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

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SECTION A. General description of the project

A.1. Title of the project:

"Implementation of Energy Saving Measures at PJSC "Khartsyzsk Pipe Plant"

Sectoral scope: 3. Energy consumption.

Version of the document: 2.0

Date of the document: 1st of December 2012.

A.2. Description of the project:

The project aims at achieving of the greenhouse gas emissions reduction by decreasing of specific energy and natural gas consumption for pipe production PJSC "Khartsyzsk Pipe Plant".

PJSC "Khartsyzsk Pipe Plant", which belongs to Metallurgy Division of Metinvest Group, is one of the biggest in the CIS producer of longitudinally welded pipes of big diameter with inner or outer anticorrosion or smoothing coating for gas and oil long distance pipelines. Nowadays, the plant capacities allow producing more than a million tonnes of pipes annually, including 700 thousand tonnes of coated pipes. Khartsyzsk Pipe Plant includes two main production workshops[1]: Pipe Welding Shop #2 (TESC-2) and Pipe Welding Shop #4 (TSC-4). TESC-2 specializes in the production of longitudinally welded pipes for the construction of trunk pipelines. TSC-4 consists of sites for external three-layer polyethylene coating and internal epoxide smooth or anti-corrosion coatings on pipes of all assortment produced by the plant.

Within the proposed project the following measures were implemented: switch from heat energy consumption produced at TPP-1 of Khartsyzsk to own heat production, replacement of old installations with new (modern) more energy-efficient equipment; replacement of pumps, installation of frequency converters; replacement of lighting equipment to energy-efficient lamp; partial switch to the electrical energy use from natural gas burning in number of production processes; optimization of operation modes of key equipment with the purpose of achievement of energy-saving effect; improvement of energy consumption accounting and elimination of loses from interconnection tracks; improving thermal insulation of buildings.

Currently, most of the planned activities have been already implemented and resulted in the reduction of energy resources consumption for pipe production PJSC "Khartsyzsk Pipe Plant" and generation of CO_2 emissions reduction. The first steps of equipment replacement and changes in waste management practices were implemented in 2003, which resulted in the start of emission reductions generation in 2004. Project duration is 25 years, which is expected operating lifetime of the basic installed facilities, while the use of this equipment ensures the conditions for greenhouse gas emission reductions creation to be preserved.

Situation existing prior to the starting date of the project

Before the beginning of the project implementation tested equipment and technology that could provide the work of the enterprise for a long period were used, heat was purchased from TPP-1 of Khartsyzsk.

[1] http://pipe.metinvestholding.com/ua/about/structure

Cost of energy resources at that moment was stable, but according to strategic reasons of providing the long-term competitiveness of the company it was decided to move in the direction of increasing energy efficiency. Ratification of the Kyoto Protocol provided for this purpose additional incentives.

Baseline scenario

The baseline scenario of the proposed project is a continuation of the existing before the project implementation situation. Specific consumption of electricity and natural gas of PJSC "Khartsyzsk Pipe Plant" would remain at pre-project level, heat would be continued to be purchased from TPP-1 of Khartsyzsk. In case of equipment failure, its replacement would have been carried out element-by-element to the equipment with similar technical specification that would have not led to the emergence of energy-saving effect due to the lack of systematic approach and limited opportunities for optimizing of energy consumption.

Project scenario

Project scenario provides a large-scale modernization of the enterprise with replacement of equipment, introduction of energy management, elimination of energy losses and establishment of optimal modes of equipment operation.

Project history

The project was initiated at the beginning of 2002, when creation and the beginning of work of the Commission for Energy Saving has been established, main aim of which is identifying and further maximum optimization of the most significant energy consumption in the production. Implementation of the basic program activity took place during 2003-2011. Since the project leads to greenhouse gas emissions reduction into the atmosphere, this reduction is necessarily has been taken into account when making a decision on the project realization. Emissions reductions will be sold as ERUs in the international market of emissions reductions, and the funds obtained will improve the financial performance of the project to a level that justifies the means that were used for its implementation. From the very beginning, JI mechanism was one of the prominent factors of the project and financial benefits under this mechanism plays an important role in making the decision on the start of the operation and considered to be one of the reasons for beginning of the project realization.

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)	PJSC "Khartsyzsk Pipe Plant"	No
The Netherlands	Metinvest International SA	No

PJSC "Khartsyzsk Pipe Plant", which belongs to Metallurgy Division of Metinvest Group, is one of the biggest in the CIS producer of longitudinally welded pipes of big diameter with inner or outer anticorrosion or smoothing coating for gas and oil long distance pipelines. The plant was founded in

1898, and in 1913 first in Russian Empire the pipe making workshop was established. Nowadays, the plant capacities allow producing more than a million tonnes of pipes annually, including 700 thousand tonnes of coated pipes. PJSC "Khartsyzsk Pipe Plant" is owner of the emission sources at which the JI project is realized. It also performs development of this project idea note, PDD, determination by accredited independent entity, application for letters of endorsement and approval.

Metinvest International SA is a potential buyer of ERUs under the project. Metinvest International SA is a part of Metinvest Group. Metinvest International SA is a trading company established in 1997 and with head-quarter in Switzerland specializing in steel and iron ore marketing. The core activity of company is aimed at marketing of iron ore, half-finished and finished steel products produced by mining and metallurgical enterprises of Metinvest Group.

A.4. Technical description of the project:

A.4.1. Location of the project:

Ukraine, Donetsk oblast

A.4.1.1. Host Party(ies):

Ukraine

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

Donetsk

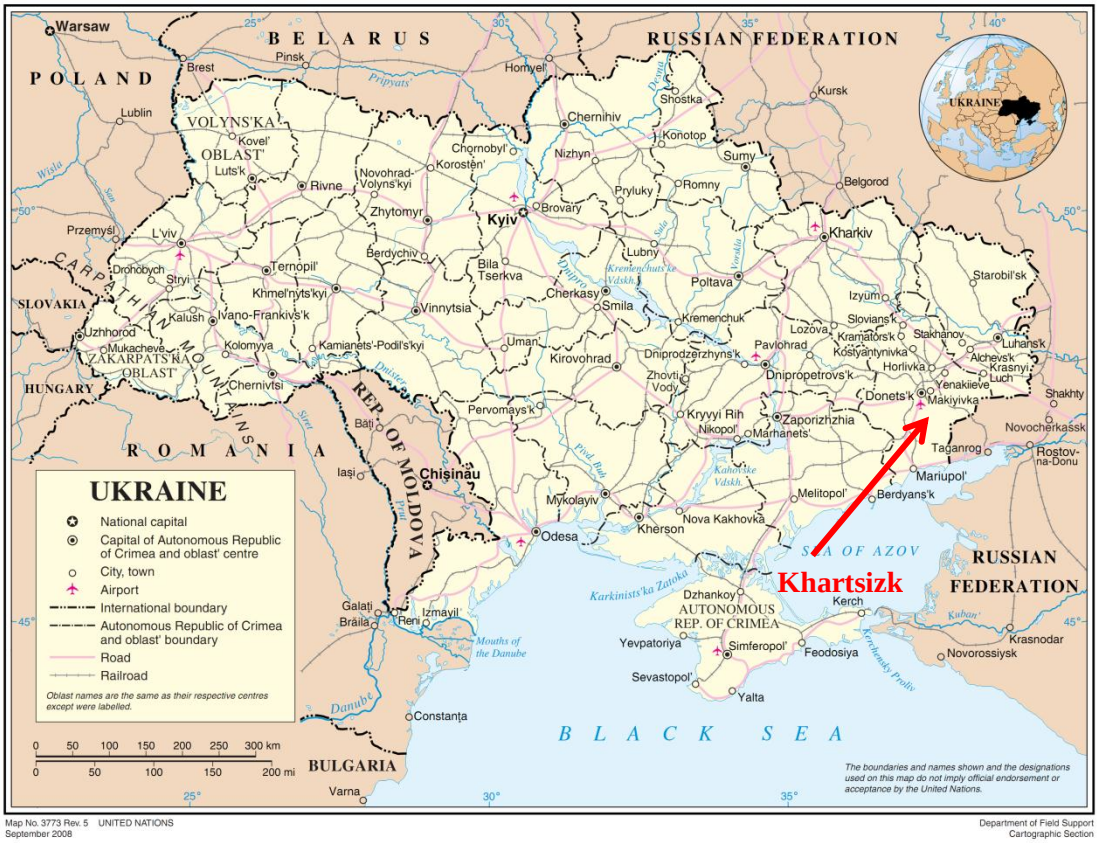

Figure 1. Location of Khartsyzsk on the map of Ukraine.

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

Khartsyzsk

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

This project is implemented in Ukraine at the enterprise PJSC "Khartsyzsk Pipe Plant".

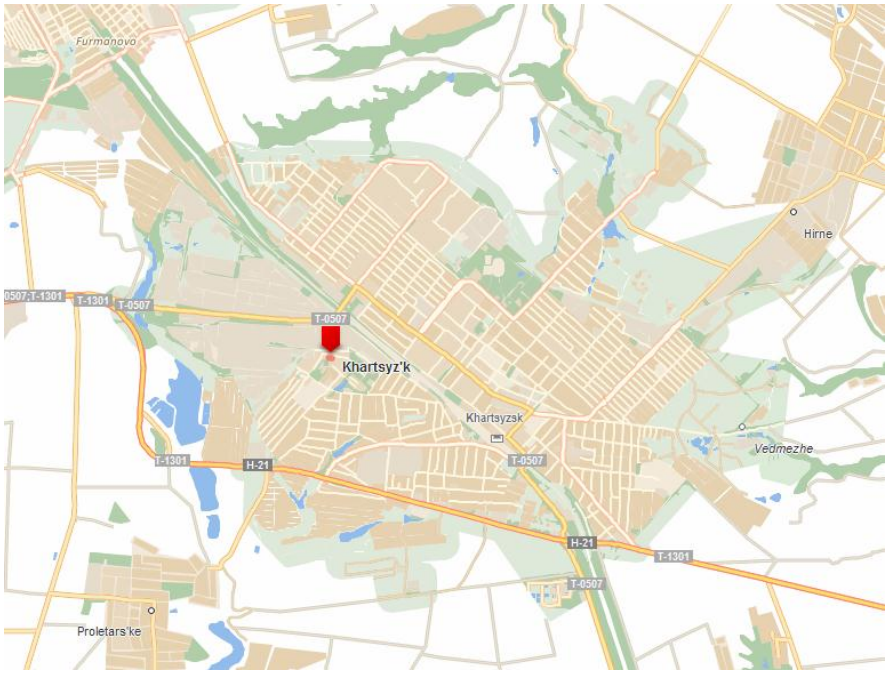

Figure 2. Location of the enterprise PJSC "Khartsyzsk Pipe Plant", where project activity was implemented.

Donetsk region is the administrative and territorial unit of Ukraine. It was created on 2nd of July 1932. Square area is 26,517 km^2 (4.4% of Ukraine). Its population as of 1st of May 2012 was 4,391,766 people. Its administrative centre is Donetsk city. There are 28 cities of oblast importance, 24 towns of rayon importance, 9 rayon centres, 131 urban villages and 874 villages.

Geographic coordinates of the project activity: 48°02'27" N 38°07'39".

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

Khartsyzsk Pipe Plant includes two main production workshops[2]: Pipe Welding Shop #2 (TESC-2) and Pipe Welding Shop #4 (TSC-4). TESC-2 specializes in the production of longitudinally welded pipes for the construction of trunk pipelines. The shop has three technological production lines of high-strength pipes with capacity of 532.9 thousand tons, 400 thousand tons and 200 thousand tons. The whole range of products produced by the factory is certified by API, EN Standards and national system UkrSEPRO. TSC-4 consists of sites for external three-layer polyethylene coating (with capacity of 663.2 thousand tons) and internal epoxide smooth or anti-corrosion coatings on pipes of all assortment produced by the plant (with capacity of 450.2 thousand tons). Auxiliary workshops are: Shop for equipment repair; Mechanical repair shop, Energy shop and Railway Shop.

[2] http://pipe.metinvestholding.com/ua/about/structure

As noted above, the project activity is aimed at introducing complex of energy saving measures at PJSC "Khartsyzsk Pipe Plant". The common list of typical measures that were performed and their brief description is given below. The complex effect of their introduction leads to reduction of fuel and electricity consumption and therefore to reduction of greenhouse gas emissions:

Replacement of old installations with new (modern) more energy-efficient equipment:

- Replacement of energy-intensive compressor equipment for compressed air production, K-250 type (5 items) and screw compressors GD (3 items) with the compressor with lower energy consumption Samsung TM 1250 (specifications are shown in Table 2);
- Replacement of heat consumption from TPP-1 of Khartsyzsk into heat production at 20 small boiler stations with 30 water boilers with total capacity of 10.1 MW (specifications of the main installed equipment are given in Annex 4 of this PDD).

Table 2. Specifications of compressor Samsung TM 1250.

#	Parameter name	Technical indicators
1.	Operating pressure (bar A)	7.0
2.	Injection temperature of compressor (C°)	98.3
3.	Outlet temperature after cooler (C°)	40
4.	Maximum outlet flow (lm^3/min)	183.7
5.	Capacity on the clutch at the maximum flow (kW)	806.7

Figure 3. Compressor Samsung TM 1250.

The effect from executed activities became a significant fuel and electrical energy economy.

Replacement of pumps, installation of frequency converters:

- Replacement of old pumps with high energy consumption with the new energy-efficient ones. Energy consumption of new pumps is 10-33 times less (depends on type) than the consumption of the old pumps (specifications of the main installed equipment are given in Annex 4 of this PDD).
- Installation of frequency converters. Old pumps used to have only one operation mode with maximum energy consumption. In practice this caused unreasonable energy waste, especially when maximal capacity was not required (about 80% of operation time). Frequency converters allow optimal use of energy according to the load.

Replacement of lighting equipment to energy-efficient lamps

Before implementation of the project, the incandescent lamps were used as lightning equipment, output-input ratio of which was not more than 15%. Also old type of lamps OSRAM HQL 1000 was used. During interior lighting equipment reconstruction all old lamps were changed into its modern analogues metal-halogen lighters with high efficiency and with low energy consumption. Near 2000 lightning points were replaced (specifications of the main installed equipment are given in Annex 4 of this PDD). Energy consumption of lightning equipment decreased by 3-5 times (depends on the type of lamps).

Figure 4. Inside look of one of PJSC "Khartsyzsk Pipe Plant".

Partial switch to the electrical energy use from natural gas burning in number of production processes:

- On the 1-st, 3-rd and 4-th production lines instead of straight type furnaces the induction furnaces of the following types were installed: "Induction" on the first line and "Radyne" on the 3-d and 4-th lines.

Induction furnace, "Induction" type, is used for heating pipes of different diameters by switching coils in collecting and unit converter IMF 2500K2. Specifications are given in Table 3.

Table 3. Specifications of induction furnace "Induction".

#	Name of the technical unit	Name of technical parameter	Technical indicators
1.	Pump installation	Engine power	11 kW
		Pumping capacity	978 l/min
2.	Transformer TNSA 2872/7.2	Capacity	2872 kVA
3.	-	Dimensions of installation	1340x870x1554
4.	-	Weight of installation	750-1250 kg

Induction furnace, "Radyne" type, is used for heating pipes of different diameters, as a part of the production by switching coils in collecting and converters of 800TS1 and 1600NCV1 types.

Table 4. Specifications of induction furnace "Radyne".

#	Name of parameter	converter 800TS1	converter 1600TSM1
1.	Input supply	480V 50 Hz 1 phase	480V 50 Hz 1 phase
2.	Output capacity	996 kW	1992 kW
3.	Output frequency	1 kHz	1 kHz
4.	Dimensions	1540x980x1954mm	2460x980x1954mm
5.	Weight	1250 kg	2400 kg

These changes resulted in the reduction of greenhouse gas emissions by switching to less carbon-intensive kind of energy.

Optimization of operation modes of key equipment with the purpose of achievement of energy-efficiency effect:

- Setting up the working process of energy-intensive equipment (furnaces), which allowed to reach the optimum input of electricity and fuel, as a result of these actions consumption of this sources decreased;
- Setting-up of burning process of boilers. Checking-up, analysis and setting-up was executed by the special company, it allowed reducing energy inputs and reaching optimal and energy-efficient burning;
- Double-chamber furnace was put to operation regime with planning of efficient loading, not more than 3 times a week;
- Repair and maintenance of gas burners (TESC-2 – 198 units, TSC-4 – 234 units, RMC – 21 units)

Improvement of energy consumption accounting and elimination of loses from interconnection tracks

- Inspection of valves, checking-up of tightness of flange and threaded fasteners at on-ground gas pipelines, repair of damages and closure;
- Repair of interconnection tracks of pneumatic tools, which allowed cutting extra electrical energy consumption for pumping air into the damaged hose pipe;

Improving thermal insulation of buildings:

It's was found out that up to 30% of heat loses occur through windows, so installation of energy-efficient windows allows to save fuel recourses on heating. Repair and changing of windows in production units are the part of the project. During this project all of the old windows will be changed into the energy-efficient double-pane units with polycarbonate instead of glass. Polycarbonate has lower heat conduction coefficient. Insulation of doorways is also among the project activities.

Table 5. Project implementation schedule

Event	Date
Beginning of the project investment stage	03/05/2003
End of the project investment stage	01/01/2012
Beginning of the project operational stage	01/01/2004
End of the project operational stage	31/12/2028
Start date of emissions reductions generation	01/01/2004
End date of emissions reductions generation	31/12/2028

The project does not require intensive staff training. The required amount of employees can obtain a basic technical training at the project site. Most of the necessary workers such as engineers, engineers, mechanics, power engineering specialists, and operators are locally available. Local resources meet project maintenance needs: own and hired workers and repair contractor. Project foresees the need for training. All employees must have a valid certificate of vocational education, and periodically pass safety training and exams. Vocational training in all required areas of professional project is available in the educational institution of Ukraine.

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:

GHG emissions reduction is achieved due to lower specific energy and natural gas consumption for pipe production PJSC "Khartsyzsk Pipe Plant".

Reduction of specific energy consumption is due to replacement of old installations with new (modern) more energy-efficient equipment; replacement of pumps, installation of frequency converters; replacement of lighting equipment to energy-efficient lamp and improvement of accounting. Reduction of specific consumption of natural gas is due to replacement of old installations with new (modern) more energy-efficient equipment; partial switch to the electrical energy use from natural gas burning in number of production processes; optimization of operation modes of key equipment with the purpose of achievement of energy-saving effect; improvement of energy consumption accounting and elimination of loses from interconnection tracks and improving thermal insulation of buildings.

Total emission reductions during the first crediting period are 362 623 tonnes of CO_2 equivalent.

In the absence of the proposed project, the reduction of GHG emissions would not be possible because without the replacement of equipment an introduction of energy management techniques, integrated of production process control measures and optimization of energy consumption, the specific energy resources consumption would remain at the pre-project level, and thus GHG emissions would be the same as before the project realization.

Detailed description of the baseline scenario and additionality justification is provided in Section B of this PDD.

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

Table 6. Estimated amount of emission reductions before the crediting period

	Years
Length of the crediting period	4
Year	Estimate of annual emission reductions in tons of CO_2 equivalent
Year 2004	79 644
Year 2005	99 436
Year 2006	107 115
Year 2007	93 626
Total estimated emission reductions before the crediting period (tonnes of CO_2 equivalent)	379 821
Annual average of estimated emission reductions before the crediting period (tonnes of CO_2 equivalent)	94 955

Table 7. Estimated amount of emission reductions during the crediting period

	Years
Length of the crediting period	5
Year	Estimate of annual emission reductions in tons of CO_2 equivalent
Year 2008	63 505
Year 2009	94 505
Year 2010	57 352
Year 2011	132 883
Year 2012	132 883
Total estimated emission reductions over the crediting period (tonnes of CO_2 equivalent)	481 128
Annual average of estimated emission reductions over the crediting period (tonnes of CO_2 equivalent)	96 226

Table 8. Estimated amount of emission reductions after the crediting period

	Years
Length of the period after 2012, for which emission reductions are estimated	16
Year	Estimate of annual emission reductions in tons of CO_2 equivalent
Year 2013	132 883
Year 2014	132 883
Year 2015	132 883
Year 2016	132 883
Year 2017	132 883
Year 2018	132 883
Year 2019	132 883
Year 2020	132 883
Year 2021	132 883
Year 2022	132 883
Year 2023	132 883
Year 2024	132 883
Year 2025	132 883
Year 2026	132 883
Year 2027	132 883
Year 2028	132 883
Total estimated emission reductions for the relevant period (tons of CO_2 equivalent)	2 126 128
Annual average of estimated emission reductions for the relevant period (tons of CO_2 equivalent)	132 883

A.5. Project approval by the Parties involved:

Documents for obtaining the Letter of Endorsement were submitted to the State Environmental Investment Agency of Ukraine. The Letter of Endorsement #3690/23/7 was achieved on 30/11/2012. Obtaining the Letter of Approval by the Host country is expected after completion of the determination process.

SECTION B. Baseline

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

In accordance with the Guidance on criteria for baseline setting and monitoring (Version 03)[3] (hereinafter referred to as the Guidance), the baseline for a JI project is the scenario that reasonably represents the anthropogenic emissions by sources or anthropogenic removals by sinks of GHGs that would occur in the absence of the proposed project.

In accordance with the Paragraph 9 of the Guidance the project participants may select either a) an approach for baseline setting and monitoring developed in accordance with appendix B of the JI guidelines (JI specific approach); or b) or a methodology for baseline setting and monitoring approved by the Executive Board of the clean development mechanism (CDM); or c) an approach to the setting of baseline and monitoring that has already been applied to comparative JI projects.

Description and justification of the baseline chosen is provided below in accordance with the Guidelines for users of the Joint Implementation Project Design Document Form, version 04[4], using the following step-wise approach:

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

To determine the baseline scenario and demonstrate additionality Combined tool to identify the baseline scenario and demonstrate additionality (Version 04.0.0) was applied. The recommendations of the Guidelines for objective demonstration and assessment of barriers were also taken into account (Version 01).

Step 2. Application of the approach chosen

Step 0. Determining whether the project activity was the first of its kind
Outcome II: The project activity was not the first of its kind.

Step 1. Identification of alternatives to the project activity

The following plausible alternatives to the implementation of each component of the project activity are identified that (a) were available to the project participants; (b) could not be implemented simultaneously with the project activity and (c) ensure the obtaining of the same result as the project activity had.

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

Implementation of energy efficiency measures and reducing energy and natural gas losses:

E1: Continuation of existing situation that does not require any investment;
According to this alternative the existing equipment is used until its operational lifetime ends up. The alternative does not require any investments and costs, and is unattractive in long-term perspective, because the strategy of PJSC "Khartsyzsk Pipe Plant" under favourable conditions foresees future intensive development and growth in output.

E2: Continuation of existing situation, which requires the cost for equipment maintenance;
This alternative envisages the continuation of the same specific power and natural gas consumption, as well as at the pre-project level. After the equipment failure, its replacement would have been carried out element-by-element to the equipment with similar technical specification that would have not led to the emergence of energy-saving effect due to the lack of systematic approach and limited opportunities for optimizing of energy consumption.

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

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

E3: Partial implementation of the planned program of energy saving, financed by a project owner;
This alternative foresees a partial implementation of energy efficiency program, implementation of those measures, which do not require significant capital investment and a sound technical upgrade of the facilities. This option requires less money for its implementation. This option would not be appropriate due to the lack of a systematic approach; therefore the resulting effect would be much lower than the result from implementation of project activity. Whereas, while making a decision on the project the future income from the sale of ERUs was taken into account, in this case their volume was insufficient for a positive decision.

E4: Implementation of project activity financed by a third party;
According to this alternative, the introduction of programs aimed at energy efficiency improvement at the facilities of PJSC "Khartsyzsk Pipe Plant" would be performed and financed by a third party, i.e. energy service company. These companies offer to install some pieces of equipment and compensate the cost through the savings achieved. Given the large scale of implemented energy efficiency measures, this alternative could not be implemented due to the lack of energy service companies that could complete such a substantial order. In addition, while realizing this alternative, energy saving measures with not substantial effect, which lead to decrease of energy consumption along with the other measures, would not be implemented. Thus, the implementation of this alternative was unrealistic.

E5: Project implementation without JI incentives.
This option includes the implementation of the project activity without registration it as JI project in the absence of additional financial revenues from the sale of ERUs. This option requires significant capital investment and generates the same emissions reductions likewise in the project scenario.

Outcome of Sub-step 1a: The following list of realistic and viable alternatives to the project activity:

E2: Continuation of existing situation, which requires the cost for equipment maintenance;
E5: Project implementation without JI incentives.

Sub-step 1b. Compliance with the present legislation.

Legislation on energy saving in Ukraine serves to create the conditions for implementation of energy efficiency technologies, strengthening the priority of this direction for Ukrainian economy development, supporting of scientific research on energy saving, etc. The main regulatory document is the Law of Ukraine "On energy efficiency". Stipulated penalty fines for excessive use of fuel, though, as the experts note, due to the lack of appropriate regulations, this rule is not performed[5]. All of the above mentioned alternatives to the project activity comply with the legislation on energy efficiency in Ukraine.

Implementation of the project meets the national policy in the metallurgical industry of Ukraine, including its directions stipulated by the State Development Programme and reforming mining and metallurgical complex for the period until 2011[6].

Thus, the implementation of any of the above mentioned alternatives complies with the legislation subject to following the procedures of waste management.

Outcome of Sub-step 1b: All these realistic and feasible alternatives to the project activities comply with the present current legislation of Ukraine.

[5] http://www.epravda.com.ua/columns/2010/03/16/229811/

[6] http://www.google.com.ua/url?sa=t&rct=j&q=&esrc=s&source=web&cd=13&ved=0CCoQFjACOAo&url=http%3A%2F%2Fppa.gov.ua%2Ffiles%2Fzvit%2Fzvit-gmk2011.docx&ei=yHFcUJj_MorLswat-oDQAg&usg=AFQjCNG4yiVjQyig72Xq3639L9U9ZjGfkA&cad=rja

Step 2. Barrier analysis.

The main barrier that prevented the implementation of project activities is financial barrier. The total cost of the implemented activities under the project is about 32 496.8 thousand UAH. This is a significant cost, which the project owner did have at the time of making the decision on implementation of the project activities, and they should be involved in capital market.

Both projects are implemented in terms of investment climate in Ukraine, which is not favourable. Ukraine is a country of high risk for business and investment. The risk of investing in Ukraine is additionally confirmed by the country rating according to international rating agency Moody's and the corresponding risk premium. In the following table risk premium for Ukraine[7]:

Table 9. The size of the total risk premium for Ukraine:

Total Risk Premium, %	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**
Ukraine	11.57	11.59	10.8	10.16	10.04	14.75	12.75	12.5

As discussed during the roundtable of OECD (Organization for Economic Cooperation and Development) on the development of business and investment climate in Ukraine, the existing legal framework is not only inadequate, but significantly sabotages the development of market economy in Ukraine. According to Western press reports, the following conclusion can be made: the tax and legal system reforming has improved the situation by adopting the Commercial Code, Civil Code and Tax Code dated January 1, 2004, but there are still unsatisfactory elements that represent a risk for foreign investors[8]. It is believed that Ukraine is heading in the right direction with the introduction of significant reforms, but it still has a long way to realizing their full potential. Frequent and unpredictable changes in the legal system along with the contradictory and inconsistent Civil and Commercial Codes do not allow transparent and stable legal conditions for business. This is seen by international companies as a source of great uncertainty, which makes risky predictions about future business goals and strategies.

According to various sources and as described above, the investment climate in Ukraine is risky and unfavourable, private capital from domestic or international sources are not available or accessible only at excessively high price because of real and perceived risks of doing business in Ukraine.

Below the influence of economic conditions on the decision regarding the implementation of alternatives to the project activity is considered.

Implementation of energy efficiency measures and reducing of energy losses:

E2: Continuation of existing situation, which requires the cost for equipment maintenance;
Implementation of this alternative does not require an attraction of large amount of funds from capital markets, and could be funded from internal working capital. Thus, the above described financial barriers do not prevent its implementation.

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

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

E5: Project implementation without JI incentives.
For the owner of the project it was absolutely impossible to implement the project worth 32 million UAH without attracting outside capital. Thus, the implementation of this alternative was stopped by the existence of financial barriers.

Outcome: Thus the existence of financial barrier would prevent the implementation of the above listed alternatives to the project activity, but alternatives E2 − "Continuation of existing situation, which requires the cost for equipment maintenance". Thus, the continuation of the current situation is the most plausible future scenario that is the baseline.

This baseline scenario has been established according to the criteria outlined in the Guidance by JISC:

1) On a project specific basis;
2) In a transparent manner with regard to the choice of approaches, assumptions, methodologies, parameters, data sources and key factors. All parameters and data are either monitored by the project participants or are taken from sources that provide a verifiable reference for each parameter. Project participants use approaches suggested by the Guidance and the methodological Tools approved 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. The above analysis shows that the chosen baseline is the most plausible future scenario, taking into account the current situation of the Donbas metallurgical industry;
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 refined oil products, so no emission reductions can be earned due to any changes outside the 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. If possible, the same approach to calculating the level of baseline and project emissions as specified in the National inventories of anthropogenic emissions by sources and removals by sinks of greenhouse gases in the Ukraine are used. The National emissions inventories use country-specific emission factors that are set to meet the 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

Baseline emissions come from following sources:

- Electricity consumption generated by power plants connected to the United Energy System of Ukraine;
- CO_2 emissions due to consumption of electricity.

Detailed description of the calculation of baseline emissions, applied formulas and emission reductions are given in Annex 2 "Baseline information" of this PDD.

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

Data/Parameter	P_y
Data unit	t
Description	Pipe production
Time of determination/monitoring	To be monitored throughout the monitoring period
Source of data (to be) used	Data of project owner
Value of data applied (for ex ante calculations/determinations)	**Year** **Value** 2004 448 138 2005 544 647 2006 596 484 2007 508 946 2008 387 746 2009 523 161 2010 308 753 2011 630 276 2012 630 276
Justification of the choice of data or description of measurement methods	Measured for the commercial purposes on site.
QA/QC procedures (to be) applied	According to the project owner policy.
Any comment	No

Data/Parameter	$TE_{NG,BL}$
Data unit	GJ
Description	Baseline heat consumption, produced at TPP-1 of Khartsyzsk
Time of determination/monitoring	Fixed ex ante during determination
Source of data (to be) used	Calculated, based on data of project owner
Value of data applied (for ex ante calculations/determinations)	372 571
Justification of the choice of data or description of measurement methods	Procedure for calculating the indicator is given in Annex 2 to this PDD.
QA/QC procedures (to be) applied	According to the project owner policy.
Any comment	No

Data/Parameter	SEC_{BL}
Data unit	MWh/t
Description	Baseline specific electricity consumption for pipe production
Time of determination/monitoring	Recorded during determination
Source of data (to be) used	Calculated using data of project owner
Value of data applied (for ex ante calculations/determinations)	0.298
Justification of the choice of data or description of measurement methods	Procedure for calculating the indicator is given in Annex 2 to this PDD.
QA/QC procedures (to be) applied	According to the project owner policy.
Any comment	No

Data/Parameter	$SFC_{NG,BL}$
Data unit	1000 m^3/t
Description	Baseline specific natural gas combustion for pipe production

Time of determination/monitoring	Recorded during determination
Source of data (to be) used	Calculated using data of project owner
Value of data applied (for ex ante calculations/determinations)	0.021
Justification of the choice of data or description of measurement methods	Procedure for calculating the indicator is given in Annex 2 to this PDD.
QA/QC procedures (to be) applied	According to the project owner policy.
Any comment	No

Data/Parameter	$EF_{CO2,EL,y}$
Data unit	$kgCO_2/kWh$ (=tCO_2/MWh)
Description	Indirect specific carbon dioxide emissions in the period of consumption of electricity by consumers which are classified as 2nd class according to the procedure for determining the classes of consumers, approved by the National Electricity Regulatory Commission of Ukraine from August 13, 1998 # 1052
Time of determination/monitoring	To be monitored throughout the monitoring period
Source of data (to be) used	"Standardized baseline emission factors for the Ukrainian electricity grid" developed by Global Carbon B.V. Orders of the Ukrainian DFP: The National Environmental Investment Agency of Ukraine Order # 62 dtd. 15/04/2011 The National Environmental Investment Agency of Ukraine Order # 63 dtd. 15/04/2011 The National Environmental Investment Agency of Ukraine Order # 43 dtd. 28/03/2011 The National Environmental Investment Agency of Ukraine Order # 75 dtd. 12/05/2011
Value of data applied (for ex ante calculations/determinations)	**Year** **Value** 2004-2007 0.896 2008 1.219 2009 1.237 2010 1.225 2011 1.227 2012 1.227
Justification of the choice of data or description of measurement methods	Indicator until 2007 is calculated and determined by the International Procedure. Indicator for 2008-2011 is calculated by DFP of Ukraine and approved by the Order for mandatory use in joint implementation projects.
QA/QC procedures (to be) applied	According to Ukrainian DFP policy.
Any comment	No

Data/Parameter	$EF_{CO2,NG,y}$
Data unit	$tCO_2/1000\ m^3$
Description	Carbon dioxide emission factor for natural gas combustion
Time of determination/monitoring	To be monitored throughout the monitoring period
Source of data (to be) used	Calculated using data National Inventory Report in Ukraine for 1990-2010, p. 458, 464, 470 Value for other industries and construction.
Value of data applied (for ex ante calculations/determinations)	**Year** **Value** 2008 1.8817 2009 1.8855

	2010 1.8817
Justification of the choice of data or description of measurement methods	Procedure for calculating the indicator is given in Annex 2 to this PDD.
QA/QC procedures (to be) applied	According to Ukrainian DFP policy.
Any comment	No

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

To determine the baseline scenario and demonstrate additionality the Combined tool to identify the baseline scenario and demonstrate additionality (Version 04.0.0) has been used. The recommendations of the Guidelines for objective demonstration and assessment of barriers (Version 01) were also taken into account.

The proposed JI project is not the first of its kind. The following step-wise approach is used to demonstrate that the project carbon dioxide emissions reductions by sources are additional with respect to any other emissions reductions:

Step 1. Identification of alternatives to the project activity

Alternatives were identified and described in the previous Section B.1. of this PDD while determining the baseline scenario.

Step 2. Barrier analysis

Barrier analysis of identified alternatives was conducted in the previous Section B.1. of this PDD while determining the baseline scenario. As the result of analysis, the following alternatives to project activities have remained that are not project scenario without JI mechanism, which were identified by baseline scenario:

For energy conservation - E2: "Continuation of existing situation, which requires the cost for equipment maintenance".

As demonstrated in previous Section, the main barrier that prevents the project implementation is financial. As a result of selling greenhouse gas emission reductions expected revenues of about 8 million UAH, representing about 22% required for the project funds that are weighty argument when making decision on the project. Thus, participation in joint implementation mechanism eliminates barriers for the project.

Therefore, when the requirements of Step 1 and 2 were satisfied, then according to the Combined tool to identify the baseline scenario and demonstrate additionality (Version 04.0.0) it can be preceded to the analysis of common practices.

Step 3: Investment analysis

Not performed according to the Combined tool to identify the baseline scenario and demonstrate additionality (Version 04.0.0).

Step 4: Common practice analysis

Sub-step 4a: The proposed project activities include the activities listed in section with definitions of the "Combined tool to identify the baseline scenario and demonstrate additionality" (Version 04.0.0).

Sub-step 4a(1): Calculation +/-50 percent of production due to proposed project activity.
Annual pipes production of PJSC "Khartsyzsk Pipe Plant" reaches 700 thousand tons. Value +/-50 of percent is respectively: 350 thousand tons and 1050 thousand tons.
Sub-step 4a(2): Identification of companies that supply the same amount of eggs within a certain range in the corresponding geographic area.
Plants in Ukraine with comparable level of production, though with different range of products, are following: JSC "INTERPIPE NTZ", JSC "Interpipe NMTZ" and JSC "Interpipe Niko Tube" (N_{all}=4).
Sub-step 4a(3): Among the identified plants, the allocation of those that use another technology, than in the project activity.
Energy efficiency measures in the same amount as of the project owner are implemented at none of the listed enterprises. According to the Report on the implementation of the State Development Programme

and reforming mining and metallurgical complex for the period until 2011, PJSC "Khartsyzsk Pipe Plant" implemented the most extensive modernization in the field[9] (N_{diff}=4)

Sub-step 4a(4): Calculating factor F=1- N_{diff}/N_{all}, reflecting the number of plants that use the same practice as in the project activity, among all plants, which have the same level of production as the plant, where project activity was implemented.

F=1- 4/4=0

The proposed project activity is considered as common practice in the relevant field and within certain geographic territory for the implementation of both following requirements:

(a) factor F larger than 0.2;

(b) N_{all} - N_{diff} larger than 3.

None of the abovementioned requirements do not apply to the proposed project activity, so it is not common practice; let us go to the outcome step 4.

Outcome of Step 4: The proposed project activity is not a common practice.

Analysis outcome: Since all three steps of analysis were satisfied, the project is additional.

9 http://www.google.com.ua/url?sa=t&rct=j&q=&esrc=s&source=web&cd=13&ved=0CCoQFjACOAo&url=http%3A%2F%2Fppa.gov.ua%2Ffiles%2Fzvit%2Fzvit-gmk2011.docx&ei=yHFcUJj_MorLswat-oDQAg&usg=AFQjCNG4yiVjQyig72Xq3639L9U9ZjGfkA&cad=rja

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

The project activity is physically limited by territory of PJSC "Khartsyzsk Pipe Plant". Total number of equipment within the project boundaries is presented in Annex 4 of the project design documentation.

The table below shows an overview of all sources of emissions in the baseline and project scenarios. The project boundary is illustrated in accordance with the paragraphs 14 and 16 of the Guidance.

Table 10. Sources of emissions in the baseline and project scenarios

	Source	Gas	Included/Excluded	Justification/Explanation
Baseline scenario	Heat energy consumption, produced at TPP-1 of Khartsyzsk by natural gas consumption	CO_2	Included	The main source of emissions.
		CH_4	Excluded	Neglected for simplification. Conservatively.
		N_2O	Excluded	Neglected for simplification. Conservatively.
	Electricity consumption generated by power plants connected to the United Energy System of Ukraine	CO_2	Included	The main source of emissions.
		CH_4	Excluded	Neglected for simplification. Conservatively.
		N_2O	Excluded	Neglected for simplification. Conservatively.
	Natural gas combustion	CO_2	Included	The main source of emissions.
		CH_4	Excluded	Neglected for simplification. Conservatively.
		N_2O	Excluded	Neglected for simplification. Conservatively.
Project scenario	Electricity consumption generated by power plants connected to the United Energy System of Ukraine	CO_2	Included	The main source of emissions.
		CH_4	Excluded	Neglected for simplification likewise the baseline scenario.
		N_2O	Excluded	Neglected for simplification likewise the baseline scenario.
	Natural gas combustion	CO_2	Included	The main source of emissions.
		CH_4	Excluded	Neglected for simplification likewise the baseline scenario.
		N_2O	Excluded	Neglected for simplification likewise the baseline scenario.

Baseline scenario

The baseline scenario of the proposed project is a continuation of the existing pre-project situation. Specific consumption of electricity and natural gas by PJSC "Khartsyzsk Pipe Plant" would remain at the pre-project level.

In the baseline scenario the emission sources within the project boundaries are:

- CO_2 emissions due to heat production by the natural gas fired boilers at TPP-1 of Khartsyzsk;
- CO_2 emissions due to electricity consumption generated by power plants connected to the United Energy System of Ukraine;
- CO_2 emissions due to consumption of electricity.

Project scenario

Owing to the implemented energy efficiency measures PJSC "Khartsyzsk Pipe Plant", the reduction of specific energy consumption per unit of output products occurred and the methods of manure handling was introduced.

In the project scenario the sources of emissions are:

- CO_2 emissions due to electricity consumption generated by power plants connected to the United Energy System of Ukraine;
- CO_2 emissions due to consumption of electricity.

Leakage

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

Due to the project implementation no leakages are expected.

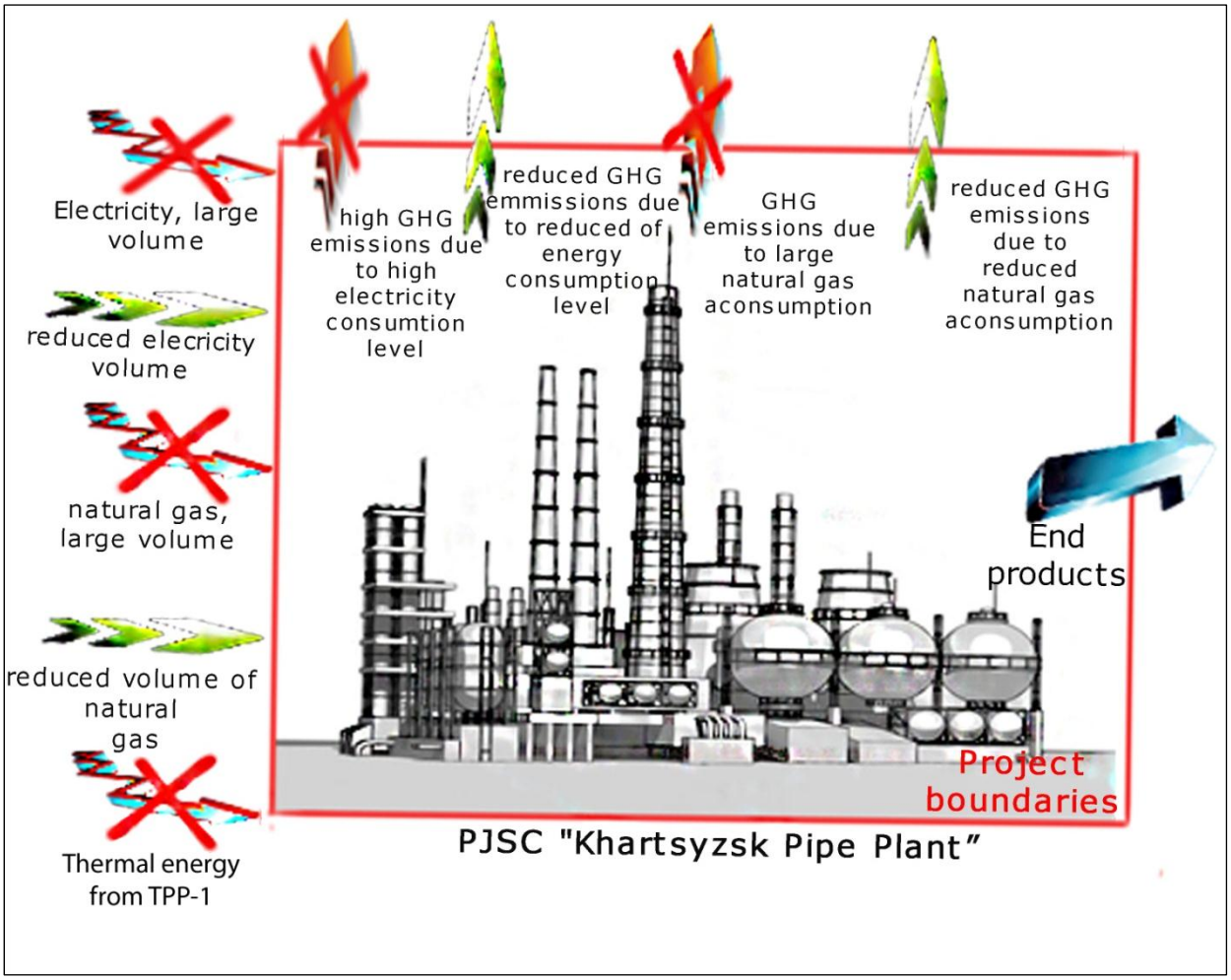

Figure 5. Project boundaries.

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: 20/09/2012

Name of person/entity setting the baseline:

PJSC "Khartsyzsk Pipe Plant", that is a project participant. Contact information:

Address: 86703, Donetsk region, Khartsyzsk city, Patona str., building 9
Phone: +38(06257) 5-95-01;
Fax: +38(06257) 4-56-95, +38(06257) 4-45-39
Zinchenko Yuriy Anatoliyovych
E-mail: Yuriy.Zinchenko@ukrpipe.com.ua
Title: Director

SECTION C. Duration of the project / crediting period

C.1. Starting date of the project:

Starting date of the project is March 17, 2002. This is the date of creation and the beginning of work of the Commission for Energy Saving, main aim of which is identifying and further maximum optimization of the most significant energy consumption in the production

C.2. Expected operational lifetime of the project:

The expected lifetime of the project is estimated to last until the end of 2028. Thus, the operational lifetime of the project will be 25 years or 300 months.

C.3. Length of the crediting period:

Start of the first crediting period: 01/01/2008.
End of the crediting period: 31/12/2028.

Length of the first crediting period under the project: 5 years or 60 months (01/01/2008-31/12/2012).

Length of the crediting period before the first commitment period under the Kyoto Protocol: 4 years or 48 months (01/01/2004-31/12/2007).

Length of the part of crediting period within the first commitment period of the Kyoto Protocol: 16 years or 192 months (01/01/2013-31/12/2028).

SECTION D. Monitoring plan

D.1. Description of monitoring plan chosen:

This monitoring plan is established in accordance with appendix B of the JI guidelines and further Guidance on Baseline Setting and Monitoring, Version 03, and Guidelines for Users of the JI PDD Form, Version 04.

The description of the monitoring plan chosen is provided using the following step-wise approach

Step 1. Indication and description of the approach chosen regarding monitoring

Option *a* provided by the Guidelines for the Users of the Joint Implementation Project Design Document Form, Version 04[10] is applied: JI specific approach is used for the monitoring plan.

Step 2. Application of the approach chosen

Baseline scenario

The baseline scenario of the proposed project is a continuation of the existing pre-project situation. Specific consumption of electric power and natural gas by PJSC "Khartsyzsk Pipe Plant" would remain at the pre-project level.

In the baseline scenario the emission sources within the project boundaries are:

- CO_2 emissions due to heat production by the natural gas fired boilers at TPP-1 of Khartsyzsk;
- CO_2 emissions due to electricity consumption generated by power plants connected to the United Energy System of Ukraine;
- CO_2 emissions due to consumption of electricity.

Project scenario

- Owing to the implemented energy saving measures at PJSC "Khartsyzsk Pipe Plant", the reduction of specific energy consumption per unit of output.

In the project scenario the sources of emissions are:

- CO_2 emissions due to electricity consumption generated by power plants connected to the United Energy System of Ukraine;

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

- CO_2 emissions due to consumption of electricity.

Emission reductions occur by decreasing of the specific energy and natural gas consumption for production at PJSC "Khartsyzsk Pipe Plant".

Data collection and calculations procedure

To calculate the amount of GHG emissions of the project (in baseline and project scenarios) the data of internal standard reporting, which are collected and processed independently from the JI project for commercial purposes of business activity, using the rules and procedures for collecting, processing and carrying out cross-checks will be used, and recorded in the "Report on rests and use of energy materials and products of petroleum" (form #4 MTP) and "Report on the use of fuel, heat and electricity energy" (form #11-MTP). This approach meets good practice of monitoring plans development. On the basis of this documentation JI project consultant-worker of PJSC "Khartsyzsk Pipe Plant" will prepare Monitoring reports. Originals of the used reports-data sources will be available for verification during site visits of accredited independent entity at the request of its representative.

Data and parameters that are not monitored throughout the crediting period, but are determined only once and thus remain fixed throughout the crediting period are listed in the table below and in Annex 2 "Baseline information".

Table 11. List of fixed values used to emissions calculations

Parameter	***Unit***	***Description***	***Source of data***	***Value***
$TE_{NG,BL}$	GJ	Baseline heat consumption, produced at TPP-1 of Khartsyzsk	Annex 2 to this PDD.	**372571**
η_{BL}	ratio	Boilers efficiency at TPP-1 Khartsyzsk	Default value in accordance with "Tool to determine the baseline efficiency of thermal or electric energy generation systems"	**0.870**
SEC_{BL}	MWh/t	Baseline specific electricity consumption for pipe production	Annex 2 to this PDD.	**0.298**
$SFC_{NG,BL}$	1000 m^3/t	Baseline specific natural gas combustion for pipe production	Annex 2 to this PDD.	**0.021**

Measuring devices, data processing and archiving

According to the applied approach for monitoring, the following parameters are to be measured: energy and natural gas consumption. Energy consumption is measured using special meters of commercial accounting of electricity in the input at MSS-1 (Main Step-down Substation-1) and MSS-2 (Main Step-down Substation-2). The data are cross-checked with the figures provided by electricity supplier. Agreed values are entered into the reports on electricity consumption to be used for preparing "Report on the use of fuel, heat and electricity energy" (form #11-MTP), based on the data of which monitoring reports will be created. Meters are regularly calibrated in accordance with their specifications and requirements of manufacturer.

Natural gas consumption is measured using special meters of commercial accounting of natural gas in the input #1 and # 2, and also in the inputs of the hotel "Trubnyk" and station "Inzhenerna" (Miniboiler house #15). Received data are cross-checked with the figures provided by natural gas supplier. Agreed values are entered into the reports on natural gas consumption to be used for preparing "Report on rests and use of energy materials and products of petroleum" (form #4 MTP), based on the data of which monitoring reports will be created. Meters are regularly calibrated in accordance with their specifications and requirements of manufacturer.

In cases if any errors, fraud or inconsistencies will be identified during the monitoring process special commission will be appointed by project host management that will conduct a review of such case and issue an order that must also include provisions for necessary corrective actions to be implemented that will ensure such situations are avoided in future.

Production reports, reports on energy and natural gas consumption, Reports under the forms #4-MTP and #11-MTP and other documents required for determination and verification, and any other data relevant to the operation of the project will be kept at least two years after the last transfer of ERUs. If the expected data for monitoring electricity and natural gas consumption is not available, specific values for the previous period will be used to calculate the level of electricity consumption for the period of missing data. This is conservative.

Training of monitoring personnel

Activities that are directly related to the monitoring do not require specific knowledge and skills other than provided in the job descriptions of personnel involved into the monitoring. At the enterprise periodic health and safety training are carried out. Control over the performance of the rules, detection and correction of violations is assigned to the heads of departments. Thus, the personnel, responsible for monitoring, receive appropriate training on procedures and requirements for monitoring. JI projects consultant will provide consultations on the Kyoto Protocol, JI projects and monitoring.

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

Section is left blank on purpose.

D.1.1.1. Data to be collected in order to monitor emissions from the project, and how these data will be archived:								
ID number *(Please use numbers to ease cross-referencing to D.2.)*	Data variable	Source of data	Data unit	Measured (m), calculated (c), estimated (e)	Recording frequency	Proportion of data to be monitored	How will the data be archived? (electronic/ paper)	Comment
P-1	$EC_{PJ,y}$ Project electricity consumption for pipe production	Data of the plant	MWh	m	continuously with monthly totals	100%	Electronic and paper	-
P-2	$FC_{NG,PJ,y}$ Project natural gas consumption for pipe production	Data of the plant	1000 m^3	m	continuously with monthly totals	100%	Electronic and paper	-
P-3	$EF_{CO2,EL,y}$ Indirect specific carbon dioxide emissions in the period of consumption of electricity by consumers which are classified as 2nd class	Orders of the Ukrainian DFP	tCO_2/ MWh	c	as provided by Orders of the Ukrainian DFP	100%	Electronic and paper	-

	according to the procedure for determining the classes of consumers, approved by the National Electricity Regulatory Commission of Ukraine from August 13, 1998 # 1052							
P-4	$C_{NG,y}$ carbon content of natural gas	National Inventory Report in Ukraine (value for other industries and construction)	tC/TJ	e	Actual data submitted by DFP of Ukraine on the annual basis	100%	Electronic and paper	Latest available country-specific data
P-5	$NCV_{NG,y}$ net calorific value of natural gas	National Inventory Report in Ukraine (value for other industries and construction)	GJ/1000 m^3	e	Actual data submitted by DFP of Ukraine on the annual basis	100%	Electronic and paper	Latest available country-specific data
P-6	$OXID_{NG,y}$ oxidation factor of natural gas	National Inventory Report in Ukraine (value for other industries and construction)	ratio	e	Actual data submitted by DFP of Ukraine on the annual basis	100%	Electronic and paper	Latest available country-specific data

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

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

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

Calculation formulae for determining the amount after the project implementation:

$$PE_y = PE_{EC,y} + PE_{NG,y}, \quad \text{(Formula 1)}$$

where:

$PE_{EC,y}$ Project CO_2 emissions attributable to the electricity consumption in period y, tCO_2;

$PE_{NG,y}$ Project carbon dioxide emissions due to natural gas combustion in the period y, tCO_2;

Project CO_2 emissions for electricity consumption are calculated as follows:

$$PE_{EC,y} = EF_{CO2,EL,y} \times EC_{PJ,y}, \quad \text{(Formula 2)}$$

where:

$EF_{CO2,EL,y}$ Indirect specific carbon dioxide emissions in the period of consumption of electricity by consumers which are classified as 1st class according to the procedure for determining the classes of consumers, approved by the National Electricity Regulatory Commission of Ukraine from August 13, 1998 # 1052, tCO_2/MWh [Parameter P-4];

$EC_{PJ,y}$ Project electricity consumption for pipe production in the period y, MWh [Parameter P-1].

Project carbon dioxide emissions due to natural gas combustion are calculated as follows:

$$PE_{NG,y} = EF_{CO2,NG,y} \times FC_{NG,PJ,y}, \quad \text{(Formula 3)}$$

where:

$EF_{CO2,NG,y}$ Carbon dioxide emission factor for natural gas combustion, $tCO_2/1000\ m^3$.

$FC_{NG,PJ,y}$ Project natural gas consumption for pipe production in the period y, 1000 m^3 [Parameter P-2].

$$EF_{CO2,NG,y} = \frac{(C_{NG,y} \times NCV_{NG,y} \times OXID_{NG,y} \times 44/12)}{1000} \quad \text{(Formula 4)}$$

where:

$EF_{CO2,NG,y}$ carbon dioxide emission factor for natural gas combustion (in year y), $tCO_2/1000\ m^3$;

$C_{NG,y}$ carbon content of natural gas (in the year y), tC/TJ [Parameter P-5];

$NCV_{NG,y}$ net calorific value of natural gas (in the year y), GJ/1000 m^3 [Parameter P-6];

$OXID_{NG,y}$ carbon oxidation factor for natural gas combustion (in the year y), ratio [Parameter P-7];

44/12 carbon dioxide/carbon molecular weight ratio reflecting carbon dioxide emissions as a result of carbon oxidation;

1000 unit conversion.

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

ID number *(Please use numbers to ease cross-referencing to D.2.)*	Data variable	Source of data	Data unit	Measured (m), calculated (c), estimated (e)	Recording frequency	Proportion of data to be monitored	How will the data be archived? (electronic/ paper)	Comment
B-1	P_y Pipe production	Data of the plant	t	m	continuously with monthly totals	100%	Electronic and paper	-

B-2	$EF_{CO2,EL,y}$ Indirect specific carbon dioxide emissions in the period of consumption of electricity by consumers which are classified as 2nd class according to the procedure for determining the classes of consumers, approved by the National Electricity Regulatory Commission of Ukraine from August 13, 1998 # 1052	Orders of the Ukrainian DFP	tCO_2/ MWh	c	as provided by Orders of the Ukrainian DFP	100%	Electronic and paper	-
B-3	$C_{NG,y}$ carbon content of natural gas	National Inventory Report in Ukraine (value for other industries and construction)	tC/TJ	e	Actual data submitted by DFP of Ukraine on the annual basis	100%	Electronic and paper	Latest available country-specific data
B-4	$NCV_{NG,y}$ net calorific value of natural gas	National Inventory Report in Ukraine (value for other industries and construction)	GJ/1000 m^3	e	Actual data submitted by DFP of Ukraine on the annual basis	100%	Electronic and paper	Latest available country-specific data

B-5	$OXID_{NG,y}$ carbon oxidation factor for natural gas combustion	National Inventory Report in Ukraine (value for other industries and construction)	ratio	e	Actual data submitted by DFP of Ukraine on the annual basis	100%	Electronic and paper	Latest available country-specific data

The table above provides data and parameters to 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):

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

Baseline emissions are calculated as follows:

$$BE_y = BE_{TE,y} + BE_{EC,y} + BE_{NG,y}, \quad \text{(Formula 7)}$$

where:

$BE_{TE,y}$ Baseline CO_2 emissions attributable to heat consumption, produced at TPP-1 of Khartsyzsk in the period y, tCO_2;

$BE_{EC,y}$ Baseline CO_2 emissions attributable to the electricity consumption in the period y, tCO_2;

$BE_{NG,y}$ Baseline carbon dioxide emissions due to natural gas combustion in the period y, tCO_2;

Baseline carbon dioxide emissions due to heat consumption, produced at TPP-1 of Khartsyzsk are calculated as follows:

$$BE_{TE,y} = EF_{CO2,NG,y} \times \left(\frac{TE_{NG,BL}}{\eta_{BL} \times NCV_{NG,y}} \right), \quad \text{(Formula 6)}$$

where:

$EF_{CO2,NG,y}$ Carbon dioxide emission factor for natural gas combustion, $tCO_2/1000\ m^3$;

$TE_{NG,BL}$ Baseline heat consumption, produced at TPP-1 of Khartsyzsk, GJ [Value is given in Table 11];

η_{BL} Boilers efficiency at TPP-1 Khartsyzsk, ratio [Value is given in Table 11];

$NCV_{NG,y}$ net calorific value of natural gas (in the year y), $GJ/1000\ m^3$ [Parameter B-4].

Baseline carbon dioxide emissions due to consumption of electricity are calculated as follows:

$$BE_{EC,y} = EF_{CO2,EL,y} \times P_y \times SEC_{BL}, \quad \text{(Formula 7)}$$

where:

$EF_{CO2,EL,y}$ Indirect specific carbon dioxide emissions in the period of consumption of electricity by consumers which are classified as 1st class according to the procedure for determining the classes of consumers, approved by the National Electricity Regulatory Commission of Ukraine from August 13, 1998 # 1052, tCO_2/MWh [Parameter B-2];

P_y Pipe production in the period *y*, t [Parameter B-1];

SEC_{BL} Baseline specific electricity consumption for pipe production, MWh/t [Value is given in Table 11].

Baseline carbon dioxide emissions due to natural gas combustion are calculated as follows:

$$BE_{NG,y} = EF_{CO2,NG,y} \times P_y \times SFC_{NG,BL}, \quad \text{(Formula 8)}$$

where:

$EF_{CO2,NG,y}$ Carbon dioxide emission factor for natural gas combustion, $tCO_2/1000\ m^3$;

P_y Pipe production in the period *y*, t [Parameter B-1];

$SFC_{NG,BL}$ Baseline specific natural gas combustion for pipe production, $1000\ m^3/t$ [Value is given in Table 11].

$$EF_{CO2,NG,y} = \frac{(C_{NG,y} \times NCV_{NG,y} \times OXID_{NG,y} \times 44/12)}{1000} \quad \text{(Formula 9)}$$

where:

$EF_{CO2,NG,y}$ carbon dioxide emission factor for natural gas consumption (in the year y), $tCO_2/1000\ m^3$;
$C_{NG,y}$ carbon content of natural gas (in the year y), tC/TJ [Parameter B-3];
$NCV_{NG,y}$ net calorific value of natural gas (in the year y), $GJ/1000\ m^3$ [Parameter B-4];
$OXID_{NG,y}$ carbon oxidation factor for natural gas combustion (in the year y), ratio [Parameter B-5];
44/12 carbon dioxide/carbon molecular weight ratio reflecting carbon dioxide emissions as a result of carbon oxidation;
1000 unit conversion.

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:

No leakage emissions are expected after the project implementation.

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
-	-	-	-	-	-	-	-	-

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

Leakage in year *y* is calculated as follows:

$$LE_y = 0, \quad \text{(Formula 10)}$$

where:

LE_y Leakage due to the project realization in period *y*, tCO_2e.

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):

Metric ton of carbon dioxide equivalent is a metric ton of carbon dioxide. That is, 1 ton of CO_2e = 1 ton of CO_2.

The annual emission reductions are calculated as follows:

$$ER_y = BE_y - LE_y - PE_y \quad \text{(Formula 11)}$$

where:

ER_y Emission reduction under JI project in period *y*, tCO_2e;

LE_y Leakage due to the project realization in period *y*, tCO_2e;

BE_y Baseline emissions in period *y*, tCO_2e;

PE_y Project emissions in period *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 (refer to Section F.1).

D.2. Quality control (QC) and quality assurance (QA) procedures undertaken for data monitored:		
Data *(Indicate table and ID number)*	Uncertainty level of data (high/medium/low)	Explain QA/QC procedures planned for these data, or why such procedures are not necessary.
D.1.1.1. – ID P-1 $EC_{PJ,y}$	Low	Parameter is determined according to internal accounting procedures by using special energy meters of commercial account. Calibration interval of such meters is 6 years. More detailed information will be provided in the Monitoring report.
D.1.1.1. – ID P-2 $FC_{NG,PJ,y}$	Low	Parameter is determined according to internal accounting procedures by using special gas meters of commercial account. Calibration interval of such meters is 2 years. More detailed information will be provided in the Monitoring report.
D.1.1.3. – ID B-1 P_y	Low	Parameter is determined according to internal accounting procedures by using special meters. Calibration interval of such meters is 1 year. More detailed information will be provided in the Monitoring report.
D.1.1.1. – ID P-4 D.1.1.3. – ID B-2 $EF_{CO2,EL,y}$	Low	This is an index calculated by the Ukrainian DFP on the basis of the latest best available data on emissions for electricity consumption by the companies of the United Energy Systems of Ukraine. Application of any additional QA/QC procedures is not required.
D.1.1.1. ID P-4 - ID P-6 D.1.1.3. ID B-3- ID B-5 $C_{NG,y}$ $NCV_{NG,y}$ $OXID_{NG,y}$	Low	Parameters are used, calculated in National Inventory Report in Ukraine based on the latest best available data. Application of any additional QA/QC procedures is not required.

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

The owner of the project, which will implement the provisions of the monitoring plan into the structure of organization and quality management, is PJSC "Khartsyzsk Pipe Plant". Management headed by its Director will be responsible for performance monitoring, data collection, registration, visualization, archiving of monitoring data, and periodic inspection of measuring instruments. Detailed structure of responsible person's interaction will be provided in the Monitoring Report to the initial and the first verification. The following block diagram demonstrates principal scheme of data flow.

Since the monitoring plan does not provide any input of specific data collection procedures, and reduction of greenhouse gas emissions will be calculated using the standardized reporting data, specifically "Report on rests and use of energy materials and products of petroleum" (form #4 MTP) and "Report on the use of fuel, heat and electricity energy" (form #11-MTP). On the basis of this documentation JI project consultant-worker of PJSC "Khartsyzsk Pipe Plant" will prepare Monitoring Reports.

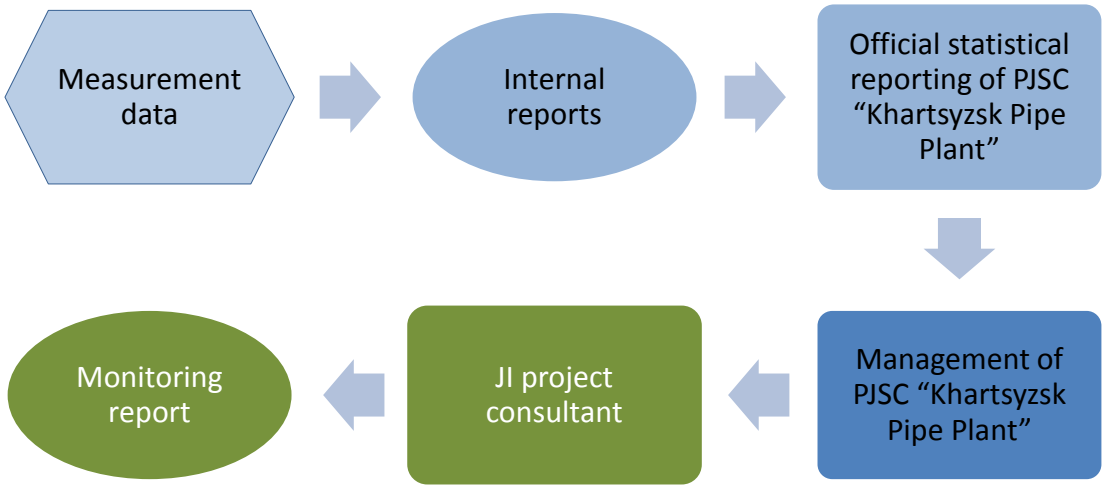

Figure 6. Monitoring flow chart.

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

Monitoring plan is developed by PJSC "Khartsyzsk Pipe Plant", that is a project participant. Contact information:

Address: 86703, Donetsk region, Khartsyzsk city, Patona str., building 9
Phone: +38(06257) 5-95-01;
Fax: +38(06257) 4-56-95, +38(06257) 4-45-39
Zinchenko Yuriy Anatoliyovych
E-mail: Yuriy.Zinchenko@ukrpipe.com.ua
Title: Director
Monitoring plan shall be implemented PJSC "Khartsyzsk Pipe Plant", that is a project participant.

SECTION E. Estimation of greenhouse gas emission reductions

E.1. Estimated project emissions:

Table 12. Estimated project emissions before the first crediting period

	Units	2004	2005	2006	2007	Total
Project emissions for electricity consumption	tCO_2e	65 417	70 107	77 009	66 417	**278 950**
Project emissions for natural gas	tCO_2e	18 531	20 931	22 223	19 499	**81 184**
Total project emissions before the first crediting period	tCO_2e	**83 948**	**91 038**	**99 232**	**85 916**	**360 134**

Table 13. Estimated project emissions during the first crediting period.

	Units	2008	2009	2010	2011	2012	Total
Project emissions for electricity consumption	tCO_2e	82 220	102 378	67 407	105 006	105 006	**462 017**
Project emissions for natural gas	tCO_2e	18 181	18 210	11 595	15 216	15 216	**78 418**
Total project emissions during the first crediting period	**tCO_2e**	**100 401**	**120 588**	**79 002**	**120 222**	**120 222**	**540 435**

Table 14. Estimated project emissions after the first crediting period (2013-2028).

	Units	Per year	Total
Project emissions for electricity consumption	tCO_2e	105 006	**1 680 096**
Project emissions for natural gas	tCO_2e	15 216	**243 456**
Total project emissions after the first crediting period	**tCO_2e**	**120 222**	**1 923 552**

E.2. Estimated leakage:

Table 15. Estimated leakage before the first crediting period

	Units	2004	2005	2006	2007	Total
Estimated leakage before the first crediting period	**tCO_2e**	**0**	**0**	**0**	**0**	**0**

Table 16. Estimated leakage during the first crediting period

	Units	2008	2009	2010	2011	2012	Total
Estimated leakage during the first crediting period	**tCO_2e**	**0**	**0**	**0**	**0**	**0**	**0**

Table 17. Estimated leakage after the first crediting period (2013-2028)

	Units	Per year	Total
Estimated leakage after the first crediting period	**tCO_2e**	**0**	**0**

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

Table 18. Estimated total project emissions before the first crediting period

	Units	2004	2005	2006	2007	Total
Total project emissions before the first crediting period	**tCO_2e**	**83 948**	**91 038**	**99 232**	**85 916**	**360 134**

Table 19. Estimated total project emissions during the first crediting period

	Units	2008	2009	2010	2011	2012	Total
Total project emissions during the first crediting period	**tCO_2e**	**100 401**	**120 588**	**79 002**	**120 222**	**120 222**	**540 435**

Table 20. Estimated total project emissions after the first crediting period (2013-2028)

	Units	Per year	Total
Total project emissions after the first crediting period	**tCO_2e**	**120 222**	**1 923 552**

E.4. Estimated baseline emissions:

Table 21. Estimated total baseline emissions before the first crediting period

	Units	2004	2005	2006	2007	Total
Baseline emissions for TPP-1 heat consumption	tCO_2e	23 701	23 701	23 701	23 701	**94 804**
Baseline emissions for electricity consumption	tCO_2e	122 235	145 315	159 146	135 790	**562 486**
Baseline emissions for natural gas consumption	tCO_2e	17 656	21 458	23 500	20 051	**82 665**
Total baseline emissions before the first crediting period	**tCO_2e**	**163 592**	**190 474**	**206 347**	**179 542**	**739 955**

Table 22. Estimated total baseline emissions during the first crediting period

	Units	2008	2009	2010	2011	2012	Total
Baseline emissions for TPP-1 heat consumption	tCO_2e	23 701	23 701	23 701	23 701	23 701	**118 505**
Baseline emissions for electricity consumption	tCO_2e	124 929	170 740	100 489	204 572	204 572	**805 302**
Baseline emissions for natural gas consumption	tCO_2e	15 276	20 652	12 164	24 832	24 832	**97 756**
Total baseline emissions during the first crediting period	**tCO_2e**	**163 906**	**215 093**	**136 354**	**253 105**	**253 105**	**1 021 563**

Table 23. Estimated total baseline emissions after the first crediting period (2013-2028)

	Units	Per year	Total
Baseline emissions for TPP-1 heat consumption	tCO_2e	23 701	**379 216**
Baseline emissions for electricity consumption	tCO_2e	204 572	**3 273 152**
Baseline emissions for natural gas consumption	tCO_2e	24 832	**397 312**
Total baseline emissions after the first crediting period	**tCO_2e**	**229 404**	**3 670 464**

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

Table 24. Estimated emission reductions before the first crediting period

	Units	2004	2005	2006	2007	Total
Emission reductions before the first crediting period	**tCO_2e**	**54 702**	**75 735**	**83 414**	**69 925**	**283 776**

Table 25. Estimated emission reductions during the first crediting period

	Units	2008	2009	2010	2011	2012	Total
Emission reductions during the first crediting period	**tCO_2e**	**39 804**	**70 804**	**33 651**	**109 182**	**109 182**	**362 623**

Table 26. Estimated emission reductions after the first crediting period (2013-2028)

	Units	Per year	Total
Total emission reductions after the first crediting period	**tCO_2e**	**109 182**	**1 746 912**

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

Table 27. Estimated balance of emissions under the proposed project before the first crediting period

Year	Estimated project emissions (tonnes of CO_2 equivalent)	Estimated leakage (tonnes of CO_2 equivalent)	Estimated baseline emissions (tonnes of CO_2 equivalent)	Estimated emission reductions (tonnes of CO_2 equivalent)
Year 2004	83 948	0	163 592	79 644
Year 2005	91 038	0	190 474	99 436
Year 2006	99 232	0	206 347	107 115
Year 2007	85 916	0	179 542	93 626
Total (tonnes of CO_2 equivalent)	**360 134**	**0**	**739 955**	**379 821**

Table 28. Estimated balance of emissions under the proposed project during the first crediting period

Year	Estimated project emissions (tonnes of CO_2 equivalent)	Estimated leakage (tonnes of CO_2 equivalent)	Estimated baseline emissions (tonnes of CO_2 equivalent)	Estimated emission reductions (tonnes of CO_2 equivalent)
Year 2008	100 401	0	163 906	63 505
Year 2009	120 588	0	215 093	94 505
Year 2010	79 002	0	136 354	57 352
Year 2011	120 222	0	253 105	132 883
Year 2012	120 222	0	253 105	132 883
Total (tonnes of CO_2 equivalent)	**540 435**	**0**	**1 021 563**	**481 128**

Table 29. Estimated balance of emissions under the proposed project after the first crediting period

Year	Estimated project emissions (tonnes of CO_2 equivalent)	Estimated leakage (tonnes of CO_2 equivalent)	Estimated baseline emissions (tonnes of CO_2 equivalent)	Estimated emission reductions (tonnes of CO_2 equivalent)
Year 2013	120 222	0	253 105	132 883
Year 2014	120 222	0	253 105	132 883
Year 2015	120 222	0	253 105	132 883
Year 2016	120 222	0	253 105	132 883
Year 2017	120 222	0	253 105	132 883
Year 2018	120 222	0	253 105	132 883
Year 2019	120 222	0	253 105	132 883
Year 2020	120 222	0	253 105	132 883
Year 2021	120 222	0	253 105	132 883
Year 2022	120 222	0	253 105	132 883
Year 2023	120 222	0	253 105	132 883
Year 2024	120 222	0	253 105	132 883
Year 2025	120 222	0	253 105	132 883
Year 2026	120 222	0	253 105	132 883
Year 2027	120 222	0	253 105	132 883
Year 2028	120 222	0	253 105	132 883
Total (tonnes of CO_2 equivalent)	**1 923 552**	**0**	**4 049 680**	**2 126 128**

SECTION F. Environmental impacts

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

The Host Party for this project is Ukraine. Environmental Impact Assessment (EIA) is the part of the Ukrainian project planning and permitting procedures. Implementation regulations for EIA are included in the Ukrainian State Construction Standard DBN A.2.2.-1-2003[11] (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 related to the construction and work of metallurgical industries, is included in this list.

The full scope EIA in accordance with the Ukrainian legislation has been conducted for PJSC "Khartsyzsk Pipe Plant".

In general, the environmental impact of the project activity implementation is positive. Reducing of electricity consumption has an indirect positive impact on the environment through reduction of greenhouse gases and other products of fuel combustion at thermal power plants. Reducing the consumption of fossil fuels (natural gas) leads to the reduction of products of their combustion into the atmosphere; as well as indirectly to elimination of negative environmental impacts during their extraction and transportation by reducing the demand for them.

Implementation of the project activity also has a positive social impact through reducing overall emissions of pollutants into the air and improving working conditions at the factory.

No transboundary effects are identified. Impacts that occur in any other country, and caused by the implementation of this project physically located entirely within Ukraine, were not identified.

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:

Completion of Environmental Impact Assessment reports and positive Findings of the State Authority of Environment and Natural Resources conclude the procedure of the environmental impact assessment according to the Ukrainian laws and regulations. PJSC "Khartsyzsk Pipe Plant" has required a working design documentation, which includes the volume of EIA, which passed environmental review and was approved by the Ministry of Environment and Natural Resources of Ukraine or by its regional department. This documentation is available on request of AIE or during visits to the company.

[11] *State Construction Standard DBN A.2.2.-1-2003: "Structure and Contents of the Environmental Impact Assessment Report (EIR) for Designing and Construction of Production Facilities, Buildings and Structures"* State Committee Of Ukraine On Construction And Architecture, 2004

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.

The public was informed on plans for reconstruction and equipment replacement by posting information on the company website[12]. As an example of such publications is the material on reconstruction of ceiling lighting[13], etc. Informing of stakeholders was conducted as a part of mandatory publication of Statement on impact in the local media in accordance with the procedure of preparation and examination of the EIA approved by *the State Construction Standard DBN A.2.2.-1-2003: "Structure and Contents of the Environmental Impact Assessment Report (EIR) for Designing and Construction of Production Facilities, Buildings and Structures"* State Committee Of Ukraine On Construction And Architecture, 2004i.

[12] http://pipe.metinvestholding.com/ua/press/news/2

[13] http://pipe.metinvestholding.com/ua/press/news/show/1832

Annex 1

CONTACT INFORMATION ON PROJECT PARTICIPANTS

Project owner:

Organization:	Public Joint Stock Company "Khartsyzsk Pipe Plant"
Street/P.O.Box:	Patona str.
Building:	9
City:	Khartsyzsk
State/Region:	Donetsk
Postal code:	86703
Country:	Ukraine
Phone:	+38(06257) 5-95-01
Fax:	+38(06257) 4-56-95, +38(06257) 4-45-39
E-mail:	Yuriy.Zinchenko@ukrpipe.com.ua
URL:	http://pipe.metinvestholding.com/ua
EDRPOU Code (Code in the State Unified Register of Companies and Enterprises of Ukraine):	00191135
KVED[14] types of economic activities:	27.22.0 Production of steel pipes and pipe fittings 28.52.0 General mechanic operations 45.21.1 Building construction 74.20.1 Engineering activity 88.22.0 Technical education 85.12.0 Medical practice
Represented by:	
Title:	Director
Salutation:	-
Last name:	Zinchenko
Middle name:	Anatoliyovych
First name:	Yuriy
Department:	-
Phone (direct):	+38(06257) 5-95-01
Fax (direct):	+38(06257) 4-56-95, +38(06257) 4-45-39
Mobile:	-
Personal e-mail:	Yuriy.Zinchenko@ukrpipe.com.ua

[14]Specified types of activity in accordance with Classification of Economic Activities DK 009-2005, valid until 31/12/2012 under the Decree of the State Committee of Ukraine for Technical Regulation and Consumer Policy #457 of 11/10/2010. Available at the reference: http://zakon.nau.ua/doc/?code=v0457609-10. Latest access 19/04/2012.

Organisation:	Metinvest International SA
Street/P.O.Box:	rue Vallin
Building:	2
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State/Region:	
Postal code:	1201
Country:	Switzerland
Phone:	+41 22 906 18 28
Fax:	+41 22 906 18 29
E-mail:	info@metinvestholding.com
URL:	http://sales.metinvestholding.com/en/contacts/misa
Represented by:	
Title:	General director
Salutation:	Mr.
Last Name:	Maksymovych
Middle Name:	
First Name:	Marian
Department:	
Phone (direct):	+41 22 906 18 28
Fax (direct):	+41 22 906 18 29
Mobile:	
Personal e-mail:	info@metinvestholding.com

Annex 2

BASELINE INFORMATION

In this project as a baseline was taken the situation in which PJSC "Khartsyzsk Pipe Plant" would not take any systematic actions in order to increase efficiency of energy consumption and cutting energy losses, and would continue using existing equipment, its operation practices and procedures for energy consumption control. This approach is based on availability and resource of existing equipment, reliability and efficiency of energy management practices in use.

The baseline scenario assumed continuation of the continuation of the practice that existed at the enterprise before the project implementation. This scenario does not require changes in the process of enterprise, any investment and does not face barriers. Under the conditions of difficult economic situation of the enterprise at the time of decision making about the project, realization of this scenario would be the most probable.

In accordance with Article 9 "Guidance on criteria for baseline setting and monitoring"[15] adopted by the Joint Implementation Supervisory Committee, project participants may establish methodology for calculating greenhouse gas emissions in the baseline scenario for a specific project in accordance with Appendix B of "JI Guidance"[16] (Decision 9/CMP.1 of the Conference of the Parties Meeting of the Parties is the Kyoto Protocol, 30 March 2006). The approach used in this project is a JI specific approach.

In the cases when the enterprise continues using existing equipment in the baseline scenario for the purposes of baseline greenhouse gases emissions estimation of baseline specific energy consumption per unit of pipes produced is determined. Then baseline specific energy consumption is multiplied by actual pipe production data.

Method of calculating emissions and emissions reductions below is presented in metric tons of carbon dioxide equivalent (tCO_2e). Metric ton of carbon dioxide equivalent is a metric ton of carbon dioxide. That is, 1 tonne of CO_2e = 1 tonne of CO_2. Values for all emission factors used for the calculation are listed in Table 1.

Baseline emissions are calculated as follows:

$$BE_y = BE_{TE,y} + BE_{EC,y} + BE_{NG,y}, \qquad \text{(Formula B.1)}$$

where:

$BE_{TE,y}$ Baseline CO_2 emissions attributable to heat consumption, produced at TPP-1 of Khartsyzsk in the period y, tCO_2;

$BE_{EC,y}$ Baseline CO_2 emissions attributable to the electricity consumption in the period y, tCO_2;

$BE_{NG,y}$ Baseline carbon dioxide emissions due to natural gas combustion in the period y, tCO_2;

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

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

Baseline carbon dioxide emissions due to heat consumption, produced at TPP-1 of Khartsyzsk are calculated as follows:

$$BE_{TE,y} = EF_{CO2,NG,y} \times \left(\frac{TE_{NG,BL}}{\eta_{BL} \times NCV_{NG,y}} \right), \quad \text{(Formula B.2)}$$

where:

$EF_{CO2,NG,y}$ Carbon dioxide emission factor for natural gas combustion, $tCO_2/1000\ m^3$;

$TE_{NG,BL}$ Baseline heat consumption, produced at TPP-1 of Khartsyzsk, GJ ;

η_{BL} Boilers efficiency at TPP-1 Khartsyzsk, ratio;

$NCV_{NG,y}$ net calorific value of natural gas (in the year y), $GJ/1000\ m^3$.

$$TE_{NG,BL} = TE_{NG,BL,m}, \quad \text{(Formula B.3)}$$

$TE_{NG,BL,m}$ Baseline heat consumption, produced at TPP-1 of Khartsyzsk in baseline year *m*, GJ;

m 2002 was taken as baseline year since it is the last operation year before the decision about the project implementation was made for which the data are available.

$$BE_{EC,y} = EF_{CO2,EL,y} \times P_y \times SEC_{BL}, \quad \text{(Formula B.4)}$$

where:

$EF_{CO2,EL,y}$ Indirect specific carbon dioxide emissions in the period of consumption of electricity by consumers which are classified as 1st class according to the procedure for determining the classes of consumers, approved by the National Electricity Regulatory Commission of Ukraine from August 13, 1998 # 1052, tCO_2/MWh.

P_y Pipe production in the period *y*, t;

SEC_{BL} Baseline specific electricity consumption for pipe production, MWh/t.

$$SEC_{BL} = \frac{EC_{BL,m}}{P_m}, \quad \text{(Formula B.5)}$$

where:

$EC_{BL,m}$ Baseline electricity consumption for pipe production in the baseline year *m*, MWh.

P_m Pipe production in the baseline year *m*, t.

m 2002 was taken as baseline year since it is the last operation year before the decision about the project implementation was made for which the data are available.

Baseline carbon dioxide emissions due to natural gas combustion are calculated as follows:

$$BE_{NG,y} = EF_{CO2,NG,y} \times P_y \times SFC_{NG,BL}, \quad \text{(Formula B.6)}$$

where:

$EF_{CO2,NG,y}$ Carbon dioxide emission factor for natural gas combustion, $tCO_2/1000\ m^3$.

P_y Pipe production in the period *y*, t;

$SFC_{NG,BL}$ Baseline specific natural gas combustion for pipe production, $1000\ m^3/t$.

$$SFC_{NG,BL} = \frac{FC_{NG,BL,m}}{P_m}, \quad \text{(Formula B.7)}$$

where:

$FC_{NG,BL,m}$ Baseline natural gas combustion for pipe production in the baseline year *m*, $1000\ m^3$.

P_m Pipe production in the baseline year *m*, t.

m 2002 was taken as baseline year since it is the last operation year before the decision about the project implementation was made for which the data are available.

Table 30. Baseline specific energy consumption for pipe production

Parameter	***Unit***	***Description***	***Source of data***	***Value***
$TE_{NG,BL}$	GJ	Baseline heat consumption, produced at TPP-1 of Khartsyzsk	Calculated by the formula B.3	**372571**
η_{BL}	ratio	Boilers efficiency at TPP-1 Khartsyzsk	Default value in accordance with "Tool to determine the baseline efficiency of thermal or electric energy generation systems"	**0.870**
SEC_{BL}	MWh/t	Baseline specific electricity consumption for pipe production	Calculated by the formula B.5	**0.298**
$SFC_{NG,BL}$	$1000\ m^3/t$	Baseline specific natural gas combustion for pipe production	Calculated by the formula B.7	**0.021**

Table 31. Country specific emission factors, where the project is implemented.

Emission factor	Units	Value	Source
Carbon dioxide emission factor for grid electricity consumption in 2004 рік	tCO_2/MWh	0.916	Operational Guidelines for Project Design Documents of Joint Implementation Projects, Volume 1: General guidelines (ERUPT)[17] Units conversion: $gCO_2/kWh = 0.001\ tCO_2/MWh$
Carbon dioxide emission factor for grid electricity consumption in 2005 рік	tCO_2/MWh	0.896	Operational Guidelines for Project Design Documents of Joint Implementation Projects, Volume 1: General guidelines (ERUPT) Units conversion: $gCO_2/kWh = 0.001\ tCO_2/MWh$
Carbon dioxide emission factor for grid electricity consumption in 2006 рік	tCO_2/MWh	0.896	"Ukraine - Assessment of new calculation of CEF"[18], determined by TUV SUD
Carbon dioxide emission factor for grid electricity consumption in 2007 рік	tCO_2/MWh	0.896	"Ukraine - Assessment of new calculation of CEF", determined by TUV SUD
Carbon dioxide emission factor for grid electricity consumption in 2008	tCO_2/MWh	1.0820	"Emission factor of specific indirect carbon dioxide emissions from electricity consumption by 1st class electricity consumers in accordance with Procedure for determining the class of consumers, adopted by Resolution of National Electricity Regulatory Commission of Ukraine on 13 of August 1998 #1052". Ukrainian National Environment Investment Agency Order No 62 from 15/04/2011[19] Units conversion: $kgCO_2/kWh = tCO_2/MWh$
Carbon dioxide emission factor for grid electricity consumption in 2009	tCO_2/MWh	1.0960	"Emission factor of specific indirect carbon dioxide emissions from electricity consumption by 1st class electricity consumers in accordance with Procedure for determining the class of consumers, adopted by Resolution of National Electricity Regulatory Commission of Ukraine on 13 of August 1998 #1052".

[17] http://ji.unfccc.int/CallForInputs/BaselineSettingMonitoring/ERUPT/index.html

[18] http://ji.unfccc.int/UserManagement/FileStorage/46JW2KL36KM0GEMI0PHDTQF6DVI514

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

			Ukrainian National Environment Investment Agency Order No 63 from 15/04/2011[20] Units conversion: $kgCO_2/kWh = tCO_2/MWh$
Carbon dioxide emission factor for grid electricity consumption in 2010	tCO_2/MWh	1.0930	"Emission factor of specific indirect carbon dioxide emissions from electricity consumption by 1st class electricity consumers in accordance with Procedure for determining the class of consumers, adopted by Resolution of National Electricity Regulatory Commission of Ukraine on 13 of August 1998 #1052". Ukrainian National Environment Investment Agency Order No 43 from 28/03/2011[21] Units conversion: $kgCO_2/kWh = tCO_2/MWh$
Carbon dioxide emission factor for grid electricity consumption in 2011	tCO_2/MWh	1.0900	"Emission factor of specific indirect carbon dioxide emissions from electricity consumption by 1st class electricity consumers in accordance with Procedure for determining the class of consumers, adopted by Resolution of National Electricity Regulatory Commission of Ukraine on 13 of August 1998 #1052". Ukrainian National Environment Investment Agency Order No 75 from 12/05/2011[22] Units conversion: $kgCO_2/kWh = tCO_2/MWh$

$$EF_{CO2,NG,y} = \frac{(C_{NG,y} \times NCV_{NG,y} \times OXID_{NG,y} \times 44/12)}{1000} \quad \text{(Formula B.6)}$$

where:

$EF_{CO2,NG,y}$ carbon dioxide emission factor for natural gas consumption (in the year y), $tCO_2/1000\ m^3$;

$C_{NG,y}$ carbon content of natural gas (in the year y), tC/TJ;

$NCV_{NG,y}$ net calorific value of natural gas (in the year y), $GJ/1000\ m^3$;

$OXID_{NG,y}$ carbon oxidation factor for natural gas combustion (in the year y), ratio;

44/12 carbon dioxide/carbon molecular weight ratio reflecting carbon dioxide emissions as a result of carbon oxidation;

1000 unit conversion.

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

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

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

Table 32. Parameters used for calculation of emission factors based on official statistics.

Parameter	Units	2008	2009	2010	Source
$C_{NG,y}$	tC/TJ	15.17	15.20	15.17	NIR 1990-2010, p. 458, 464, 470 Value for other industries and construction
$NCV_{NG,y}$	GJ/ 1000 m^3	34	34	34	NIR 1990-2010, p. 456, 462, 468 Value for other industries and construction
$OXID_{NG,y}$	ratio	0.995	0.995	0.995	NIR 1990-2010, p. 459, 465, 471 Value for other industries and construction

Annex 3

MONITORING PLAN

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

Annex 4

Information on the characteristics of the main technical parameters of the technology used in the project

#	Equipment	The main technical parameters of the technology used in the project
1.	**Compressor**	Models and types of compressor equipment: Samsung TurboMaster Model TM1250 Equipment capacity: 806.7 kW
2.	**Miniboiler houses**	Types of boilers: Vitogas-100, CPA-200, CPA-500, CPA-300, CPA-250, Protherm-50, CPA-700,CPA-300, CPA-700,CPA-350, CPA-250, CPA-500, HM150Jumbo, CPA-130, CPA-130, CPA-70, CPA-70, DOMIcompakt, Protherm-50, Protherm-50, THM-600 Capacities (kW): 96, 232, 580, 348, 290, 48, 812, 348, 812, 406, 290, 580, 144, 151, 151, 81, 81, 33, 48, 48,391, 96
3.	**Pumps**	Models and types of pumping equipment: **HALM** HUP40-11.0U250, **Grundfos** LP 50-125/132, **WILO** IL 32/150-2,2/2, **Grundfos** LP 65-125/128, **WILO** IL 32/140-1,5/2, **DAB** A 56/180 XM **Grundfos** LP 80-125/133, **WILO** IPN 50/250-2,2/4, **Grundfos** UPS 32-80-180, **DAB** BPH 180/280.40T, **DAB** BPH 180/280.50T, **Calpeda** NR 50 DE/2, **DAB** BPH 120/250.40T, **HALM** HUP 30-6.0U180, BUP 25-6.0U130, **ROCA** SC-80M, **ROCA** SC-65, **Calpeda** NR 50 DE/2T, **WILO** TOP-S 65/13, **DAB** BPH 150/280-50T, **Calpeda** VA 25/180, **Calpeda** NR 50 CE/2, **Grundfos** UPA 15-90-160, **Grundfos** UPS 15-60-130, **ROCA** MC-65, **ROCA** MC-80**,**, **Grundfos** LM 40-125/142, **WILO** TOP-S 25/7, **Grundfos** LM 40-125/142AF, **WILO**MV 1210, **WILO** IL 50/130-3/2 **Grundfos** TP 40-230/2 **Grundfos** LP 80-125/133 Capacity of pumping equipment: from 4 to 60 kW
4.	**Induction furnaces**	Models and types of furnaces: Induction furnace, type INDUCTION, RADYNE Equipment capacity: transformer INDUCTION 2872kVA, capacity: output capacities of furnace converters RADYNE – 996 kW; 1992 kW
5.	**Lighting lamps**	Models and types of lighting lamps: metal-halide lamps, LED spotlights LUXON PP-30, lamps Maxus, LED lamps DSP 05S-90-001, luminaires GSP-07V-150 with MHL, lamps Maxus.1-ESL-199-1.15W 2700K E27ZhKU-21-150, ELECRTUM ELM 2*36, HSP-07U-150 with MHL, ZhO-07U, Equipment capacity: from 36 W to 300 W