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

## CONTENTS



## Annexes

## SECTION A. General description of the project

### A.1. Title of the project:

Waste heaps coal extraction by Technoanthracite Ltd.

Sectoral scope: 8. Mining/mineral production

Version of the document: 2.1
Date of the document: 1st of December 2011.

### A.2. Description of the project:

The coal industry of Ukraine is a huge commercial complex, which includes about 196 operating mines, 3 open-cast mines, 119 mines which are at the stage of closing, processing, transport and other enterprises. Over geological reserves of fossil carbon Ukraine is ranked as first in Europe and is on the eighth place in the world.

The main area of coal mining is the Donetsk Basin. Donetsk Basin's coal is mainly situated at medium depths of 400-800 m. The average thickness of coal beds is around 0,6-1,2 m. Therefore, coal is mined at Donbas mainly by mining. Most mines develop beds at the depth of 400-800 m; however, 35 mines of the region mine the coal at the depth of 1000-1300 m. Coal-beds in Donetsk basin are interleaved with rock and usually are found every 20-40 m.

Coal mining in such conditions leads to rise of large amounts of coal containing rock mass discharge to the surface. Coal is separated from the rock mass, which forms a huge coal containing waste heaps. The process of coal extraction at the coal mines was never effective.

In the past, ***before the starting of the project*****,** very often it was not economically feasible to extract all 100% of coal from the rock mass. Therefore, waste heaps of Donbas contains a large amount of coal, which is self-ignited later on. According to different estimations, the rock mass, which is mined from the coal mine, contains only around 65-70% of coal, while the rest is a waste. Up to 60% of this rock mass is formed in coal containing waste heaps. According to experts' estimations, percentage of combustible substances in the coal containing waste heaps is around 15-30%, when at the same time the coal content varies from 7% and till 28-32%.

All the waste heaps that were self-ignited or the ones that are close to self-ignition are the centre of uncontrolled pollutants and greenhouse gas emissions. Harmful substances herewith include sulphurous anhydride that turns into sulphur acid, which causes sulphur rains together with hydrogen sulphide and carbon monoxide discharge. Groundwater is polluted by small particles of rock during the contact with coal containing waste heaps. As the result, acidity and hardness of water rises. The erosion processes often lead to fracture of waste heaps, which pollute surrounding areas with dust containing harmful substances (e.g. sulphur). Over time, erosion can lead to complete destruction of waste heaps or massive landslide, which is dangerous both in terms of direct damage to people and property, as well as huge dust and harmful substances emissions into the atmosphere. Erosion also increases the probability of waste heaps self-ignition. The process of carbon combustion in the waste heaps is quite continuous and lasts from 5 to 7 years.

***In the baseline scenario*** it is assumed that this common practice will continue and waste heaps will be burning and emitting GHG into the atmosphere until the coal is consumed. Whereas using improved extraction techniques, proposed in this project, the residual coal can be extracted from the waste heaps and the coal can be used to for the energy needs of local consumers. The reclaimed coal will replace coal that would have otherwise been mined, causing fugitive emissions of methane during the mining process.

This Project is aimed at coal extraction from the mine's waste heaps near the town of Sverdlovsk, Lughansk Region, Ukraine. 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. The Project includes the installation of coal extraction units and the grading of the extracted coal. Extracted coal is then sold for heat and power production.

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

Brief summary of the history of the project: The project has been initiated in the mid 2006. Project design has been completed by end of 2006 and installation and construction works were done by the end of the 2007. The JI was one of the drivers for the project from the start and financial benefits provided by the JI mechanism were considered as one of the reasons to start the project.

## A.3. Project participants:

*Table 1 Project participants*

| Party involved | Legal entity project participant (as applicable) | Please indicate if the Party involved wishes to be considered as project participant (Yes/No) |
|---|---|---|
| Ukraine (Host party) | • Technoanthracite Ltd. | No |
| Switzerland | • Rutek Trading AG | No |

Technoanthracite Ltd. is the project host. Rutek Trading AG is the sponsor of the project.

## A.4. Technical description of the project:

### A.4.1. Location of the project:

Coal containing rock mass from waste heaps, which is purchased and processed by Technoanthracite Ltd.

#### A.4.1.1. Host Party(ies):

Ukraine

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

Lughansk region

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

Town of Sverdlovsk

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

*Figure 1 Location of the project near city Sverdlovsk on the map of Ukraine*


*Figure 2 Location of the project on Google maps*

Project site area is in the legal use of Technoanthracite Ltd. and located on the territory under existing buildings and constructions of former mine #71 of the state company "Sverdlovanthracite" of Sverdlovsk city Council's lands.

The nearest industrial units are the following coal mines: "Dolhozhanska-Capitalna", "Krasny Partizan", as well as coal enrichment plant "Sverdlovska".

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

Taking into account that the first coal containing waste heap was located near the special coal extraction plant, during years 2008-2009 the coal containing waste heaps mass is directly transported by the bulldozers to the special coal extraction plant.

At the first stage the coal containing waste heaps mass is loaded in the ground tunnel. The coal containing mass is then transported through vibrating feed unit, conveyor belt and metal separation unit to the separator. After that, the separated fraction of +50 mm is transported through conveyor (installed in the gallery for additional coal separation) to a newly formed flat rock mass formation (by the bulldozers) in order to enable future usage of lands vacated from waste heaps. The fraction of 0-50 mm is transported for further coal extraction.

At the second stage, the coal containing waste heaps mass (fraction of 0-50 mm) is supplied to the special coal extraction plant for further dressing and processing. The selection of the main equipment was performed in accordance with recommendations of the Ukrainian Coal Enrichment Institute. The complete coal enrichment cycle process in heavy media is performed in the premises of coal extraction plant. The process is performed by mixing waste heap mass with magnetic suspension. As a result of this, the separation of processing material into coal concentrate and rock mass is performed due to the influence of centrifugal force. It is envisaged to equip the coal extraction unit with necessary blocking and alarm systems, emergency disconnection systems and sensors of performance control. Production process at this unit is automatic. The end product is coal concentrate in fractions of 0-10 mm, 10-25 mm and 25-50 mm. Sorted coal, obtained within the project activity is delivered to consumers for further consumption.

After the processing, the remains of rock mass are also transported (by the bulldozers) to a newly formed flat rock mass formation in order to enable future usage of lands vacated from waste heaps.

Taking into account that the first coal containing waste heap was fully dressed and processed and also that the second waste heap is located on a 14 km distance from the special coal extraction plant, starting from the August 2010 the coal containing waste heaps mass is separated by a slightly different separation technology which is described below.

1) Coal containing waste heaps mass is transported to the sorting units by the bulldozers in order to conduct further separation process of coal containing waste heaps mass on specific fractions.

2) Excavator Hyundai 360 (backhoe bucket, See below) is used for coal containing waste heaps mass with its further load to receivers of mobile sorting units.


***Figure 3 The excavator Hyundai 360***

3) Sorting complex for coal containing waste heaps processing is used to separate the coal containing waste heaps on different fractions of 0-50 mm and +50-120 mm (represented by mobile sorting units (sieves) Kleemann MS 19Z and Kleemann MS 16Z (made in Germany).

***Figure 4 Mobile sorting unit (sieve) Kleemann MS 19Z***

***Figure 5 Mobile sorting unit (sieve) Kleemann MS 16Z***

4) After the coal containing waste heaps are sorted by fractions of 0-50 mm and +50-120 mm, the coal containing waste heaps mass of 0-50 mm fraction is loaded by frontal loaders Hyundai HL760-7A (see below) in the bulldozers and transported to the coal extraction plant for further dressing and processing of coal

containing waste heaps (the process of further dressing and processing is conducted on the same facilities as was described in this section above).

*Figure 6 Frontal loader Hyundai HL760-7A*

5) The coal containing waste heaps mass (fraction of +50-120 mm) is loaded by frontal loaders Hyundai HL770-7A in the dump trucks and transported to the newly flat rock mass formation. After finalisation of old coal containing waste heap processing and forming the new one, the territory that will be released from the coal containing waste heaps will be reclaimed and planted with grass.


*Figure 7 Frontal loader Hyundai HL770-7A*

All technologies used for coal extraction from the waste heaps are typical and used in the other plants, hence no weaknesses are expected.

**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 objective is to reduce anthropogenic greenhouse gas emissions into the atmosphere.

Moreover, the project will contribute to improvement of ecological situation at the enterprise.

The mentioned above objective to be achieved by coal extraction from coal containing waste heaps in order to prevent $CO_{2e}$ emissions into the atmosphere which are occurring as the result of waste heaps spontaneous burning and also to obtain additional quantities of coal. An important result of waste heaps coal extraction with further processing of the waste heaps mass is the exclusion of unfavourable ecological impacts of the waste heaps (dust emissions, greenhouse gas emissions, harmful gases and pollutants emissions, polluted waste water discharge from the surface of the waste heaps into the environment). Waste heaps coal extraction and the usage of the rock mass enables further reclamation of the renewed land from the waste heaps and efficient economical use of the area, which is restored for construction needs. On the 23rd of June 2006 project documentation development regarding waste heaps coal extraction plant was initiated in order to achieve the result under the project activity.

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

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

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

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

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

*Table 2 Estimated amounts of emission reductions during the crediting period*

| | 5 Years |
|---|---|
| Length of the crediting period | 01/01/2008 – 31/12/2012 |
| Year | Estimate of annual emission reductions in tonnes of $CO_2$ equivalent |
| Year 2008 | 115675 |
| Year 2009 | 150453 |
| Year 2010 | 36770 |
| Year 2011 | 99000 |
| Year 2012 | 99000 |
| Total estimated emission reductions over the crediting period (tonnes of $CO_2$ equivalent) | **500898** |
| Annual average of estimated emission reductions over the crediting period (tonnes of $CO_2$ equivalent) | 100180 |

*Table 3 Estimated amounts of emission reductions after the crediting period*

| | 8 Years |
|---|---|
| Period after 2012, for which emission reductions are estimated | 01/01/2013 – 31/12/2020 |
| Year | Estimate of annual emission reductions in tonnes of $CO_2$ equivalent |
| Year 2013 | 99000 |
| Year 2014 | 99000 |
| Year 2015 | 99000 |
| Year 2016 | 99000 |
| Year 2017 | 99000 |
| Year 2018 | 99000 |
| Year 2019 | 99000 |
| Year 2020 | 99000 |
| Total estimated emission reductions over the period indicated (tonnes of $CO_2$ equivalent) | **792000** |
| Annual average of estimated emission reductions over the period indicated (tonnes of $CO_2$ equivalent) | 99000 |

## A.5. Project approval by the Parties involved:

The project has been officially presented for endorsement to the Ukrainian authorities. Letter of Endorsement # 2810/23/7 has been issued by the State Environmental Investment Agency of Ukraine on the 28th of September 2011 for this project. The project participants will submit necessary documents in order to obtain approval from the Host Party after the determination report will be issued as indicated by the project approval procedures of the Host Party.

## SECTION B. Baseline

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

In accordance with «Guidance On Criteria For Baseline Setting And Monitoring» version 02[1] (hereinafter referred to as JISC Guidance) approved by Joint Implementation Supervisory Committee project participants can establish baseline greenhouse gas emission calculation methodology on a project specific basis in line with Appendix B of Joint Implementation Guidelines[2] (Decision 9/CMP.1 Conference of the Parties serving as the Meeting of the Parties to the Kyoto Protocol 30th of March 2006 – hereinafter referred to as JI Guidelines). All documents are available at http://ji.unfccc.int/Ref/Docs.html. The following step by step approach is applied in order to describe and justify the baseline chosen.

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

According to the Article 20 of JISC Guidance a baseline is the scenario that reasonably represents the anthropogenic emissions by sources or net anthropogenic removals by sinks of GHGs that would occur in the absence of the project.

The baseline for this project is established on a project specific basis in accordance with the Article 21 of JISC Guidance. For this project there is used multi-project Carbon Emission Factor for fugitive methane emissions from coal mining, which is assessed by "National GHG inventory of Ukraine, period 1990-2009" for JI projects developed in Ukraine.

In accordance with the Article 9 of JISC Guidance, option A for establishment of the baseline is selected:
*(a) An approach for baseline setting and monitoring developed in accordance with appendix B of the JI guidelines (JI specific approach);*

In accordance with the Article 11 of JISC Guidance for the baseline setting is used the most recent valid version of the methodology chosen in the PDD of the project "Waste heaps dismantling with the aim of decreasing the greenhouse gases emissions into the atmosphere" which is published on the UNFCCC JI website at http://ji.unfccc.int/UserManagement/FileStorage/IE7LK2SZF1NOXRVB4CYG65WQPJMHA3.

Taking into account the JI specific approach selected for baseline establishment above, in accordance with the Article 24 of JISC Guidance, baseline will be identified:

*By listing and describing plausible future scenarios on the basis of conservative assumptions and selecting the most plausible one.*

The most plausible future scenario will be identified by checking that all alternatives are consistent with mandatory applicable laws and regulations and by performing a barrier analysis. Should only two alternatives remain, of which one alternative should represent the project scenario with the JI incentive, the CDM Tool "Tool for the demonstration and assessment of additionality" shall be used to prove that the project scenario cannot regarded at the most plausible one.

**Step 2. Application of the approach chosen**

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

[1] http://ji.unfccc.int/Ref/Documents/Baseline_setting_and_monitoring.pdf
[2] http://unfccc.int/resource/docs/2005/cmp1/eng/08a02.pdf#page=2

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

Scenario 1. Continuation of existing situation
In the current situation waste heaps are not utilised. Spontaneous self-heating and subsequent burning of waste heaps is very common and measures to extinguish fire are taken sporadically. Burning waste heaps are sources of uncontrolled greenhouse gas emissions. Coal is not extracted from the waste heaps. Coal is produced by underground mines of the region and used for energy production or other purposes. Coal mining activities cause emissions of fugitive methane and also the formation of new waste-heaps.

Scenario 2. Direct energy production from the heat energy of burning waste heap
Waste heaps are not extinguished and not monitored properly. Some burning heaps are used to produce energy by direct insertion of heat exchangers into the waste heap[3]. This captures a certain amount of heat energy for direct use or conversion into electricity. The coal is not extracted from the waste heaps. Coal is produced by underground mines of the region and used for energy production or other purposes. Mining activities, resulting in fugitive gas release, and the formation of more waste-heaps.

Scenario 3. Production of construction materials from waste heap matter
Waste heaps are being processed in order to produce construction materials (bricks, panels, etc.). Coal in the waste heap matter is burnt during the agglomeration process[4]. 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[5].

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

***Sub step 2c. Barrier analysis***

[3] *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)
[4] *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, Lughansk, #1 2007
[5] *Sverdlovsk – Territory of disaster*, XXI vek, 2007 (http://xxi.com.ua/region/7_26_2.htm)

Scenario 1. Continuation of existing situation
This scenario does not anticipate any activities and therefore does not face any barriers.

Scenario 2. Direct energy production from the heat energy of burning waste heap
*Technological barrier*: This scenario is based on the highly experimental technology, which has not been implemented even in a pilot project. It is also not suitable for all waste heaps as the project owner will have to balance the energy resource availability (i.e. waste heap location) and the location of the energy user. On-site generation of electricity addresses this problem but requires additional interconnection engineering. In general this technology has yet to prove its viability. In addition it does not allow the control and management of the emitted gases.

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

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

Scenario 4. Coal extraction from waste heaps without JI incentives
This scenario faces several barriers and at least one of few implemented similar project are realized only with JI incentives. 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[6]. 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.[7] Waste heaps in this situation are considered as additional burdens and mines often do not even perform minimum required maintenance. Spontaneous self-heating and subsequent burning of waste heaps is very common and among 594 surveyed waste heaps in Donetsk region alone, only 20 are known not to have been burning at sometime, exact data are not always available. From a commercial view point the fines that are usually levied by the authorities are considerably lower than costs of all the measures outlined by this scenario.

***Sub step 2d. Baseline identification***

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.

[6] *Report on the fire risk of Lughansk Region's waste heaps*, Scientific Research Institute "Respirator", Donetsk, 2010. This is a proprietary study that will be made available to the accredited independent entity
[7] *Coal Sector of Ukraine: Problems and Sustainable Development Perspectives*, Yuri Makogon, National Institute For Strategic Research, 2008 (http://www.niss.gov.ua/Monitor/desember08/5.htm)

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 excepting of the similar project "Waste heaps dismantling with the aim of decreasing the greenhouse gases emissions into the atmosphere" which is published on the UNFCCC JI website at http://ji.unfccc.int/UserManagement/FileStorage/IE7LK2SZF1NOXRVB4CYG65WQPJMHA3 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 Donbass 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 energy coal that will displace the same amount of the same type of coal in the baseline scenario;
2) The coal that is displaced in the baseline scenario and the coal that is generated in the project activity are used for the same type of purpose and is stationery combusted;
3) The coal that is displaced in the baseline scenario is produced by the underground mines of the region and as such causes fugitive emissions of methane;
4) Waste-heaps of the region are vulnerable to spontaneous self-heating and burning and at some point in time will burn;
5) 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;
6) Coal burning in the waste heaps will oxidize to $CO_{2e}$ completely if allowed to burn uncontrolled.

Baseline emissions come from three major sources:
1) Carbon dioxide emissions that occur during combustion of energy coal. These are calculated as stationery combustion emissions from coal in the equivalent of the amount of coal that is extracted from the waste heaps in the project scenario.

2) 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.
3) Carbon dioxide emissions from burning waste heaps. These are calculated as stationery combustion emissions from coal in the equivalent of the amount of coal that is extracted from the waste heaps in the project scenario, adjusted by the probability of a waste heap burning at any point in time. As the baseline suggests that the current situation is preserved regarding the waste heaps burning, it is assumed that for any given waste heap, actual burning will occur in some point in time. This probability of burning is established by the study [8] that assessed the status of all existing waste heaps in Lughansk Region historically. Based on the gathered data it is concluded that 69,9% of all waste heaps in the Lughansk Region have been, or are now, on fire.

The tables below provide values for constant parameters used to determine the baseline emissions.

**List of default values used for baseline emissions calculations (estimations)**

| **Data/Parameter** | $GWP_{CH4}$ |
|---|---|
| Data unit | $tCO_{2e}/tCH_4$ |
| Description | Global warming potential of methane |
| Time of determination/monitoring | Fixed ex ante |
| Source of data (to be) used | IPCC Second Assessment Report[9] |
| Value of data applied (for ex ante calculations/determinations) | 21 |
| Justification of the choice of data or description of measurement methods and procedures (to be) applied | |
| QA/QC procedures (to be) Applied | See Section D.2. |
| Any comment | The parameter is remained fixed throughout the crediting period. |

| **Data/Parameter** | $\rho_{CH4}$ |
|---|---|
| Data unit | $t/m^3$ |
| Description | 2006 IPCC Guidelines for National Greenhouse Gas Inventories, Volume 2, Energy[10]<br>Standard (room temperature 20˚C and 1 ATM) |
| Time of determination/monitoring | Fixed ex ante |
| Source of data (to be) used | Standard (room temperature 20˚C and 1 ATM) |
| Value of data applied (for ex ante calculations/determinations) | 0,00067 |
| Justification of the choice of data or description of | |

[8] *Report on the fire risk of Lughansk Region's waste heaps*, Scientific Research Institute "Respirator", Donetsk, 2010. This is a proprietary study that will be made available to the accredited independent entity.
[9] *"IPCC Second Assessment: Climate Change 1995. A Report of the Intergovernmental Panel on Climate Change". IPCC website*. http://www.ipcc.ch/pdf/climate-changes-1995/ipcc-2nd-assessment/2nd-assessment-en.pdf.
[10] *2006 IPCC Guidelines for National Greenhouse Gas Inventories, Volume 2, Energy, p 4.12* (http://www.ipcc-nggip.iges.or.jp/public/2006gl/pdf/2_Volume2/V2_4_Ch4_Fugitive_Emissions.pdf).

| | |
|---|---|
| measurement methods and procedures (to be) applied | |
| QA/QC procedures (to be) Applied | See Section D.2. |
| Any comment | The parameter is remained fixed throughout the crediting period. |

| **Data/Parameter** | $NCV_{coal}$ |
|---|---|
| Data unit | TJ/kt |
| Description | Net calorific value of coal |
| Time of determination/monitoring | Fixed ex ante |
| Source of data (to be) used | National GHG inventory of Ukraine, period 1990-2009[11] |
| Value of data applied (for ex ante calculations/determinations) | 21,5 |
| Justification of the choice of data or description of measurement methods and procedures (to be) applied | |
| QA/QC procedures (to be) Applied | See Section D.2. |
| Any comment | The parameter is remained fixed throughout the crediting period. If information on actual net calorific value is available, it would prevail over default values at the stage of monitoring report development. |

| **Data/Parameter** | $OXID_{coal}$ |
|---|---|
| Data unit | % |
| Description | Carbon oxidation factor of coal |
| Time of determination/monitoring | Fixed ex ante |
| Source of data (to be) used | National GHG inventory of Ukraine, period 1990-2009[12] |
| Value of data applied (for ex ante calculations/determinations) | 96,3 |
| Justification of the choice of data or description of measurement methods and procedures (to be) applied | |
| QA/QC procedures (to be) Applied | See Section D.2. |
| Any comment | The parameter is remained fixed throughout the crediting period. |

| **Data/Parameter** | $k_{coal}^{C}$ |
|---|---|
| Data unit | tC/TJ |
| Description | Carbon content of coal |

[11] In accordance with "National GHG inventory of Ukraine, period 1990-2009", Table P2.24, page 393 (http://unfccc.int/national_reports/annex_i_ghg_inventories/national_inventories_submissions/items/5270.php).
[12] In accordance with "National GHG inventory of Ukraine, period 1990-2009", Table P2.27, page 396 (http://unfccc.int/national_reports/annex_i_ghg_inventories/national_inventories_submissions/items/5270.php).

| | |
|---|---|
| Time of determination/monitoring | Fixed ex ante |
| Source of data (to be) used | National GHG inventory of Ukraine, period 1990-2009[13] |
| Value of data applied (for ex ante calculations/determinations) | 25,95 |
| Justification of the choice of data or description of measurement methods and procedures (to be) applied | |
| QA/QC procedures (to be) Applied | See Section D.2. |
| Any comment | The parameter is remained fixed throughout the crediting period. If information on actual carbon content is available, it would prevail over default values at the stage of monitoring report development. |

| **Data/Parameter** | $EF_{CH4,CM}$ |
|---|---|
| Data unit | $m^3/t$ |
| Description | Emission factor for fugitive methane emissions from coal mining |
| Time of determination/monitoring | Fixed ex ante |
| Source of data (to be) used | National GHG inventory of Ukraine, period 1990-2009[14] |
| Value of data applied (for ex ante calculations/determinations) | 25,67 |
| Justification of the choice of data or description of measurement methods and procedures (to be) applied | |
| QA/QC procedures (to be) Applied | See Section D.2. |
| Any comment | The parameter is remained fixed throughout the crediting period. |

| **Data/Parameter** | $P_{WHS}$ |
|---|---|
| Data unit | ratio |
| Description | Probability of waste heaps self-ignition |
| Time of determination/monitoring | Fixed ex ante |
| Source of data (to be) used | Proprietary study[15] |
| Value of data applied (for ex ante calculations/determinations) | 0,699 |

[13] In accordance with "National GHG inventory of Ukraine, period 1990-2009", Table P2.26, page 395 (http://unfccc.int/national_reports/annex_i_ghg_inventories/national_inventories_submissions/items/5270.php).
[14] In accordance with "National GHG inventory of Ukraine, period 1990-2009", page 90 (http://unfccc.int/national_reports/annex_i_ghg_inventories/national_inventories_submissions/items/5270.php).
[15] "*Report on the fire risk of Lughansk Region's waste heaps"*, Scientific Research Institute "Respirator", Donetsk, 2010. This is a proprietary study that will be available to the verifier upon his request.

| | |
|---|---|
| Justification of the choice of data or description of measurement methods and procedures (to be) applied | The parameter is in accordance with report regarding waste heaps self-ignition probability in Lughansk region and is defined as the ratio between waste heaps that are or have been self-ignited historically and all existing waste heaps in Lughansk region. |
| QA/QC procedures (to be) Applied | See Section D.2. |
| Any comment | The parameter is remained fixed throughout the crediting period. |

**Key parameters and data used to establish the baseline are given below:**

| **Data/Parameter** | $FC_{BE,coal,y}$ |
|---|---|
| Data unit | T |
| Description | Amount of coal that has been extracted from the waste heaps under the baseline scenario and combusted for energy needs (equal to the amount of coal extracted from the waste heaps under the project line scenario) |
| Time of determination/monitoring | Continuous with regular tabulation (collected on monthly basis) |
| Source of data (to be) used | Project owner records |
| Value of data applied (for ex ante calculations/determinations) | As given by the project owner |
| Justification of the choice of data or description of measurement methods and procedures (to be) applied | Measured for the commercial purposes on site. |
| QA/QC procedures (to be) Applied | See Section D.2. |
| Any comment | The parameter will be monitored throughout the crediting period. |

Baseline emissions are calculated as follows:

$$BE_y = BE_{coal,y} + BE_{CH_4,y} + BE_{WHS,y}, \qquad \text{(Formula 1)}$$

where:

$BE_y$ - Baseline emissions, $tCO_{2e}$ per year;
$BE_{coal,y}$ - Baseline emissions as a result of coal consumption for energy production needs, t $CO_{2e}$ per year;
$BE_{CH4,y}$ - Baseline emissions as a result of uncontrolled emissions of methane during extraction works, t $CO_{2e}$ per year;
$BE_{WHS,y}$ - Baseline emissions as a result of coal containing waste heaps self-ignition, t $CO_{2e}$ per year.

$$BE_{coal,y} = \frac{FC_{BE,coal,y}}{1000} \cdot NCV_{coal} \cdot OXID_{coal} \cdot k_{coal}^{C} \cdot 44/12, \qquad \text{(Formula 2)}$$

where:

$FC_{BE,coal,y}$ - Amount of coal that has been mined under the baseline scenario and combusted for energy needs (equal to the amount of coal extracted from the waste heaps under the project line scenario in the year *y*), tonnes;

$NCV_{coal}$ - Net calorific value for coal, TJ/kt;
$OXID_{coal}$ - Carbon oxidation factor of coal, %;
$k_{coal}^{C}$ - Carbon content of coal, tC/TJ;
44/12 - Ratio between molecular mass of $CO_{2e}$ and C. Reflects oxidation of C to $CO_{2e}$.

$$BE_{CH_4,y} = FC_{BE,coal,y} \cdot EF_{CH_4,CM} \cdot \rho_{CH_4} \cdot GWP_{CH_4}, \qquad \text{(Formula 3)}$$

where:

$EF_{CH4,CM}$ - Emission factor for methane emissions as the result of coal mining ($m^3$/t). The parameter is equal to 25,67 $m^3$/t in accordance with National GHG inventory of Ukraine, period 1990-2009[16];
$\rho_{CH4}$ - Density of methane, t/$m^3$;
$GWP_{CH4}$ - Global warming potential of methane, $tCO_{2e}/tCH_4$.

$$BE_{WHS} = \frac{FC_{BE,coal,y}}{1000} \cdot p_{WHS} \cdot NCV_{coal} \cdot OXID_{coal} \cdot k_{coal}^{C} \cdot {}^{44}\!/_{12}, \qquad \text{(Formula 4)}$$

where:

$FC_{BE,coal,y}$ - Amount of coal that has been mined under the baseline scenario and combusted for energy needs (equal to the amount of coal extracted from the waste heaps under the project line scenario in the year *y*), tonnes;
$P_{WHS}$ - Probability of waste heaps self-ignition. The parameter is in accordance with report[17] regarding waste heaps self-ignition probability in Lughansk region and is defined as the ratio between waste heaps that are or have been self ignited historically and all existing waste heaps in Lughansk region. This ratio is equal to 0,699, ratio;
$NCV_{coal}$ - Net calorific value for coal, TJ/kt;
$OXID_{coal}$ - Carbon oxidation factor of coal, %;
$k_{coal}^{C}$ - Carbon content of coal, tC/TJ;
44/12 - Ratio between molecular mass of $CO_{2e}$ and C. Reflects oxidation of C to $CO_{2e}$.

**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:**

According to Paragraph 2 of Annex 1 to the JISC Guidance, approach B has been selected for demonstration of this project's additionality:

*(b) 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.*[18]

[16] In accordance with "National GHG inventory of Ukraine, period 1990-2009", page 90 (http://unfccc.int/national_reports/annex_i_ghg_inventories/national_inventories_submissions/items/5270.php).
[17] "*Report on the fire risk of Lughansk Region's waste heaps"*, Scientific Research Institute "Respirator", Donetsk, 2010. This is a proprietary study that will be available to the verifier upon his request.
[18] *Guidance For Criteria On Baseline Setting And Monitoring*, Joint Implementation Supervisory Committee, Annex 1, Paragraph 2.

The most recent determined project "Waste heaps dismantling with the aim of decreasing the greenhouse gases emissions into the atmosphere" which is published on the UNFCCC JI website at http://ji.unfccc.int/UserManagement/FileStorage/IE7LK2SZF1NOXRVB4CYG65WQPJMHA3 is applied to prove that the anthropogenic emissions are reduced below those that would have occurred in the absence of the JI project. The above mentioned project "Waste heaps dismantling with the aim of decreasing the greenhouse gases emissions into the atmosphere" has same GHG mitigation measure, same country, similar technology, similar scale.

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

The project activities are physically limited to the coal containing waste heaps mass that is purchased by Technoanthracite Ltd. At the same time, some sources of GHG emissions are indirect – fugitive methane emissions as the result of coal mining in Ukraine, carbon dioxide emissions due to the consumption of power from the Ukrainian electricity grid, as a result of electricity generation using fossil fuels.

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

*Table 4 Sources of emissions in the baseline and project line scenarios*

| | Source | Gas | Included/Excluded | Justification / Explanation |
|---|---|---|---|---|
| **Baseline** | Waste heaps self-ignition | $CO_2$ | Included | Main emission source |
| | Emissions from coal mining activities | $CH_4$ | Included | Fugitive emissions. Main emission source |
| | Coal consumption | $CO_2$ | Included | Main emission source. This coal is displaced in the project activity by the coal extracted from the waste heaps |
| **Project scenario** | Coal consumption | $CO_2$ | Included | Main emission source. This coal is extracted from the waste heaps |
| | Electricity use for the process of coal extraction from the waste heaps | $CO_2$ | Included | Main emission source |
| | Fossil fuel (diesel) consumption for the process of coal extraction from the waste heap | $CO_2$ | Included | Main emission source |

**Baseline scenario**

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

- Fugitive methane emissions during the underground coal mining;
- $CO_{2e}$ emissions due to the coal consumption for the production of energy;
- $CO_{2e}$ emissions from the burning of coal in the waste heaps.

**Project scenario**

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

- $CO_{2e}$ emissions from fossil fuel (diesel) consumption to run part of the project equipment (motor cars) for the process of coal extraction from the waste heap.
- $CO_{2e}$ emissions associated with the electricity consumption by the project equipment,
- $CO_{2e}$ emissions due to the coal consumption for the production of energy.

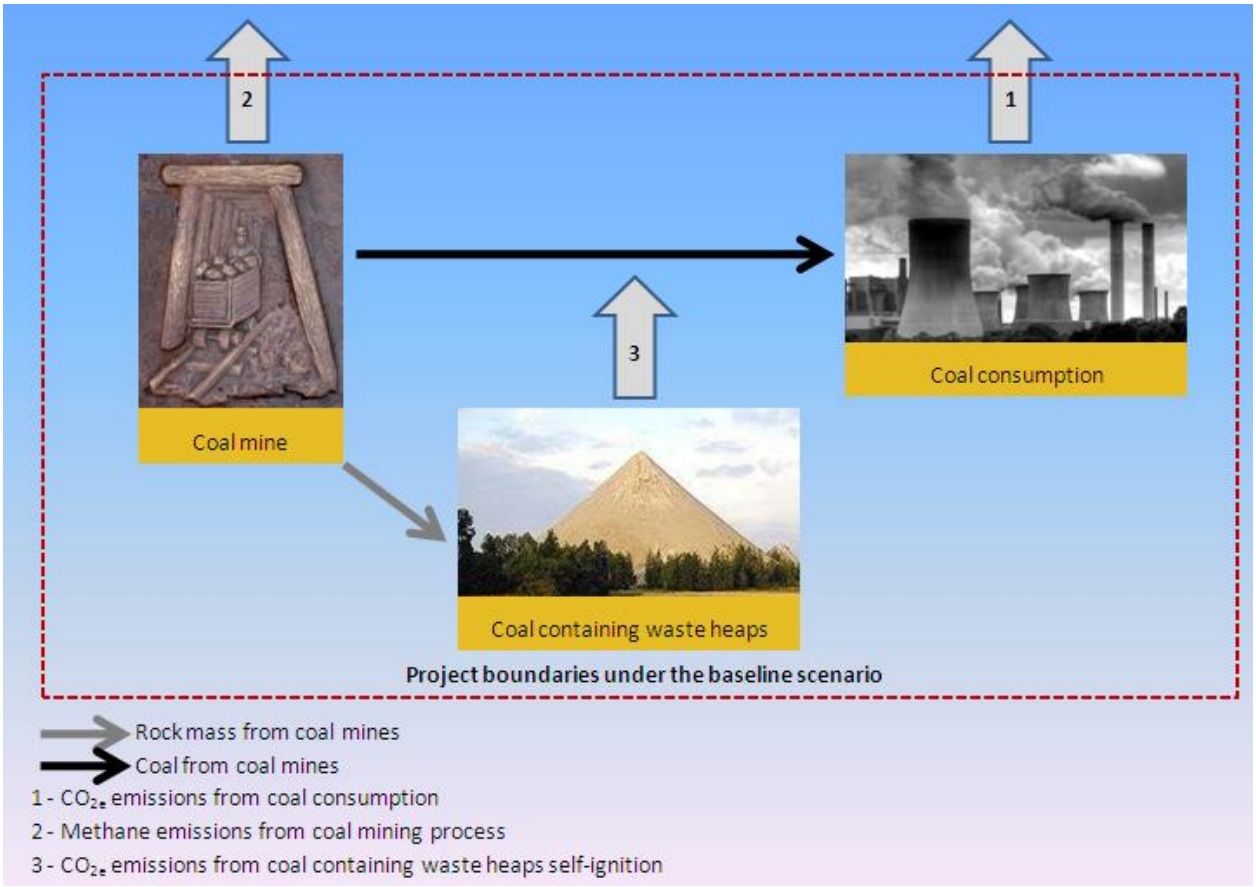



Figure 8. Project boundaries in the baseline scenario

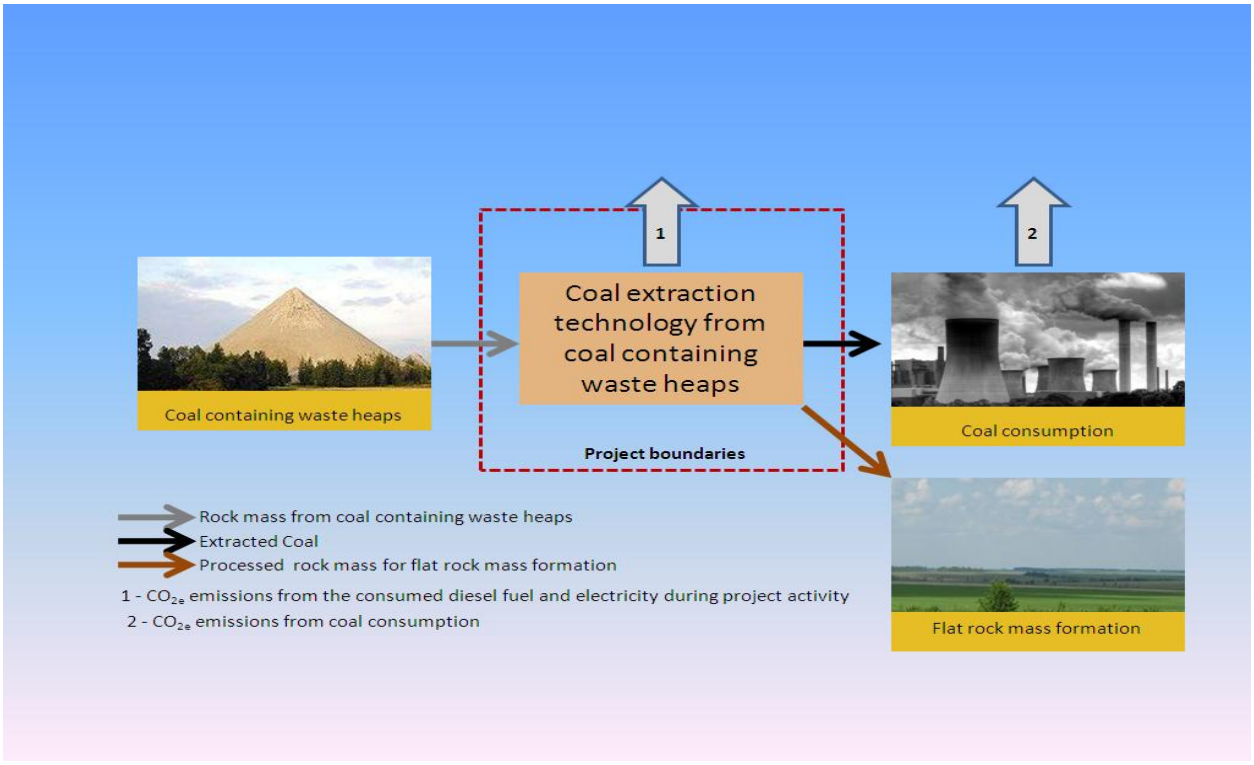



Figure 9. Project boundaries in the project scenario

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

Date of baseline setting:
01/10/2011

Name of person/entity setting the baseline:
Airat Khakimzianov – representative of "InvestEcoGroup" Ltd., tel: +38050-446-59-49, e-mail: ukreuroconsulting@gmail.com.

Airat Khakimzianov is not a project participant.

## SECTION C. Duration of the project / crediting period

### C.1. Starting date of the project:

Starting date of the project is 3rd of August 2006 (the date when joint venture contract was signed between Tehnoathracite and Termoanthracite)

### C.2. Expected operational lifetime of the project:

The lifetime of the project is estimated to last until the end of 2020. Thus the operational lifetime of the project will be 13 years or 156 months.

### C.3. Length of the crediting period:

The crediting period starts on 01/01/2008 and lasts till 31/12/2020, and its total duration is 13 years or 156 months, including (The factory was commissioned at 16/11/2007 and worked at test mode till the end of 2007, At full capacity it started from beginning of 2008. As first commitment period of Kyoto protocol also started at 01/01/2008. This date was chosen as beginning of crediting period):

− The 1st commitment period: 01/01/2008 – 31/12/2012 (5 years or 60 months);
− Period following the 1st commitment period: 01/01/2013 – 31/12/2020 (8 years or 96 months).

Extension of the crediting period beyond 2012 is subject to the host Party approval.

## SECTION D. Monitoring plan

### D.1. Description of monitoring plan chosen:

The monitoring plan for this project is developed according to Annex 1, requirements "Guidance on criteria for baseline setting and monitoring", (Version 02).

Together with this, the monitoring plan is fully based on JI specific approach which is identical to the JI specific approach that was applied in the already registered JI project (under Track 2, reference # UA2000020[19]) – "Waste heaps dismantling with the aim of decreasing the greenhouse gases emissions into the atmosphere".

The task of monitoring plan is to ensure existence of all data, that is necessary to determine the levels of $CO_{2e}$ emissions at baseline and project scenarios, and hence the amount of $CO_{2e}$ emission reductions by the implementation of proposed JI project.

The approach used in this project is specific for this project.

Transparent management structure will be determined for allocation of responsibility for monitoring of $CO_{2e}$ emission reductions. Monitoring data will be entered in a special form and stored electronically and on paper. Monitoring of $CO_{2e}$ emission reductions will be made by measuring and fixing the following parameters:

• Additional electrical energy consumed in the relevant period as a result of project activity implementation;
• Amount of diesel fuel that was used during implementation of project activity in the relevant period (if the data concerning volumes of diesel fuel consumed will be provided in litres rather than in tones, the data in litres will be converted into tonnes by using the density of 0,85 kg/l. (GOST 305-82 Diesel Fuel. Specifications. 0,85 kg/l is taken as an average between two suggested types of diesel fuel: summer and winter (http://elarum.ru/info/standards/gost-305-82/);
• Amount of coal that was extracted from the coal containing waste heaps and consumed to receive the energy within the project frames in the relevant period that is equivalent to the quantity of coal, which would have to be extracted from mines and consumed to generate energy according to baseline scenario.

To determine the positive impact on the local environment, the monitoring of the quantity of rock mass used for flat rock mass formation or construction works will be carried out.

The Monitoring data will be based on technical data and/or accounting data. All data associated with this JI project will be stored during the whole project activity and for 2 years after the last transfer of ERU.

[19] http://ji.unfccc.int/JIITLProject/DB/1LS1WLYASLYCHS4CBQXWAX2OWU8V3G/details.

Calibration of measurement equipments participated in project is done by special metrological organisations with regularity established by current rules and standards.

| **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 |
| | | | | | | | | |

This section is left blank on purpose

**List of default values used for project line emissions calculations (estimations)**

| **Data/Parameter** | $NCV_{coal}$ |
|---|---|
| Data unit | TJ/kt |
| Description | Net calorific value of coal |
| Time of determination/monitoring | Fixed ex ante |
| Source of data (to be) used | National GHG inventory of Ukraine, period 1990-2009[20] |
| Value of data applied (for ex ante calculations/determinations) | 21,5 |
| Justification of the choice of data or description of measurement methods and | |

[20] In accordance with "National GHG inventory of Ukraine, period 1990-2009", Table P2.24, page 393 (http://unfccc.int/national_reports/annex_i_ghg_inventories/national_inventories_submissions/items/5270.php).

| | |
|---|---|
| procedures (to be) applied | |
| QA/QC procedures (to be) Applied | See Section D.2. |
| Any comment | The parameter is remained fixed throughout the crediting period. If information on actual net calorific value is available, it would prevail over default values at the stage of monitoring report development. |

| **Data/Parameter** | $NCV_{diesel}$ |
|---|---|
| Data unit | TJ/kt |
| Description | Net calorific value of diesel fuel |
| Time of determination/monitoring | Fixed ex ante |
| Source of data (to be) used | National GHG inventory of Ukraine, period 1990-2009[21] |
| Value of data applied (for ex ante calculations/determinations) | 42,2 |
| Justification of the choice of data or description of measurement methods and procedures (to be) applied | |
| QA/QC procedures (to be) Applied | See Section D.2. |
| Any comment | The parameter is remained fixed throughout the crediting period. If information on actual net calorific value is available, it would prevail over default values at the stage of monitoring report development. |

| **Data/Parameter** | $OXID_{coal}$ |
|---|---|
| Data unit | % |
| Description | Carbon oxidation factor of coal |
| Time of | Fixed ex ante |

[21] In accordance with "National GHG inventory of Ukraine, period 1990-2009", Table P2.36, page 404 (http://unfccc.int/national_reports/annex_i_ghg_inventories/national_inventories_submissions/items/5270.php).

| | |
|---|---|
| determination/monitoring | |
| Source of data (to be) used | National GHG inventory of Ukraine, period 1990-2009[22] |
| Value of data applied (for ex ante calculations/determinations) | 96,3 |
| Justification of the choice of data or description of measurement methods and procedures (to be) applied | |
| QA/QC procedures (to be) Applied | See Section D.2. |
| Any comment | The parameter is remained fixed throughout the crediting period. |

| **Data/Parameter** | $OXID_{diesel}$ |
|---|---|
| Data unit | % |
| Description | Carbon Oxidation factor of diesel fuel |
| Time of determination/monitoring | Fixed ex ante |
| Source of data (to be) used | Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories[23] |
| Value of data applied (for ex ante calculations/determinations) | 99 |
| Justification of the choice of data or description of measurement methods and procedures (to be) applied | |
| QA/QC procedures (to be) Applied | See Section D.2. |
| Any comment | The parameter is remained fixed throughout the crediting period. |

[22] In accordance with "National GHG inventory of Ukraine, period 1990-2009", Table P2.27, page 396 (http://unfccc.int/national_reports/annex_i_ghg_inventories/national_inventories_submissions/items/5270.php).
[23] In accordance with Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories. Workbook (Volume 2), Module 1 (Energy), Table 1-4, page 1.8 (http://www.ipcc-nggip.iges.or.jp/public/gl/guidelin/ch1wb1.pdf).

| **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 GHG inventory of Ukraine, period 1990-2009[24] |
| Value of data applied (for ex ante calculations/determinations) | 25,95 |
| Justification of the choice of data or description of measurement methods and procedures (to be) applied | |
| QA/QC procedures (to be) Applied | See Section D.2. |
| Any comment | The parameter is remained fixed throughout the crediting period. If information on actual carbon content is available, it would prevail over default values at the stage of monitoring report development. |

| **Data/Parameter** | $k_{diesel}^{C}$ |
|---|---|
| Data unit | tC/TJ |
| Description | Carbon content of diesel fuel |
| Time of determination/monitoring | Fixed ex ante |
| Source of data (to be) used | National GHG inventory of Ukraine, period 1990-2009[25] |
| Value of data applied (for ex ante calculations/determinations) | 20,2 |

[24] In accordance with "National GHG inventory of Ukraine, period 1990-2009", Table P2.26, page 395 (http://unfccc.int/national_reports/annex_i_ghg_inventories/national_inventories_submissions/items/5270.php).
[25] In accordance with "National GHG inventory of Ukraine, period 1990-2009", Table P2.38, page 405 (http://unfccc.int/national_reports/annex_i_ghg_inventories/national_inventories_submissions/items/5270.php).

| | |
|---|---|
| Justification of the choice of data or description of measurement methods and procedures (to be) applied | |
| QA/QC procedures (to be) Applied | See Section D.2. |
| Any comment | The parameter is remained fixed throughout the crediting period. If information on actual carbon content is available, it would prevail over default values at the stage of monitoring report development. |

| **Data/Parameter** | $EF_{CO2e,electricity,y}$ |
|---|---|
| Data unit | $tCO_{2e}/MWh$ |
| Description | Emission factor for electricity consumption |
| Time of determination/monitoring | Regular tabulation (applied on annual basis) |
| Source of data (to be) used | Carbon emission factors based on the Orders of the National environmental investment agency of Ukraine #43 dated 28th of March 2011, #62 dated 15th of April 2011, #63 dated 15th of April 2011 and #75 dated 12th of May 2011. |
| Value of data applied (for ex ante calculations/determinations) | See Annex 2 |
| Justification of the choice of data or description of measurement methods and procedures (to be) applied | During 2008 the carbon emission factor for electricity consumption is based on the order of the National environmental investment agency of Ukraine #62 dated 15th of April 2011[26]. During 2009 the carbon emission factor for electricity consumption is based on the order of the National environmental investment agency of Ukraine #63 dated 15th of April 2011[27]. During 2010 the carbon emission factor for electricity consumption is based on the order of the National environmental investment agency of Ukraine #43 dated 28th of March 2011[28]. Starting from year 2011 the carbon emission factor for electricity consumption is based on the order of the National environmental investment agency of Ukraine #75 dated 12th of May 2011[29]. Taking into account that the emission factor for year 2011 is the most updated, such emission factor will be used for ex ante emission reductions calculations (in the PDD) for the periods after year 2011. If any other emission factors will be officially approved, the project developer will make an appropriate modification at the stage of monitoring report development. For more detailed information please also see Annex 2. |
| QA/QC procedures (to be) Applied | See Section D.2. |
| Any comment | The parameter is remained fixed throughout the crediting period. If any other emission factors will be officially approved, the project developer will make an appropriate modification at the stage of monitoring report development. |

[26] http://www.neia.gov.ua/nature/doccatalog/document?id=127171
[27] http://www.neia.gov.ua/nature/doccatalog/document?id=127172
[28] http://www.neia.gov.ua/nature/doccatalog/document?id=126006.
[29] http://www.neia.gov.ua/nature/doccatalog/document?id=127498.

**Key parameters and data used to establish the project line are given below:**

| **Data/Parameter** | $FC_{PE,coal,y}$ |
|---|---|
| Data unit | T |
| Description | Amount of coal that has been extracted from the waste heaps under the project line scenario and combusted for energy needs |
| Time of determination/monitoring | Continuous with regular tabulation (collected on monthly basis) |
| Source of data (to be) used | Project owner records |
| Value of data applied (for ex ante calculations/determinations) | As given by the project owner |
| Justification of the choice of data or description of measurement methods and procedures (to be) applied | Measured for the commercial purposes on site. |
| QA/QC procedures (to be) Applied | See Section D.2. |
| Any comment | The parameter will be monitored throughout the crediting period. |

| **Data/Parameter** | $EC_{PE,y}$ |
|---|---|
| Data unit | MWh |
| Description | Amount of electricity consumed under the project line scenario |
| Time of determination/monitoring | Continuous with regular tabulation (collected on monthly basis) |
| Source of data (to be) used | Project owner records |
| Value of data applied (for ex ante calculations/determinations) | As given by the project owner |
| Justification of the choice of data or description of measurement methods and procedures (to be) applied | Measured for the commercial purposes on site. |
| QA/QC procedures (to be) | See Section D.2. |

| | |
|---|---|
| Applied | |
| Any comment | The parameter will be monitored throughout the crediting period. |

| **Data/Parameter** | $FC_{PE,diesel,y}$ |
|---|---|
| Data unit | T |
| Description | Amount of diesel fuel consumed under the project line scenario |
| Time of determination/monitoring | Continuous with regular tabulation (collected on monthly basis) |
| Source of data (to be) used | Project owner records |
| Value of data applied (for ex ante calculations/determinations) | As given by the project owner |
| Justification of the choice of data or description of measurement methods and procedures (to be) applied | Measured for the commercial purposes on site. If the data concerning volumes of diesel fuel consumed will be provided in litres rather than in tones, the data in litres will be converted into tonnes by using the density of 0,85 kg/l. (GOST 305-82 Diesel Fuel. Specifications. 0,85 kg/l is taken as an average between two suggested types of diesel fuel: summer and winter (http://elarum.ru/info/standards/gost-305-82/). |
| QA/QC procedures (to be) Applied | See Section D.2. |
| Any comment | The parameter will be monitored throughout the crediting period. |

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

Emissions from the project activity are calculated as follows:

$$PE_y = PE_{coal,y} + PE_{electricity,y} + PE_{diesel,y}, \quad \text{(Formula 5)}$$

where:

$PE_y$ - Project emissions, $tCO_{2e}$ per year (ID-#1);
$PE_{coal,y}$ - Project emissions as a result of coal consumption for energy needs under the project line scenario, $tCO_{2e}$ per year (ID-#2);
$PE_{electricity,y}$ - Project emissions as a result of electricity consumption from the grid under the project line scenario, $tCO_{2e}$ per year (ID-#3);
$PE_{diesel,y}$ - Project emissions as a result of diesel fuel consumption under the project line scenario, $tCO_{2e}$ per year (ID-#4).

$$PE_{coal,y} = \frac{FC_{PE,coal,y}}{1000} \cdot NCV_{coal} \cdot OXID_{coal} \cdot k_{coal}^{C} \cdot 44/12, \quad \text{(Formula 6)}$$

where:

$FC_{PE,coal,y}$ - Amount of coal that has been extracted from the waste heaps under the project line scenario and combusted for energy needs (in the year $_y$), tonnes (ID-#5);
$NCV_{coal}$ - Net calorific value for coal, TJ/kt (ID-#6);
$OXID_{coal}$ - Carbon oxidation factor of coal, % (ID-#7);
$k_{coal}^{C}$ - Carbon content of coal, tC/TJ (ID-#8);
44/12 - Ratio between molecular mass of $CO_{2e}$ and C. Reflects oxidation of C to $CO_{2e}$.

$$PE_{electricity,y} = EC_{PE,y} \cdot EF_{CO2e,electricity,y}, \quad \text{(Formula 7)}$$

where:

$EC_{PE,y}$ - Amount of electricity consumed under the project line scenario (in the year $_y$), MWh (ID-#9);
$EF_{CO2e,electricity,y}$ - Emission factor for electricity consumption from the grid under the project line scenario, $tCO_{2e}$/MWh (ID-#10).

$$PE_{diesel,y} = \frac{FC_{PE,diesel,y}}{1000} \cdot NCV_{diesel} \cdot OXID_{diesel} \cdot k_{diesel}^{C} \cdot 44/12, \quad \text{(Formula 8)}$$

where:
$FC_{PE,diesel,y}$ - Amount of diesel fuel consumed under the project line scenario (in the year $_y$)[30], tonnes (ID-#11);
$NCV_{diesel}$ - Net calorific value for diesel, TJ/kt (ID-#12);
$OXID_{diesel}$ - Carbon oxidation factor of diesel, % (ID-#13);

[30] If the data concerning volumes of diesel fuel consumed will be provided in litres rather than in tones, the data in litres will be converted into tonnes by using the density of 0,85 kg/l. (GOST 305-82 Diesel Fuel. Specifications. 0,85 kg/l is taken as an average between two suggested types of diesel fuel: summer and winter (http://elarum.ru/info/standards/gost-305-82/).

$k^{C}_{diesel}$ - Carbon content of diesel, tC/TJ (ID-#14);
44/12 - Ratio between molecular mass of $CO_{2e}$ and C. Reflects oxidation of C to $CO_{2e}$.

| **D.1.1.3. Relevant data necessary for determining the baseline of anthropogenic emissions of greenhouse gases by sources within the project boundary, and how such data will be collected and archived:** | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| ID number *(Please use numbers to ease cross-referencing to D.2.)* | Data variable | Source of data | Data unit | Measured (m), calculated (c), estimated (e) | Recording frequency | Proportion of data to be monitored | How will the data be archived? (electronic/ paper) | Comment |
| | | | | | | | | |

This section is left blank on purpose

**List of default values used for baseline emissions calculations (estimations)**

| **Data/Parameter** | $GWP_{CH4}$ |
|---|---|
| Data unit | $tCO_{2e}/tCH_4$ |
| Description | Global warming potential of methane |
| Time of determination/monitoring | Fixed ex ante |
| Source of data (to be) used | IPCC Second Assessment Report[31] |
| Value of data applied (for ex ante calculations/determinations) | 21 |
| Justification of the choice of data or description of measurement methods and procedures (to be) applied | |
| QA/QC procedures (to be) | See Section D.2. |

[31] *"IPCC Second Assessment: Climate Change 1995. A Report of the Intergovernmental Panel on Climate Change". IPCC website*. http://www.ipcc.ch/pdf/climate-changes-1995/ipcc-2nd-assessment/2nd-assessment-en.pdf.

| | |
|---|---|
| Applied | |
| Any comment | The parameter is remained fixed throughout the crediting period. |

| **Data/Parameter** | $\rho_{CH4}$ |
|---|---|
| Data unit | $t/m^3$ |
| Description | 2006 IPCC Guidelines for National Greenhouse Gas Inventories, Volume 2, Energy[32]<br>Standard (room temperature 20˚C and 1 ATM) |
| Time of determination/monitoring | Fixed ex ante |
| Source of data (to be) used | Standard (room temperature 20˚C and 1 ATM) |
| Value of data applied (for ex ante calculations/determinations) | 0,00067 |
| Justification of the choice of data or description of measurement methods and procedures (to be) applied | |
| QA/QC procedures (to be) Applied | See Section D.2. |
| Any comment | The parameter is remained fixed throughout the crediting period. |

| **Data/Parameter** | $NCV_{coal}$ |
|---|---|
| Data unit | TJ/kt |
| Description | Net calorific value of coal |
| Time of determination/monitoring | Fixed ex ante |
| Source of data (to be) used | National GHG inventory of Ukraine, period 1990-2009[33] |
| Value of data applied (for ex ante calculations/determinations) | 21,5 |

[32] *2006 IPCC Guidelines for National Greenhouse Gas Inventories, Volume 2, Energy, p 4.12* (http://www.ipcc-nggip.iges.or.jp/public/2006gl/pdf/2_Volume2/V2_4_Ch4_Fugitive_Emissions.pdf)
[33] In accordance with "National GHG inventory of Ukraine, period 1990-2009", Table P2.24, page 393 (http://unfccc.int/national_reports/annex_i_ghg_inventories/national_inventories_submissions/items/5270.php).

| | |
|---|---|
| Justification of the choice of data or description of measurement methods and procedures (to be) applied | |
| QA/QC procedures (to be) Applied | See Section D.2. |
| Any comment | The parameter is remained fixed throughout the crediting period. If information on actual net calorific value is available, it would prevail over default values at the stage of monitoring report development. |

| **Data/Parameter** | $OXID_{coal}$ |
|---|---|
| Data unit | % |
| Description | Carbon oxidation factor of coal |
| Time of determination/monitoring | Fixed ex ante |
| Source of data (to be) used | National GHG inventory of Ukraine, period 1990-2009[34] |
| Value of data applied (for ex ante calculations/determinations) | 96,3 |
| Justification of the choice of data or description of measurement methods and procedures (to be) applied | |
| QA/QC procedures (to be) Applied | See Section D.2. |
| Any comment | The parameter is remained fixed throughout the crediting period. |

| **Data/Parameter** | $k_{coal}^{C}$ |
|---|---|
| Data unit | tC/TJ |
| Description | Carbon content of coal |

[34] In accordance with "National GHG inventory of Ukraine, period 1990-2009", Table P2.27, page 396 (http://unfccc.int/national_reports/annex_i_ghg_inventories/national_inventories_submissions/items/5270.php).

| | |
|---|---|
| Time of determination/monitoring | Fixed ex ante |
| Source of data (to be) used | National GHG inventory of Ukraine, period 1990-2009[35] |
| Value of data applied (for ex ante calculations/determinations) | 25,95 |
| Justification of the choice of data or description of measurement methods and procedures (to be) applied | |
| QA/QC procedures (to be) Applied | See Section D.2. |
| Any comment | The parameter is remained fixed throughout the crediting period. If information on actual carbon content is available, it would prevail over default values at the stage of monitoring report development. |

| **Data/Parameter** | $EF_{CH4,CM}$ |
|---|---|
| Data unit | $m^3/t$ |
| Description | Emission factor for fugitive methane emissions from coal mining |
| Time of determination/monitoring | Fixed ex ante |
| Source of data (to be) used | National GHG inventory of Ukraine, period 1990-2009[36] |
| Value of data applied (for ex ante calculations/determinations) | 25,67 |
| Justification of the choice of data or description of measurement methods and procedures (to be) applied | |
| QA/QC procedures (to be) | See Section D.2. |

[35] In accordance with "National GHG inventory of Ukraine, period 1990-2009", Table P2.26, page 395 (http://unfccc.int/national_reports/annex_i_ghg_inventories/national_inventories_submissions/items/5270.php).
[36] In accordance with "National GHG inventory of Ukraine, period 1990-2009", page 90 (http://unfccc.int/national_reports/annex_i_ghg_inventories/national_inventories_submissions/items/5270.php).

| | |
|---|---|
| Applied | |
| Any comment | The parameter is remained fixed throughout the crediting period. |

| **Data/Parameter** | $P_{WHS}$ |
|---|---|
| Data unit | ratio |
| Description | Probability of waste heaps self-ignition |
| Time of determination/monitoring | Fixed ex ante |
| Source of data (to be) used | Proprietary study[37] |
| Value of data applied (for ex ante calculations/determinations) | 0,699 |
| Justification of the choice of data or description of measurement methods and procedures (to be) applied | The parameter is in accordance with report regarding waste heaps self-ignition probability in Lughansk region and is defined as the ratio between waste heaps that are or have been self-ignited historically and all existing waste heaps in Lughansk region. |
| QA/QC procedures (to be) Applied | See Section D.2. |
| Any comment | The parameter is remained fixed throughout the crediting period. |

**Key parameters and data used to establish the baseline are given below:**

| **Data/Parameter** | $FC_{BE,coal,y}$ |
|---|---|
| Data unit | T |
| Description | Amount of coal that has been extracted from the waste heaps under the baseline scenario and combusted for energy needs (equal to the amount of coal extracted from the waste heaps under the project line scenario) |
| Time of determination/monitoring | Continuous with regular tabulation (collected on monthly basis) |
| Source of data (to be) used | Project owner records |

[37] "*Report on the fire risk of Lughansk Region's waste heaps"*, Scientific Research Institute "Respirator", Donetsk, 2010. This is a proprietary study that will be available to the verifier upon his request.

| | |
|---|---|
| Value of data applied (for ex ante calculations/determinations) | As given by the project owner |
| Justification of the choice of data or description of measurement methods and procedures (to be) applied | Measured for the commercial purposes on site. |
| QA/QC procedures (to be) Applied | See Section D.2. |
| Any comment | The parameter will be monitored throughout the crediting period. |

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

Baseline emissions are calculated as follows:

$$BE_y = BE_{coal,y} + BE_{CH_4,y} + BE_{WHS,y}, \quad \text{(Formula 1)}$$

where:

$BE_y$ - Baseline emissions, $tCO_{2e}$ per year (ID-#15);
$BE_{coal,y}$ - Baseline emissions as a result of coal consumption for energy production needs, t $CO_{2e}$ per year (ID-#16);
$BE_{CH4,y}$ - Baseline emissions as a result of uncontrolled emissions of methane during extraction works, t $CO_{2e}$ per year (ID-#17);
$BE_{WHS,y}$ - Baseline emissions as a result of coal containing waste heaps self-ignition, t $CO_{2e}$ per year (ID-#18).

$$BE_{coal,y} = \frac{FC_{BE,coal,y}}{1000} \cdot NCV_{coal} \cdot OXID_{coal} \cdot k_{coal}^{C} \cdot 44/12, \quad \text{(Formula 2)}$$

where:

$FC_{BE,coal,y}$ - Amount of coal that has been mined under the baseline scenario and combusted for energy needs (equal to the amount of coal extracted from the waste heaps under the project line scenario in the year *y*), tonnes (ID-#19);
$NCV_{coal}$ - Net calorific value for coal, TJ/kt (ID-#20);

$OXID_{coal}$ - Carbon oxidation factor of coal, % (ID-#21);
$k_{coal}^{C}$ - Carbon content of coal, tC/TJ (ID-#22);
44/12 - Ratio between molecular mass of $CO_{2e}$ and C. Reflects oxidation of C to $CO_{2e}$.

$$BE_{CH_4,y} = FC_{BE,coal,y} \cdot EF_{CH_4,CM} \cdot \rho_{CH_4} \cdot GWP_{CH_4}, \quad \text{(Formula 3)}$$

where:

$EF_{CH4,CM}$ - Emission factor for methane emissions as the result of coal mining ($m^3/t$). The parameter is equal to 25,67 $m^3/t$ in accordance with National GHG inventory of Ukraine, period 1990-2009[38] (ID-#23);
$\rho_{CH4}$ - Density of methane, $t/m^3$ (ID-#24);
$GWP_{CH4}$ - Global warming potential of methane, $tCO_{2e}/tCH_4$ (ID-#25).

$$BE_{WHS} = \frac{FC_{BE,coal,y}}{1000} \cdot p_{WHS} \cdot NCV_{coal} \cdot OXID_{coal} \cdot k_{coal}^{C} \cdot 44/12, \quad \text{(Formula 4)}$$

where:

$FC_{BE,coal,y}$ - Amount of coal that has been mined under the baseline scenario and combusted for energy needs (equal to the amount of coal extracted from the waste heaps under the project line scenario in the year *y*), tonnes (ID-#19);
$P_{WHS}$ - Probability of waste heaps self-ignition. The parameter is in accordance with report[39] regarding waste heaps self-ignition probability in Lughansk region and is defined as the ratio between waste heaps that are or have been self ignited historically and all existing waste heaps in Lughansk region. This ratio is equal to 0,699, ratio (ID-#26);
$NCV_{coal}$ - Net calorific value for coal, TJ/kt (ID-#20);
$OXID_{coal}$ - Carbon oxidation factor of coal, % (ID-#21);
$k_{coal}^{C}$ - Carbon content of coal, tC/TJ (ID-#22);

[38] In accordance with "National GHG inventory of Ukraine, period 1990-2009", page 90 (http://unfccc.int/national_reports/annex_i_ghg_inventories/national_inventories_submissions/items/5270.php).
[39] "*Report on the fire risk of Lughansk Region's waste heaps"*, Scientific Research Institute "Respirator", Donetsk, 2010. This is a proprietary study that will be available to the verifier upon his request.

44/12 - Ratio between molecular mass of $CO_{2e}$ and C. Reflects oxidation of C to $CO_{2e}$.

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

This section is left blank on purpose

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

This section is left blank on purpose

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

This section is left blank on purpose

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

Not applicable.

| **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 |
| | | | | | | | | |

This section is left blank on purpose.

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

This section is left blank on purpose.

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

The annual emission reductions are calculated as follows:

$$ER_y = BE_y - PE_y \quad \text{(Formula 9)}$$

where:

$ER_y$ - $CO_2e$ emissions reductions of the JI project in year y ($tCO_2e$);
$BE_y$ - Baseline $CO_2e$ emissions in year y ($tCO_2e$);
$PE_y$ - Project $CO_2e$ emissions in year y ($tCO_2e$).

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

Collection and archiving of the information on the environmental impacts of the project will be done based on the approved EIA in accordance with the Host Party legislation - *State Construction Standard DBN A.2.2-1-95 (amended 2003): "Structure and Contents of the Environmental Impact Assessment Report (EIR) for Designing and Construction of Production Facilities, Buildings and Structures", "Main engineering provisions"* approved by the order of State committee of Ukraine on municipal engineering #37 dated 28/02/95 and by the order of Ministry of economical security of Ukraine #9 dated 05/04/95, which comes into effect starting from 01/07/95 and *State Construction Standard DBN A.2.2-3-97: "Structure, Elaboration Order, Coordination and Approval of the Project Documentation for Building"* approved by the order of State committee of Ukraine on municipal engineering #143 dated 15/08/97, which comes into effect starting from 01/01/98.

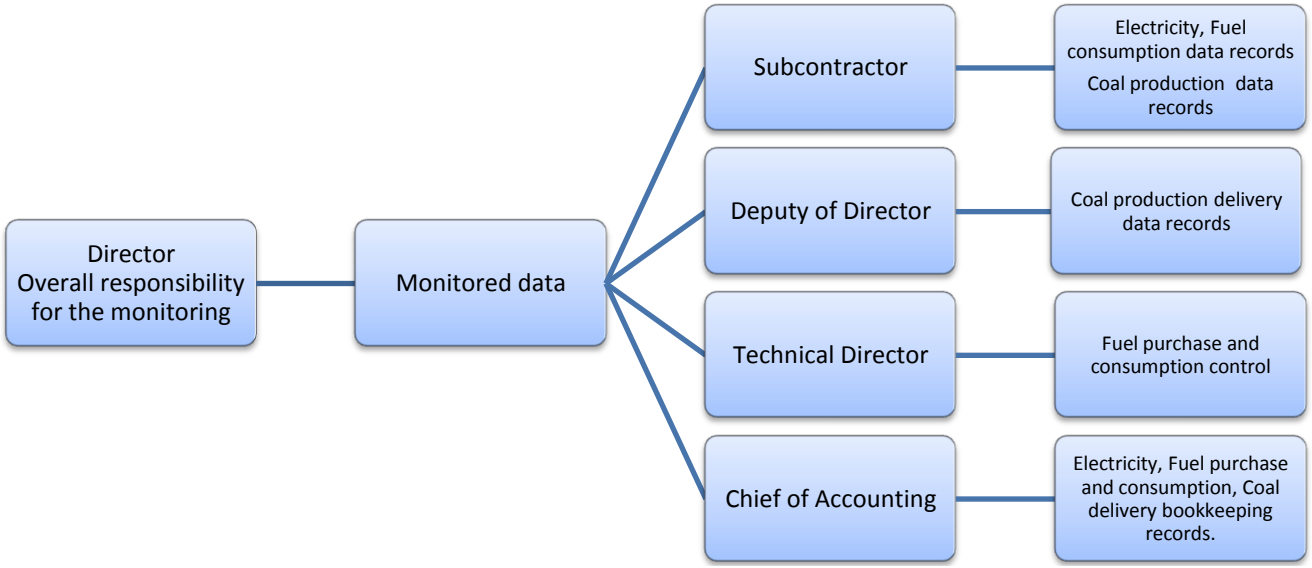
**D.2. Quality control (QC) and quality assurance (QA) procedures undertaken for data monitored:**

| Data *(Indicate table and ID number)* | Uncertainty level of data (high/medium/low) | Explain QA/QC procedures planned for these data, or why such procedures are not necessary. |
|---|---|---|
| D.1.1.2. – ID 1-4 | Low | These parameters are formulas which are used to calculate project line emissions. |
| D.1.1.2. – ID 5 | Low | These data are used in commercial activities of the company. The weights are calibrated (verified) according to the procedures of the Host Party. Calibration (verification) is conducted with established periodicity. In case of data absence Accounting documentation will be used. |
| D.1.1.2. – ID 9 | Low | This data are used in the commercial activity of the company. The electricity meters are calibrated (verified) according to the procedures of the Host Party. Calibration (verification) is conducted with established periodicity. In case of data absence Accounting documentation will be used. |
| D.1.1.2. – ID 11 | Low | This data are used in the commercial activity of the company. Flow meters are calibrated (verified) according to the procedures of the Host Party. Calibration (verification) is conducted with established periodicity. In case of data absence Accounting documentation will be used. |
| D.1.1.2. – ID 7,13 | Low | These parameters are fixed default values taken from reputable sources. |
| D.1.1.2. – ID 6,8,10,12,14 | Low | These parameters are fixed default values taken from reputable sources but may be modified at the stage of monitoring report development in case of data availability. |
| D.1.1.4. – ID 15-18 | Low | These parameters are formulas which are used to calculate baseline emissions. |
| D.1.1.4. – ID 19 | Low | These data are used in commercial activities of the company. The weights are calibrated (verified) according to the procedures of the Host Party. Calibration (verification) is conducted with established periodicity. In case of data absence Accounting documentation will be used. |
| D.1.1.4. – ID 21, 23-26 | Low | These parameters are fixed default values taken from reputable sources. |
| D.1.1.4. – ID 20, 22 | Low | These parameters are fixed default values taken from reputable sources but may be modified at the stage of monitoring report development in case of data availability. |

In case of having problems with certain monitoring devices, the accounting system is organized in such way that allows double checking of all the data. Ultimately all information can be proven by independent invoices with the third parties. However, such a risk is very low.

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

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




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

Airat Khakimzianov – representative of "InvestEcoGroup" Ltd., tel: +38050-446-59-49, e-mail: ukreuroconsulting@gmail.com.

Airat Khakimzianov is not a project participant.

## SECTION E. Estimation of greenhouse gas emission reductions

### E.1. Estimated project emissions:

*Table 5 Estimated project emissions during the crediting period*

| | | 2008 | 2009 | 2010 | 2011 | 2012 | Totally |
|---|---|---|---|---|---|---|---|
| Project emissions as a result of coal consumption for energy needs under the project line scenario | $tCO_{2e}$ | 134583 | 176981 | 45276 | 123171 | 123171 | **603183** |
| Project emissions as a result of electricity consumption from the grid under the project line scenario | $tCO_{2e}$ | 2592 | 3766 | 1618 | 5280 | 5280 | **18535** |
| Project emissions as a result of diesel fuel consumption under the project line scenario | $tCO_{2e}$ | 481 | 1937 | 1560 | 4399 | 4399 | **12777** |
| **Total Project emissions during the crediting period** | $tCO_{2e}$ | 137656 | 182684 | 48455 | 132850 | 132850 | **634495** |

*Table 6 Estimated project emissions after the crediting period*

| | | 2013-2020 |
|---|---|---|
| Project emissions as a result of coal consumption for energy needs under the project line scenario | $tCO_{2e}/y$ | 123171 |
| Project emissions as a result of electricity consumption from the grid under the project line scenario | $tCO_{2e}/y$ | 5280 |
| Project emissions as a result of diesel fuel consumption under the project line scenario | $tCO_{2e}/y$ | 4399 |
| **Total Project emissions after the crediting period** | $tCO_{2e}/y$ | **132850** |

### E.2. Estimated leakage:

Not applicable. Please refer to section D.1.3.

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

*Table 7 Estimated total project emissions during the crediting period*

| | | 2008 | 2009 | 2010 | 2011 | 2012 | Totally |
|---|---|---|---|---|---|---|---|
| **Total Project emissions** | $tCO_{2e}$ | 137656 | 182684 | 48455 | 132850 | 132850 | **634495** |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **during the crediting period** | | | | | | | |

*Table 8 Estimated total project emissions after the crediting period*

| | | 2013-2020 |
|---|---|---|
| **Total Project emissions after the crediting period** | $tCO_{2e}/y$ | **132850** |

## E.4. Estimated baseline emissions:

*Table 9 Estimated baseline emissions during the crediting period*

| | | 2008 | 2009 | 2010 | 2011 | 2012 | Totally |
|---|---|---|---|---|---|---|---|
| Baseline emissions as a result of coal consumption for energy production needs | $tCO_{2e}$ | 134583 | 176981 | 45276 | 123171 | 123171 | **603183** |
| Baseline emissions as a result of uncontrolled emissions of methane during extraction works | $tCO_{2e}$ | 24674 | 32447 | 8301 | 22582 | 22582 | **110585** |
| Baseline emissions as a result of coal containing waste heaps self-ignition | $tCO_{2e}$ | 94074 | 123710 | 31648 | 86097 | 86097 | **421625** |
| **Baseline emissions during the crediting period** | $tCO_{2e}$ | 253331 | 333137 | 85225 | 231850 | 231850 | **1135393** |

*Table 10 Estimated baseline emissions after the crediting period*

| | | 2013-2020 |
|---|---|---|
| Baseline emissions as a result of coal consumption for energy production needs | $tCO_{2e}/y$ | 123171 |
| Baseline emissions as a result of uncontrolled emissions of methane during extraction works | $tCO_{2e}/y$ | 22582 |
| Baseline emissions as a result of coal containing waste heaps self-ignition | $tCO_{2e}/y$ | 86097 |
| **Baseline emissions after the crediting period** | $tCO_{2e}/y$ | **231850** |

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

*Table 11 Estimated emission reductions during the crediting period*

| | | 2008 | 2009 | 2010 | 2011 | 2012 | Totally |
|---|---|---|---|---|---|---|---|
| **Emission reductions during the crediting period** | $tCO_{2e}$ | 115675 | 150453 | 36770 | 99000 | 99000 | **500898** |

*Table 12 Estimated emission reductions after the crediting period*

| | | 2013-2020 |
|---|---|---|
| **Emission reductions after the crediting period** | $tCO_{2e}/y$ | **99000** |

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

*Table 13 Estimated balances of emissions under the proposed project over the crediting period*

| Year | Estimated Project Emissions (tonnes $CO_2$ equivalent) | Estimated Leakage (tonnes $CO_2$ equivalent) | Estimated Baseline Emissions (tonnes $CO_2$ equivalent) | Estimated Emissions Reductions (tonnes $CO_2$ equivalent) |
|---|---|---|---|---|
| 2008 | 137656 | 0 | 253331 | 115675 |
| 2009 | 182684 | 0 | 333137 | 150453 |
| 2010 | 48455 | 0 | 85225 | 36770 |
| 2011 | 132850 | 0 | 231850 | 99000 |
| 2012 | 132850 | 0 | 231850 | 99000 |
| **Totally (tonnes $CO_2$ equivalent)** | **634495** | **0** | **1135393** | **500898** |
| **Annual average value of $CO_2$ equivalent emission reductions** | | | | **100180** |

*Table 14 Estimated balances 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 | 132850 | 0 | 231850 | 99000 |
| 2014 | 132850 | 0 | 231850 | 99000 |
| 2015 | 132850 | 0 | 231850 | 99000 |
| 2016 | 132850 | 0 | 231850 | 99000 |
| 2017 | 132850 | 0 | 231850 | 99000 |
| 2018 | 132850 | 0 | 231850 | 99000 |
| 2019 | 132850 | 0 | 231850 | 99000 |
| 2020 | 132850 | 0 | 231850 | 99000 |
| **Totally (tonnes $CO_2$ equivalent)** | **1062800** | **0** | **1854800** | **792000** |
| **Annual average value of $CO_2$ equivalent emission reductions** | | | | **99000** |

## SECTION F. Environmental impacts

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

The Host Party for this project is Ukraine. Environmental Impact Assessment (EIA) is the part of the Ukrainian project planning and permitting procedures. Implementation regulations for EIA are included in the Ukrainian State Construction Standard DBN A.2.2.-1-95 (amended 2003)[40] (Title:"Structure and Contents of the Environmental Impact Assessment Report (EIR) for Designing and Construction of Production Facilities, Buildings and Structures").

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

The full scope EIA in accordance with the Ukrainian legislation has been conducted for the proposed project in 2005-2006 by the local developer SPE "Company Nature". Key findings of this EIA are summarized below:

- Impact on air is the main environmental impact of the project activity. Due to the project activity additional amount of coal dust and coal concentrate dust will be emitted into the atmosphere. However, the study of emission levels and disbursement patterns of the contaminators show that maximum concentration limits will not be exceeded throughout the project lifetime. Also, uncontrolled dust and hazardous substances emissions from the waste heap will be avoided;
- Impact on water is minor. The technical water, used under the project activity for the coal extraction processing, is supplied by pumping station from the slime pit of "Dolzhanska-Kapitalna" mine and then dumped into slime pit of Mine #71.
- Impacts on flora and fauna are mixed. Due to the project activity the existing landscape will be changed but the overall resulting impact is positive. Grass and trees will be planted on the re-cultivated areas. No rare or endangered species will be impacted. Project activity is not located in the vicinity of national parks or protected areas;
- Noise impact is limited. Main source of noise will be located at the minimum required distance from residential areas, mobile noise sources (automobile transport) will be in compliance with local standards;
- Impacts on land use are positive. Significant portions of land will be freed from the waste heaps and will be available for development;
- 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:**

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.-1-95 (amended 2003)[41] (Title:"Structure and Contents of the Environmental Impact Assessment Report (EIR) for Designing and Construction of Production Facilities, Buildings and Structures").

[40] *State Construction Standard DBN A.2.2.-1-95 (amended 2003):"Structure and Contents of the Environmental Impact Assessment Report (EIR) for Designing and Construction of Production Facilities, Buildings and Structures"*.
[41] *State Construction Standard DBN A.2.2.-1-95 (amended 2003):"Structure and Contents of the Environmental Impact Assessment Report (EIR) for Designing and Construction of Production Facilities, Buildings and Structures"*.

Coal containing waste heaps processing implies environmentally friendly process that does not require consumption of harmful substances and chemicals.

Considering all the mentioned above, the project activity will not lead to environmental contamination.

## SECTION G. Stakeholders' comments

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

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

Annex 1

## CONTACT INFORMATION ON PROJECT PARTICIPANTS

| | |
|---|---|
| Organisation: | Technoanthracite Ltd. (company code - 34423981)<br><br>Identification codes of enterprises economic activities:<br>19.20 Manufacture of refined petroleum products<br>28.92 Manufacture of machinery for mining, quarrying and construction<br>05.10 Mining of hard coal<br>46.90 Non-specialized wholesale trade<br>72.19 Research and experimental development in other science and engineering |
| Street/P.O.Box: | Saksaganskogo str. |
| Building: | 52-A |
| City: | Kiev |
| State/Region: | |
| Postal code: | 01033 |
| Country: | Ukraine |
| Phone: | +380 44 536-11-45 |
| Fax: | +380 44 536-11-45 |
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Annex 2

## BASELINE INFORMATION

**Table containing the key elements of the baseline**

| # | Parameter | Data unit | Source of data |
|---|---|---|---|
| **1** | $FC_{BE,coal,y}$ - Amount of coal that has been extracted from the waste heaps under the baseline scenario and combusted for energy needs (equal to the amount of coal extracted from the waste heaps under the project line scenario) | t | Project owner records |
| **2** | $EF_{CH4,CM}$ - Emission factor for fugitive methane emissions from coal mining | $m^3/t$ | National GHG inventory of Ukraine, period 1990-2009[42] |
| **3** | $P_{WHS}$ - Probability of waste heaps self-ignition | ratio | "Report on the fire risk of Lughansk Region's waste heaps", Scientific Research Institute "Respirator", Donetsk, 2010. This is a proprietary study that will be available to the verifier upon his request. |
| **4** | $GWP_{CH4}$ - Global warming potential of methane | $tCO_{2e}/tCH_4$ | IPCC Second Assessment Report[43] |
| **5** | $\rho_{CH4}$ - Density of methane | $t/m^3$ | Standard (room temperature 20˚C and 1 ATM) |
| **6** | $NCV_{coal}$ - Net calorific value of coal | TJ/kt | National GHG inventory of Ukraine, period 1990-2009[44] |
| **7** | $OXID_{coal}$ - Carbon oxidation factor of coal | % | National GHG inventory of Ukraine, period 1990-2009[45] |
| **8** | $k_{coal}^{C}$ - Carbon content of coal | tC/TJ | National GHG inventory of Ukraine, period 1990-2009[46] |

**Baseline Emission Factor for Ukrainian Electricity Grid**

As soon as any other developed baseline emission factor of the Ukrainian electricity system will be approved, the project developer will make appropriate modifications of emission reduction calculations at the stage of monitoring repot development.

During 2008 the carbon emission factor for electricity consumption is based on the Order of the National environmental investment agency of Ukraine #62 dated 15th of April 2011[47]. During 2009 the carbon emission factor for electricity consumption is based on the Order of the National environmental investment agency of

[42] In accordance with "National GHG inventory of Ukraine, period 1990-2009", page 90 (http://unfccc.int/national_reports/annex_i_ghg_inventories/national_inventories_submissions/items/5270.php).
[43] *"IPCC Second Assessment: Climate Change 1995. A Report of the Intergovernmental Panel on Climate Change". IPCC website.* http://www.ipcc.ch/pdf/climate-changes-1995/ipcc-2nd-assessment/2nd-assessment-en.pdf.
[44] In accordance with "National GHG inventory of Ukraine, period 1990-2009", Table P2.24, page 393 (http://unfccc.int/national_reports/annex_i_ghg_inventories/national_inventories_submissions/items/5270.php).
[45] In accordance with "National GHG inventory of Ukraine, period 1990-2009", Table P2.27, page 396 (http://unfccc.int/national_reports/annex_i_ghg_inventories/national_inventories_submissions/items/5270.php).
[46] In accordance with "National GHG inventory of Ukraine, period 1990-2009", Table P2.26, page 395 (http://unfccc.int/national_reports/annex_i_ghg_inventories/national_inventories_submissions/items/5270.php).
[47] http://www.neia.gov.ua/nature/doccatalog/document?id=127171.

Ukraine #63 dated 15th of April 2011[48]. During 2010 the carbon emission factor for electricity consumption is based on the Order of the National environmental investment agency of Ukraine #43 dated 28th of March 2011[49]. Starting from year 2011 the carbon emission factor for electricity consumption is based on the Order of the National environmental investment agency of Ukraine #75 dated 12th of May 2011[50].

[48] http://www.neia.gov.ua/nature/doccatalog/document?id=127172.
[49] http://www.neia.gov.ua/nature/doccatalog/document?id=126006.
[50] http://www.neia.gov.ua/nature/doccatalog/document?id=127498.

Annex 3

**MONITORING PLAN**

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

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