449
<i>коксівне вугілля</i>				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



Найменування шахти	Дольова участь в видобутку вугілля по шахті у 2010 році, %	Марка вугілля ДСТУ 3472-96		Фактичний видобуток родового вугілля у 2009 році		Видобуток родового вугілля, що планується у 2010 році				Класифікаційні параметри			
		кокс.	енерг.	тис. т	Зольність А ^d , %	тис. т	Зольність А ^d , %	Сірка S ^d , %	Волога W ^d , %	Середній показник відбиття вітринити R _в , %	Товщина пластинчатого шару Y, мм	Вихід легких речовин на сухий стан V ^{сух} , %	Висота згорання Q _г , ккал/кг
Донецька область				32159,6	38,1	32038,5	38,3	2,2	6,9	-	-	25,6	8389
у тому числі:													
Підпорядковані Мінуглепрому				17919,6	40,0	18344,0	39,9	2,4	7,1	-	-	27,6	8307
Непідпорядковані Мінуглепрому				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 Мінуглепрому України				17246,7	38,3	17502,0	38,4	1,9	7,3	-	-	11,1	8062
Непідпорядковані Мінуглепрому України				6155,0	40,4	8300,0	41,1	2,5	6,0	-	-	31,3	7473

Найменування шахти	Дольова участь в видобутку вугілля по шахті у 2010 році, %	Марка вугілля ДСТУ 3472-96		Фактичний видобуток родового вугілля у 2009 році		Видобуток родового вугілля, що планується у 2010 році				Класифікаційні параметри			
		кокс.	енерг.	тис. т	Зольність А ^d , %	тис. т	Зольність А ^d , %	Сірка S ^d , %	Волога W ^d , %	Середній показник відбиття вітринити R _в , %	Товщина пластинчатого шару Y, мм	Вихід легких речовин на сухий стан V ^{сух} , %	Висота згорання Q _г , ккал/кг
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	8690
		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



Table 34- Coal mined at mines and sections - 2008

I 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 родового вугілля у 2007 році		Видобуток родового вугілля, що планується у 2008 році				Класифікаційні параметри			
		кокс.	енерг.	тис. т	Зольність А ⁴ , %	тис. т	Зольність А ⁴ , %	Сірка S ⁴ , %	Волога W ⁴ , %	Середній показник вмісту вугілля R ₄ , %	Товщина пластичного шару У, мм	Вихід легких речовин на сухий стан V ⁴ , %	Висота теплоти згорання Q ₄ ⁴ , ккал/кг
МІНВУГЛЕПРОМ УКРАЇНИ				75095,4	38,1	78343,6	38,4	2,1	8,0	-	-	28,1	8243
<i>у тому числі:</i>													
<i>Підпорядковані Мінвуглепрому</i>				42152,3	40,1	46000,0	39,2	2,2	7,1	-	-	24,0	8195
<i>Непідпорядковані Мінвуглепрому</i>				32943,1	35,5	32343,6	37,2	2,1	9,4	-	-	33,9	8311
<i>у тому числі:</i>													
<i>енергетичне вугілля</i>				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
<i>коксівне вугілля</i>				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	11879,0	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	890,0	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 родового вугілля у 2007 році		Видобуток родового вугілля, що планується у 2008 році				Класифікаційні параметри			
		кокс.	енерг.	тис. т	Зольність А ⁴ , %	тис. т	Зольність А ⁴ , %	Сірка S ⁴ , %	Волога W ⁴ , %	Середній показник вмісту вугілля R ₄ , %	Товщина пластичного шару У, мм	Вихід легких речовин на сухий стан V ⁴ , %	Висота теплоти згорання Q ₄ ⁴ , ккал/кг
Донецька область				33790,3	38,6	34598,6	38,2	2,3	7,0	-	-	28,5	8341
<i>у тому числі:</i>													
<i>Підпорядковані Мінвуглепрому</i>				19249,1	42,1	22270,0	39,8	2,4	7,1	-	-	31,1	8292
<i>Непідпорядковані Мінвуглепрому</i>				14541,2	34,1	12328,6	35,3	2,1	6,8	-	-	24,0	8430
<i>у тому числі:</i>													
<i>енергетичне вугілля</i>				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	2089,3	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
<i>коксівне вугілля</i>				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
<i>у тому числі:</i>													
<i>Підпорядковані Мінвуглепрому України</i>				19387,6	37,1	20185,0	37,2	1,9	7,2	-	-	13,7	8075
<i>Непідпорядковані Мінвуглепрому України</i>				5821,1	35,0	6890,0	39,3	2,6	5,5	-	-	33,1	8531

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Annex 5:

Reference of the State Statistics Service of Ukraine “The actual costs of electricity production per one tonne of coal stone agglomerated”



ДЕРЖАВНА СЛУЖБА СТАТИСТИКИ УКРАЇНИ
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29.05.2012р. № 15/1-20/692/11 На № _____ від _____

Товариство з обмеженою відповідальністю
«Науково-дослідний центр КТФ»

01030 м. Київ, вул. Б. Хмельницького, 16/22

На Ваш лист від 23.05.2012р. № 12 Держстат у межах своїх повноважень надає наявну статистичну інформацію щодо фактичних витрат електроенергії на видобуток однієї тонни вугілля кам'яного неагломерованого.

Фактичні витрати електроенергії на видобуток однієї тонни вугілля кам'яного неагломерованого*.

	2008	2009	2010	2011
Україна	87,8	90,5	92,6	84,2

кВт.г/т

*Розраховано як частка від ділення фактичних витрат електроенергії на видобуток вугілля кам'яного неагломерованого за звітний період на обсяг видобутого вугілля кам'яного неагломерованого за звітний період, помножена на 1000.

Заступник Голови



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