JOINT IMPLEMENTATION PROJECT

Installation of the AlfaCond steam condensation systems on the turbine-generators of the Heat and Power Plant of JSC "Avdeevskiy coke-processing works"

Position of the head of organization, company, entity being the developer of documents

Managing Director, Europe, Middle East and Africa
Camco Carbon Russia Limited

_____ Arthur Houston
(date) (signature) (first, middle and last name)

stamp

Position of the head of company being the emission source owner where the Joint Implementation project is envisaged

General Director, PJSC Avdeevka coke processing plant

_____ Gennadiy O. Vlasov
(date) (signature) (first, middle and last name)

stamp

Avdeevka, October 2012

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

CONTENTS

SECTION A. General description of the project

A.1. Title of the project:

Installation of the AlfaCond steam condensation systems on the turbine-generators of the Heat and Power Plant of JSC "Avdeevskiy coke-processing works"

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

PDD version: 2.0

Date: 04/12/2012

A.2. Description of the project:

The project envisages installation of the AlfaCond steam condensation systems on the turbine-generators ## 7,8 of the Heat and Power plant (HPP) of JSC "Avdeevskiy coke-processing works" (ACPW). Purpose of the project is improving of turbine-generator efficiency and increasing own electricity generation by ACPW.

KP-540/2 type condensers were installed on turbine-generators (TG) #7,8 of the HPP prior the project realization. Insufficient cooling surface of these condensers did not allow turbine-generators to achieve design electricity generation. Furthermore standard KP condensers with bigger cooling surface can not be placed in the existing installation site.

Steam condensation system AlfaCond has twice as much cooling ability than old condenser KP-540/2 with the smaller overall dimensions. It was specially designed for ACPW conditions by company Alfa Laval which is the global leader in heat transfer technologies. Installation of Alfa Cond system increases electricity generation by turbine-generator up to 50%.

HPP of the ACPW operates using coke-oven gas for steam and electricity production. Surplus amount of coke-oven gas that is not needed for steam and electricity generation and in-plant use is burned at the special coke-oven gas off-take (flare). Therefore increase of electricijty generation due to the project implementation doesn't increase fuel combustion at the ACPW.

Additional project electricity generation replaces electricity from Integrated Electricity System of Ukraine (IESU) which is produced at the power stations connected to the grid partially with fossil fuel combustion. So project realization results in greenhouse gases (GHG) emission reductions into the atmosphere.

According to the baseline scenario, the installation of the new AlfaCond steam condensation system is not intended. Baseline scenario to the project is preservation of the current situation with continuation of usage KP-540/2 condensers on TG ##7,8.

Preliminary works on the project were initiated in 2006 by the ACPW Technical Council for approving of investment projects with consideration given to the opportunity of using mechanisms of the Kyoto protocol during the project realization. Alfa Cond system on turbine-generator #8 was commissioned in February 2008. Delivery contract of Alfa Cond system for turbine-generator #7 was signed in October 2010 and it is planned to begin operations of the system in February 2011.

A.3. Project participants:

Party involved	Legal entity project participant (if applicable)	Please indicate if the Party involved wishes to be considered as project participant (Yes/No)
Party A: Ukraine (Host Party)	Legal entity: JSC "Avdeevskiy coke-processing work"– project owner and developer	No
Switzerland	Metinvest International S.A.	No

Avdeevskiy coke-processing work is the largest among the Ukrainian coke and chemicals companies.

ACPW accounts for 20% of gross coke produced in Ukraine. In 2007 the company produced over 3 Mt of metallurgical coke. The company's products are well marketed in Ukraine, Russia, Moldova, Poland, Czech Republic, Romania, Turkey and Egypt. ACPW employs over 6 thousand people.

The plant was established in 1963 with the coke battery #1 having produced its first coke. Since then the plant started to develop gradually to become the leader of coke industry of Ukraine. In 1973 the Coking shop #1 was commissioned followed by Coking shop #.3 (1976) and Coking shop #.4 (1980). ACPW was the first in the industry to develop chemicals production.

During its history the company produced over 200 Mt of metallurgical coke, processed over 12 Mt of carbon tar, produced over 3.7 Mt of phthalic anhydride, about 2.1 Mt of benzene and 2.5 Mt of ammonium sulphate.

ACPW is a part of Coal and coke Division of Metinvest Group.

Code of ACPW in the Unified State Register of Enterprises and Organisations: 00191075

Codes of ACPW economic activities according to Ukrainian standard industrial classification of economic activities:

19.10 Coke and coke-products production;

86.21 General medical practice;

46.90 Nonspecialized wholesale trade;

71.11 Activity in the architecture field;

35.30 Delivery of steam, hot water and conditioned air;

41.20 Construction of residental and non-residental buildings.

Metinvest Group is an international vertically integrated mining and steel group of companies. Production facilities of Metinvest produce enough steelmaking raw materials to meet its own demand and to be the key supplier to major steelmaking companies in Ukraine, Europe and Asia.

The Group comprises 23 industrial companies leading in mining and steel industry of Ukraine and CIS. In Europe Metinvest is represented by Ferriera Valsider and Metinvest Trametal – Italian re-rolling companies, British carbon steel plate producer Spartan UK and Bulgarian long products manufacturer Promet Steel.

Metallurgical companies of Metinvest manufacture a wide range of high quality steel products used in major steel consuming industries.

In 2009 Metinvest enterprises mined 9.6 Mt of coking coal, produced 4.1 Mt of metallurgical coke, 17.6 Mt was merchant concentrate, with the remainder being used for the production of 11.6 Mt of pellets; 7 Mt of crude steel and 9.2 Mt of finished steel products.

The products of the Group are well marketed in more than 75 countries all over the world.

The major shareholders of Metinvest are SCM Group (75% ownership) and Smart-Holding (25% ownership) partnering in Company's management.

Metinvest Holding LLC (the managing company of Metinvest Group) was established in early 2006 and presented to the public on June 6th, 2006. Metinvest Holding performs the strategic management of assets in coal and ore mining, coke, steelmaking and welded pipes industries.

Metinvest International S.A. – metal trading company, established in 1997 in Switzerland, the member of group Metinvest. The company conducts export supplies of metal products to the markets of near abroad and far abroad countries. Metinvest International S.A. is the potential buyer of ERUs generated as a result of the proposed project.

A.4. Technical description of the project:

A.4.1. Location of the project:

JSC "Avdeevskiy coke-processing works" is located in the territory of Donetsk region.
The company location is presented in Figure A.1.

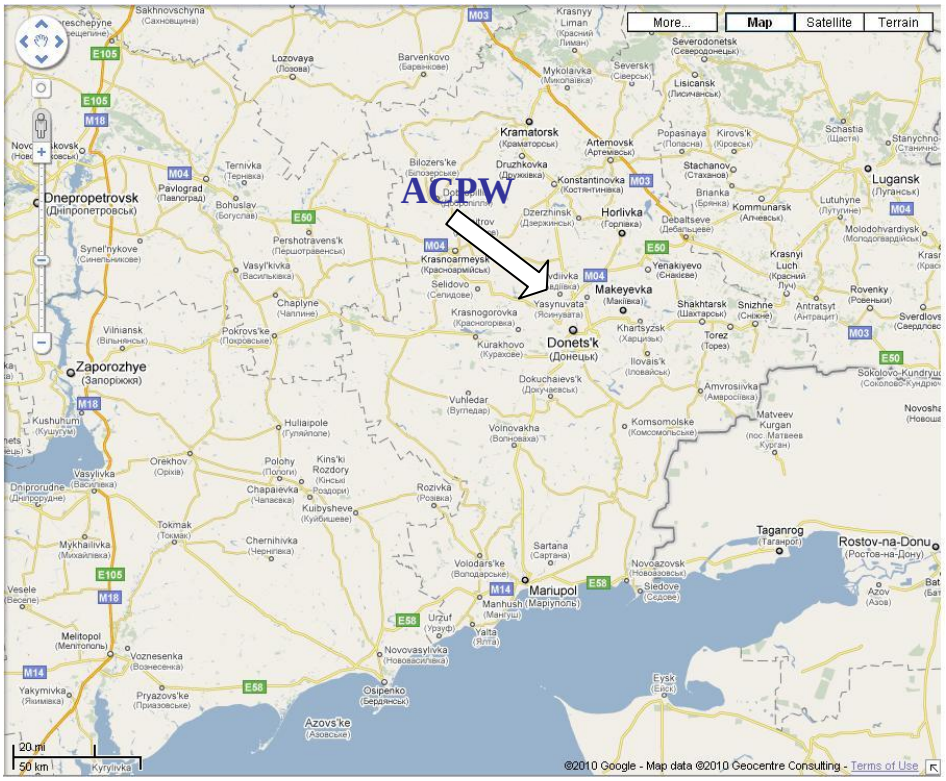

Figure A.1 ACPW location

A.4.1.1. Host Party(ies):

Ukraine

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

Figure A.2 Donetsk region on the Ukraine map

Donetsk region is located in southeastern Ukraine. Its administrative center is Donetsk.

The area of the region (26,900 km²), comprises about 4.4% of the country total area. The region borders Russia on the east, and with the Azov Sea on the south. Its longitude from north to south is 270 km, from east to west – 190 km.

The population of Donetsk region is 4.7 million (as of 2004), which constitutes 10% of the overall Ukrainian population, making it the most populous and most densely populated region of the country. Its large population is due to the presence of several big industrial cities and numerous villages agglomerated around them. As of the Ukrainian National Census, 2001, the main ethnic groups within the Donetsk region are: Ukrainians — 2,744,100 (56.9% of the total population), Russians — 1,844,400 (38.2%).

The Donetsk region covers more than one half coal, finished steel, coke, cast iron and steel production in Ukraine. Ferrous metallurgy, fuel industry and power industry are in demand in the structure of industry production.

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

Avdeevka is a town in Ukraine, located 12km to the north of Donetsk.
The city population is 36.2 thousand people (as of 2007).
Time zone: GMT +2:00.

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

ACPW is located in the town of Avdeevka in the Donetsk region of Ukraine. Its coordinates are 48° 09' N, 37° 44' E.

Figure A.3 The town Avdeevka and ACPW

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

The base product of ACPW is a metallurgical coke produced by decomposition of coking coal without air into the coke oven batteries. Coke is shipped to consumers, mainly to metallurgical companies.

Crude coke gas is a by-product of the decomposition coking coal into the coke oven batteries. It comes in the chemical plant of ACPW. Valuable chemicals such as carbon tar, phthalic anhydride, benzene, etc. are derived from the coke gas there.

Part of treated coke gas uses for heating of the coke oven batteries and in a steam boilers shop as a fuel, but significant surplus of coke gas is burned at the special coke-oven gas off-take (flare). Steam is utilized for electricity generation in turbine shops ##1, 2 and for in-plant needs.

General diagram of the ACPW electricity and steam production is presented in Figure A.4 below.

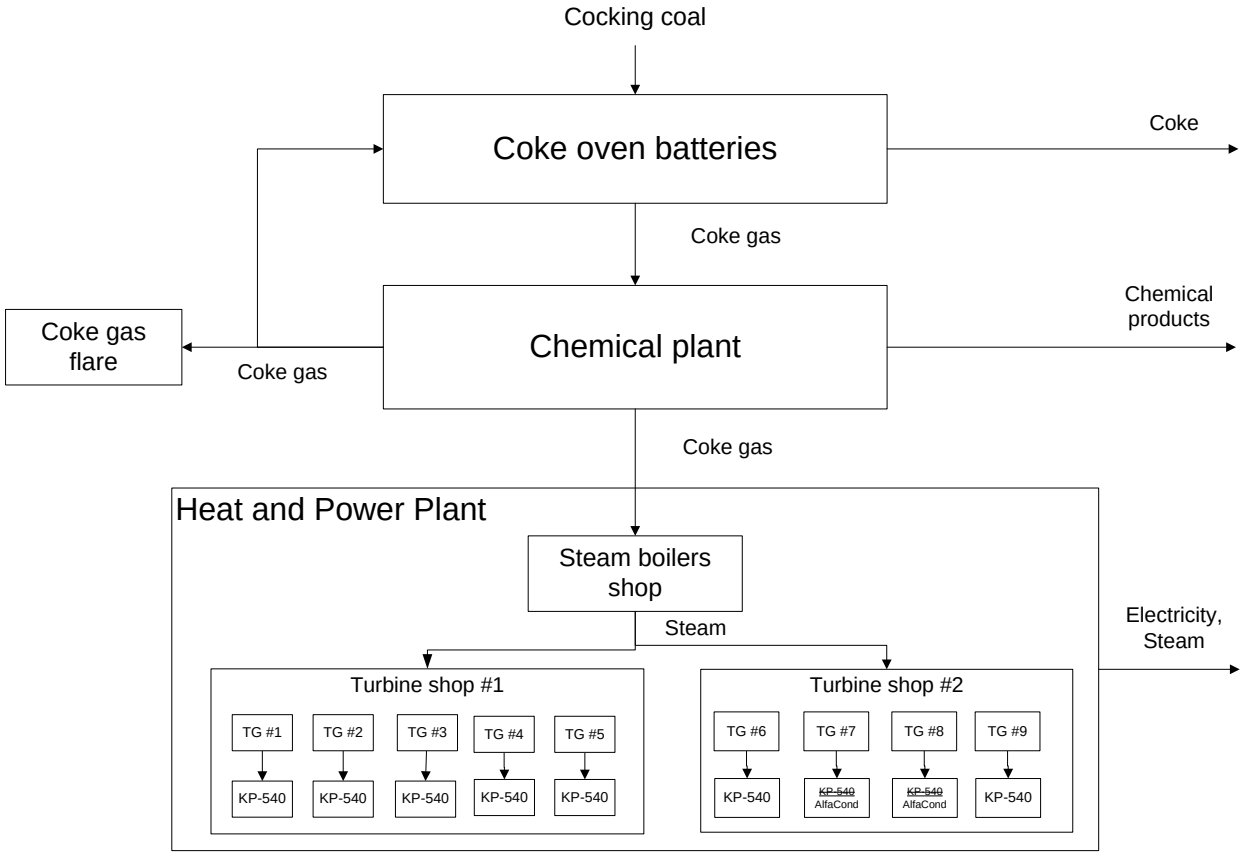

Figure A.4 General diagram of the ACPW electricity and steam production

Turbine generator is a device that converts thermal energy from pressurized steam into mechanical energy of rotary motion in the turbine as the first step and then into electrical energy in the generator. Exhausted steam from the turbine flows to the condenser.

Condenser performs the following functions:

- condensation of exhausted steam from the turbine and return of condensed vapor into the production cycle;
- maintenance of the under-pressure at the exhaust hood of turbine.

Prior the project realization all of turbine-generators in the ACPW turbine shops were equipped with condensers KP-540/2 type. These condensers consist of shell, water boxes (plenums), tube sheets, baffles and brass or cupro-nickel cooling tubes (Figure A.5). Cooling water flows inside the tubes and steam passes over the surface of this tubes. Condensed vapor is gathered into the condensate tank and returned into the steam boiler shop. Circulatory water is piped to the cooling towers and subsequently given back to the condensers.

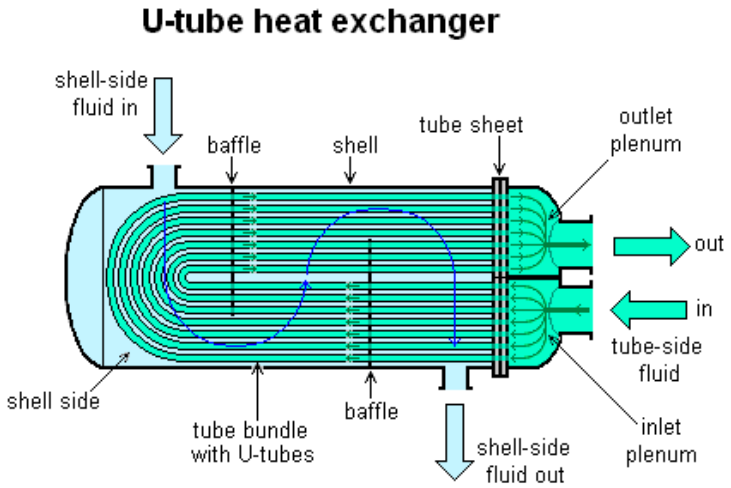

Figure A.5 Simplified scheme of condensers KP-540/2 type

As it planned during designing of HPP, all turbine-generators had to work in combine regime. It means that some part of steam had to be taken off for internal ACPW needs, and only the residual steam had to be condensed after the steam turbine.

The ratio of takeoff steam was supposed to be equal to 50%. As a result condensers KP-540/2 with cooling area 540 m^2 were installed on the turbine-generators. It is twice lower than required if all the steam would be going to condenser. In this case standard condenser with cooling surface 1000 m^2 would be needed.

Currently ACPW has a large surplus of steam due to construction of new dry coke quenching facilities which produce additional amount of steam for the plant. Turbine-generators work in condensation regime only and can not generate nominal amount of electricity due to low condensation capacity of KP-540/2 condensers. Furthermore standard KP condensers with 1000 m^2 cooling surface and bigger overall dimensions can not be placed in the existing installation site.

Therefore management of ACPW made a decision about replacement of KP-540/2 condensers on turbine-generators #7,8 by AlfaCond steam condensation systems. This system is more efficient and enables condensation of all amount of steam. In addition Alfa Cond system has smaller overall dimensions than the old KP-540/2 type condenser.

AlfaCond steam condensation system uses the cassette concept with the plates welded in pairs (Figure A.6). The steam is condensed in the welded channel while the cooling water passes through a gasketed channel. The plate pattern is specifically designed for optimal condensation, with an asymmetric channel configuration that features a large gap on the vapour side and a small gap on the cooling water side. This makes it possible to maintain a very low pressure drop on the vapour side while still keeping up the velocity and turbulence on the cooling water side, thus maximizing the heat transfer efficiency.

Alfa Cond steam condensation system as well as the old condensers KP-540/2 does not consume electricity during operation. Therefore own consumption of electricity by the project equipment is not taken into account during project emissions calculation.

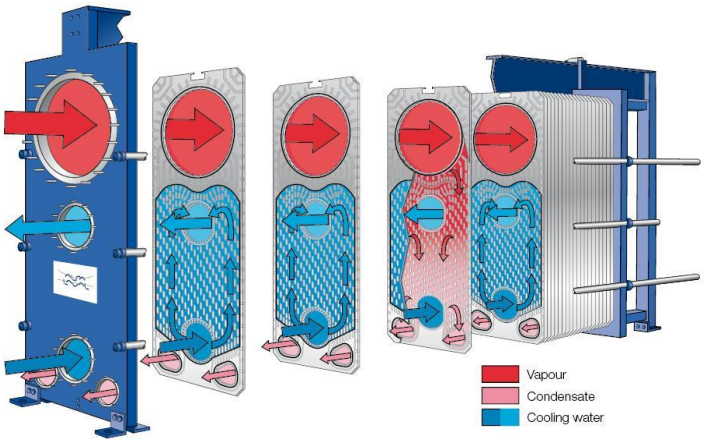

Figure A.6 Flow principle for AlfaCond

AlfaCond steam condensation system was specially designed for ACPW conditions by company Alfa Laval which is the global leader in heat transfer technologies.

Table A.1

Main design parameters AlfaCond steam condensation system

Parameter	Unit	Value
Dimensions		
Height	Mm	4620
Width	Mm	1132
Length	Mm	3191
Steam channel		
Flow rate	kg/h	27 500
Pressure losses	kPa	2.046
Water channel		
Flow rate	kg/h	1 000 000
Pressure losses	kPa	23.62

Modifications of the auxiliary equipment such as modernization and replacement of the circulatory pipe-line of Turbine shop #2 and modernization of the cooling tower #1 of HPP was carried out in 2008-2011 for the support of the stable work of turbine generators #7,8 with increased generation of electricity as a result of AlfaCond steam condensation systems installation.

Actual schedule of the project realization is presented in Figure A.7 below.

#	Task	2006	2007	2008	2009	2010	2011
1	Preliminary works and decision to realize the project	Jul-06					
2	Alfa cond condensation system for turbine-generator #8						
2.1	Equipment delivery, construction and asembly operations	Aug-06		Feb-08			
2.2	Commissioning			Mar-08			
3	Alfa cond condensation system for turbine-generator #7						
3.1	Equipment delivery, construction and asembly operations					Oct-10	Jan-11
3.2	Commissioning						Feb-11

Figure A.7 Actual project realization schedule

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:

AlfaCond steam condensation system has twice as much cooling efficiency than old condenser KP/540 used at HPP turbine-generators ## 7,8 before, and allows increasing electricity generation by turbine-generator by up to 50%.

HPP of the ACPW is producing steam and electricity and operates using coke gas. Coke gas is a by-product of the ACPW primary coke production. Surplus amount of coke gas that is not needed for steam generation and in-plant use is burned at the special coke gas flare.

Therefore addition of electricity generation by the turbine-generators ## 7,8 due to the condenser efficiency improving doesn't increase fuel combustion at the ACPW.

Additional project electricity generation of the HPP replaces Ukrainian grid electricity which is produced at the power stations connected to the grid partially with fossil fuel combustion. So project realization results in greenhouse gases (GHG) emission reductions into the atmosphere.

The acquired emission reduction cannot be achieved by any other way but through the realization of this Joint Implementation Project. The baseline assumes the preservation of the situation before the project realization with continuation condensers KP-540/2 operations on the turbine-generators ## 7,8.

A series of factors speak in favor of this development of situation along the baseline:

- This scenario represents the usual (business-as-usual) ACPW operations under the Ukranian legislation;
- Continuation of KP-540/2 operations does not require significant investments for special Alfa Cond steam condencing system designing and installation;
- Replacement of the standard condensers in HPP by steam condensation systems is not a common practice for Ukrainian coke producers. Detailed analisys of the common practice for the project is provided in Section B.2.

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

Estimates of total and annual emission reductions for the first crediting period of the Kyoto protocol (2008-2012) are provided in the table below.

Table A.2

Estimated amount of emission reduction for the period 2008-2012

	Years
Length of the crediting period:	4 years and 10 months
Year	Estimate of annual emission reductions in tonnes of CO_2 equivalent
2008	23 714
2009	27 665
2010	20 399
2011	68 846
2012	74 925
Total estimated emission reductions over the crediting period (tonnes of CO_2 equivalent)	215 549
Annual average of estimated emission reductions over the crediting period (tonnes of CO_2 equivalent)	44 596

Estimated amount of emission reductions after the end of the first crediting period of the Kyoto Protocol is presented in Table A.3. It is a subject to approval by the host country.

Table A.3

Estimated amount of emission reduction for the crediting period 2013-2022

	Years
Length of the crediting period 2013-2022	10
Year	Estimate of annual emission reductions in tones of CO_2 equivalent
2013	74 925
2014	74 925
2015	74 925
2016	74 925
2017	74 925
2018	74 925
2019	74 925
2020	74 925
2021	74 925
2022	74 925
Total estimated emission reductions over the crediting period 2013-2022 (tonnes of CO_2 equivalent)	749 250
Annual average of estimated emission reductions over the crediting period 2013-2022 (tonnes of CO_2 equivalent)	74 925

A.5. Project approval by the Parties involved:

The Project Idea Note had been submitted for review of the National Environmental Investment Agency of Ukraine (NEIA). NEIA issued a Letter of Endorsement #1459/23/7 from 24 September 2010 for this project providing its support for further development of the Joint Implementation project.

In accordance with the "Requirements for the Joint Implementation Projects preparation" approved by NEIA (Order #33 from 25th of June, 2008) to receive a Letter of Approval for the JI project the project owner should provide to the State Environmental Investment Agency of Ukraine[1] the determination report of the proposed project together with project design documentation and the copy of Letter of Endorsement.

[1] NEIA was renamed to the State Environmental Investment Agency of Ukraine by order of the President of Ukraine dd 13.11.2011 #455/2011

SECTION B. Baseline

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

Selection of baseline is made based on the demands of the Guidance on criteria for baseline setting and monitoring[2] and given the requirements of the Decision 9/CMP.1, Appendix B "Criteria for baseline setting and monitoring" [3]. During the selection of the approach to the baseline justification, the developer can use the following options:

- JI specific approach complying with the requirements of the Decision 9/CMP.1, Appendix B;

- Methodology, applicable to the project for the setting of baseline and monitoring, approved by the CDM Executive Board.

The Project developer used JI specific approach for the baseline justification, since among the methodologies, approved by the CDM Executive Board there is none fully matching the proposed Project.

According to the Guidance on criteria for baseline setting and monitoring a baseline shall be established on a project-specific basis and/or using a multi-project emission factor. Baseline of the proposed project is established on a project-specific basis, because the emissions intensity depends significantly on technology of electricity production among Ukranian coke plants, that doesn't allow using the standard emission factor.

The choice of baseline scenario is based on the definition of the most probable project of alternative scenarios among the possible ones for the project participants, which ensures the manufacture of products, comparable in quality with the products, obtained as a result of the Project, and is in agreement with the requirements of the Ukranian legislation.

The following possible scenarios, alternative to the Project, were identified:

1. Preservation of the current situation with continuation of usage KP-540/2 condensers on TG ##7,8;
2. Replacement of KP-540/2 condensers by similar standard condensers with increased cooling surface;
3. Construction of a new gas turbine with recovery boiler at HPP ACPW;
4. Realization of the project, i.e. replacement of condensers on TG #7,8 by Alfa Cond steam condensation systems without carbon financing.

Given below is the estimate of the proposed scenarios with the purpose of identifying the opportunity for their consideration as the baseline in relation to the Project.

1. Preservation of the current situation with continuation of usage KP-540/2 condensers on TG #7,8

[2] Guidance on criteria for baseline setting and monitoring (version 02), JISC

[3] Report of the Conference of the parties serving as the meeting of the Parties to the Kyoto Protocol on its first session, held at Montreal from 28 November to 10 December 2005. Decision 9/CMP.1 Guidelines for the implementation of Article 6 of the Kyoto protocol. Appendix B Criteria for baseline setting and monitoring. p.12-13.

This scenario represents the usual (business-as-usual) continuation of the ACPW HPP operations under the legislation of Ukraine. Besides, this scenario does not require investments for purchasing and installation of the new steam condensation systems.

According to this scenario, the TG#7,8 electricity generation would be lower than as per the Project. However, ACPW can continue to purchase necessary amount of electricity from the grid which is preservation of the current situation. Net volume of electricity procurement from the Integrated Electricity System of Ukraine (IESU) was about 30-50 GWh per year in 2006-2009 (Table B.1).

Table B.1

Electricity balance of ACPW, MWh/year

Year	Consumption of the plant	Generation	Purchasing from IESU	Delivery to IESU	Balance
2005	362 390	376 739	9 333	23 682	+ 14 349
2006	341 878	313 944	38 948	11 014	- 27 934
2007	348 968	306 059	43 098	189	- 42 909
2008	369 794	336 132	44 543	10 881	- 33 662
2009	319 053	272 327	51 756	5 030	- 46 726

Therefore, this alternative can be viewed as the plausible baseline scenario.

2. Replacement of KP-540/2 condensers by similar standard condensers with increased cooling surface

Replacement of KP-540/2 condensers by standard condensers with cooling surface 1000 m^2 (condensers KP-1000M type) can ensure increasing of electricity generation by TG#7,8, equal to the Project.

However, condenser KP-1000M has significantly bigger overall dimensions and can not be placed in the existing installation site (Table B.2). Comparison of overall dimensions the standard condensers and Alfa Cond steam condensation system with sizes of installation site is given in Table B.2.

Table B.2

Overall dimensions, mm

	Standard condensers[4]		Alfa Cond system	Installation site
	KP-540/2	KP-1000M		
Overall lenght	5160	6750	4620	6000
Overall width	2255	3065	1132	2950

Therefore, this alternative cannot be viewed as the plausible baseline scenario.

3. Construction of a new gas turbine with recovery boiler at HPP ACPW;

Currently one of the most effective technologies for energy production is an electricity generation by gas turbine with steam production in recovery boiler with utilization heat of exhausted gas from turbine.

In the Report of ACPW energy audit “Combined electricity and steam generation, increasing of energy efficiency at Avdeevskiy coke-processing works” prepared by Pacific Northwest National Laboratory

[4]According to web-site of JSC «Kaluga turbine works», leading producer of condensers, turbines and heat exchange equipment http://www.ktz.kaluga.ru/russian/heatexchangers/table01.htm

(USA) and Agency for Rational Energy Use and Ecology of Ukraine in 1998 the investments for construction of the gas turbine with recovery boiler are presented. Investment for such project with 14.7 MW installed capacity was estimated for ACPW conditions at USD 10 mln.

Furthermore modification of ACPW infrastructure is needed for realization this scenario. Construction of gas-compressor house for increasing of coke gas pressure, renewal of a water treatment and supply system, replacement of gas pipe lines are pointed in the scope of demands to maintain the gas turbine operations.

Implementation of this scenario could increase efficiency of electricity and steam production at ACPW, but very high volume of investments is needed. For this reason construction of the gas turbine with recovery boiler was declined by ACPW management.

Therefore, this alternative cannot be viewed as the plausible baseline scenario.

4. Realization of the project, i.e. replacement of condensers on TG #7,8 by Alfa Cond steam condensation systems without carbon financing.

The opportunity to realize this alternative as the baseline scenario is reviewed during the proving the project additionality with using the investment analysis.

Based on the investment analysis result, presented in section B.2 (step № 2) this option cannot be viewed as the baseline scenario.

Thus, as a result of considering the potential alternative scenarios, Scenario #1 is the baseline to the proposed activities under the Project.

Baseline scenario

Baseline scenario foresees continuation of existing practice using turbine-generators #7,8 with condensers KP-540/2 type. According to this scenario hourly production of the turbo-generators does not change and remains at the level which is average for the last three years prior realization of the project.

Average data in 2004 -2006 is used for TG#8 baseline hourly production estimation (Table B.3) and 2008-2010 average for TG#7 (Table B.4).

Table B.3

Turbine-generator #8 perfomance figures in 2004-2006

Parameter	Unit	2004	2005	2006	Average
Electricity generation	MWh	71 980	58 096	5 649	**45 242**
Operational time	hours	8 644	8 539	997	**6 060**
Average hourly production	MW	8.3	6.8	5.7	**6.93**

Table B.4

Turbine-generator #7 perfomance figures in 2008-2010

Parameter	Unit	2008	2009	2010 (11 months)	Average
Electricity generation	MWh	37 709	2 652	39 425	**26 595**
Operational time	hours	6 830	511	6 164	**4 502**
Average hourly production	MW	5.5	5.2	6.4	**5.70**

The source of greenhouse gases emissions in the baseline scenario is CO_2 emission due to electricity generation in the Integrated Electricity System of Ukraine (IESU).

Baseline emissions are calculated upon difference between project and baseline electricity generation by TG ## 7,8.

(B.1) $BE_Y = EF_{CO2\ grid\ Y} \bullet (EG_{PJ\ Y} - EG_{BL\ Y})$,

where BE_Y is CO_2 baseline emission, t CO_2/year;

$EF_{CO2\ grid\ Y}$ is the baseline emission factor during the IESU electricity generation, t CO_2 /MWh;

$EG_{PJ\ Y}$ is the annual project electricity generation, MWh /year;

$EG_{BL\ Y}$ is the annual baseline electricity generation, MWh /year.

Baseline and project electricity generation are based upon the data about average hourly production and annual operating hours of the TG ## 7,8 in the baseline and project scenarios (see "Key information and data used to establish the baseline").

ACPW balance of electricity purchasing from IESU and delivering electricity to IESU is negative in 2006-2009 (Table B.1). Therefore the project results in reduce of electricity consumption from the grid.

Calculation of baseline CO_2 emissions is made with usage CO_2 emission factors for electricity generation by power stations connected to IESU which are established by orders of NEIA "On approval of the specific carbon dioxide emissions factors in 2008-2011". [5] Ex-ante estimation of the baseline emission factor for 2012 is based on the last available data.

Key information and data used to establish the baseline

Data/Parameter	$P_{BL\ TG7}$ $P_{BL\ TG8}$
Data unit	MW
Description	Baseline hourly production
Time of	For TG#8 are used 2004-2006 data, for TG#7 – 2008-2010

[5] http://www.neia.gov.ua/nature/doccatalog/document?id=127171
http://www.neia.gov.ua/nature/doccatalog/document?id=127172
http://www.neia.gov.ua/nature/doccatalog/document?id=126006
http://www.seia.gov.ua/seia/doccatalog/document?id=629524

determination/monitoring	
Source of data (to be) used	Memo of HPP ACPW
Value of data applied (for ex ante calculations/determinations)	$P_{BL\ TG7}$ = 5.70 $P_{BL\ TG8}$ = 6.93
Justification of the choice of data or description of measurement methods and procedures (to be) applied	Average data for the last three years prior realization of the project
QA/QC procedures (to be) applied	The acquisition procedures were regulated by the procedures approved by the management of the company.
Any comment	

Data/Parameter	$P_{PJ\ TG7}$ $P_{PJ\ TG8}$
Data unit	MW
Description	Project hourly production
Time of determination/monitoring	Annualy
Source of data (to be) used	Memo of HPP ACPW
Value of data applied (for ex ante calculations/determinations)	$P_{PJ\ TG8\ 2008}$ = 11.17 $P_{PJ\ TG8\ 2009}$ = 11.28 $P_{PJ\ TG8\ 2010}$ = 9.19 $P_{PJ\ TG7\text{-}8\ 2011\text{-}2012}$ = 10.55
Justification of the choice of data or description of measurement methods and procedures (to be) applied	Actual perfomance figures of TG#8 with Alfa Cond steam condensation system in 2008-2010 are used. Average data of TG#8 for three years after realization of the project is used as a forecast for TG ## 7,8 operation in 2011-2012.
QA/QC procedures (to be) applied	The acquisition procedures were regulated by the procedures approved by the management of the company
Any comment	

Data/Parameter	T_{TG8}
Data unit	Hours per year
Description	Operating hours of TG #8

Time of determination/monitoring	Annualy
Source of data (to be) used	Memo of HPP ACPW
Value of data applied (for ex ante calculations/determinations)	$T_{TG8\ 2008}$ = 5 304 $T_{TG8\ 2009}$ = 5 953 $T_{TG8\ 2010}$ = 8 470 $T_{TG8\ 2011}$ = 7 776 $T_{TG8\ 2012}$ = 8 328
Justification of the choice of data or description of measurement methods and procedures (to be) applied	Actual perfomance figures of TG#8 in 2008-2010 are used. Forecast of operation hours for 2011-2012 is estimated by ACPW specialists with due consideration of scheduled maintenance of the turbine-generator.
QA/QC procedures (to be) applied	The acquisition procedures were regulated by the procedures approved by the management of the company
Any comment	

Data/Parameter	T_{TG7}
Data unit	Hours per year
Description	Operating hours of TG #7
Time of determination/monitoring	Annualy
Source of data (to be) used	Memo of HPP ACPW
Value of data applied (for ex ante calculations/determinations)	$T_{TG7\ 2011}$ = 7560 $T_{TG7\ 2012}$ = 8328
Justification of the choice of data or description of measurement methods and procedures (to be) applied	Forecast of operation hours is estimated by ACPW specialists with due consideration of scheduled maintenance of the turbine-generator
QA/QC procedures (to be) applied	The acquisition procedures were regulated by the procedures approved by the management of the company
Any comment	

Data/Parameter	$EF_{CO2\ grid\ Y}$
Data unit	kg CO_2/kWh
Description	Emission factor during power generation in the Integrated Electricity System of Ukraine

Time of determination/monitoring	Annually
Source of data (to be) used	Orders of NEIA: "On approval of the specific carbon dioxide emissions factor in 2008" #62 dd.15/04/2011; "On approval of the specific carbon dioxide emissions factor in 2009" #63 dd.15/04/2011; "On approval of the specific carbon dioxide emissions factor in 2010" #43 dd.28/03/2011; "On approval of the specific carbon dioxide emissions factor in 2010" #75 dd.12/05/2011.
Value of data applied (for ex ante calculations/determinations)	$EF_{CO2\ grid\ 2008}$ = 1.055 $EF_{CO2\ grid\ 2009}$ = 1.068 $EF_{CO2\ grid\ 2010}$ = 1.067 $EF_{CO2\ grid\ 2011}$ = 1.063 $EF_{CO2\ grid\ 2012}$ = 1.063
Justification of the choice of data or description of measurement methods and procedures (to be) applied	Grid emission factor for the Integrated Electricity System of Ukraine which is approved by NEIA for calculation of JI projects developed in the Ukraine
QA/QC procedures (to be) applied	Annual check of standard emission factor with the latest available official data
Any comment	Estimation of the emission factor for 2012 is based on the last available data approved by NEIA

Project scenario

Project scenario envisages installation of the AlfaCond steam condensation systems on the turbine-generators ##7, 8 instead of KP-540/2 type steam condensers. Average hourly production of turbine-generators is increased as a result of the project realization.

Actual perfomance figures of TG#8 with Alfa Cond steam condensation system in 2008-2010 are presented in Table B.5.

Table B.5

Actual perfomance figures of TG#8 in 2008-2010

Parameter	Unit	2008	2009	2010 (11 months)	Average
Electricity generation	MWh	59 246	67 171	71 659	**66 026**
Operational time	hours	5 304	5 953	7 798	**6 352**
Average hourly production	MW	11.17	11.28	9.19	**10.55**

Actual perfomance figures of TG#8 with Alfa Cond steam condensation system are used for determination of electricty project hourly production in 2008-2010. Forecast of project hourly production by TG ##7,8 is based on average data of TG#8 for the three years after realization of the project (Table B.6).

Table B.6

TG ##7,8 project hourly production, MW

	2008	2009	2010	2011	2012
TG#7	-	-	-	10.55	10.55
TG#8	11.17	11.28	9.19	10.55	10.55

Actual operational hours figures in 2008-2010 and forecast for 2011-2012 with due consideration of scheduled maintenance of the TG ##7,8 are used for calculation of additional project electricity generation and presented below (Table B.7).

Table B.7

Project operational hours

	2008	2009	2010	2011	2012
TG#7				7 560	8 328
TG#8	5 304	5 953	8 470	7 776	8 328

Additional project electricity generation replaces electricity from Ukrainian grid which is produced at the power stations connected to the grid according to the baseline.

Since additional electricity generation due to the project realization is not connected with increasing of fossil fuel combustion, the project emissions are equal to zero.

Steam consumption on the turbine-generator #8 is higher due to the project realization (Table B.8). But specific steam consumption (per MWh) on the turbine-generator #8 is slightly lower (down to 15% in relation to the aveage value).

Table B.8

Steam consumption on the turbine-generators in 2009

	th.tonnes	th.tonnes per MWh
TG#6	280.8	6.85
TG#7	17	6.32
TG#9	0	-
Average TG##6,7,9		6.59
TG#8	377.9	5.63

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 "Tool for the demonstration and assessment of additionality" (version 05.2) approved by the CDM Executive Board was used in order to prove the project additionality. Upon the proof of the additionality, the following series of steps is stipulated by the tool:

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

2. Investment analysis (including the sensitivity analysis);
3. Barrier analysis;
4. Common practice analysis.

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

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

The following possible scenarios, alternative to the Project, were identified during baseline setting in Section B.1:

1. Preservation of the current situation with continuation of usage KP-540/2 condensers on TG #7,8;
2. Replacement of KP-540/2 condensers by similar standard condensers with increased cooling surface;
3. Construction of a new gas turbine with recovery boiler at HPP ACPW;
4. Realization of the project, i.e. replacement of condensers on TG #7,8 by Alfa Cond steam condensation systems without carbon financing.

As a result of the analysis of the offered alternatives, given in section B.1 of this PDD the following realistic and credible alternative scenarios to the proposed project activity are identified:

- Preservation of the current situation with continuation of usage KP-540/2 condensers on TG #7,8;
- Realization of the project, i.e. replacement of condensers on TG #7,8 by Alfa Cond steam condensation systems without carbon financing.

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

Preservation of the current situation represents the usual (business-as-usual) continuation of the "ACPW" combined heat and power plant operations under the Ukraine legislation. "ACPW" has no commitments to federal, regional or municipal authorities regarding the stopping of the old condensers operations on TG ##7,8.

Project realization without carbon financing attraction also does not have any additional requirements from the side of the Ukrainie legislation as compared to the project scenario and can be implemented with the compliance with all legislative and other normative acts.

Thus, identified in sub-step 1a alternative scenarios are consistent with mandatory laws and regulations.

Step 2. Investment analysis

Sub-step 2a: Determine appropriate analysis method

During this step of proving the project additionality, the project developer can use one of the following types of analysis: simple cost analysis, investment comparison analysis or benchmark analysis.

As a comparison method the benchmark analysis was used. The simple cost analysis for this project is not applicable, since the project activity and the alternatives identified in Step 1 generate financial benefits other than CDM related income. At the same time, the employment of the investment

comparison analysis is impossible, since the alternative, stipulating the preservation of the current situation does not include capital expenditures and is not an investment project.

Sub-step 2b: Apply benchmark analysis

As a financial indicator during the benchmark analysis, the internal rate or return (IRR) figure is used, because during making the decision on the commencement of the project implementation, the management of the Metinvest Holding was orienting at the value of this indicator. Benchmark equals 15% according to the official order of the Metinvest Holding "On the establishment of the discount rate».

Sub-step 2c: Calculation and comparison of financial indicators (only applicable to Options II and III)

Key assumptions of the investment comparison analysis, used in the calculations:

Discount rate: 15%

Planning horizon: 11 years;

Exchange rate 5.05 UAH/$ (for 2006);

Profit tax rate: 25%;

Project implementation commencement date: Q3 of 2006;

Date of the project equipment commissioning: Q3 of 2007 (TG #8);

Q1 of 2008 (TG #7).

Additional electricity generation: 24 410 MWh per year;

Volume of investments: USD 3 367.7 th. (with auxiliary equipment modernization cost);

Product price: based on the market data;

Cost price: based on the production cost at the plant;

Investment analysis results are presented in table B.9.

Table B.9

Investment analysis results

Scenario	Internal Rate of Return, %
Project scenario	6.9
Benchmark	**15**

Therefore, the project scenario has lower IRR than the benchmark and the activity under the project cannot be considered as financially attractive.

Sub-step 2.d Sensitivity analysis

Sensitivity analysis was performed varying the following factors:

1. Investment expenses';
2. Electricity price;

3. Cost level.

Table B.10

Sensitivity analysis results

#	Financial indicator	Internal rate of return (IRR), %				
	Factor change	**-10.0%**	**-5.0%**	**0.0%**	**5.0%**	**10.0%**
1	Investment expenses	9.3	8.0	**6.9**	5.8	4.8
2	Electric energy price	3.4	5.1	**6.9**	8.5	10.1
3	Cost level	8.2	7.5	**6.9**	6.2	5.4

Sensitivity analysis results show that the conclusions regarding the project scenario not being the financially attractive remain true upon changes of the investments' calculation main parameters.

Conclusion on Step 2:

As a result of the performed investment analysis it was shown that the proposal project activity cannot be considered as most financially attractive and this conclusion is robust to reasonable variations in the critical assumptions.

As a result of the conducted investment analysis the option with preservation of the current situation was selected as the baseline scenario.

Step 3. Barrier analysis

In line with "Tool for the demonstration and assessment of additionality" barrier analysis is not mandatory when investment analysis is applied. Thus this step is omitted here.

Step 4. Common practice analysis

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

Production of the metallurgical coke in Ukraine was 18.8 mln.t in 2006. This is much less then the project capacity of Ukrainian coke-processing works, which was 26.3 mln.t. In 2006 only 55 coke-oven batteries was operational in Ukraine and 14 was suspended for various reasons i.e. complete overhaul, shortage of the coking coal. Average operational lifetime of working coke-oven batteries was 26.4 years and exceeded standard depreciable life. Deterioration of coke oven batteries was 65%, chemical shops of coke-processing plants – 75%. Renewal of the Ukraine coke-processing facilities is carried out by few plants and volume of investments in industry is not significant.

Generally Ukraine coke-processing plants invest in the replacement of out-of-date base coke production equipment. JSC "Alcheevskcoke" realised construction of a new #10b coke-oven battery with capacity 1 mln.t of coke per year project in 2007. Also in 2007 a new coke-oven battary was commissionned after reconstruction at "Arcelor Mittal Steel Krivyi Rog".

Recently several projects with usage of the coke gas energy for electricity generation was realised as JI projects in Ukraine. JSC "Zaporozhcoke" and JSC «Yasynivskyi Coke Plant» put in operation off-gas burning installations for electricity generation in 2003-2006. These projects are

registered as a JI project under the framework of the Kyoto Protocol and placed on the web-site of UN FCCC[6].

It should be noted that Alfa Cond steam condensation system on TG#8 ACPW is the unique equipment in the context of heat transfer intensity and overall dimensions. Such systems are not installed in the coke-chemical plants of Ukraine before.

Sub-step 4b: Comparing the proposed project activity to the other similar activities

During execution of Sub-step 4a no similar activities to the proposed project were identified.

Conclusion on Step 4:

The project of installation of Alfa Cond steam condensation system on TG ## 7,8 is not a common practice for the enterprises of the Ukraine coke industry.

Thus, the analysis carried out in this section shows that the project scenario is the additional one.

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

According to the Decision 9/CMP.1, Appendix B "Criteria for baseline setting and monitoring" [7] the project boundary shall encompass all anthropogenic emissions by sources of GHGs which are:

(i) Under the control of the project participants;
(ii) Reasonably attributable to the project; and
(iii) Significant.

The Integrated Electricity System of Ukraine is included into the project boundary since it is indirect emissions source reasonably attributable to the project:

[6] http://ji.unfccc.int/JIITLProject/DB/RVQ6AIPDWWUFGLWZU3ITTLN4TFQVUI/details http://ji.unfccc.int/JI_Projects/DB/5WN6N4R5K3L8QH20EWB7DPTHL4008R/Determination/Bureau%20Veritas%20Certification1276093168.48/viewDeterminationReport.html

[7] Report of the Conference of the parties serving as the meeting of the Parties to the Kyoto Protocol on its first session, held at Montreal from 28 November to 10 December 2005. Decision 9/CMP.1 Guidelines for the implementation of Article 6 of the Kyoto protocol. Appendix B Criteria for baseline setting and monitoring. p.12-13.

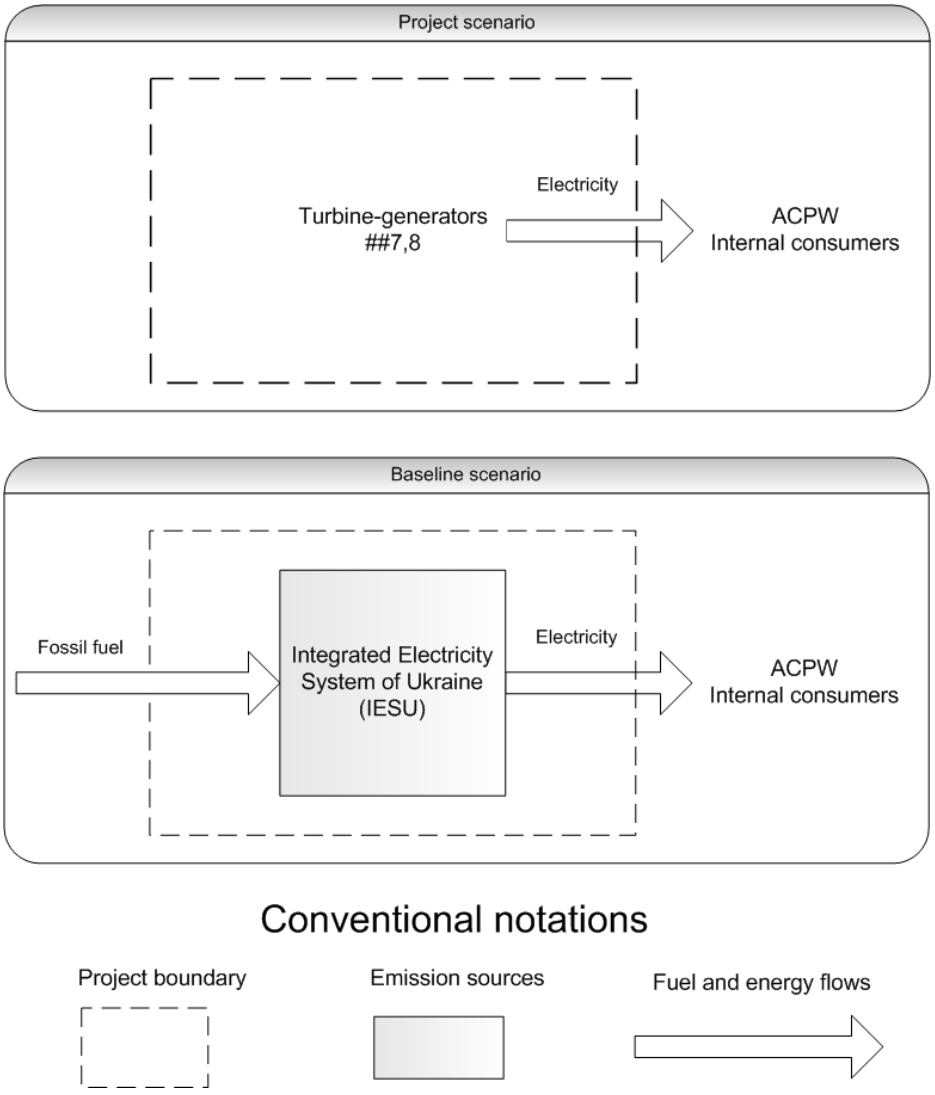

Figure B.1 Emission sources located within the project boundary

Since the additional electricity generation assossiates with the new more effective equipment installation but not with production, transportation and firing of additional amount of fuel, project leakages are absent.
Emission sources are included or excluded from the project boundary based on their significance (Table B.3.1).

Table B.3.1. Emission sources included or excluded from the project boundaries

	Source	Gas	Incl./Excl.	Justification / Explanation
Baseline	Emissions due electricity generation by power plants of IESU	**CO_2**	**Incl**.	**Significant. Main source of emissions.**
		CH_4	Excl.	Unsignificant. Conservative
		N_2O	Excl.	Unsignificant. Conservative
Project	Emissions due to additional electricity generation as a result of project realization	CO_2	Excl.	Unsignificant. Considered equal to zero since additional electricity generation does not assossiate with production, transportation and firing of fuel
		CH_4	Excl.	Unsignificant. Considered equal to zero since additional electricity generation does not assossiate with production, transportation and firing of fuel
		N_2O	Excl.	Unsignificant. Considered equal to zero since additional electricity generation does not assossiate with production, transportation and firing of fuel

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 – 31/01/2011;
Baseline is developed by the specialists of "Camco Carbon Russia Limited";

- Developer: Oleg Ryumin, JI Manager;
- E-mail: Project.participant.ru@camcoglobal.com;
- Tel/fax: +7 495 721 2565.

"Camco Carbon Russia Limited" is not a project participant listed in Annex 1.

SECTION C. Duration of the project / crediting period

C.1. Starting date of the project:

Project realization starting date: 14/08/2006 (data of the project approval by investment committee of Metinvest)

C.2. Expected operational lifetime of the project:

25 years (300 months)[8]

C.3. Length of the crediting period:

14 years and 10 months (178 months): from 23/02/2008 till 31/12/2022
Project commissioning and start-up date: 23/02/2008

[8] According to the CDM "Tool to determine the remaining technical lifetime of equipment", default value for Electric Generators

SECTION D. Monitoring plan

D.1. Description of monitoring plan chosen:

Selection of baseline is made based on the demands of the "Guidance on criteria for baseline setting and monitoring"[1] and given the requirements of Decision 9/CMP.1, Appendix B "Criteria for baseline setting and monitoring"[2]. The project developer used project-specific approach for establishing the monitoring, since among the approved CDM methodologies for baseline and monitoring there is not a single one that would be associated with the proposed project.

Since additional electricity generation due to the project realization is not connected with increasing of fossil fuel combustion, the project emissions are equal to zero and Option 2 - direct **monitoring** of emission reductions from the project is used.

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

Not applicable since Option 2 is used for monitoring of emission reductions from the project.

[1] Guidance on criteria for baseline setting and monitoring (version 02), JISC

[2] Report of the Conference of the parties serving as the meeting of the Parties to the Kyoto Protocol on its first session, held at Montreal from 28 November to 10 December 2005. Decision 9/CMP.1 Guidelines for the implementation of Article 6 of the Kyoto protocol. Appendix B Criteria for baseline setting and monitoring. p.12-13.

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

Not applicable since Option 2 is used for monitoring of emission reductions from the project.

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

ID number *(Please use numbers to ease cross-referencing to D.2.)*	Data variable	Source of data	Data unit	Measured (m), calculated (c), estimated (e)	Recording frequency	Proportion of data to be monitored	How will the data be archived? (electronic/ paper)	Comment

Not applicable since Option 2 is used for monitoring of emission reductions from the project.

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

Not applicable since Option 2 is used for monitoring of emission reductions from the project.

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
P-1.$EG_{TG7\ PJ\ Y}$	*Electricity generation by turbine – generator #7*	*Detalied breakdown of electricity generation by HPP per month*	*MWh /year*	*(m)*	*Monthly*	*100%*	*Paper*	
P-2.$EG_{TG8\ PJ\ Y}$	*Electricity generation by turbine – generator #8*	*Detalied breakdown of electricity generation by HPP per month*	*MWh/year*	*(m)*	*Monthly*	*100%*	*Paper*	
P-3.$T_{TG7\ PJ\ Y}$	*Operating hours of turbine – generator #7*	*Perfomance figures of HPP per month*	*hour*	*(m)*	*Monthly*	*100%*	*Paper*	
P-4.$T_{TG8\ PJ\ Y}$	*Operating hours of turbine – generator #8*	*Perfomance figures of HPP per month*	*hour*	*(m)*	*Monthly*	*100%*	*Paper*	
P-5.$EF_{CO2\ grid\ Y}$	*Standardized emission factors for the Ukrainian electricity grid*	*Order of NEIA "On approval of the specific carbon dioxide emissions factor"*	*t CO_2/GWh*	*(e)*	*Annually*	*100%*	*Paper*	

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):

Baseline emissions are calculated upon difference between real project electricity generation by TG ## 7,8 and baseline electicity generation.
Annual project electricity generation is calculated as the sum the electricity generation by turbine – generators #8 and #7:

(D.1) $EG_{PJ\,Y} = EG_{TG7\,PJ\,Y} + EG_{TG8\,PJ\,Y}$,
where $EG_{TG7\,PJ\,Y}$ is the annual project electricity generation by TG #7, obtained as a result of monitoring (*P-1*), MWh /year;
$EG_{TG8\,PJ\,Y}$ is the annual project electricity generation by TG #8, obtained as a result of monitoring (*P-2*), MWh /year.

Annual baseline electricity generation is calculated based on the baseline electric power of the TG #8 and #7, established in section B.1 of this PDD:

(D.2) $EG_{BL\,Y} = P_{BL\,7} \bullet T_{TG7\,PJ\,Y} + P_{BL\,8} \bullet T_{TG8\,PJ\,Y}$,
where $P_{BL\,7}$ is baseline hourly production of the electric power by the TG #7, equals to 5.70 MW, according Section B.1;
$P_{BL\,8}$ is baseline hourly production of the electric power by the TG #8, equals to 6.93 MW, according Section B.1;
$T_{TG7\,PJ\,Y}$ is the annual operating hours of TG #7, obtained as a result of monitoring (*P-3*), hour /year;
$T_{TG8\,PJ\,Y}$ is the annual operating hours of TG #8, obtained as a result of monitoring (*P-4*), hour /year.

Annual reductions of CO_2 emissions due to the project realization (ER_Y) are calculated by the following formula:

(D.3) $ER_Y = EF_{CO2\,grid\,Y} \bullet (EG_{PJ\,Y} - EG_{BL\,Y})$,
where ER_Y is emissions reductions, t CO_2/year;
$EF_{CO2\,grid\,Y}$ is the baseline emission factor during the Integrated Electricity System of Ukraine electricity generation, estimated during monitoring (*P-5*), t CO_2 /MWh;
$EG_{PJ\,Y}$ is the annual project electricity generation, MWh /year;
$EG_{BL\,Y}$ is the annual baseline electricity generation, MWh /year.

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

Not applicable according to Section B.3.

D.1.3.1. If applicable, please describe the data and information that will be collected in order to monitor leakage effects of the project:								
ID number *(Please use numbers to ease cross-referencing to D.2.)*	Data variable	Source of data	Data unit	Measured (m), calculated (c), estimated (e)	Recording frequency	Proportion of data to be monitored	How will the data be archived? (electronic/ paper)	Comment

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

Not applicable according B.3.

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):

Estimation is based on the formulae used for the emission reduction calculation in Section D.1.2.2:

(D.3) $ER_Y = EF_{CO2\ grid\ Y} \bullet (EG_{PJ\ Y} - EG_{BL\ Y})$,

where ER_Y is emissions reductions, t CO_2/year;

$EF_{CO2\ grid\ Y}$ is the baseline emission factor during the Integrated Electricity System of Ukraine electricity generation, estimated during monitoring (*P-5*), t CO_2 /MWh;

$EG_{PJ\ Y}$ is the annual project electricity generation, MWh /year;

$EG_{BL\ Y}$ is the annual baseline electricity generation, MWh /year.

All data and parameters which is needed for emission reductions calculation except Ukrainian grid emission factor and baseline hourly production of the electric power by the TG #7,8 are monitored throughout the crediting period. Grid emission factor and baseline hourly production by the TG #7,8 are not monitored but already determined at the stage of the PDD preparation. There are no fixed parameters which is unavailable at the stage of the PDD preparation.

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:

Within the ACPW structure there is the Chief Engineer Office. In its operations this office is governed by the active legislation, orders and instructions from the General Director of the company and the regulations of the Ministry for ecology and natural resources of Ukraine. Chief Engineer Office is well able to facilitate the proper environmental monitoring of the project.

The Office exercises control over:

- Emission of contaminants into the atmosphere;
- Quality of waste and technical water;
- Utilization, storage, relocation and burial of production wastes.

Analytical control over various types of environmental impact as a result of the ACPW operations will be carried out in compliance with the active Ukraine legislation, laws #1264-XII dd. 25.06.1991 "Envoronmental Law" and #45/95-BP dd. 09.02.1995 "About the Ecological Expertise". The Plant will report in compliance with the following annual official statistical form:

- 2-tp (air) *Data on the atmosphere air protection*, including the information on the amount of the collected and neutralized atmospheric pollutants, detailed emissions of specific contaminants, number of emission sources, measures for reduction of emissions into the atmosphere and emissions from separate groups of contamination sources (is being prepared in compliance with the order of the Ukrainian State Statistical Committee dd. 03.06.2008 #172));
- 2-tp (water management) *Data on the water usage*, including the information on the water consumption from natural sources, discharge of waste water and content of contaminants in the water, capacity of water treatment facilities etc. (is being prepared in compliance with the order of the Ukrainian State Statistical Committee dd. 30.09.1997 #230);
- 2-tp (wastes) *Data on the generation, use, neutralization, transportation and emplacement of production and consumption wastes,* including the annual balance of the wastes management separately for their types and hazard classes (is being prepared in compliance with the order of the Ukrainian State Statistical Committee dd. 30.06.2009 #223).

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.
P-1.$EG_{TG8\ PJ\ Y}$ *P-2.*$EG_{TG7\ PJ\ Y}$	*Low*	*Generation of electricity is measured by electricity meters SA3I670D(M) type. Meters are verified by state company "Donetskstandardmetrology" once in 4 years. Meters are calibrated by employees of ACPW Instruments and Meters Shop. Calibration frequency of meters is once in 6 months.*
P-3.$T_{TG8\ PJ\ Y}$ *P-4.*$T_{TG7\ PJ\ Y}$	*Low*	*Operational hours are registered in "Daily list of the turbine-generators operations". Monthly data are calculated by Chief of Turbine Shop #2 of ACPW. Additional cross-check of data with production and technical department of HPP is provided when it necessary*
P-5.$EF_{CO2\ grid\ Y}$	*Low*	*Standard emission factor is estimated annually with the use of the latest versions of documents, specified as data sources in Table D.1*

If expected monitored data for the turbine-generator in any period are unavailable the calculations for this turbine-generator in this period will not be made, in according to principle of conservatism the estimated emission reductions for this boiler-house in this year will be assumed equal to 0.

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

The operational and management monitoring system takes into maximum account the existing "ACPW" reporting systems and is presented in figure D.1 below.

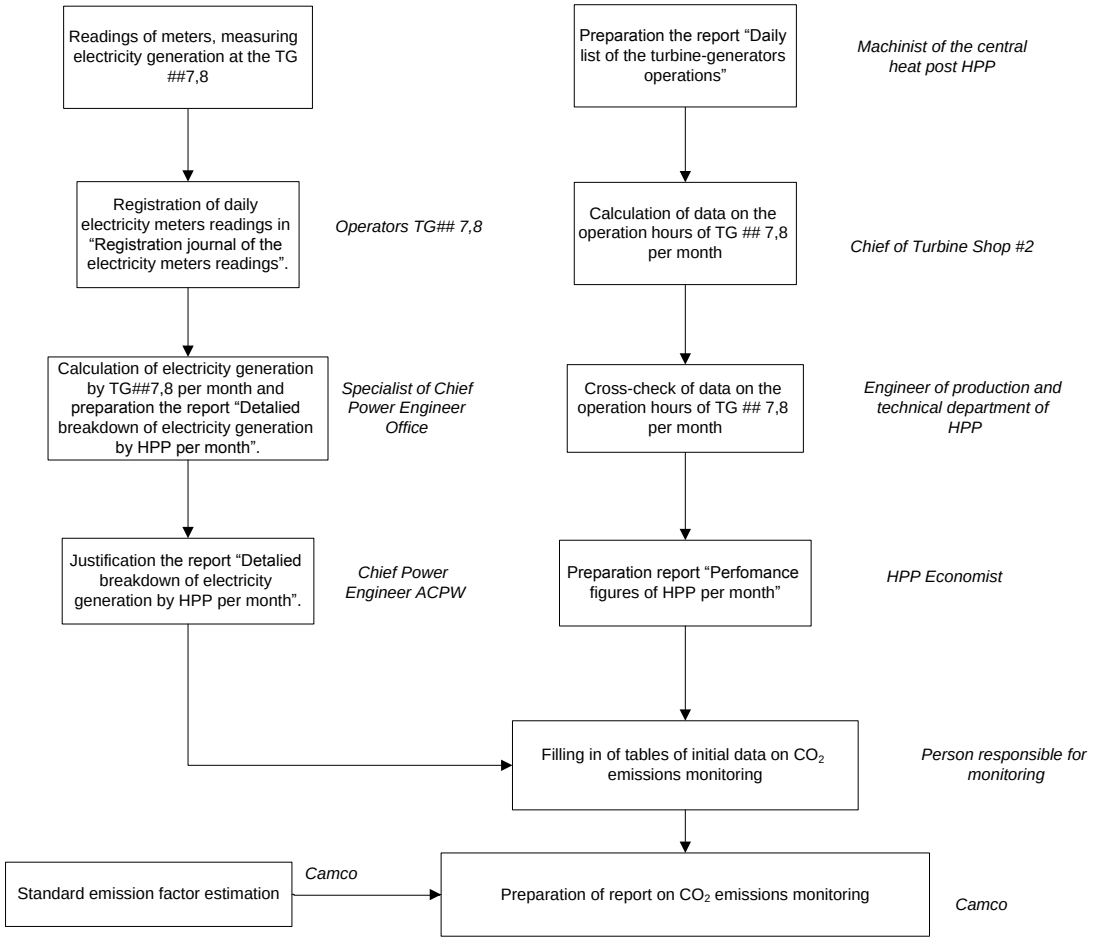

Figure D.1. Diagram of CO_2 emissions monitoring system at ACPW

Stages of CO_2 emissions monitoring at "ACPW":

1. Operators of TG##7,8 register daily electricity meters readings in "Registration journal of the electricity meters readings".

2. Specialist of Chief Power Engineer Office calculates electricity generation by TG##7,8 per month and prepares the report "Detalied breakdown of electricity generation by HPP per month".

3. Chief Power Engineer justifies the report "Detalied breakdown of electricity generation by HPP per month"

4. Machinist of the central heat post HPP fills operations data of TG ##7,8 in the report "Daily list of the turbine-generators operations"

5. Monthly operation hours of TG##7,8 are calculated by Chief of Turbine Shop #2 of ACPW. He submits the data in production and technical department of HPP to cross-check.

6. HPP economist fills operation hours data in the report "Perfomance figures of HPP per month".

7. Chief of HPP justifies the report "Perfomance figures of HPP per month".

8. Based on the report from pp.3,7 the person, responsible for monitoring, fills in the form to prepare the report on the CO_2 emissions monitoring and hands the form over to Camco. The person, responsible for monitoring, ensures the storage of data, needed for the calculation of the emission reduction units, on the electronic and paper media until 2014 in the order, which will be established by the plant "Regulations for the order of CO_2 emissions monitoring at ACPW".

9. Camco specialists estimate the standardized emission factors for the Ukrainian electricity grid (P-5), using the latest version of data source specified in section D.2.

10. Based on the methods, specified in section D.2, Camco makes calculation of the emission reduction units and prepares the report on the project monitoring.

The template for submitting the initial data for the preparation of the CO_2 emissions report is presented in Annex 3 – "Monitoring plan".

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

Monitoring plan was developed by the specialists of "Camco Carbon Russia Limited":

- Developer: Oleg Ryumin, JI Manager;
  - E-mail: Project.participant.ru@camcoglobal.com;
  - Tel/fax: +7 495 721 2565.

"Camco Carbon Russia Limited" is not a project participant listed in Annex 1.

SECTION E. Estimation of greenhouse gas emission reductions

E.1. Estimated project emissions:

As it was described in Section B.1, since additional electricity generation due to the project realization is not connected with increasing of fossil fuel combustion, the project emissions are equal to zero.

E.2. Estimated leakage:

As it was described in Section B.3, project leakages are absent, since the additional electricity generation aligned with the new more effective equipment installation but not with production, transportation and firing of additional amount of fuel.

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

Project emissions and leakage are equal to zero

E.4. Estimated baseline emissions:

Baseline emissions are calculated upon difference between project and baseline electricity generation by TG ## 7,8.

Project electricity generation is calculated as the sum the electricity generation by turbine – generators #8 and #7:

(E.1) $EG_{PJ\,Y} = P_{TG7\,PJ\,Y} \bullet T_{TG7\,PJ\,Y} + P_{TG8\,PJ\,Y} \bullet T_{TG8\,PJ\,Y}$,

where $P_{TG7\,PJ\,Y}$ is the project electricity hourly production by TG#7, estimated in Section B.2 (Table B.6), MW;

$P_{TG8\,PJ\,Y}$ is the project electricity hourly production by TG#8, estimated in Section B.2 (Table B.6), MW;

$T_{TG7\,PJ\,Y}$ is the annual operating hours of TG #7, estimated in Section B.2 (Table B.7), hour /year;

$T_{TG8\,PJ\,Y}$ is the annual operating hours of TG #8, estimated in Section B.2 (Table B.7), hour /year.

Calculation results of additional project electricity generation are presented in table E.1.

Table E.1

Project electricity generation, MWh

	2008	2009	2010	2011	2012	Total
TG#7	-	-	-	79 741	87 841	167 582
TG#8	59 246	67 171	77 834	82 019	87 841	374 112
Total	59 246	67 171	77 834	161 760	175 683	541 694

Baseline electricity generation is calculated as the sum the electricity generation by turbine – generators #8 and #7 according to the baseline scenario. The annual operating hours of TG #7,8 according to the baseline scenario is the same as in the project scenario.

(E.2) $EG_{BL\,Y} = P_{TG7\,BL\,Y} \bullet T_{TG7\,BL\,Y} + P_{TG8\,BL\,Y} \bullet T_{TG8\,BL\,Y}$,

where $P_{TG7\,BL\,Y}$ is the baseline electricity hourly production by TG#7, estimated in Section B.2, MW;

$P_{TG8\ BL\ Y}$ is the baseline electricity hourly production by TG#8, estimated in Section B.2, MW;
$T_{TG7\ PJ\ Y}$ is the annual operating hours of TG #7, estimated in Section B.2 (Table B.7), hour /year;
$T_{TG8\ PJ\ Y}$ is the annual operating hours of TG #8, estimated in Section B.2 (Table B.7), hour /year.

Calculation results of additional project electricity generation are presented in table E.2.

Table E.2

Baseline electricity generation, MWh

	2008	2009	2010	2011	2012	Total
TG#7	-	-	-	43 299	47 697	90 996
TG#8	36 769	41 268	58 716	53 905	57 732	248 390
Total	36 769	41 268	58 716	97 204	105 429	339 386

According to the baseline scenario, the amount of additional electricity, generated due the new Alfa Cond condensation systems installation, will be supplied from IESU.

Emissions of CO_2 due to the Ukranian electricity generation are calculated by the following formula:

(E.3) $BE_Y = EF_{CO2\ grid\ Y} \bullet (EG_{PJ\ Y} - EG_{BL\ Y})$,
where BE_Y is CO_2 baseline emission, t CO_2/year;
$EF_{CO2\ grid\ Y}$ is the baseline emission factor during the IESU electricity generation, t CO_2 /MWh;
$EG_{PJ\ Y}$ is the annual project electricity generation, MWh /year;
$EG_{BL\ Y}$ is the annual baseline electricity generation, MWh /year.

Table E.3

Baseline emissions, t CO_2/year

Parameter	Unit	2008	2009	2010	2011	2012	Total
Project electricity generation	MWh	59 246	67 171	77 834	161 760	175 683	541 694
Baseline electricity generation	MWh	36 769	41 268	58 716	97 015	105 221	338 988
Additional generation	MWh	22 478	25 903	19 118	64 745	70 462	202 706
Grid emission factor	t CO_2e/MWh	1.055	1.068	1.067	1.063	1.063	-
Baseline GHG emission	t CO_2e	23 714	27 665	20 399	68 846	74 925	215 549

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

(E.4) $ER_Y = BE_Y$
where BE_Y is CO_2 baseline emissions, t CO_2/year;
ER_Y is CO_2 emission reductions, t CO_2/year.

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

GHG emissions reduction for each year of first crediting period (2008-2012) presented in the table below:

Table E.4

Calculation results of CO_2 emission reductions during 2008-2012

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)
2008	0	0	23 714	23 714
2009	0	0	27 665	27 665
2010	0	0	20 399	20 399
2011	0	0	68 846	68 846
2012	0	0	74 925	74 925
Total (tones of CO2 equivalent)	0	0	215 548	215 549
Average value of CO2 emission reductions				44 596

GHG emissions reduction for the period 2013-2022 presented in the table below:

Table E.5

Calculation results of CO_2 emission reductions during 2013-2022

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	0	0	74 925	74 925
2014	0	0	74 925	74 925
2015	0	0	74 925	74 925
2016	0	0	74 925	74 925
2017	0	0	74 925	74 925
2018	0	0	74 925	74 925
2019	0	0	74 925	74 925
2020	0	0	74 925	74 925
2021	0	0	74 925	74 925
2022	0	0	74 925	74 925
Total (tones of CO2 equivalent)	0	0	749 247	749 250
Average value of CO2 emission reductions				74 925

SECTION F. Environmental impacts

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

The Host Party for this project is Ukraine.

Necessity of the conduct and procedure of Environmental Impact Assessment (EIA) for investment project are defined in the following laws:

- ”Envoronmental Law” #1264-XII dd. 25.06.1991[11];
- “About the ecological expertise” #45/95-BP dd. 09.02.1995[12];
- “About the investment activity” №1560-XII dd 18.09.1991[13].

Projects which are performed by private companies should obtain complex state expert’s opinion in accordance to article 8 of the law “About the investment activity”. Environmental Impact Assessment should be provided as a part of complex state expertise.

However carrying out of Environmental Impact Assessment is not mandatory in case of equipment replacement without changes of technical parameters which can result in negative impact on the environment. It is states by Cabinet of Ministers Resolution #1269 “About procedure of the investment projects approval and state expertise” dd 31.10.2007.[14] In this case only sanitary and epidemiological expertise should be provided.

Since Alfa Cond systems installation on the turbine-generators during capital repair does not lead to negative impact on the environment, complex state expertise for the project is not mandatory.

ACPW obtains the positive opinion letter #336/031 dd. 15.02.2008 on the project of Alfa Cond system installation on the TG#8 from Donetsk sanitary and epidemiological station. It is mentioned in the letter that the condensation process does not attend by contaminant emission and does not have the impact on the quality and quantity of plant emission into atmosphere and water sources. The same letter is planned to obtain for Alfa Cond system installation on the TG#7.

Transboundary impacts

Ukraine has ratified three Protocols to the UN Convention on Long-range Transboundary Air Pollution. Two of these Protocols are directly related to the reduction and control over the hazardous substances emissions, namely:

- The 1985 Helsinki Protocol on the Reduction of Sulphur Emissions or their Transboundary Fluxes by at least 30 per cent, entered into force as of September 2nd, 1987.
- The 1988 Sofia Protocol concerning the Control of Emissions of Nitrogen Oxides or their Transboundary Fluxes, entered into force as of February 14th, 1991.

[11] http://search.ligazakon.ua/l_doc2.nsf/link1/T126400.html

[12] http://search.ligazakon.ua/l_doc2.nsf/link1/Z950045.html

[13] http://search.ligazakon.ua/l_doc2.nsf/link1/T156000.html

[14] http://search.ligazakon.ua/l_doc2.nsf/link1/ed_2008_11_12/KP071269.html#

The Resolution also includes as Annex “List of the projects of industrial facilities construction which can be approved without state expertise conclusion”

According to the positive opinion letter by Donetsk sanitary and epidemiological station, the project does not have the impact on the quality and quantity of plant emission into atmosphere and water sources. Therefore, the project is fully in accordance with the commitments of Ukraine under the UN Convention on Long-range Transboundary Air Pollution.

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:

In acordance to positive opinion letter #336/031 dd. 15.02.2008 on the project from Donetsk sanitary and epidemiological station the project does not have any negative impacts on the environment.

SECTION G. Stakeholders' comments

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

The Host Party doesn't require stakeholder consultation process for the JI projects.

During the project realization, the local public community was informed via the mass-media and ACPW newspaper "Zavodchanin". No comments on the project were received.

In addition, stakeholder comments will be collected during the time of this PDD publication in during the determination procedure.

Annex 1

CONTACT INFORMATION ON PROJECT PARTICIPANTS

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Annex 2

BASELINE INFORMATION

Table 1

Turbine-generator #8 2004-2006 perfomance figures

Parameter	Unit	2004	2005	2006	Average
Electricity generation	MWh	71 980	58 096	5 649	**45 242**
Operational time	hours	8 644	8 539	997	**6 060**
Average hourly production	MW	8.3	6.8	5.7	**6.93**

Table 2

Turbine-generator #7 2008-2010 perfomance figures

Parameter	Unit	2008	2009	2010 (11 months)	Average
Electricity generation	MWh	37 709	2 690	39 425	**26 608**
Operational time	hours	6 830	511	6 164	**4 502**
Average hourly production	MW	5.5	5.3	6.4	**5.73**

Table 3

Ukrainian baseline grid emission factor

Parameter	Unit	2008	2009	2010	2011	2012
Specific GHG emissions due to electrcicity generation by stations connected to IESU	t CO_2e/GWh	1 055	1 068	1 067	1 063	1 063

Annex 3

MONITORING PLAN

Initial data reporting form for preparation of CO_2 emissions monitoring report

ID number/ Symbol	Data variable	Source of data	Data unit	Value	Comment
P-1.$EG_{TG7\ PJ\ Y}$	*Electricity generation by turbine – generator #7*	*Detalied breakdown of electricity generation by HPP per month*	*MWh /year*		
P-2.$EG_{TG8\ PJ\ Y}$	*Electricity generation by turbine – generator #8*	*Detalied breakdown of electricity generation by HPP per month*	*MWh/year*		
P-3.$T_{TG7\ PJ\ Y}$	*Operating hours of turbine – generator #7*	*Perfomance figures of HPP per month*	*hour*		
P-4.$T_{TG8\ PJ\ Y}$	*Operating hours of turbine – generator #8*	*Perfomance figures of HPP per month*	*hour*		
P-5.$EF_{CO2\ grid\ Y}$	*Standardized emission factors for the Ukrainian electricity grid*	*Order of NEIA "On approval of the specific carbon dioxide emissions factor"*	*t CO_2/GWh*		

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