JOINT IMPLEMENTATION PROJECT

"Rehabilitation and technical re-equipment of Starobeshivska TPP of the OJSC "Donbasenergo"

(project title)

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

Director,
Institute of Engineering Ecology, Ltd.

(position)

(signature)

PS

Oleksandr I. Sigal

(name and patronymic, last name)

Position of the head of entity – owner of the source, where the Joint Implementation project is planned to be realized

General Director,
PJSC "Donbasenergo"

(position)

(signature)

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Kyiv, 2012

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

CONTENTS

Annexes

SECTION A. General description of the project

A.1. Title of the project:

"Rehabilitation and technical re-equipment of Starobeshivska TPP of the OJSC "Donbasenergo"

Sectoral scope 1: Energy industries (renewable / non-renewable sources).

PDD version: 07-1.

Dated: January 14, 2013

A.2. Description of the project:

The main goal of the project is the reduction of greenhouse gas emissions by reduction of fuel consumption due to rehabilitation and technical re-equipment of the power generating units and implementation of technically attainable measures for reduction of fuel consumption for electricity generation at the Starobeshivska thermal power plant (TPP). The purpose is the facilitation to sustainable development and improvement of ecological situation through implementation of energy saving technologies.

Since Starobeshivska TPP is not a legal entity, and is one of divisions of the Public Joint Stock Company (PJSC) "Donbasenergo" (till 12/04/2011 – OJSC "Donbasenergo"), thus the owner of emission source is PJSC "Donbasenergo". The electricity generated by Starobeshivska TPP is sold at the wholesale electricity market of Ukraine.

a) Situation existing prior to the starting date of the project

Construction of the Starobeshivska TPP lasted from 1954 until 1967. In 1967 the equipment of the Starobeshivka TPP attained the project installed capacity of 2300 MW. In 1982 three power generating units were put out of operation, equipment was dismantled and decommissioned from the installed capacity. In 1988 by the decision of the Ministry of Energy of the UkrSSR, the 200 MW power units due to deterioration of equipment were re-marked into 175 MW power units (Technical act of re-marking dated 14.08.1988 No. 181).

Planned fuel for boilers is anthracitic coal of anthracite fines (AF) rank with calorific value of 6010 kcal/kg[1].

The main field of the TPP's activity is generation of electricity. Heat energy production is a small share of activity.

b) Baseline scenario

For Baseline scenario the economically feasible and realistic scenario "business-as-usual" with the implementation of only the necessary repair work against the background of overall degradation of technical equipment state with very slow rehabilitation activities was chosen. The current activity of Starobeshivska TPP is characterized by the prolonged deterioration of the power generating units' energy efficiency due to physical depreciation of equipment, and due to lack of funding for its reconstruction and modernization. As a result, specific consumption of fossil fuel for electricity generation is increasing steadily.

[1] *http://www.ecu.gov.ua/ua/activity/production/power_plant.html*

c) Project scenario

The project scenario provides the increase of the fuel and energy resources (FER) consumption efficiency in order to reduce greenhouse gas emissions relative to current practice, through the rehabilitation and modernization of main and supplementary equipment of all marked power generation units of the plant (the station No.No. 4 - 13).

The scheduled measures include modernization of: boiler equipment, turbines, control systems, electrical and automatic schemes, optimization of equipment operation modes, of fuel preparation, etc. (described in details in Section A.4.2). The most significant reconstruction and technical re-equipping measures are being implemented at power generating units No. 4 and No. 7.

At Unit No. 4, the highly effective ecologically clean technology for combustion of low-grade fuel and waste of coal-preparation plants in the boiler with atmospheric circulating fluidized bed (ACFB) technology of Lurgi GmbH (Germany) company is being implemented The unit installed capacity increases from 175 MW_e to 210 MW_e, with planned efficiency increasing from 83 % to 90.3 %. After implementation of technology of combustion in a fluidized bed, the unit will use low-quality domestic coal and wastes from coal-preparation plants.

At unit No. 7 the technical re-equipment of the main and supplementary equipment is scheduled, in order to increase unit capacity to 210 MW, to prolong equipment life by 20-30 years, to increase unit maneuverability and to reduce toxic emissions to a level that does not exceed the permitted limits.

The project will contribute to sustainable development both in social (after project realization, the energy equipment will operate more efficiently and reliably, thereby improving the safety of the station work) and in environmental (reduction of greenhouse and toxic gases and substance emissions, such as CO_2, SO_2, NO_x, CO and particulate matter, will lead to improvement of health of workers and residents of nearby settlements) aspects.

The brief history (the main milestones) of the project (including its JI component):

The project was initiated in 2000.

January, 2000 – Technical meeting of the OJSC "Donbasenergo" has accepted the Decision to realize the activity on GHG emission reduction through reconstruction and technical re-equipment of thermal power plants of the OJSC “Donbasenergo”. (Protocol of the Technical meeting dated 28/01/2000).

April, 2008 – Contract was signed between OJSC «Donbasenergo» and “E-Energy B.V.” on purchase of emission reductions (Contract dated April 23, 2008).

May, 2008 – The Ministry for Environmental Protection of Ukraine has issued the Letter of Endorsement for the JI project “Rehabilitation and technical re-equipping of Starobeshivska TPP of the OJSC “Donbasenergo” (No. 6140/11/10-08 dated May 15, 2008).

August, 2010 - The Letter of Approval from the Party of buyer - The Netherlands # 2010JI23 was issued on 30.08.2010.

November, 2010 - The National Environmental Investment Agency of Ukraine has issued the Letter of Approval No. 1916/23/7 for the JI project "Rehabilitation and technical re-equipping of Starobeshivska TPP of OJSC" Donbasenergo» (No. 1916/23/7 dated 17.11.2010).

November, 2010 - The National Environmental Investment Agency of Ukraine has confirmed this JI project under Track 1 procedure by the Order No. 178 dated November 25, 2010.

Project identification number provided in the International Journal of transactions (ITL project ID) is UA1000198.

PDD version 06 is designed due to change of the project boundaries and the baseline for the project.

A.3. 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 "Donbasenergo"	No
The Netherlands	• E – energy B.V.	No
* Please indicate if the Party involved is a host Party.		

Table A-1. Project participants

- ***PJSC "Donbasenergo":*** the company, which implements this project and manages the Starobeshivska TPP. It is responsible for design, engineering and installation works and finances this project, and is the Supplier of emission reduction units for this project.

Historical details:

According to the Order of Ministry of Energy and Electrification of Ukraine dated 07.02.1996 No. 26 to carry out the Decree of the President of Ukraine "On structural reorganization in the electric power complex of Ukraine" dated 04.04.1995 No.282/95, the State Enterprise "Donbasenergo" was reorganized into the State Stock Energy Generating Company (SSEGC) and registered by the order of the Executive Committee of Gorlivka City Council dated 21.02.1996 No.999-r. By the decision of the General meeting of the shareholders dated 04.08.1998, the SSEGC "Donbasenergo" was reorganized into the Open Joint-Stock Company "Donbasenergo". After the decision of the General meeting of the shareholders dated 12.04.2011, OJSC "Donbasenergo" was reorganized into the Public joint stock company (PJSC) "Donbasenergo".

PJSC "Donbasenergo" is the entire economic complex that integrates energy companies producing electricity and heat energy. It has two thermal power stations - Starobeshivska TPP and Slovianska TPP with total installed capacity of 2880 MW[2], and belongs to the sphere of management of the NJSC "Energy Company of Ukraine».

PJSC "Donbasenergo" USREOU Code: 23343582.
Types of activity under CFEA-2010:
35.11 Production of electric power
71.12 Activity in the field of engineering, geology and geodesy, rendering of the technical consulting services in these spheres
74.90 Other professional, scientific and technical activity
35.30 Supply of steam, hot water and conditioned air
36.00 Diversion, cleaning and supply of water
38.32 Renewal of the sorted wastes.

[2] http://www.ecu.gov.ua/ua/company/structure/donbas.html

- ***E-Energy B.V.:*** is the purchaser of the emission reduction units generated from this Project. It is a company registered in the Netherlands, is one of subsidiaries belonging to the E energija group.

Having started its activity in 1994, E energija group has expanded from its first established company Energijos taupymo centras (Energy saving center).

The rising work range and economical-social conditions caused the creation of vertically integrated company's structure, with the separation of group's operation fields. For this purpose, the company E energija UAB, which now is the management company of the whole E energija group, was established. E energija, UAB is an energy planning and management company, which implements turnkey projects from conceptual development and owns companies generating and supplying energy for industries and residents of the cities.

One of key aims of E energija specialists is to prepare energy plans to meet energy needs for subsistence and development of alternate energy sources and the increase of energy efficiency at least cost to the economy and environment.

Since 2005 E energija group, one of the first companies in the Baltic countries, has been involved in the project development under Kyoto Protocol flexible mechanisms and started trading activities with EU allowances as specified by EU Emission Trading Scheme.

E-Energy B.V. is a company responsible for E energija group carbon credit procurement for its own purposes and all business related with carbon credit trade. E-Energy B.V. is active investor in the market of Eastern European countries in a number of JI projects.

A.4. Technical description of the project:

A.4.1. Location of the project:

A.4.1.1. Host Party(ies):

The project is located in Ukraine.

Ukraine is an Eastern European country that ratified the Kyoto Protocol to UN FCCC on February 4th, 2004[3], it enters into the list of the countries of the Annex I to the UN FCCC and into the list of the countries of the Annex B to the Kyoto Protocol to UNFCCC[4], and is eligible for the Joint Implementation projects.

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

The Project is located in Donetsk region, South-East of Ukraine (Figs. A.1, A.2).

Fig. A.1. The map of Ukraine with administrative division; location of project activity is marked with red circle

Donetsk Region is situated in the south- east of Ukraine. Its territory is 26500 km^2. Its population is about 4.7 million.

The administrative center of the region is Donetsk city.

[3] http://zakon.rada.gov.ua/cgi-bin/laws/main.cgi?nreg=1430-15
[4] http://zakon.rada.gov.ua/cgi-bin/laws/main.cgi?page=1&nreg=995_801

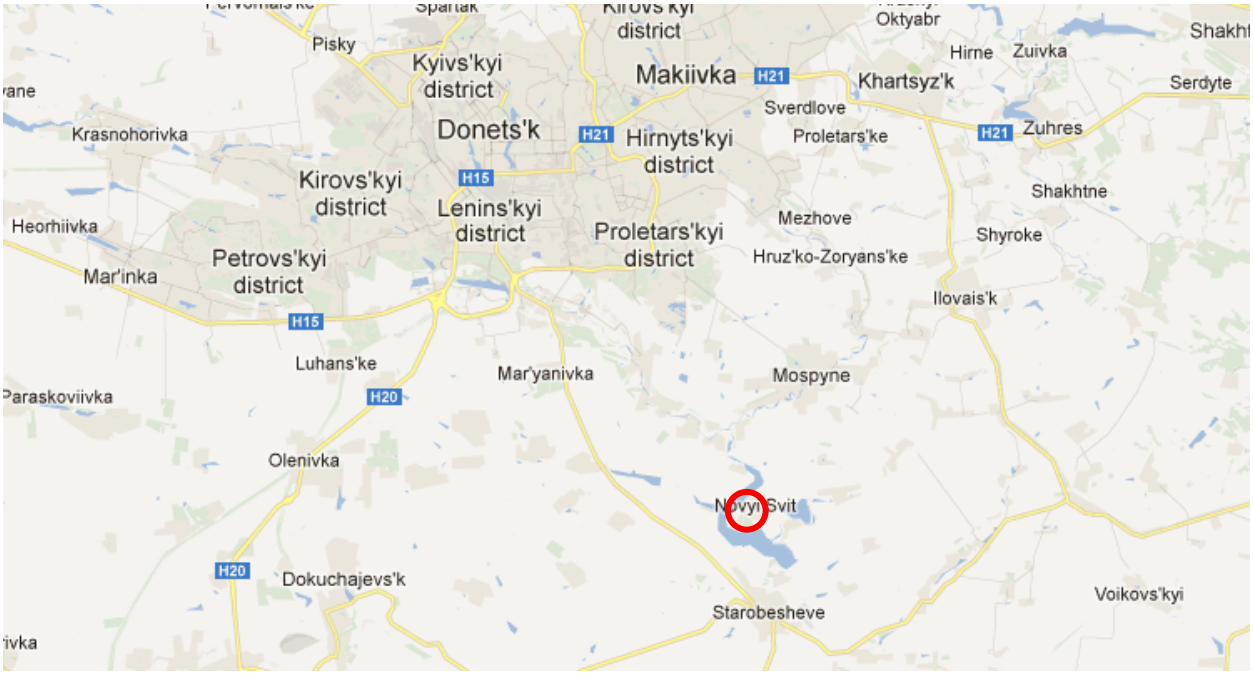

Fig. A.2 Location of Starobeshivska TPP in Donetsk region[5]

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

Donetsk region, Starobeshiv disrict, Novyj Svit town.

Fig. A.3 Location of Starobeshivska TPP near Novyj Svit town

[5] http://travel.kyiv.org/map/o_don.htm

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

Starobeshivska TPP is located in the South-East part of Ukraine, in 27 km to the South from the Donetsk city, at the left bank of the Starobeshiv lake. The nearest settlement is a Novyj Svit town (2 km to the center of the town), the distance from the district center Starobeshevo town is 11 km.

Address: Ukraine, 87230, Donetsk region, Starobeshiv district, Novyj Svit town, 3 Stanciyna str.

Coordinates: 47°48'00" N, 38°00'00" E.

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

At the start of the project activity, from 13 power generating units of Starobeshivska TPP, only 9 (No.No. 5 – 13) were able to work with 175 MW installed electric capacity each, the actual installed electric capacity of the thermal power plant was 1,575 MW.

The structure of each power generating unit consists of boiler, steam turbine, electric generator, water heaters, pumps for water and condensate, condenser, pumps for water circulation, steam generator, main and supplementary electric transformers and subsidiary equipment.

To the time of project start, the main equipment of power generating units were:

- Boiler of TP-100 type produced by Taganrog Boiler Plant with 640 t/h nominal steam capacity, of single drum with natural circulation, designed for pulverized-coal burning of the solid fuel with liquid slag removal. Their distinguishing feature is the T-shaped configuration. The furnace chamber has a prismatic shape and is divided along depth by the two-side screen into two halves of the furnace. As a grinding equipment for solid fuel, the circular tumbling mills of W-50 type are used in the amount of 2 units per one power generating unit.
- Condensing steam turbine of K-200-130 type produced by Leningrad Metal Plant with 200 MW nominal capacity, consisting of single-shaft three-cylinder unit, with intermediate steam superheating and two exhaust canals.
- Turbogenerators f TGV-200 type produced by "Elektrovazhmash" Kharkov plant.
- Boilers are equipped with blow fans of VD-32N3 type with 435 000 m^3/h productivity of each and with smoke exhausters of D-25-2SH type, with 648 500 m^3/h productivity, two for each boiler.
- Control equipment and automation equipment systems of obsolete types.

The main types of fuel that are used by Starobeshivska TPP are the low-reactionary anthracitic coal of AF, AF0 ranks, as well as coal of TP, TK and AKO ranks from the Donetsk coal field. The scheduled boilers' fuel is the coal of AF rank with calorific value 6010 kcal/kg. The natural gas is partly used, as well as small amount of fuel oil.

Since Ukraine has no own industrial resources of gas and oil, and according to the Energy Strategy of Ukraine[6], the reduction of natural gas consumption is a priority of the state policy, the part of domestic coal at Starobeshivska TPP is gradually increased with corresponding reduction of the part of natural gas. Fuel from different mines is combusted at TPP, and composition of coal is often being changed during boilers' operation, which negatively affects their efficiency.

Since coal is the more carbon intensive fuel, greenhouse gas emission reduction can be achieved only by leading efficiency increasing of power generating units with reduction of specific fuel consumption and greenhouse gas emissions per unit of output.

The project activity boundaries include the large-scale rehabilitation of power generating units No.4 and No.7:

- Reconstruction of the power generating unit No.4 by replacement of the existing steam boiler with 640 t/h steam capacity by the boiler with atmospheric circulating fluidized bed (ACFB) (high-efficient environmentally friendly technology for combustion of the low-grade solid fuel and waste of coal-preparation plants) with 670 t/h steam capacity, which combusts anthracite sludge, made by Lurgi Lentjes AG (Germany) [7].. The installed capacity of the unit is increased from 175 MW_e to 210 MW_e. Boiler efficiency is increased from 83% to 90.3%.
- Rehabilitation and technical re-equipment of the power generating unit No.7, including modernization of TP-100 boiler with replacement of drum, modernization of turboset with replacement of the low pressure cylinder flow part by the new one, modernization of electrical equipment, update of control system, construction of electrofilter.

Also, the following measures at the station power generating units are under implementation:

- Modernization of the main combined powder-gas burners;
- Acid flushing of a boiler;
- Partial replacement of boiler gas flue;
- Replacement of boiler furnace screen panels;
- Rehabilitation of furnace brick envelope of a boiler;
- Rehabilitation of furnace heat insulation of a boiler;
- Rehabilitation of an ignition unit of a boiler;
- Replacement and modernization of radial seals of a regenerative air heater (RAH);
- Replacement (modernization) of cold and hot layers of stuffing of a regenerative air heater;
- Replacement of tubular air heater (TAH) cubes;
- Renovation and replacement of packages of the third and fourth stages of a convective steam superheater (CSSH) and an input (lower) collector;
- Replacement of packages of a cold convective steam superheater (CCSH);
- Replacement of the third stage of a primary steam superheater (PSSH);
- Replacement of packages of input stage of a secondary steam superheater (SSSH);
- Replacement of packages of output stage of a secondary steam superheater (SSSH);
- Replacement of an overhead steam superheater;
- Replacement of a platen steam superheater;
- Replacement of a water economizer packages;
- Replacement of operating blades of low pressure rotor (LPR) of a turbine;

[6] http://mpe.kmu.gov.ua/fuel/control/uk/publish/category?cat_id=35086

[7] http://lurgi.com/website/Lurgi-GmbH.15.0.html?&L=1

- Replacement of end and diaphragm seals at high pressure cylinder (HPC), medium pressure cylinder (MPC) and low pressure cylinder (LPC) of a turbine;
- Installation of ball cleaning system for turbine condensers;
- Replacement of low pressure heater (LPH) sections;
- Replacement of coiled pipes of a high pressure heater (HPH);
- Rehabilitation of mill seals;
- Replacement of mill armour-plating;
- Modernization and improvement of control and automatic systems.

Implementation of these measures will increase the energy efficiency of equipment, and will reduce specific fuel consumption per unit of electricity.

Atmospheric circulating fluidized bed technology, that is implemented in the project for reconstruction of power generating unit No,4, is being used for the first time and is the most up-to-date practice in Ukraine. This technology obviously will not be replaced by any other technology within the project period.

Since ACFB technology significantly differs from traditional technologies used in Ukraine, in addition to regular training courses that operational personnel of TTP periodically passes, the appropriate trainings were conducted:

a) The course organized by the Institute of coal energy technologies of NAS of Ukraine and Ministry of fuel and energy of Ukraine "Modern CFB technology" (Protocol No.1 dated 10-13.04.2007);

b) The course organized by the Ministry of Fuel and Energy of Ukraine and the State Enterprise “DonORHRES”: "Structure features and operation of heat-mechanical equipment of 210 MW capacity unit with the ACFB-670 boiler and the K-200-130 turbine" (Protocol No.1 dated 20.11.2007).

The majority of the planned measures are already implemented. At the present time, the following boilers are under operation at Starobeshivska TPP:

- unit No.4 – the boiler of ACFB-670 type (circulating fluidized bed at atmospheric pressure) produced by Lurgi Lentjes AG (Germany) with 670 t/h steam capacity. Average efficiency is 88.5%, the maximal gross efficiency at the nominal loading is 90,75%;
- units No. 5 ÷ 13 – boilers of TP-100 type produced by Taganrog Boiler Plant with 200 MW installed capacity.

At the present time, marking of power generating units are the following: unit No.4 - 215 MW, units No.No. 6, 8, 9, 11, 12 – 200 MW, units No.No. 5, 7, 10, 13 – 175 MW. The installed capacity of the thermal power plant is 1915 MW.

Implementation periods of measures aimed at improving the efficiency of the power generating units of Starobeshivska TPP, with numbers of the power generating units, are provided in Table A.1.

Measure / Year	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Modernization of the main combined powder-gas burners							#9,13	#8, 10	#6		#5,10	
Acid flushing of a boiler	#12	#5, 13	#8, 10	#6	#11	#12	#10					
Partial replacement of boiler gas flue	#12	#5, 13	#8, 10	#6	#11	#12	#9,10, 13					
Replacement of the boiler furnace screen panels								#8	#6	#10, 11	#5, 8	#6, 9, 12
Rehabilitation of furnace brick envelope of a boiler	#12	#5, 13	#8, 10	#6	#11	#12		#8,10, 13	#6	#10, 11	#5, 8	
Rehabilitation of furnace heat insulation of a boiler								#8,10, 13	#6	#10, 11	#5, 8	
Rehabilitation of an ignition unit of a boiler	#12						#9,13	#8,10	#6	#10, 11, 12, 13	#5, 8	#12
Replacement and modernization of radial seals of a regenerative air heater (RAH)	#12	#5, 13	#8, 10	#6	#11	#12						
Replacement (modernization) of cold and hot layer of stuffing of a regenerative air heater (RAH)							#9					
Replacing of tubular air heater (TAH) cubes							#9	#13	#6, 8	#10, 11	#5	
Renovation and replacement of packages of the third and fourth stages of a convective steam superheater (CSSH) and an input (lower) collector									#6			
Replacement of packages of a cold convective steam superheater (CCSH)								#13			#5	
Replacement of the third stage of a primary steam superheater (PSSH)											#5	
Replacement of packages of input stage of a secondary steam superheater (SSSH)									#6	#11	#5	

Replacement of packages of output stage of a secondary steam superheater (SSSH)								#8		#11	#5	#6, 8, 9
Replacement of an overhead steam superheater												#6, 12
Replacement of a platen steam superheater											#5	
Replacement of water economizer packages								#13		#11	#5, 8	
Replacement of operating blades of low pressure rotor (LPR) of a turbine									#10, 11	#10		
Replacement of operating blades of low pressure cylinder (CLP) of a turbine									#6, 8		#5	
Replacement of end and diaphragm seals at high pressure cylinder (HPC), medium pressure cylinder (MPC) and low pressure cylinder (LPC) of a turbine									#6	#10, 11	#5	
Installation of ball cleaning system for turbine condensers								#10	#6, 8	#11	#5	
Replacement of low pressure heater (LPH) sections										#10, 11	#5	
Replacement of coiled pipes of a high pressure heater (HPH)										#10, 11	#5	
Rehabilitation of mill seals			#8, 10	#6								
Replacement of mill armour-plating												#6, 9
Modernization and improvement of control and automatic systems							#9,13	#8, 10	#6		#5	

Table A.2. Measures for efficiency improving of power generating units of Starobeshivska TPP

A.4.3. Brief explanation of how the anthropogenic emissions of greenhouse gases by sources are to be reduced by the proposed JI project, including why the emission reductions would not occur in the absence of the proposed project, taking into account national and/or sectoral policies and circumstances:

The project activity is directed at rehabilitation of power generating units No.No. 4, 7 and implementation of measures for energy efficiency improvement at power generating units No.No. 5, 6, 8 - 13 of Starobeshivska TPP. Implementation of these measures will lead to increasing of the energy efficiency of equipment and will decrease the specific fuel consumption for electric energy production. Fuel saving at electric energy production and reduction of energy consumption for own needs of power generating units will lead to reduction of emissions of greenhouse and toxic gases and substances such as CO_2, SO_2, NO_x, CO and particulate matter.

In the absence of the proposed project, only minimum repair works for maintenance of operation of power generating units at the existing level will be made. Emission reductions would not occur.

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

Estimated amounts of emission reductions over the crediting period are provided in Tables A3 - A6:

Period before January 1, 2008:

	Years
Length of the crediting period	4
Year	Estimate of annual emission reductions in tonnes of CO_2 equivalent
2004	167 915
2005	215 334
2006	229 140
2007	197 984
Total estimated emission reductions over the early crediting period (tonnes of CO_2 equivalent)	**810 373**
Annual average of estimated emission reductions over the early crediting period (tonnes CO_2 equivalent)	202 593

Table A.3. Estimated emission reductions for early crediting period before January 1, 2008 (2004-2007)

The First Kyoto Commitment period 2008 – 2012:

	Years
Length of the crediting period	5
Year	Estimate of annual emission reductions in tonnes of CO_2 equivalent
2008	262 071
2009	332 698
2010	324 784
2011	284 769
2012	284 769
Total estimated emission reductions over the first commitment period (tonnes of CO_2 equivalent)	**1 489 091**
Annual average of estimated emission reductions over the first commitment period (tonnes CO_2 equivalent)	297 818

Table A.4. Estimated emission reductions during the first commitment period (2008 – 2012)

The Post-first commitment period 2013 – 2032:

	Years
Length of the crediting period	20
Year	Estimate of annual emission reductions in tonnes of CO_2 equivalent
2013	284 769
2014	284 769
2015	284 769
2016	284 769
2017	284 769
2018	284 769
2019	284 769
2020	284 769
2021	284 769
2022	284 769
2023	284 769
2024	284 769
2025	284 769
2026	284 769
2027	284 769
2028	284 769
2029	284 769
2030	284 769
2031	284 769

2032	284 769
Total estimated emission reduction over the post-first commitment period (tonnes of CO_2 equivalent)	**5 695 380**
Annual average of estimated emission reductions over the post-first commitment period (tonnes CO_2 equivalent)	284 769

Table A.5. Estimated emission reductions during the post-first commitment period (2013 –2032)

The total amount of emission reductions over the crediting period:

	Years
Length of the crediting period	29
Year	Estimate of annual emission reductions in tonnes of CO_2 equivalent
Total estimated emission reductions over crediting period (tonnes of CO_2 equivalent)	**7 994 844**
Annual average of estimated emission reductions over the crediting period (tonnes CO_2 equivalent)	275 684

Table A.6. Estimated emission reductions during the crediting period (2004 –2032)

More detailed information is provided in the **Appendix A** (Excel table).

Description of formulae used to estimate emission reductions is provided in **Section D** and **Appendix A**

A.5. Project approval by the Parties involved:

The project has been already approved by local authorities and representative of the Government of Ukraine.

The Ministry for Environmental Protection of Ukraine (Ukrainian DFP at that time) has issued the Letter of Endorsement for the JI project “Rehabilitation and technical re-equipping of Starobeshivska TPP of the OJSC “Donbasenergo” (No. 6140/11/10-08 dated 15.05.2008).

The Letter of Approval from the Party of buyer - The Netherlands No. 2010JI23 was issued on 30.08.2010.

The National Environmental Investment Agency of Ukraine (Ukrainian DFP at that time) has issued the Letter of Approval No. 1916/23/7 dated 17.11.2010 for the JI project "Rehabilitation and technical re-equipping of Starobeshivska TPP of OJSC" Donbasenergo» (for PDD version 05).

The National Environmental Investment Agency of Ukraine (Ukrainian DFP at that time) has confirmed this JI project under Track 1 procedure by the Order No. 178 dated 25.11.2010.

The project has obtained the Project identification number in the International Journal of transactions (ITL project ID): UA1000198.

PDD version 06 is developed due to change of the project boundaries, and change of the project baseline.

After the additional determination of the project, according to the Order No.79 of the National Environmental Investment Agency of Ukraine, the new PDD version and the Determination report will be submitted to the State Environmental Investment Agency of Ukraine (Ukrainian DFP at present) for information.

SECTION B. Baseline

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

In accordance with the tasks of the "Power strategy of Ukraine till 2030"[8] and the situation at the natural gas market in Ukraine, the thermal power plants in Ukraine are oriented to consumption of coal of domestic production. The fuel structure at Starobeshivska TPP and as well as at other TPP of the country is being changed: increase of part of the more carbon intensive fuel (coal) with taking into account its availability and price, along with the corresponding reduction of part of the less carbon intensive fuel (natural gas). The current activity of the Starobeshivska TPP is characterized by the continuous prolonged worsening of operation of the power generating units with lowering of their efficiency, as a result of wearing of equipment without its rehabilitation due to lack of funding.

The Project activity is directed to the reduction of the GHG emissions of the existing Starobeshivska TPP due to its rehabilitation and implementation of measures for energy efficiency improvement, that will lead to the reduction of the specific consumption of standard fuel for unit of power production in conditions of increasing of, the share of fuel which has the higher carbon intensity (coal and / or fuel oil).

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

Among the approved CDM baseline and monitoring methodologies, the following methodologies are close to the proposed project activity:

- the consolidated methodology ACM0011 *„Consolidated baseline methodology for fuel switching from coal and/or petroleum fuels to natural gas in existing power plants for electricity generation" (Version 02.2)*[9].
- the methodology AM0061 *"Methodology for rehabilitation and/or energy efficiency improvement in existing power plants" (Version 02.1)*[10].

However, consolidated methodology ACM0011 is directed at switch from the more carbon intensive fuel to the less carbon intensive fuel that does not correspond to the project activity.

The closest methodology for the proposed project is the methodology AM0061 *"Methodology for rehabilitation and/or energy efficiency improvement in existing power plants"* (at present the version 02.1 is the last valid)[10]. This methodology is applicable to project activities on rehabilitation of the equipment and/or implementation of measures for energy efficiency increasing of an operating TPP, including for the purpose of increasing of power generating units' capacity without adding new generating capacity.

However, this methodology also does not respond to the conditions of the project activity:

• In accordance with methodology AM0061 emission reductions within the frames of project activity take place by condition that the emission factor of the power grid is higher, than the emission factor of the power plant. Otherwise, the additional to the average history level production of electric power does not lead to emission reductions. The emission factor of the Starobeshivska TPP is higher than the emission factor for the Ukrainian Electricity Grid.

[8] http://mpe.kmu.gov.ua/fuel/control/uk/publish/category?cat_id=35086

[9] http://cdm.unfccc.int/UserManagement/FileStorage/1WS8W1641K25AZ8E9L80V1RS3TAVWK

[10] http://cdm.unfccc.int/UserManagement/FileStorage/9K6GRQITX27OVG3CAS2MVDN1IWXJX1

- The methodology AM0061 does not deal with the GHG emission reduction in conditions of increase of fuel carbon intensity.

Thus, among the approved CDM baseline and monitoring methodologies there are no suitable for use in such type projects.

In course of development of this JI project, in accordance with paragraph 9(a) of the "*Guidance on criteria for baseline setting and monitoring*" (the valid version 03)[11], the project specific approach for baseline setting and monitoring was used, developed in accordance with appendix B "*Criteria for baseline setting and monitoring*" to the "*Guidelines for the implementation of Article 6 of the Kyoto Protocol*" ("*JI Guidelines*")[12].

In accordance with this project specific approach, construction of the baseline is based on the use of historical data on operation of the Starobeshivska TPP since 1993 till 1999, as well as on the general tendency of the development of the TPP electricity production system in Ukraine.

The main indicator of the TPP efficiency is the specific fuel consumption per unit of produced electricity. Since different types of fuel - solid (coal and sludge), liquid (oil) and gas (natural gas) are used at the Starobeshivska TPP, and the ratio of these fuels from year to year is significantly changed, than the standardized indicator for characterization of the TPP operation is usually used – the specific standard fuel consumption per unit of produced (or supplied) electricity.

Due to continuous increase in operation hours of the power generating units and continuous reduction of boiler and other equipment efficiency as a result of aging, and continuous increase of the coal share in the fuel, the specific standard fuel consumption per unit of produced electricity is constantly increasing. According to the data from the Ministry of Energy and Coal Industry of Ukraine, specific fuel consumption for electricity generation by TPPs in Ukraine as a whole from 1991 is increased by approximately 17%[13].

Step 2. Application of the approach chosen

There were three different versions of the Baseline scenario that were considered before starting this project.

The first version of the Baseline scenario was the business-as-usual scenario with implementation of minimum operation maintenance and repair works at the Starobeshivska TPP balanced by overall degradation of the TPP.

For implementation of this Baseline scenario there are no barriers (no investment barrier since this scenario doesn't require attraction of additional investments, and no technological barrier since the equipment is operated by existing skilled personnel, and additional re-training is not required). This scenario represents the common practice in Ukraine.

The second version of Baseline scenario was to implement measures for energy efficiency increasing of the Starobeshivska TPP operation, analogous to the project activity, without JI mechanism.

In this case there exist both investment barrier since this scenario requires the attraction of large additional investments, and due to very large payback time and high risks it is not attractive for investments, and as well the technological barrier since operation of the new modern equipment will require an additional re-training of personnel.

[11] http://ji.unfccc.int/Ref/Documents/Baseline_setting_and_monitoring.pdf
[12] http://unfccc.int/resource/docs/2005/cmp1/eng/08a02.pdf

[13] http://mpe.kmu.gov.ua/fuel/control/uk/publish/article;jsessionid=866C6FFC7148AF417483DD005778768C?art_id=93895&cat_id=35082

The third version of the baseline scenario was a partial implementation of the project activities, without energy efficiency measures at the generating equipment. In this case the investment barrier exists as well, because this scenario requires additional investments with long-term payback, though to a lesser extent, so is also not attractive for investors.

Thus, the first version was chosen for the baseline scenario.

Development of the project design document for this JI project was started in 2000. Modernization of the old equipment and implementation of the new equipment within the project activity had already started at the end of 2000.

Since during the whole historical operation period of Starobeshivska TPP which is used for baseline setting, that is till 1999 inclusive, the statistical reporting of the TPP was performed in the form of "Report of the thermal power plant on the heat efficiency of equipment" ("Maket 15506-1"), which had already contained calculated data on total consumption of the standard fuel, so this information was sufficient for calculation of tendency of the main parameter of the dynamic baseline – the specific consumption of the standard fuel per unit of electricity output.

Since 2000, statistical reporting about engineering and economical performance of the TPP equipment operation is carried out by form "Form No.3-tech-TPP"[14], which contains estimated data about the total consumption of standard fuel, and shares of different fuels (coal, natural gas and fuel oil) in the total consumption of standard fuel. Thus, for calculation of the specific fuel consumption per unit of electricity output in a reported year namely these parameters were used.

Greenhouse gas emissions in the project are reduced due to efficiency increasing of the whole cycle of electricity production by power generating units of Starobeshivska TPP with corresponding reduction of standard fuel consumption per unit of electricity output as a result of rehabilitation and optimization of boilers, turbine equipment, control and management systems, as well as of optimization of fuel preparation and of operation mode of the equipment.

For calculation of the project activities efficiency in this scenario, the baseline is constructed in accordance with the average annual historical specific fuel consumption per unit of electricity output to the state grid by linearization with using of the least-squares method, and correspondingly is dynamic.

The baseline setting will be executed for each year for which the monitoring of emission reductions for the project will be performed.

This approach is partly similar to the approaches used in several JI projects on rehabilitation of thermal power plants ("Reconstruction of Units 1, 2, 3 and 4 at Zuyevska Thermal Power Plant"[15], "Reconstruction of the Units at the Structure Unit "Kurakhovska TPP" of the "Skhidenergo" Ltd."[16], etc.) and district heating systems rehabilitation in cities and regions of Ukraine ("Rehabilitation of the Heat and Water Supply Systems at Vinnytsia region", "Rehabilitation of the Heat and Water Supply Systems in Lutsk city" and others), that had already successfully passed the determination by Accredited Independent Entities (AIEs).

This specific approach is provided in detail in the **Section D** (in particular, description of formulae used to estimate baseline emissions is provided in detail in the sub-section D.1.1.4) and **Appendix A** (Excel calculation table).

[14] *GKD-34.09.103-96 "Calculation of reported technical and economic indicators of the thermal efficiency of power plant equipment. Methodological tool" [http://megamarket.co.ua/ukr/group_12/pos17271.htm]*

[15] *http://www.neia.gov.ua/nature/doccatalog/document?id=125299*

[16] *http://www.neia.gov.ua/nature/doccatalog/document?id=123305*

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

Data / Parameter	B_j
Data unit	t.s.f.
Description	Actual standard fuel consumption for generation of electricity output to the grid in year *j* of the historical period before the project implementation
Time of determination/monitoring	Once in the process of baseline setting
Source of data (to be) used	Report of the thermal power plan about heat efficiency of equipment" (Maket 15506-1)
Value of data applied (for ex ante calculations/determinations)	Year: t.s.f. 1993: 3 220 043 1994: 3 162 864 1995: 3 324 223 1996: 2 261 947 1997: 2 127 597 1998: 1 808 324 1999: 1 930 286
Justification of the choice of data or description of measurement methods and procedures (to be) applied	The Production-Technical Department based on data about consumption of all fuel types calculates the amount of consumed standard fuel, data are summarized in the annual report (Maket 15506-1)
QA/QC procedures (to be) applied	Measuring equipment is inspected and calibrated according to the State Standard of Ukraine # 2708:2006 "Metrology. Calibration of measuring equipment. The organization and procedure"[17]
Any comment	Information is archived in a paper form

Data / Parameter	EG_j
Data unit	MWh
Description	Electricity output to the grid in year *j* of the historical period before the project implementation
Time of determination/monitoring	Once in the process of baseline setting
Source of data (to be) used	Report of the thermal power plant about heat efficiency of equipment" (Maket 15506-1)
Value of data applied (for ex ante calculations/determinations)	Year: MWh 1993: 7 913 888

[17] *hths.tp://oscill.com/files/27082006.pdf*

	1994	7 604 158	
	1995	7 942 543	
	1996	5 415 707	
	1997	5 043 035	
	1998	4 277 612	
	1999	4 547 212	
Justification of the choice of data or description of measurement methods and procedures (to be) applied	Measurement by electricity meters		
QA/QC procedures (to be) applied	Measuring equipment is inspected and calibrated according to the State Standard of Ukraine # 2708:2006 “Metrology. Calibration of measuring equipment. The organization and procedure"[18]		
Any comment	Information is archived in a paper form		

Data / Parameter	$S_{i,y}$
Data unit	%
Description	Part of fuel type *i* in standard fuel in year *y*
Time of determination/monitoring	Once per year
Source of data (to be) used	“Form No.3-tech-TPP” of Starobeshivska TPP for year *y*
Value of data applied (for ex ante calculations/determinations)	See **Appendix A**
Justification of the choice of data or description of measurement methods and procedures (to be) applied	The actual consumption of different fuel types are regularly measured, than subject to a fuel NCV this data is calculated
QA/QC procedures (to be) applied	Measuring equipment is inspected and calibrated according to the State Standard of Ukraine # 2708:2006 “Metrology. Calibration of measuring equipment. The organization and procedure"[18]
Any comment	Information is archived in a paper and electronic form

Data / Parameter	$EF_{i,y}$
Data unit	t C / TJ
Description	Carbon content factor for fuel type *i* in year *y*
Time of determination/monitoring	Once per year
Source of data (to be) used	"National inventory of anthropogenic emissions by sources and removals by sinks of greenhouse gases in Ukraine in 1990-2010” Annex 2, Section P2.5[19]
Value of data applied (for ex ante calculations/determinations)	See **Appendix A**

[18] hths.tp://oscill.com/files/27082006.pdf

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

Justification of the choice of data or description of measurement methods and procedures (to be) applied	N/A
QA/QC procedures (to be) applied	"National inventory of anthropogenic emissions by sources and removals by sinks of greenhouse gases in Ukraine in 1990-2010" is the official report submitted to the secretariat of the UNFCCC
Any comment	N/A

Data / Parameter	$OXID_{i,y}$
Data unit	-
Description	Carbon oxidation factor under combustion of fuel type *i* in year *y*
Time of determination/monitoring	Once per year
Source of data (to be) used	Guidelines for National Greenhouse Gas Inventories IPCC, 1996[20], Vol.2, Tabl. 1-4, p.1.8. "National inventory of anthropogenic emissions by sources and removals by sinks of greenhouse gases in Ukraine in 1990-2010" Annex 2, Section P2.6[21]
Value of data applied (for ex ante calculations/determinations)	See **Appendix A**
Justification of the choice of data or description of measurement methods and procedures (to be) applied	N/A
QA/QC procedures (to be) applied	"National inventory of anthropogenic emissions by sources and removals by sinks of greenhouse gases in Ukraine in 1990-2010" is the official report submitted to the secretariat of the UNFCCC
Any comment	N/A

Data / Parameter	EG_y
Data unit	MWh
Description	Electricity output to the grid in year *y*
Time of determination/monitoring	Once per year
Source of data (to be) used	"Form No.3-tech-TPP" of Starobeshivska TPP for year *y*
Value of data applied (for ex ante calculations/determinations)	See **Appendix A**
Justification of the choice of data or description of measurement methods and procedures (to be) applied	Measurement by electricity meters
QA/QC procedures (to be)	Measuring equipment is inspected and calibrated according to the

[20] http://www.ipcc-nggip.iges.or.jp/public/gl/guidelin/ch1wb1.pdf

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

applied	State Standard of Ukraine # 2708:2006 “Metrology. Calibration of measuring equipment. The organization and procedure"[22]
Any comment	Information is archived in a paper and electronic form

More detailed information is provided in the **Appendix A** (Excel table).

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

The anthropogenic emissions of GHG in the project scenario will be reduced due to implementation of measures on rehabilitation and technical re-equipment of power generating units No.No. 4 – 13 of the Starobeshivska TPP, proposed in the project activities and described in **section A.4.2.**

Illustrative picture of how the anthropogenic emissions of greenhouse gases are reduced below those that would have occurred in the absence of the JI project is graphically represented at Fig B.1.

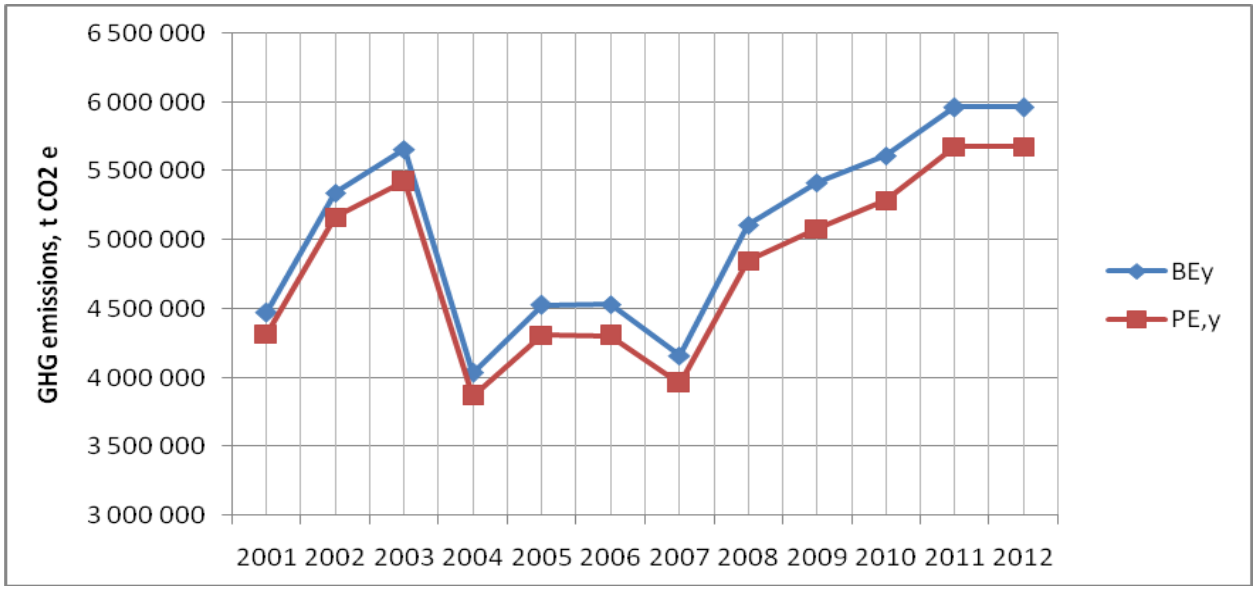

Fig. B.1. Dynamic baseline and project GHG emissions

[22] *hths.tp://oscill.com/files/27082006.pdf*

Additionality of the project

The additionality of the project activity is demonstrated and assessed below with using the "Tool for the demonstration and assessment of additionality" (Version 06.1.0)[23] (Fig. B.2). This tool was originally developed for CDM projects but may be applied to JI projects as well.

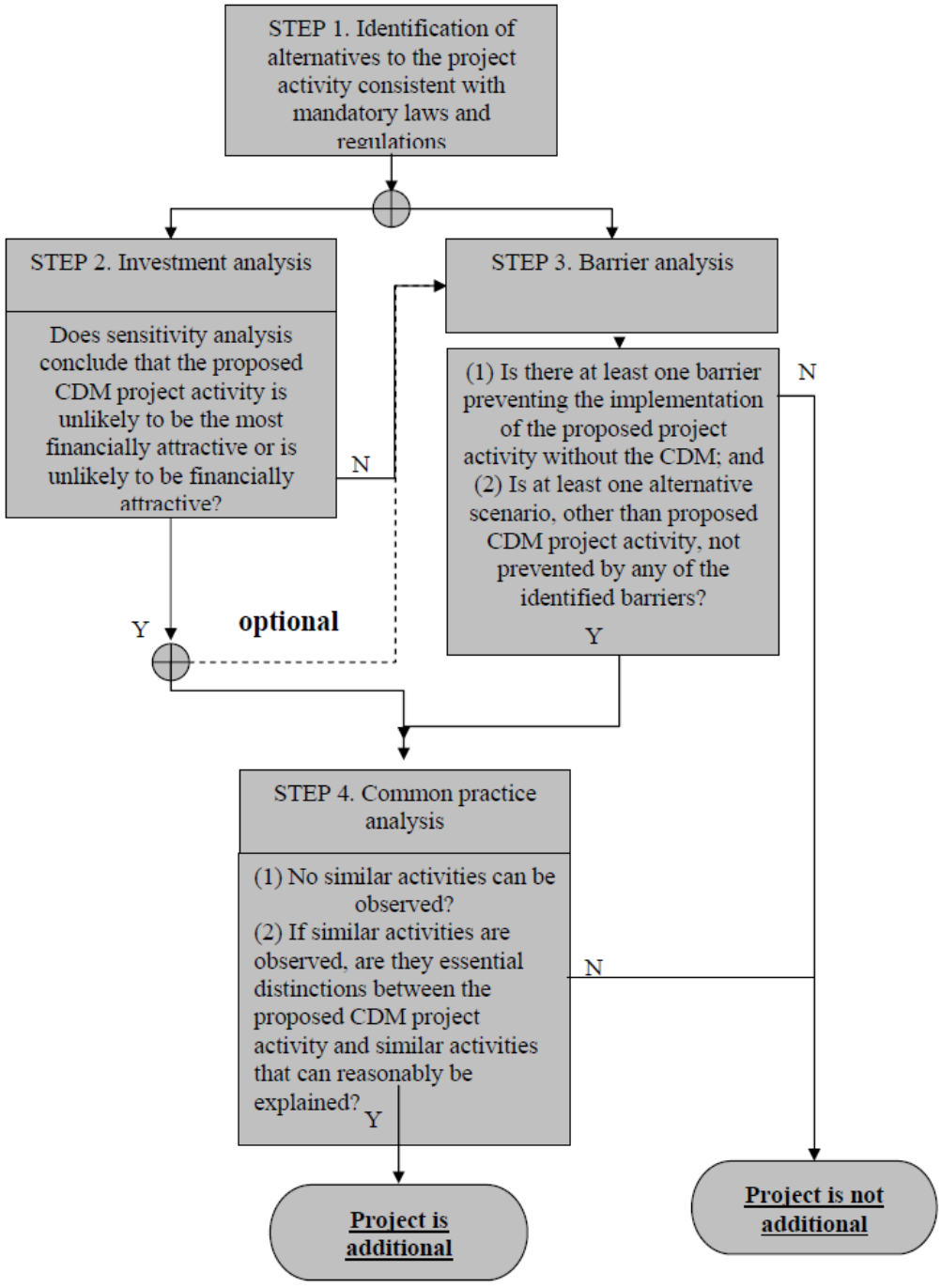

Figure B.1. Steps for demonstration of additionality

[23] http://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-01-v6.1.0.pdf

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

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

There are three alternatives to this project (as it was already discussed in **section B1**).

1. The first alternative is the "business-as-usual" scenario, i.e. continuation of the current situation in which there is no significant investment in the reconstruction or repair of existing equipment. For saving funds for fuel purchasing, a low-grade fuel is used. But the use of low-grade coal (the main fuel used by the power plant) leads to a decreasing of the equipment efficiency and reduction of the operation life time. TPP will continue to produce electricity with the constant decreasing of its performance,, i.e. business-as-usual scenario with minimum rehabilitation works, approximately balanced by overall degradation of the power generating units.

2. The second alternative is to implement measures for energy efficiency increasing of the Starobeshivska TPP operation, analogous to the project activity, without JI mechanism.

3. The third alternative is a partial implementation of the project activities, without energy efficiency measures for the electro-generating equipment.

Outcome of Sub-step 1a: Three realistic and credible alternative scenarios to the project activity are identified.

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

All alternatives are consistent with the main regulatory documents in the field: the Law of Ukraine "On Electric Power Industry" dated 16.10.1997 No. 575/97-VR[24], the Law of Ukraine "On Energy Saving" dated 01.07. 1994 No. 74/94-VR[25], the Decree of the Cabinet of Ministers of Ukraine dated 19.11.2008 No. 1446-p "On approving of the Concept for the State Task Economic Energy Efficiency Program for 2010–2015"[26].

Outcome of Sub-step 1b: The alternatives, which are: to continue business-as-usual scenario, to make rehabilitation works without JI mechanism and to implement shortened project activity without any of the non-key type of project activity, are in compliance with the mandatory laws and regulations.

Hence, the Step 1 is satisfied.

According to the "Tool for the demonstration and assessment of additionality" (Version 06.1.0), for further additionality analysis it is possible to follow the Step 2 or Step 3 (or both).

Step 3: Barrier analysis

Sub-step 3a: Identify barriers that would prevent the implementation of the proposed project activity:

Identifying and analysis of the barriers are performed according to the "Guidelines for objective demonstration and assessment of barriers"[27].

[24] *http://zakon.rada.gov.ua/cgi-bin/laws/main.cgi?page=1&nreg=575%2F97-%E2%F0*

[25] *http://www.rada.gov.ua/cgi-bin/laws/main.cgi?nreg=74%2F94-%E2%F0*

[26] *http://www.rada.gov.ua/cgi-bin/laws/main.cgi?nreg=1446-2008-%F0*

[27] *http://cdm.unfccc.int/EB/050/eb50_repan13.pdf*

Investment barrier:

Investment barriers are related to the structure of the existing electricity tariffs, which are regulated by the state and does not include amortization and investment needs. Ukraine has one of the lowest electricity tariffs in Europe. All electricity produced by TPPs is supplied to the national electricity grid, and the state pays for electricity to its manufacturers. But in conditions of economic crisis these payments are delayed. This situation brings significant element of uncertainty for the long-term investment projects. This situation leads to constant lack of funds and inability to invest in modernization and rehabilitation of power generating units equipment.

The set baseline scenario does not foresee investments. Thus, the proposed project is very risky and only prospects for additional funding by attraction funds from the sale of ERUs has pushed the project implementation.

Technological barrier:

Implementation of ACFB boiler is the unique technology for Ukraine. Qualification of operating personnel of the boiler is obviously not sufficient through the complication of this technology. The special trainings for power generating unit operation personnel are required to overcome this barrier. This project activity is the "First-of-its-kind" and according to the item 2(b) of paragraph 40 of the "Tool for the demonstration and assessment of additionality" (Version 06.1.0)[28] is additional.

Organizational barrier:

The management experience in implementation of JI projects is absent, including international collaboration, determination, verification, registration, monitoring of similar projects, etc.

Outcome of Sub-step 3a*:* The identified barriers would prevent the implementation of the proposed project, as well as other alternatives – execution of proposed activity and partial rehabilitation without using JI mechanism.

Sub-step 3b: Show that the identified barriers would not prevent the implementation of at least one of the alternatives (except the proposed project activity):

One of the alternative scenarios is to continue business-as-usual scenario. Therefore, as the barriers mentioned above are directly related to investing into the rehabilitation and technical re-equipment of the power plant, and implementation of the new technologies, there is no barriers for PJSC "Donbasenergo» to operate the plant at the present level.

Outcome of Sub-step 3b: The identified barriers would not prevent the implementation of at least one of the alternatives – the business-as-usual scenario.

Outcome of Step 3. There is at least one alternative scenario, except the proposed project activity, implementation of which would not be prevented by any of the identified barriers. This business-as-usual scenario is further considered as the baseline scenario for the proposed project.

Hence, the Step 3 is satisfied.

[28] *http://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-01-v6.1.0.pdf*

Step 4: Common practice analysis

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

The common practice for thermal power stations in Ukraine is carrying out only the necessary repair works to maintain the operationability of the existing old equipment without rehabilitation or modernization.

Only with the JI component it is possible to obtain the additional investments for the rehabilitation and modernization of the TPP's equipment.

Currently in Ukraine there are the following initiatives to implement projects to improve energy efficiency at existing generating plants: "Reconstruction of Units 1, 2, 3 and 4 at Zuyevska Thermal Power Plant"[29], "Reconstruction of the Units at the Structure Unit "Luhanska TPP" of the "Skhidenergo" Ltd."[30], "Reconstruction of the Units at the Structure Unit "Kurakhovska TPP" of the "Skhidenergo" Ltd"[31], that are implemented only by the possibility of selling ERUs in JI projects. But other JI projects should not be involved in the analysis of the common practice.

Outcome of Step 4a: Since the similar projects (being implemented without JI mechanism, since the projects implemented with JI mechanism are not to be taken into account) are not observed in the region, there is no basis for analysis of the similar activities.

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

All projects on rehabilitation of TPPs in Ukraine are being implemented only with attraction of the Kyoto Protocol JI mechanism. In the absence of additional financing (such as grants, other non-commercial finance terms, carbon credits, etc.) implementation of these projects would be impossible. Application of the JI mechanism is the only incentive to implement such projects.

Outcome of Sub-step 4b: Based on the available facts, the following conclusion may be made: activities similar to this project are not widespread in the power generation sector in Ukraine and are not a common practice.

Outcome of Step 4: Requirements of the Step 4 are satisfied as far as project activities do not fall under the category of *common practice*.

Hence, the Step 4 is satisfied.

Conclusion:

The results of the above assessment lead to the conclusion that the project activity is additional.

[29] *http://www.neia.gov.ua/nature/doccatalog/document?id=125299*

[30] *http://www.neia.gov.ua/nature/doccatalog/document?id=123314*

[31] *http://www.neia.gov.ua/nature/doccatalog/document?id=123305*

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

Sources of greenhouse gases and the project boundaries

Since the reduction of greenhouse gases emission is calculated based on changes of specific standard fuel consumption for production of electricity supplied to the grid, which take place due to the implementation of the project activity at Starobeshivska TPP, project boundaries are limited only by the project plant, and include all sources of emissions that are affected or controlled by the project activity. Emissions associated with the production and transportation of fuel are not included into the project.

Project boundaries for the **Baseline scenario** are represented by red dotted line at the graphical representation Fig. B.3.

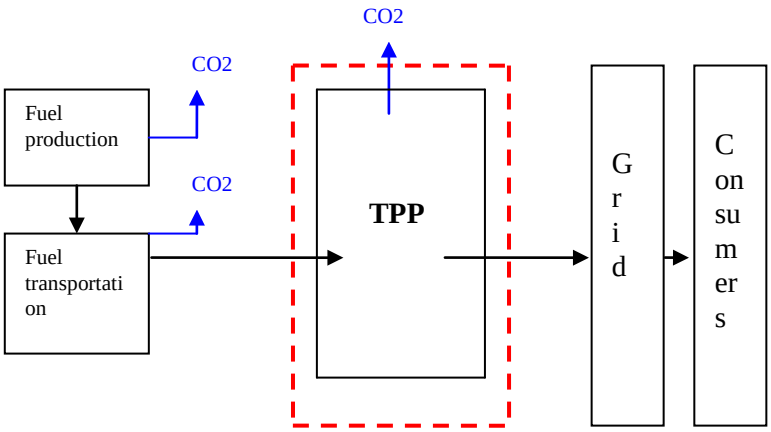

Figure B.3. Scheme of the project boundaries for Baseline scenario

Project boundaries for the **Project scenario** are represented by red dotted line at the graphical representation Fig. B.4.

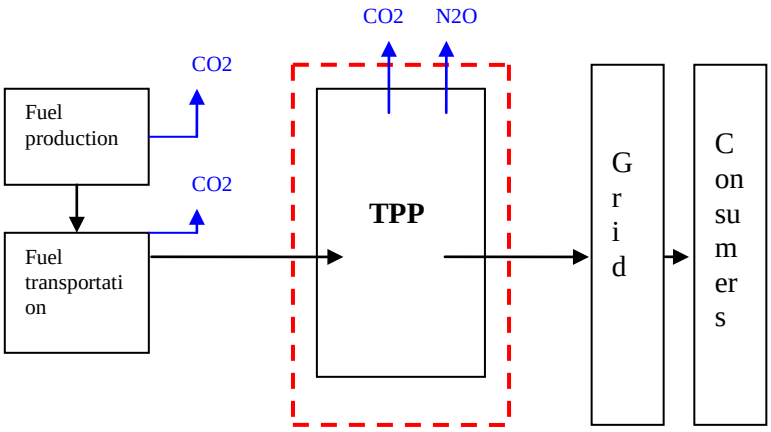

Fig. B.4. Scheme of the project boundaries for Project scenario

Direct and indirect emissions

Direct on-site emissions: CO_2, CH_4, N_2O, NO_x, CO and SO_2 emissions generated from fuel combustion in boilers of the TPP power generating units for electricity production.

Emissions of CH_4 and N_2O from fuel combustion in the baseline scenario are small, thus are excluded from the calculations for simplification.

N_2O emissions from fossil fuel combustion in the fluidized bed at power generating unit No.4 of the Starobeshivska TPP in the project scenario are included in the calculations.

Direct off-site emissions: none.

Indirect on-site emissions: none.

Indirect off-site emissions: greenhouse gas emissions from the extraction, production and transportation of fuel.

Emissions for baseline and project scenarios are shows in Table B.2 along with an explanation why the sources are included in / excluded from the project boundary.

Scenario	Source of emissions	Emissions	Included or excluded	Explanations
Local emissions				
Baseline	Emissions due to the fossil fuels combustion in boilers of power generating units of the TPP for electricity production	CO_2	Included	The main emission source
		CH_4	Excluded	Minor source*. Excluded from considerations for simplification..
		N_2O	Excluded	Minor source. Excluded from considerations for simplification..
		NO_x	Excluded	NO_x is not the immediate-action greenhouse gas
		CO	Excluded	CO is not the immediate-action greenhouse gas
		SO_2	Excluded	SO_2 is not the immediate-action greenhouse gas
Project	Emissions due to the fossil fuels combustion in boilers of power generating units of the TPP for electricity production	CO_2	Included	The main emission source
		CH_4	Excluded	Minor source. Excluded from considerations for simplification.
		N_2O	Included	Will appear after implementation of the combustion technology with air circulating boiling layer at power unit No.4
		NO_x	Excluded	NO_x is not the immediate-action greenhouse gas
		CO	Excluded	CO is not the immediate-action greenhouse gas
		SO_2	Excluded	SO_2 is not the immediate-action greenhouse gas
Extraneous emissions				
Emissions from a fuel production and transportation		Excluded		It is not under the control of project owner

*Methane emission is minor source in processes of fuel combustion at Starobeshivska TPP.

Table B.2. Sources of the emissions included to and excluded from the project's bounds

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.

The baseline is determined by the Institute of Engineering Ecology, the project developer (is not the project participant), and PJSC "Donbasenergo", the project participant – supplier.

Institute of Engineering Ecology
Kiev, Ukraine.
Oleksandr Sigal,
Director, PhD.
Phone: (+38 044) 453-28-62
Fax: (+38 044) 456-92-62
e-mail: engeco@kw.ua

PJSC "Donbasenergo"
Donetsk, Ukraine
Eduard Bondarenko .
General Director
Phone: (+38 062) 388 5822
Fax: (+38 062) 388 5890
e-mail: office@de.com.ua

SECTION C. Duration of the project / crediting period

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C.1. Starting date of the project:

The starting date of the project: 28/01/2000.

The date of the Technical meeting of the OJSC "Donbasenergo" on accepting of the Decision to realize the activity on GHG emission reduction through reconstruction and technical re-equipment of thermal power plants of the OJSC "Donbasenergo" (Protocol of the Technical meeting dated 28/01/2000) is taken as the starting date of the project.

C.2. Expected operational lifetime of the project:

32 years (384 months), from 01/01/2001 till 31/12/2032.

The minimal nominal lifetime of the new boilers is 20 years. The real average lifetime of the new energy equipment (boilers, turbines, etc.) is estimated to be up to 30 – 40 years. In accordance with conservative approach, the operational lifetime for the project is assumed equal to 20 years, or 240 months, since implementation of the last project activity (31/12/2012).

C.3. Length of the crediting period:

The starting date of the crediting period is accepted as January 1, 2004, because since namely this date the emission reductions are subject to crediting.

Earning of the ERUs corresponds to the first commitment period of 5 years (January 1, 2008 – December 31, 2012).

The status of emission reductions generated by the JI projects after ending of the first commitment period within Kyoto Protocol (continuation of the crediting period after 2012) may be defined as per relevant agreements and procedures within the framework of UNFCCC and Host country.

Thus the length of the crediting period is 29 years (348 months), from 01/01/2004 till 31/12/2032.

SECTION D. Monitoring plan

D.1. Description of monitoring plan chosen:

In accordance with paragraph 9(a) of the "Guidance on criteria for baseline setting and monitoring" (version 03)[32], the specific approach regarding monitoring plan was used, developed in accordance with Appendix B "Criteria for baseline setting and monitoring"[33] to "Guidelines for the implementation of Article 6 of the Kyoto Protocol" ("JI Guidelines")[34]. The project specific monitoring approach developed for this JI project is partially similar to the approach used in several JI projects on rehabilitation of thermal power plants and district heating systems in cities and regions of Ukraine, which had successfully passed the determination by accredited independent entities.

The monitoring plan chosen for this JI project has as its objective to ensure the availability of all relevant data necessary for determining of the emission amount in the baseline and project scenarios, and therefore – emission reductions due to the JI project implementation.

In accordance with the defined baseline, monitoring plan provides for measurement of fuel (coal, natural gas, fuel oil), its calorific value and useful electricity output during a year (reporting period). Other parameters are calculated or determined according to the normative documents.

Collection of all key parameters necessary for calculating GHG emissions is performed in accordance with the practices established in Starobeshivska TPS for fuel consumption and electricity output account, as well as for the environmental impact assessment. Monitoring of the project does not require changes in the existing data collection and account system. All relevant data are calculated and archived in any case, according to the requirements for statistical reporting of the station. Possible leakages were analyzed based on the conservative approach and were identified as insignificant (see Section E.2). Data of monitoring plan are to be kept for 2 years after the last transaction of emission reduction units for the project.

If expected monitored data for any object of the project activity in any reported period are unavailable:

- for statistical data unavailable, the default values from IPCC reports will be taken;
- for non-statistical data unavailable, the calculations for this object in this reported period will not be made, in according to conservative approach the estimated emission reductions for this object in this reported period will be assumed equal to 0.

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

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

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

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

D.1.1.1. Data to be collected in order to monitor emissions from the project, and how these data will be archived:

ID number *(Please use numbers to ease cross-referencing to D.2.)*	Data variable	Source of data	Data unit	Measured (m), calculated (c), estimated (e)	Recording frequency	Proportion of data to be monitored	How will the data be archived? (electronic/ paper)	Comment
1.	Actual standard fuel consumption in year *y* ***(B_y)***	PTD of Starobeshivska TPP, Form No.3-tech-TPP	t.s.f.	m/c	Once per year	100%	Registered in the journal (paper and/or electronic)	The actual consumption of different fuel types are regularly measured, than subject to a fuel NCV this data is calculated
2.	Part of the fuel type *i* in the standard fuel in year *y* ***($S_{i,y}$)***	PTD of Starobeshivska TPP, Form No. 3-tech-TPP	%	m/c	Once per year	100%	Registered in the journal (paper and/or electronic)	The actual consumption of different fuel types are regularly measured, than subject to a fuel NCV this data is calculated

3	Carbon content factor for fuel type *i* in year *y* ***($EF_{i,y}$)***	Normative document[35]	t C/ TJ	c	Once per year	100%		
4	Carbon oxidation factor under combustion of fuel type *i* in year *y* ***($OXID_{i,y}$)***	Normative document[36]	-	c	Once per year	100%		
5	Coal (sludge) consumption in year *y* ***($FC_{sl,y}$)***	Scales	t	m	Once per year	100%	Registered in the journal (paper and/or electronic)	Measured regularly with archiving monthly and yearly
6	Net calorific value of coal (sludge) in year *y* ***($NCV_{sl,y}$)***	Chem. Lab Analysis Report	GJ /t	m	Once per year	100%	Registered in the journal (paper and/or electronic)	Measured regularly with archiving monthly and yearly
7	Nitrous oxide emission factor for coal (sludge)	Normative document[37]	t N_2O / GJ	c	Once per year	100%		

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

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

[37] http://www.ipcc-nggip.iges.or.jp/public/2006gl/pdf/2_Volume2/V2_2_Ch2_Stationary_Combustion.pdf

	combusted by ACFB technology in year *y* ($EF_{N2O,sl,y}$)							
8	Quantity of limestone used in year *y* (L_y)	Scales	t	m	Once per year	100%	Registered in the journal (paper and/or electronic)	Measured regularly with archiving monthly and yearly
9	Carbon dioxide emission factor for limestone in year *y* ($EF_{CO2,l,y}$)	Normative document[38]	t CO_2/ t limestone	c	Once per year	100%		

All the data and parameters above are monitored throughout the crediting period.

According to valid legislation[39], all measuring equipment in Ukraine should meet the specified requirements of corresponding standards and is subject to the periodical calibration.

In case of failure of measurement equipment, it should be replaced or repaired as soon as possible. Such cases should be noted in monitoring reports.

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

[39] http://oscill.com/files/27082006.pdf

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

Greenhouse gas emissions in the reported year *y* for the project scenario are calculated as follows:

$$PE_y = \sum_i PE_{i,y} + PE_y^{ACFB} \qquad \text{(D.1.1.2-1)}$$

Where

$PE_{i,y}$ – GHG emissions due to combustion of fuel type *i* in year *y*, CO_2e;

PE_y^{ACFB} – additional GHG emissions due to features of fuel combustion in the ACFB boiler (N_2O emissions) and CO_2 emissions from limestone addition in year *y*, t CO_2e.

GHG emissions due to combustion of fuel type *i* in year *y*:

$$PE_{i,y} = \frac{B_y \times S_{i,y}}{100} \times 29{,}3 \times EF_{i,y} \times 44/12/1000 \times OXID_{i,y} \qquad \text{(D.1.1.2-2)}$$

where:

B_y – actual standard fuel consumption in year *y*, t.s.f.

$S_{i,y}$ – part of fuel type *i* in standard fuel in year *y*, %;

29,3 – calorific value of standard fuel, GJ / t;

$EF_{i,y}$ – carbon content factor for fuel type *i* in year *y*, t C / TJ;

44/12 – stoichiometric ratio between the molecular masses of carbon dioxide and carbon, t CO_2/ t C;

1000 – conversion factor of GJ into TJ;

$OXID_{i,y}$ – carbon oxidation factor under combustion of fuel type *i* in year *y*;

[i] – the type of combusted fuel (coal, natural gas, fuel oil);

[y] – reported year.

Additional GHG emissions due to features of fuel combustion in the ACFB boiler in year *y*:

$$PE_y^{ACFB} = PE_{sl,y}^{ACFB} + PE_{l,y} \quad \text{(D.1.1.2-3)}$$

where:

$PE_{sl,y}^{ACFB}$ – nitrous oxide emissions in units of carbon dioxide equivalent due to fuel combustion in the ACFB boiler in power generating unit No. 4 in year *y*, t CO_2e;

$PE_{l,y}$ – GHG emissions due to limestone using in power generating unit No. 4 in year *y*, t CO_2e;

Nitrous oxide emissions in units of carbon dioxide equivalent due to fuel combustion in the ACFB boiler in power generating unit No. 4 in year *y*:

$$PE_{sl,y}^{ACFB} = FC_{sl,y} \times NCV_{sl,y} \times EF_{N2O,sl,y} \times 310 \quad \text{(D.1.1.2-4)}$$

where:

$FC_{sl,y}$ – coal (sludge) consumption in year *y*, t;

$NCV_{sl,y}$ – net calorific value of coal (sludge) in year y, GJ / t;

$EF_{N2O,sl,y}$ – nitrous oxide emission factor for coal (sludge) combusted by ACFB technology in year *y*, t N_2O/ GJ;

310 – global warming potential of nitrous oxide, t CO_2e / t N_2O.

GHG emissions due to limestone using in power generating unit No 4 in year *y*:

$$PE_{l,y} = L_y \bullet EF_{l,CO2}, \quad \text{(D.1.1.2-5)}$$

where:

L_y – quantity of limestone used in year *y*, t;

$EF_{l,CO2}$ – carbon emission factor for limestone in year *y*, t CO_2/ t limestone.

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 ©, estimated (e)	Recording frequency	Proportion of data to be monitored	How will the data be archived? (electronic/ paper)	Comment
1	Actual standard fuel consumption for generation of electricity output to the grid in year *j* of the historical period (B_j)	PTD of Starobeshivska TPP "Maket 15506-1"	t.s.f.	m/c	Once after the end of the base historical period	100%	Registered in the journal (paper and/or electronic)	The actual consumption of different fuel types are regularly measured, than subject to a fuel NCV this data is calculated
2	Dynamic baseline standard fuel consumption in year *y* (B^d_y)		t.s.f.	c	Once per year	100%	Registered in the journal (paper and/or electronic)	

3	Part of the fuel type *i* in the standard fuel in year *y* ***($S_{i,y}$)***	PTD of Starobeshivska TPP Form No. 3-tech-TPP	%	m/c	Once per year	100%	Registered in the journal (paper and/or electronic)	The actual consumption of different fuel types are regularly measured, than subject to a fuel NCV this data is calculated
4	Carbon content factor for fuel type *i* in year *y* ***($EF_{i,y}$)***	Normative document[40]	t C / TJ	c	Once per year	100%		
5	Carbon oxidation factor under combustion of fuel type *i* in year ***($OXID_{i,y}$)***	Normative document[41]	-	c	Once per year	100%		
6	Electricity output to the grid in year *y* ***(EG_y)***	PTD of Starobeshivska TPP Form No. 3-tech-TPP	MWh	Mb	Once per year	100%	Registered in the journal (paper and/or electronic)	Measured continuously with archiving monthly and yearly

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

[41] http://www.ipcc-nggip.iges.or.jp/public/gl/guidelin/ch1wb1.pdf

7	Electricity output to the grid in year *j* of historical period ***(EG $_j$)***	PTD of Starobeshivska TPP "Maket 15506-1"	MWh	m	Once after the end of the base historical period	100%	Registered in the journal (paper and/or electronic)	

Data and parameters that are not monitored throughout the crediting period, but are determined only once (and thus remain fixed throughout the crediting period), and that are available already at the stage of determination regarding the PDD: D.1.1.3.-1: ***B*** $_j$ **,** D.1.1.3.-7: ***EG*** $_j$ **.**

All other data and parameters in Table D.1.1.3 above (No.No. D.1.1.3.-2 – D.1.1.3.-6) are monitored throughout the crediting period.

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

GHG baseline emissions for dynamic baseline setting is calculated as follows:

$$BE_y = \sum_i BE_{i,y} \qquad \text{(D.1.1.4-1)}$$

where:

$BE_{i,y}$ – dynamic baseline emissions due to the fuel combustion of type i in year y, t CO_2e;

$$BE_{i,y} = B^d_y * S_{i,y}/100 * 29.3 * EF_{i,y} * 44/12/1000 * OXID_{i,y} \qquad \text{(D.1.1.4-2)}$$

where

B^d_y – dynamic baseline standard fuel consumption in year y, t.s.f.;

$S_{i,y}$ – part of the fuel type i in the standard fuel in year y,%;

29.3 – net calorific value of standard fuel, GJ / t;

$EF_{i,y}$ – carbon content factor for fuel type i in year y, t C / TJ;

44/12 – stoichiometric ratio between the molecular mass of carbon dioxide and carbon, t CO_2/ t C;

1000 – conversion factor of GJ into TJ;

$OXID_{i,y}$ – carbon oxidation factor under combustion of fuel type *i* in year *y*;

[i]– the type of combusted fuel (coal, natural gas, fuel oil);

[y] – reported year,

$$B_y^d = SEC_y^d \times EG_y \qquad \text{(D.1.1.4-3)}$$

where

SEC_y^d – dynamic baseline specific standard fuel consumption in year *y*, t.s.f. / MWh;

EG_y –electricity output to the grid in year *y*, MWh;

[y] – reported year.

Dynamic baseline specific standard fuel consumption SEC_y^d are calculated based on the assumption of their linear increasing with time. This linear dependence is based on historical data for the period *j* from 1993 till 1999 with using of the least-squares method.

$$SEC_y^d = a * y + b \qquad \text{(D.1.1.4-4)}$$

where:

a – linear dependence coefficient;

b – linear dependence coefficient;

[y] – reported year.

$$a = \frac{k \times \sum_j \left(SEC_j \times j\right) - \sum_j SEC_j \times \sum_j j}{k \times \sum_j j^2 - \left(\sum_j j\right)^2} \qquad \text{(D.1.1.4-5)}$$

$$b = \frac{\sum_j SEC_j - a \times \sum_j j}{k} \qquad \text{(D.1.1.4-6)}$$

where:

SEC_j – specific standard fuel consumption in year *j* of the historical period, t.s.f. / MWh;

[k] – amount of years of the historical period;

[j] – year of the historical period.

$$SEC_j = B_j / EG_j \qquad \text{(D.1.1.4-7)}$$

where:

B_j – actual standard fuel consumption for generation of electricity output to the grid in year *j* of the historical period, t.s.f.;

EG_j – electricity output to the grid in year *j* of the historical period, MWh

[j] – year of the historical period.

More detailed information is provided in the **Appendix A** (Excel tables).

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

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 for purpose. Option 1 is chosen.

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 for purpose. Option 1 is chosen.

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

No leakages are expected.

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

No leakages are expected.

Any occasional leakage emissions (for example, caused by pipes' leakages, etc.) should be eliminated as soon as possible.

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

No leakages are expected.

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):

Estimated emission reductions for the project activity in the reported year *y*:

$$ER_y = BE_y - PE_y \quad \text{(D.1.4.-1)}$$

where:

ER_y – GHG emission reductions in year *y*, t CO_2e;

BE_y – GHG baseline emissions due to fossil fuels combustion in year *y*, t CO_2e;

PE_y – GHG project emissions due to fossil fuels combustion in year *y*, t CO_2e;

[y] – reported year.

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:

According to the common Ukrainian practice for such type projects, the environmental impact of the project will be estimated by fuel consumption and combustion.

- Law of Ukraine No. 1264-XII "On environmental protection" dated 25/06/1991[42];
- Law of Ukraine No. 2707-XII "On atmospheric air protection" dated 16/10/1992[43];
- Valid rules on emissions limitation: "Norms of limit admissible emissions of pollution agents from stationary sources" – adopted by Ministry for Environmental Protection of Ukraine on 27/06/2006, No.309 and registered by Ministry of Justice of Ukraine on 01/09/2006, No. 912/12786[44].

Starobeshivska TPP will systematically collect data on pollution, which can have a negative impact on the environment. The qualified plant employees will perform data monitoring, measuring equipment data (electric meters, flowmeters) collection and archiving.

[42] http://zakon2.rada.gov.ua/cgi-bin/laws/main.cgi?nreg=1264-12

[43] http://zakon2.rada.gov.ua/cgi-bin/laws/main.cgi?nreg=2707-12

[44] http://zakon2.rada.gov.ua/cgi-bin/laws/main.cgi?nreg=z0912-06

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: 1. Actual standard fuel consumption in year *y* ***(B_y)***	Low	Measuring instruments must be calibrated according to national regulations (the State Standard of Ukraine No. 2708:2006 "Metrology. Calibration of measuring equipment. The organization and procedure"[45]).
D.1.1.3: 1. Actual standard fuel consumption for generation of electricity output to the grid in year *j* of historical period ***(B_j)***	Low	Measuring instruments must be calibrated according to national regulations
D.1.1.3: 2. Dynamic baseline standard fuel consumption in year *y* ***(B^d_y)***	Low	No QA/QC procedures are necessary. Calculated data (calculated according to dynamic baseline standard fuel consumption and electricity output to the grid in year *y*).
D.1.1.1: 2; D.1.1.3: 3. Part of the fuel type *i* in the standard fuel in year *y* ***($S_{i,y}$)***	Low	Measuring instruments must be calibrated according to national regulations

[45] *hths.tp://oscill.com/files/27082006.pdf*

D.1.1.1: 3.; D.1.1.3: 4. Carbon content factor for the fuel type *i* in year *y* ***(EF*** $_{i,y}$ ***)***	Low	Normative documents data. No QA/QC procedures are necessary. "National inventory of anthropogenic emissions by sources and removals by sinks of greenhouse gases in Ukraine in 1990-2010"[46] is the official report submitted to the secretariat of the UNFCCC
D.1.1.1: 4; D.1.1.3: 5. Carbon oxidation factor under combustion of fuel type *i* in year *y* ***(OXID*** $_{i,y}$ ***)***	Low	Normative documents data. No QA/QC procedures are necessary. "National inventory of anthropogenic emissions by sources and removals by sinks of greenhouse gases in Ukraine in 1990-2010" [47] is the official report submitted to the secretariat of the UNFCCC
D.1.1.1: 5. Coal (sludge) consumption in year *y* ***(FC*** $_{sl,y}$ ***)***	Low	Measuring instruments must be calibrated according to national regulations
D.1.1.1: 6. Net calorific value of coal (sludge) in year y ***(NCV*** $_{sl,y}$ ***)***	Low	Measuring instruments must be calibrated according to national regulations
D.1.1.1: 7. Nitrous oxide emission factor for coal (sludge) combusted by ACFB technology in year *y* (***EF*** $_{N2O,sl,y}$ ***)***	Low	No QA/QC procedures are necessary. Guidelines for National Greenhouse Gas Inventories IPCC, 2006[48] is the official document of the UNFCCC

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

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

[48] http://www.ipcc-nggip.iges.or.jp/public/2006gl/pdf/2_Volume2/V2_2_Ch2_Stationary_Combustion.pdf

D.1.1.1: 8. Quantity of limestone used in year *y* ***(L $_y$)***	Low	Measuring instruments must be calibrated according to national regulations
D.1.1.1: 9. Carbon emission factor for limestone in year *y* ***(EF $_{CO2,l,y}$)***	Low	Normative documents data. No QA/QC procedures are necessary. "National inventory of anthropogenic emissions by sources and removals by sinks of greenhouse gases in Ukraine in 1990-2010"[49] is the official report submitted to the secretariat of the UNFCCC
D.1.1.3: 6. Electricity output to the grid in year *y* ***(EG $_y$)***	Low	Measuring instruments must be calibrated according to national regulations
D.1.1.3: 7. Electricity output to the grid in year *j* of historic period ***(EG $_j$)***	Low	Measuring instruments must be calibrated according to national regulations

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

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

Project management

The scheme describing the operational and management structure that the project operator will apply in implementing the monitoring plan, and identifying the responsibilities and the authority regarding the monitoring activity as to the parameters to be monitored is presented in **Annex 3**.

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

The monitoring plan is determined by the Institute of Engineering Ecology, the project developer (is not a project participant), PJSC "Donbasenergo", the project participant– supplier.

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SECTION E. Estimation of greenhouse gas emission reductions

Estimation (calculation) of GHG emission reductions for years when values of all parameters are already available, that is for the past years from 2004 to 2011, is based on the actual data according to the monitoring plan with using the formulae presented in sections D.1.1 - D.1.4.

The emission reductions for 2012 and the following years are conservatively estimated as equal to the actual data for the 2011.

E.1. Estimated project emissions:

The results of calculations with using of formulas provided in Section D.1.1 - D.1.4., and prognostic estimation are provided in **Appendix A.**

GHG Project emissions are provided in Tables E-1.1 - E - 1.4.

Year	Project emissions (t CO_2 equivalent)
2004	3 866 619
2005	4 310 545
2006	4 302 166
2007	3 960 989
Total 2004 – 2007 (t CO_2 equivalent)	16 440 319

Table E.1.1. Estimated project emissions for the period January 1, 2004 - December 31, 2007

Year	Project emissions (t CO_2 equivalent)
2008	4 848 387
2009	5 083 968
2010	5 286 528
2011	5 679 869
2012	5 679 869
Total 2008 – 2012 (t CO_2 equivalent)	26 578 621

Table E.1.2. Estimated project emissions for the period January 1, 2008 - December 31, 2012

Year	Project emissions (t CO_2 equivalent)
2013	5 679 869
2014	5 679 869
2015	5 679 869
2016	5 679 869
2017	5 679 869
2018	5 679 869
2019	5 679 869
2020	5 679 869
2021	5 679 869
2022	5 679 869
2023	5 679 869
2024	5 679 869

2025	5 679 869
2026	5 679 869
2027	5 679 869
2028	5 679 869
2029	5 679 869
2030	5 679 869
2031	5 679 869
2032	5 679 869
Total 2013 – 2032 ($t CO_2$ equivalent)	113 597 380

Table E.1.3. Estimated project emissions for the period January 1, 2013 - December 31, 2032

2004 – 2032	Project emissions ($t CO_2$ equivalent)
Total 2004 – 2032 ($t CO_2$ equivalent)	156 616 320

Table E.1.4. Estimated project emissions for the period January 1, 2004 - December 31, 2032

E.2. Estimated leakage:

No leakage is expected, so they are not taken into account in calculations.

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

Since no leakage is expected in the project activity, the sum of E.1 and E.2 will be the same as E.1 (see Table E.1 above).

E.4. Estimated baseline emissions:

Baseline emissions are provided in Tables E-4.1 - E-4.4.

Year	Baseline emissions ($t CO_2$ equivalent)
2004	4 034 534
2005	4 525 879
2006	4 531 306
2007	4 158 973
Total 2004 – 2007 ($t CO_2$ equivalent)	17 250 692

Table E.4.1. Baseline emissions for the period January 1, 2004 - December 31, 2007

Year	Baseline emissions (t CO_2 equivalent)
2008	5 110 458
2009	5 416 666
2010	5 611 312
2011	5 964 638
2012	5 964 638
Total 2008 – 2012 (t CO_2 equivalent)	28 067 712

Table E.4.2. Baseline emissions for the period January 1, 2007 - December 31, 2012

Year	Baseline emissions (t CO_2 equivalent)
2013	5 964 638
2014	5 964 638
2015	5 964 638
2016	5 964 638
2017	5 964 638
2018	5 964 638
2019	5 964 638
2020	5 964 638
2021	5 964 638
2022	5 964 638
2023	5 964 638
2024	5 964 638
2025	5 964 638
2026	5 964 638
2027	5 964 638
2028	5 964 638
2029	5 964 638
2030	5 964 638
2031	5 964 638
2032	5 964 638
Total 2013 – 2032 (t CO_2 equivalent)	119 292 760

Table E.4.3. Baseline emissions for the period January 1, 2013 - December 31, 2032

2004 – 2032	Baseline emissions (t CO_2 equivalent)
Total 2004 – 2032 (t CO_2 equivalent)	164 611 164

Table E.4.4. Baseline emissions for the period January 1, 2004 - December 31, 2032

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

Project emission reduction = Baseline emissions - (Project emissions +Estimated leakage).

Emission reductions from the project are presented in Tables E.5.1-E.5.4.

Year	Estimated emission reductions (t CO_2 equivalent)
2004	167 915
2005	215 334
2006	229 140
2007	197 984
Total 2004 – 2007 (t CO_2 equivalent)	810 373

Table E.5.1. Estimated emission reductions for the period January 1, 2004 - December 31, 2007

Year	Estimated emission reductions (t CO_2 equivalent)
2008	262 071
2009	332 698
2010	324 784
2011	284 769
2012	284 769
Total 2008 – 2012 (t CO_2 equivalent)	1 489 091

Table E.5.2. Estimated emission reductions for the period January 1, 2008 - December 31, 2012

Year	Estimated emission reductions (t CO_2 equivalent)
2013	284 769
2014	284 769
2015	284 769
2016	284 769
2017	284 769
2018	284 769
2019	284 769
2020	284 769
2021	284 769
2022	284 769
2023	284 769
2024	284 769
2025	284 769
2026	284 769
2027	284 769
2028	284 769
2029	284 769
2030	284 769
2031	284 769
2032	284 769
Total 2013 – 2032 (t CO_2 equivalent)	5 695 380

Table E.5.3. Estimated emission reductions for the period January 1, 2013 - December 31, 2032

2004 – 2032	Estimated emission reductions (t CO_2 equivalent)
Total 2004 – 2032 (t CO_2 equivalent)	7 994 844

Table E.5.4. Estimated emission reductions for the period January 1, 2004 - December 31, 2032

The detailed calculations of the emission reductions are provided in **Appendix A** (Microsoft Excel table).

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

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)
2004	3 866 619	0	4 034 534	167 915
2005	4 310 545	0	4 525 879	215 334
2006	4 302 166	0	4 531 306	229 140
2007	3 960 989	0	4 158 973	197 984
Total 2004 – 2007 (tonnes of CO_2 equivalent)	16 440 319	0	17 250 692	810 373

Table E.6.1. Estimated emission reductions for the period 1 January 2004 - 31 December 2007

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)
2008	4 848 387	0	5 110 458	262 071
2009	5 083 968	0	5 416 666	332 698
2010	5 286 528	0	5 611 312	324 784
2011	5 679 869	0	5 964 638	284 769
2012	5 679 869	0	5 964 638	284 769
Total 2008 – 2012 (tonnes of CO_2 equivalent)	26 578 621	0	28 067 712	1 489 091

Table E.6.2. Estimated emission reductions for the period 1 January 2008 - 31 December 2012

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)
2013	5 679 869	0	5 964 638	284 769
2014	5 679 869	0	5 964 638	284 769
2015	5 679 869	0	5 964 638	284 769
2016	5 679 869	0	5 964 638	284 769
2017	5 679 869	0	5 964 638	284 769
2018	5 679 869	0	5 964 638	284 769
2019	5 679 869	0	5 964 638	284 769
2020	5 679 869	0	5 964 638	284 769
2021	5 679 869	0	5 964 638	284 769
2022	5 679 869	0	5 964 638	284 769
2023	5 679 869	0	5 964 638	284 769
2024	5 679 869	0	5 964 638	284 769
2025	5 679 869	0	5 964 638	284 769
2026	5 679 869	0	5 964 638	284 769
2027	5 679 869	0	5 964 638	284 769
2028	5 679 869	0	5 964 638	284 769
2029	5 679 869	0	5 964 638	284 769
2030	5 679 869	0	5 964 638	284 769
2031	5 679 869	0	5 964 638	284 769
2032	5 679 869	0	5 964 638	284 769
Total 2013 – 2032 (tonnes of CO_2 equivalent)	113 597 380	0	119 292 760	5 695 380

Table E.6.3. Estimated emission reductions for the period 1 January 2013 - 31 December 2032

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)
Total 2004 - 2032 (tonnes of CO_2 equivalent)	156 616 320	0	164 611 164	7 994 844

Table E.6.4. Estimated emission reductions for the period 1 January 2004 - 31 December 2032

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:

According to the Ukrainian regulations, the design documentation for the new building, reconstruction and major technical re-equipment of industrial and civil objects may include the environmental impact assessment.

Environmental Impact Assessment (EIA) is directed on determination of scales and levels of the project activity impact on an environment, on development of measures for prevention or reduction of this impact, on estimation of acceptability of project decisions from the ecological point of view.

The legislative requirements to EIA materials content are enshrined in the Article 36 of the Law of Ukraine «On ecological expertise»[50]. Requirements to the structure, composition and content of the EIA sections are enshrined in the State Building Norms of Ukraine DBN A.2.2-1-2003 "Composition and content of the Environmental Impact Assessment (EIA) materials at designing and construction of enterprises, buildings and premises"[51].

PJSC "Donbasenergo" has the necessary Environmental Impact Assessments of project on rehabilitation of power generating units No. 4 and No. 7 in accordance with the Ukrainian legislation.

Also PJSC "Donbasenergo" has permissions for emission of pollutants into the air from stationary sources, for special water use, for waste treatment, that contain limits for generation and disposal of waste (see below).

In general, the project implementation will have positive effect on the environment.

1. Due to the use of more environmental friendly combustion technology at the unit No.4, installation of electric filter and of the system for monitoring of toxic substances emissions from the power generating unit No.4, the emissions will be reduced:[52]

   NO_x: from 900 to 200 mg/nm^3;

   SO_2: from 1500 to 200 mg/nm^3;

   Dust: from 2500 to 50 mg/nm^3.

2. Due to technical re-equipment of the power generating unit No. 7, installation of the system for the exhaust gas cleaning from dust and sulfur dioxide, the emissions will be reduced:

SO_2: from 3000-5000 to 400 mg/nm^3 (according to the Order of Ministry of Environmental protection of Ukraine dated 22.10.2008 No. 541 «On approval of the technological norms for permissible emissions of contaminants from the heat units, nominal heat capacity of which exceeds 50 MW», the technological norms are set for the power generating unit No. 7 as for a power generating unit under modernization);

Dust: from 2000-4000 to 50 mg/nm^3.

[50] http://zakon1.rada.gov.ua/cgi-bin/laws/main.cgi?nreg=45%2F95-%E2%F0

[51] http://www.budinfo.com.ua/dbn/8.htm

[52] http://www.kmu.gov.ua/control/uk/publish/article?art_id=244298814&cat_id=244277216

3. The environmental pollution will be reduced due to the use of existing huge clutters of wastes in the waste reservoirs of coal concentration plants (slimes) as a fuel in the boiler with the atmospheric circulating fluidized bed and due to recycling of such wastes as coke-ashy wastes which are the raw material for production of building materials.

Transboundary impacts of the project activity according to their definition in the text ratified by Ukraine "Convention on Transboundary Pollution at a great distance", will not take place, because as far as the usual activity of the Starobeshivska TPP does not cause the transboundary transfer of pollutants, the project activity which reduces the negative environmental impact does not cause the transboundary transfer as well.

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:

Impact on the ambient air

The project implementation will have positive effect on ambient air:

1) Reduction of NO_x, SO_x, CO and particulate matter due to application of more environmental friendly coal energy production technology;

2) Reduction of fuel consumption for electricity production and power consumption for own needs of power generating units will lead to reduction of emissions of the same air pollutants.

Impact on ambient air is governed by the Law of Ukraine "On Protection of Atmospheric Air" dated 16.10.1992, № 2707-XII.

Impact on the land use

Implementation of the project will have positive impact on the land use:

Burning of wastes of coal preparation plants in the ACFB boiler enables to free and to re-cultivate territories where these wastes are accumulated.

There is no impact on the land/soil.

Relevant regulation is the sphere of land use is presented by the Land Code of Ukraine.

Impact on the water medium

Impact on the water medium will be the same as in the baseline scenario.

The existing technology for electricity generation used at the Starobeshivska TPP foresees discharging of waste water to the sewage network with chemical control in accordance to Water Code of Ukraine[53], Decision of KMU dated September, 11, 1996 No. 1100 “On Procedure of development and approval of norms for maximum permissible discharge of contaminants and list of contaminants the discharge of which is normalized”[54], on determining the maximum permissible concentration for internal water bodies. Waste water will not be discharged to the open water bodies.

[53] *http://zakon.nau.ua/doc/?uid=1011.17.21&nobreak=1*

[54] *http://document.ua/porjadok-rozroblennja-i-zatverdzhennja-normativiv-granichno--nor8270.html*

Impact on the biodiversity

Impact on biodiversity is not present.

Waste generation, their treatment and disposal

In the process of project implementation, generation of waste occurs after dismantling of the obsolete equipment (burners, pipes, etc.). Also, construction wastes are generated due to dismounting of foundations, etc.

Positive impact on the environment will have the use of existing huge clutters of wastes in the waste reservoirs of coal concentration plants (slimes) as a fuel in the boiler with atmospheric circulating fluidized bed.

The relevant legislation in the field of waste treatment is represented by the Law of Ukraine "On Waste" dated 06.07.2012, № 5179-VI.

SECTION G. Stakeholders' comments

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

The Stakeholders' comments are presented in the following publications:

«Statement on environmental consequences of equipment modernization at power unit No. 7 of the Starobeshivska TPP" (Newspaper "Golos Energetika" No.28 (2414) dated 29/07/2005).

«Statement on Starobeshivska TPP intention to get permissions for pollutant emissions from boiler unit with the atmospheric circulating fluidized bed at the power unit No. 4" (Newspaper "Golos Energetika No.20 (2554) dated 13/06/2008).

Project "Rehabilitation and technical re-equipment of Starobeshivska TPP of the OJSC "Donbasenergo" was presented at XVIII and XIX International conferences „Problems of ecology and operation of energy facilities" (Yalta, June 10-14, 2008 and June 8-12, 2009), where it was comprehensively discussed by the representatives of generating companies and potential investors.

Annex 1

CONTACT INFORMATION ON PROJECT PARTICIPANTS

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Annex 2

BASELINE INFORMATION

The main baseline information is presented in section B.2.

Key elements of the baseline (including variables, parameters and data sources) are given in the table below.

	Symbol	Parametr	Data unit	Measured (m), calculated (c), estimated (e)
1	B_j	Actual standard fuel consumption for generation of electricity output to the grid in year *j* of historical period	t e.f.	m/c
2	B^d_y	Dynamic baseline standard fuel consumption in year *y*	t e.f.	c
3	$S_{i,y}$	Part of the fuel type *i* in the standard fuel in year *y*	%	m/c
4	$EF_{i,y}$	Carbon content factor for fuel type *i* in year *y*	tC / TJ	National inventory of anthropogenic emissions by sources and removals by sinks of greenhouse gases in Ukraine in 1990 - 2010", Appendix 2, Section P2.5[55]
5	$OXID_{i,y}$	Carbon oxidation factor under combustion of fuel type *i* in year *y*		National inventory of anthropogenic emissions by sources and removals by sinks of greenhouse gases in Ukraine in 1990 - 2010", Appendix 2, Section P2.6[56]
6	EG_y	Electricity output to the grid in year *y*	MWh	m
7	EG_j	Electricity output to the grid in year *j* of historical period	MWh	m

Table Ann2.1. Key elements of the baseline

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

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

Annex 3

MONITORING PLAN

1. Determination of all potential GHG emission sources and types within the project boundaries.
2. Collection of information on monitoring parameters required for the estimation of GHG emissions.
3. Collection of information on calibration of the measuring equipment.
4. Collection of information on the environmental impact of the project activity.
5. Archiving of data.

	Symbol	Parametr	Data unit	Measured (m), calculated (c), estimated (e)
1	B_y	Actual standard fuel consumption in year *y*	t e. .	m/c
2	$S_{i,y}$	Part of the fuel type *i* in the standard fuel in year *y*	%	m/c
3	$EF_{i,y}$	Carbon content factor for fuel type *i* in year *y*	t C/TJ	"National inventories of anthropogenic emissions by sources and removals by sinks of greenhouse gases in Ukraine 1990 – 2010" [57], Annex 2, Section P2.5
4	$OXID_{i,y}$	Carbon oxidation factor under combustion of fuel type *i* in year *y*		"National inventories of anthro-pogenic emissions by sources and removals by sinks of greenhouse gases in Ukraine in 1990 – 2010", Annex 2, Section P2.6[57]
5	$FC_{sl,y}$	Coal (sludge) consumption in year *y*	t	m
6	$NCV_{sl,y}$	Net calorific value of coal (sludge) in year *y*	GJ / t	m
7	$EF_{N2O,sl,y}$	Nitrous oxide emission factor for coal (sludge) combusted by ACFB technology in year *y*	t N_2O / GJ	«Guidelines for National Greenhouse Gas Inventories ", IPCC, 2006 [58]
8	L_y	Quantity of limestone used in year *y*	t	m
9	$EF_{CO2,l,y}$	Carbon dioxide emission factor for limestone in year *y*	t CO_2 / t limeston e	"National inventories of anthro-pogenic emissions by sources and removals by sinks of greenhouse gases in Ukraine in 1990 – 2010", Annex 2, Section 4[57]

Table Ann3.1. Key elements of the monitoring

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

[58] http://www.ipcc-nggip.iges.or.jp/public/2006gl/pdf/2_Volume2/V2_2_Ch2_Stationary_Combustion.pdf

Monitored parameters

According to the JI project specific approach to monitoring that is used in this JI project, the parameters to be measured or monitored at regular intervals are defined.

The parameters required to monitor the project are collected in the planned manner during usual operation of the power plant; appropriately, the project monitoring makes the organic part of planned monitoring.

These parameters will be entered into the Excel spreadsheets, whereby the GHG emission reductions will be calculated.

Data collection for the monitoring period

Collection of data on fuel consumption at Starobeshivska TPP of the PJSC “Donbasenergo” is as follows:

Note: operational staff of the appropriate shop collects the primary data on electricity and fuel account

1. All the data required for monitoring are collected at the production department of the Starobeshivska TPP.

2. Accounting of coal consumed by Starobeshivska TPP during the reported day is performed by the operational personnel of the power plant, from indications of the band scales installed at band conveyors fedding coal into the boiler compartment of the power plant. The amount of daily coal consumption is registered by operational staff in the daily statements by Form TP-21. The amount of coal consumed by Starobeshivska TPP in the reported period (month) is displayed in the Act of traffic and balances of fuel according to the TP-22 Form.

3. Accounting of natural gas consumed by Starobeshivska TPP during the reported day is performed by operational staff of the gas distribution station (GDS), at which the commercial accounting unit of natural gas is installed. GDS is a division of Starobeshivsky gas supply department of the PJSC “Donetskoblgaz” of the NJSC "Naftogaz of Ukraine". Operating personnel of GDS transfers operational data on daily natural gas consumption to the power plant shift supervisor for registration in the daily report. Operational control of the natural gas consumption during a day is performed by power plant staff on the basis of the indications of the technical accounting unit installed at the gas distribution point (GDP) of Starobeshivska TPP. The amount of natural gas consumed by Starobeshivska TPS in the reported period (month) is processed by the bilateral Act of transferring / receiving of natural gas between the Starobeshivska TPP and the Starobeshivska MGG, and is reflected in the Act of transportation and balances of fuel according to the TP-22 Form.

4. Accounting of fuel oil consumed by Starobeshivska TPP during the reported day is performed by operational personnel of the power plant on the basis of the difference in the levels of fuel oil in tanks according to calibration tables for the tank from which the fuel oil was fed to the boilers, taking into account the density of fuel oil at the moment. The density of fuel oil is determined periodically by the staff of the certified chemical laboratory of the chemical shop. The amount of fuel oil daily consumed by the power plant is registered in the daily report of the power plant shift supervisor. The amount of fuel oil consumed by Starobeshivska TPP in the reporting period (month) is reflected in the Act of transportation and balances of fuel according to the TP-22 Form.

5. Monitoring of the useful electricity output to the grid as well as of electricity consumed by equipment of the Starobeshivska TPP that is used for the enterprise own needs, is carried out with using electricity meters. The data are summarized monthly and are registered electronically and documented. Data on electricity delivered to the power grid and consumed by the plant’s auxiliary equipment, are monthly checked against bills obtained from the service grid operator.

Specifications of all metering equipment meet the technical standards of Ukraine; the same standards are applied at meter calibration to ensure their accuracy.

Operation personnel of the Main control board (MCB) makes up the layout on the amount of produced and usefully supplied electricity during the reported day on the basis of the indications of meters of the electricity produced by generators and output from the plant, registered by the operational staff of electric shop in daily plant data sheet for 24.00 hours of the reported day, which is sent in electronic form to the control center of the “Donbas Electrical Networks".

Daily data sheet from the main control board after the day ending is sent to the technological group of the Production and technical department (PTD) (where is further archived), where on the basis of the aforementioned indications of meters the independent layout is prepared on the amount of produced and usefully supplied electricity for the reported day, and check is made with values calculated by the MCB operational staff. This layout in electronic form is sent to the energy market collaboration department of the PJSC "Donbasenergo", from where it is sent to the state enterprise "Energy market"/

According to the electricity meters indications at 00.00 hours of the first day and at 24.00 hours on the last day of the reported month, the Act on produced and usefully supplied electricity in the reported month is made, according to the Instruction on the commercial electricity account (Annex 10 to the Agreement between the members of the Wholesale Electricity Market of Ukraine, 2003). This Act in electronic form is submitted to the department on work with energy market of the PJSC "Donbasenergo", as well as to the control center of the “Donbas Electrical Networks", then signed by responsible officials of the power plant is additionally sent to “Donbas Electrical Networks”.

To control the electricity meters indications for 24.00 pm of the last day of the reported month, the bilateral balance sheet of power at the 110 and 220 kV buses of the Starobeshivska TPP is made by Form A-083, where the electricity meters indications for 24.00 pm of the last day of the reported month are registered. The above Act is signed by representatives of PJSC "Donetskoblenergo" and Starobeshivska TPP, and is transferred for archiving to the technology group of PTD.

For monitoring of greenhouse gases emissions, the responsible managers of the plant operation service are assigned.

Calibration procedures

Under current legislation, all measuring equipment in Ukraine should meet the appropriate standards and is to be calibrated periodically.

Means of measurements (meters, scales, flow meters, calorimeters, etc.) that are subject to calibration by the territorial Derzhspozhyvstandart organizations have the mark of the state calibration entity and are submitted to it in due course. The power plant has the calibration schedule endorsed with Derzhspozhyvstandart organizations and approved by the chief engineer (technical director). The organization and procedure of calibration meet the state standards.

Setting-up, technological and comprehensive tests of facilities for machine sampling and processing of solid fuel samples are performed by the competent organization according to the RD 34.23.504.

The procedure for handling cases of failure of the heat-mechanical equipment, eliminating of the general station accidents are regulated by the "Instruction to prevent and eliminate accidents". For each type of accidents and places of their appearance the measures are established to eliminate them.

The following types of accidents are provided for: malfunction of fuel supply, fuel oil pipes damage, fire of the tail heating surfaces of boilers, damage of pipes inside boilers damage of feed water pipelines and the main steam lines, damage of the high pressure steam pipelines, damage of turbine oil system, damage of technical water supply system, damage op heat network pipelines.

Malfunction of devices are repaired by specialists of metrology service.

The structure of responsibility for JI project monitoring at Starobeshivska TPP

The overall responsibility for project management and implementation is imposed on the General Director of the PJSC "Donbasenergo" Mr. Eduard Mykolayovych Bondarenko.

Operational and management structure of the project includes the following departments of the Starobeshivska TPP: production and technology department, fuel and transport department, accounting department, production chemical laboratory, electric shop.

Possible obstacles and mistakes in project implementation should be identified and solved by the responsible personnel of the PTD.

Scheme of monitoring data collection and processing at the power plant is shown at Fig. Ann3.1.

Trainings

As far as the main activity of Starobeshivska TPP is not changed in course of the JI project implementation, the special technical trainings for personnel are not necessary. The technical personnel of the enterprise has sufficient knowledge and experience for implementation of the project activity and maintenance of the usual equipment. The regular periodic advanced training courses for operation personnel are carried out at the power plant, and staff is sufficiently qualified.

However, since the technology of fuel combustion with atmospheric circulating fluidized bed is significantly different from those technologies that are widely used in Ukraine, in addition to regular professional training, the appropriate special training for the staff are provided.

For operational personnel maintaining the boiler with atmospheric circulating fluidized bed, the following trainings were recently carried out:

a) training course "Modern atmospheric circulating fluidized bed technology " organized by the Institute of coal energy technologies of NAS of Ukraine and Ministry of fuel and energy of Ukraine (Protocol No.1 dated 10-13.04.2007);

b) training course "Structural features and operation of heat-mechanical equipment of 210 MW capacity unit with the ACFB-670 boiler and the K-200-130 turbine" organized by the Ministry of Fuel and Energy of Ukraine and the State Enterprise "DonORHRES" (Protocol No.1 dated 20.11.2007).

PJSC "Donbasenergo" provides personnel retraining according to labour protection norms. The enterprise has the Labour protection department, which is responsible for raising the level of personnel skills and trainings.

In course of the JI project development, specialists of the Institute of Engineering Ecology has carried out comprehensive consultations and trainings for involved representatives of Starobeshivska TPP on the necessary data collection according to Monitoring plan for the project.

The special training was held in December, 2009. The special group was organized consisted of representatives of Starobeshivska TPP, OJSC "Donbasenergo" and Institute of Engineering Ecology, in particular:

Ivan H. Smirnov, Deputy General Director of the OJSC "Donbasenergo";

Valerij A. Bekerov, Deputy chief engineer on operation of Starobeshivska TPP;

Olena V. Fedorenko, deputy head of the production and technical department of the Starobeshivska TPP;

Nonna Yu. Pavliuk, senior scientific researcher of the Institute of Engineering Ecology.

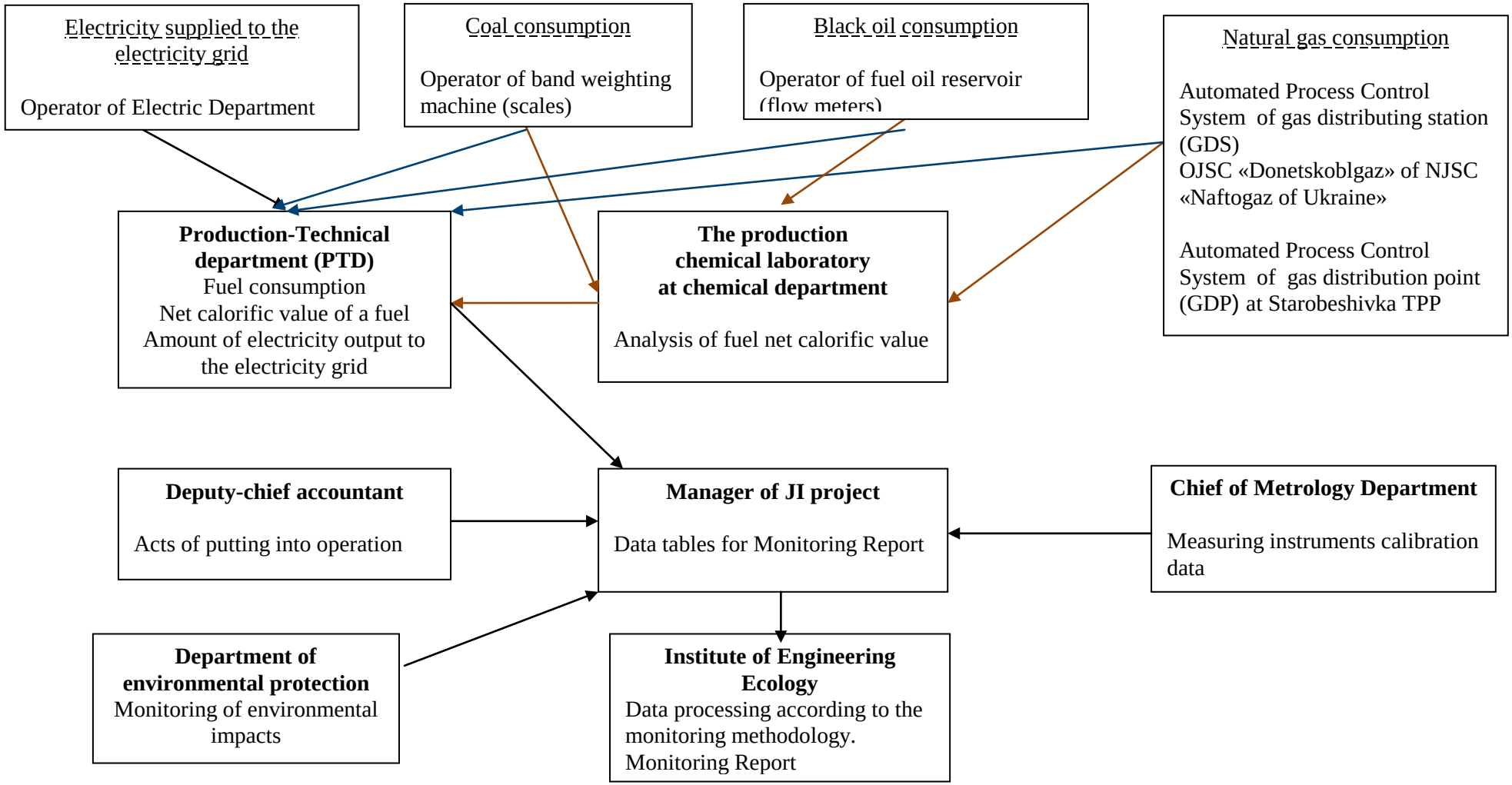

Fig. Ann3.1. Scheme of data collection for Monitoring Report