

**CONTENTS**

- A. General description of the project activity
- B. Key monitoring activities
- C. Calculations of the GHG emission reductions

## Background and Objectives of the Monitoring Report

According to paragraph 36 of the JI guidelines project participants "shall submit to an accredited independent entity a report in accordance with the monitoring plan on reductions in anthropogenic emissions by sources or enhancements of anthropogenic removals by sinks that have already occurred. The report shall be made publicly available."

The objective of the present monitoring report is to provide the complete, consistent, clear, and accurate calculation of the emissions reductions, within the boundaries of the "Reconstruction of the units at the Structure Unit "Luhanskaya TPP" of the "Skhidenergo" ltd." Joint Implementation Project, for the period 1st April 2011 – 31st December 2011.

## SECTION A. General description of the project activity

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

>>

Title: Reconstruction of the units at the Structure Unit “Luhanskaya TPP” of the “Skhidenergo” ltd.

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

Version: 1.1-LuTPP-1/04/2011-31/12/2011

Date: 08.04.2012

### A.2. JI registration number:

>>

UA 1000206

Letters of Approval:

- 752/23/07 issued by the National Environmental Investment Agency of Ukraine 09.06.2010;
- CFCarbonII/01/2010 issued by the UK Department of Energy and Climate Change 3.12.2010.

### A.3. Short description of the Project Activity:

>>

According to the Project Schedule the Reconstruction of the Unit №10 continued at the TPP. Also, the preparation measures for the TPP Units’ Reconstructions were implemented during the monitoring period and the unscheduled maintenance within the current, medium or major repairs. The mandatory list of the measures within the repairs is given in the GKD 34.20.661-2003 "The Rules for the Organization of the Power Plants and the Networks Equipment, Buildings and Constructions Servicing and Repairs” approved by the Ministry of the Fuel and Energy of Ukraine in 2004. The measures outside the list should be taken into account when calculating the Project, Baseline Emission and the Emission Reductions These measures included:

**Generating Unit № 9:**

## JI PROJECT MONITORING REPORT

4

- 1) The replacement of the gas ducts and the pipeline turns;
- 2) The repairs of the screen pipes;
- 3) The repairs of the mill with the electric motor bearing replacement;
- 4) The replacement of the first air ducts at the burners;
- 5) The repairs of the boiler brickworks;
- 6) The dismantling and repairs of the boiler thermal insulation system;
- 7) The main oil pump repair at the turbine;
- 8) The circulating water ducts armouring at the turbine;
- 9) The anticorrosive coating of the deaerators inner surface of the electricity generator;

### **Generating Unit № 10:**

- 1) The boiler unit brickwork thermal insulation;

### **Generating Unit № 11:**

- 1) The replacement of the screen pipelines and ducts at the boiler;
- 2) The major overhaul and repair of the mill;
- 3) The boiler control group of the turns cleaning;
- 4) The repairs of the boiler brickworks;
- 5) The dismantling and repairs of the boiler thermal insulation system;
- 6) The overhaul and repairs of the steam pipelines of the turbine;
- 7) The repairs of the main oil pump of the turbine;
- 8) The repairs of the condensers of the turbine;
- 9) The dismantling and repairs of the generator thermal insulation system;;
- 10) The replacement of the gas cooler;

### **Generating Unit № 13:**

- 1) The replacement of the screen pipelines and ducts at the boiler;
- 2) The replacement of the DS-13 armor at the boiler;
- 3) The repairs of the DS rotor;
- 4) The repairs of the mill with the replacement of the Du-1300 compensators;
- 5) The dismantling and repairs of the boiler thermal insulation system;

## JI PROJECT MONITORING REPORT

5

- 6) The ultra-sound diagnostics of the pipeline turns of the turbine and their replacement and repairs where needed;
- 7) The replacement of the oil cooler of the steam electric heater B №1;
- 8) The replacement of the heating surface ISV-6;
- 9) The dismantling and repairs of the turbogenerator thermal insulation system;
- 10) The anticorrosion coating of the turbogenerator;

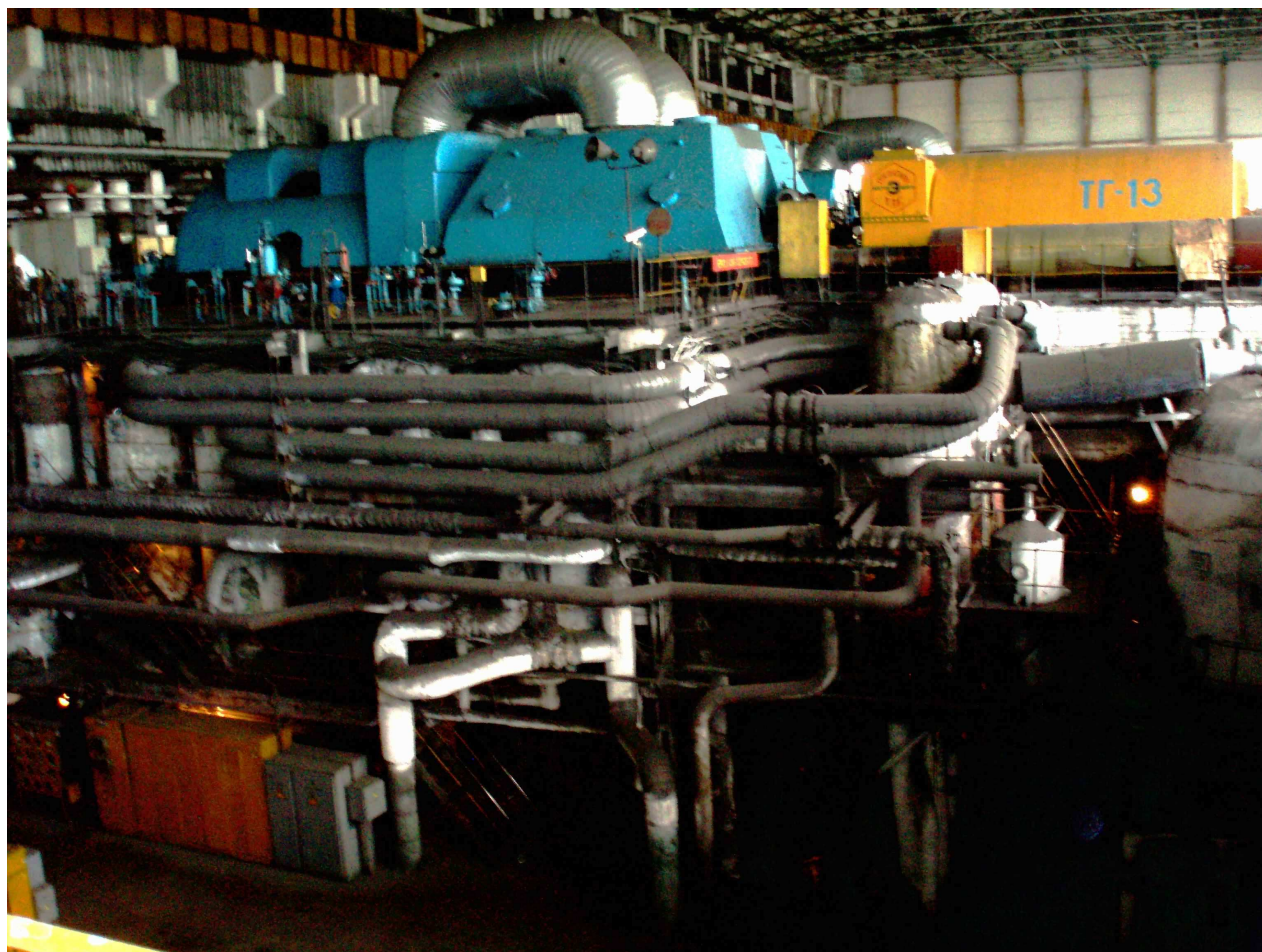
### **Generating Unit № 14:**

- 1) The boiler screen pipelines, ducts and duct turns repair;
- 2) The trimming of the control groups of the turns at the non-heated zone of the boiler;
- 3) The boiler unit brickworks repairs;
- 4) The dismantling and repairs of the boiler thermal insulation system;
- 5) The repairs of the steam electric heater B;
- 6) The dismantling and repairs of the turbine thermal insulation system;
- 7) The anticorrosion coating of the turbogenerator;

### **Generating Unit № 15:**

- 1) The boiler screen pipelines, ducts and duct turns repair and replacement;
- 2) The repairs of the 1-4 burners at the boiler;
- 3) The replacement of the exhaust burners cooling jumpers;
- 4) The boiler unit brickworks repairs;
- 5) The dismantling and repairs of the boiler thermal insulation system;
- 6) The replacement of the turbine bearing № 1;
- 7) The replacement of the oil shields of the turbine;
- 8) The repairs of the regulating valves №1 and 4;
- 9) The repairs of the main oil pump of the turbine;
- 10) The replacement of the exhaust valve of the high-pressure heater of the turbine;
- 11) The dismantling and repairs of the turbogenerator thermal insulation system;
- 12) The anticorrosion coating of the turbogenerator;

*Figure 1 Energy generating Unit №13 of the Luhanskaya TPP*



As the result of the foregoing measures, the average Specific Fuel Rate of the energy supplied by the TPP lowered from **0,4379 tef/MWh (12,8305 GJ/MWh)** in the **Baseline Scenario** to **0,4243 tef/MWh (12,4320 GJ/MWh)** in **December 2011**.

The electricity supply in the Monitoring Period (01.04.2011 – 31.12.2011) was **3 453 086 MWh**.

**A.4. Project participants:**

>>

<b>Name of Party involved (*) ((host) indicates a host Party)</b>	<b>Private and/or public entity(ies) project participants (*) (as applicable)</b>	<b>Kindly indicate if the Party involved wishes to be considered as project participant (Yes/No)</b>
Ukraine	Skhidenergo Ltd.	No
Ukraine	ECO-ELTA LLC	No
United Kingdom	CF Partners LLP	No

**A.5. Monitoring Period:**

>>

Date of the Monitoring Period Start: 01.04.2011.

Date of the Monitoring Period End: 31.12.2011.

**A.6. Baseline and Monitoring Methodology applied:**

>>

For the Project the own Approach was provided and determined by the AIE. In 2010 the Approach was approved by the National environmental investment agency of Ukraine as the Baseline and Monitoring Methodology “Methodology for Calculation and Monitoring of the Emissions due to the Rehabilitation and/or Energy Efficiency Improvement in Existing Thermal Power Plants”.

Project uses a baseline and monitoring plan in accordance with “Combined tool to identify the baseline scenario and demonstrate additionality” (Version 02.2)<sup>1</sup>.

In the proposed project CO2 emissions to atmosphere is reduced through the efficiency increase of power generation at the Luhanskaya TPP after the optimisation of the regimes, servicing, fuel preparations, reconstruction of the boiler,

---

<sup>1</sup> <http://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-02-v2.2.pdf>

the turbine equipment, the control and regulation system, the electro-generation and the cooling system.

The energy production depends on the demand of the market. The TPP can increase the energy production at any time. It means that all the additional energy produced during the Project period substitutes the energy, which would have been produced by the TPP, but with the less efficiency and higher GHG emission.

The proposed Approach for the emission reductions' calculation uses the specific fuel rate (*SFRy*) parameter. This parameter shows the efficiency level of the fuel combustion at the TPP and, consequently, the emissions from the fuel combustion. This parameter is being calculated in in tons of the equivalent fuel and allows seeing the actual picture of the energy efficiency measures provided on the Station.

For the purposes of the Baseline Emission and Emission Reductions calculation the value of the *SFRy* parameter was fixed on the 0.4379 tef/MWh (12.8305 GJ/MWh) – the average value for the 2003 – 2005. The Baseline Emission is calculated monthly and summarized at the end of the year for the whole lifetime of the Project, taking into account the annual electricity supply and the fuel mix in the specific year.

The Project Emission is also calculated monthly through the whole lifetime of the Project and being summarized at the end of the reporting period. The actual data of the calculated *SFRy* is used for these purposes.

For the Calculations the value of the Specific Fuel Rate (*SFRy*) was used. This parameter is commonly used in energy sector and it shows the fuel (energy) consumption per the electric energy supplied to the grid.

The SFR parameter is calculated using the formula:

$$SFRy = \frac{\sum (Fiy * NCViy)}{7} / AELSy \quad (1)$$

Where



$SFR_y$  – specific fuel rate of the TPP in year  $y$ , t.e.f./MWh. (GJ/MWh);

$F_{iy}$  – the amount of the fuel  $i$  consumed by the TPP for the electricity production in year  $y$ , tons (th.m<sup>3</sup>);

$NCV_{iy}$  – net caloric value of the fuel  $i$  in year  $y$ , Gcal/ton (th.m<sup>3</sup>);

7 - the net caloric value of one ton of the equivalent fuel, Gcal/t.e.f.;

$AELS_y$  - annual energy supply of the TPP in year  $y$ , MWh.

All the data achieved in the calculations is being lowered by the uncertainties and accuracy level of the measuring equipment. (According to the GKD-34.09.103-96, approved by the Ministry of Energy and Electrification of Ukraine in 1996).

The fixation of the  $SFR_y$  parameter in the Baseline Scenario allows taking into account the planned repairs measures. If not, the  $SFR_y$  parameter should have been growing each year because of the physical deterioration of the equipment.

The  $SFR_y$  is usually measured in the grams of the equivalent fuel per kWh (tons per MWh) of the energy supplied to the grid. One ton of the equivalent fuel (tef) is 29,3076 GJ or 7 Gcal.

The calculation of the  $SFR_y$  shows the fuel consumption irrelative of the type of the fuel. All the amount of the natural fuel is multiplied by the net caloric value of the fuel (specifically consumed) and these values are summed up. The use of the  $SFR_y$  parameter shows the real fuel efficiency of the TPP independent of the fuel quality and the net caloric value and allows comparing the fuel efficiency data of the different time periods.

For the Baseline Emission and the Emission Reductions calculations, the  $SFR_y$  was fixed as 0,4379 tef/MWh (12,8305 GJ/MWh), which is the average for the period 2003 – 2005. The Baseline Emissions are being calculated monthly and summed for

the whole lifetime of the Project, taking into account the annual electricity supply and the parameters of the fuel mix for the monitoring period.

### A.7. Intended deviations or revisions to the determined PDD and Monitoring

#### Plan:

>>

In the PDD the IPCC 1996 Guidelines for National Greenhouse Gas Inventories<sup>2</sup> data of the Carbon Emission Factor (*EF<sub>iy</sub>*) of the Coal and Natural Gas and also the Oxidation Factor (*OXID<sub>iy</sub>*) was used for the Baseline Emission, Project Emission and the Emission Reductions calculations. In the present Monitoring Report the data from the “National GHG Inventory Report” (Inventory) of Ukraine for 1990 - 2010<sup>3</sup> was used as more accurate.

***EF<sub>iy</sub> for the coal*** – **0,09717** tons of CO<sub>2</sub> per GJ (according to the Inventory, the carbon emission factor of the coal, used at the Luhanskaya TPP in 2010 (the latest reported year) was **26,5** tons of C / TJ<sup>4</sup>. To calculate the carbon dioxide (CO<sub>2</sub>) emission factor we use the transformation coefficient CO<sub>2</sub>/C = **44 / 12**. Thus, for the Project and Baseline emission and the Emission reductions calculation for the Project the CO<sub>2</sub> emission factor **97,17** tons of CO<sub>2</sub>/TJ, or **0,09717** tons of CO<sub>2</sub>/GJ was used for the coal);

***EF<sub>iy</sub> for the heavy fuel oil*** – **0,0774** tons of CO<sub>2</sub> per GJ (according to the IPCC 1996 Workbook, the carbon emission factor of heavy fuel oil is **21,1** tons of C / TJ. To calculate the carbon dioxide (CO<sub>2</sub>) emission factor we use the transformation coefficient CO<sub>2</sub>/C = **44 / 12**. Thus, for the Project and Baseline emission and the Emission reductions calculation for the Project the CO<sub>2</sub> emission factor **77,366** tons of CO<sub>2</sub>/TJ, or **0,0774** tons of CO<sub>2</sub>/GJ was used for the heavy fuel oil);

***EF<sub>iy</sub> for the natural gas*** – **0,0556** tons of CO<sub>2</sub> per GJ (according to the Inventory, the carbon emission factor of natural gas used in Ukraine in 2010 (the latest reported

<sup>2</sup> <http://www.ipcc-nggip.iges.or.jp/public/gl/invs6a.htm>

<sup>3</sup> [http://unfccc.int/national\\_reports/annex\\_i\\_ghg\\_inventories/national\\_inventories\\_submissions/items/6598.php](http://unfccc.int/national_reports/annex_i_ghg_inventories/national_inventories_submissions/items/6598.php)

<sup>4</sup> [http://unfccc.int/national\\_reports/annex\\_i\\_ghg\\_inventories/national\\_inventories\\_submissions/items/6598.php](http://unfccc.int/national_reports/annex_i_ghg_inventories/national_inventories_submissions/items/6598.php), p. 443, table. P2 13

year) was **15,17** tons of C / TJ<sup>5</sup>. To calculate the carbon dioxide (CO<sub>2</sub>) emission factor we use the transformation coefficient CO<sub>2</sub>/C = **44 / 12**. Thus, for the Project and Baseline emission and the Emission reductions calculation for the Project the CO<sub>2</sub> emission factor **55,62** tons of CO<sub>2</sub>/TJ, or **0,0556** tons of CO<sub>2</sub>/GJ was used for the natural gas).

According to the Inventory *OXIDiy* for the coal used at the Luhanskaya TPP in 2009 (the latest reported year) was **0,946**<sup>6</sup>;

*OXIDiy* for the heavy fuel oil is **0,99** according to the IPCC 1996;

*OXIDiy* for the natural gas is **0,995** according to the IPCC 1996.

### **A.8. Changes since determination:**

>>

There are some deviations in the values of the Baseline, Project Emissions and the Emission Reductions in the Monitoring Report in comparison with the determined PDD. For instance, the Emission Reductions for the 2011 at the PDD were determined at the level of 369 012 tons of the CO<sub>2</sub> equivalent, but the Monitoring Report represents this value as 170 056 tons of the CO<sub>2</sub> equivalent (for the Monitoring Period (01.04.2011 – 31.12.2011) and previous 3 month shown in the previous Monitoring Report). These deviations exist because there were the planned annual values of the Electricity Supply, Specific Fuel Rate and the Fuel mix used for the calculation of the PDD values. In the Monitoring Report these calculations were made based on the factual data and the results were lower, especially in the Electricity Supply because of the economic crisis.

### **A.9. Person(s) responsible for the preparation and submission of the monitoring report:**

>>

---

<sup>5</sup> [http://unfccc.int/national\\_reports/annex\\_i\\_ghg\\_inventories/national\\_inventories\\_submissions/items/6598.php](http://unfccc.int/national_reports/annex_i_ghg_inventories/national_inventories_submissions/items/6598.php), p. 437, table. P2 8

<sup>6</sup> [http://unfccc.int/national\\_reports/annex\\_i\\_ghg\\_inventories/national\\_inventories\\_submissions/items/6598.php](http://unfccc.int/national_reports/annex_i_ghg_inventories/national_inventories_submissions/items/6598.php), p. 444, table. P2 16

## JI PROJECT MONITORING REPORT

12

Skhidenergo ltd.

- Zayats Olexiy Viktorovich, Director for Economic and Finance

“ECO-ELTA” LLC

Rogovoy Maksym Ivanovich, Director.

Tel: +38 050 595 0311

Fax: +38 057 713 41 02

E-mail: [m\\_rogovoy@elta.kharkov.ua](mailto:m_rogovoy@elta.kharkov.ua)

**SECTION B. Key Monitoring activities**

&gt;&gt;

The project is implemented on the TPP in accordance with technical standards of Ukraine. All the equipment has monitoring and security equipment according to the national energy sector requirements. All the data, needed for the monitoring is collected in the production department of the TPP and accumulated in a specific standard table called “3-tech Form” in accordance with the GKD-34.09.103-96 “The calculation of the reported technical and economical parameters of the power plant concerning the thermal efficiency of the equipment. Methodological tool”, approved by the Ministry of Energy and Electrification of Ukraine in 1996. The main parameters of the TPP are measured by the meters and shown in graphs in a real time. The data of the fuel consumption is measured and collected for the whole TPP and the energy produced is measured per each unit separately. This allows to measure the average emission for all the TPP and to see the influence of the Project activity while some of the units are out of operation.

All the starts and stops of each Unit are monitored and also shown in the technical documentation alongside with the working time hours for each Unit of the TPP.

That means, that even when some unit is out of the operation, all the measures continue to be collected and the overall project emission is still being calculated. All the calibrations and checks of the equipment are also documented.

The electricity supply is being monitored by the Electricity Department of the TPP at the central electric panel of the TPP and sent to the Technical Production Department (TPD).

The coal consumption is being monitored daily by the Fuel-Transport Department. The reports are also sent to the TPD.

The heavy fuel oil consumption is being monitored daily by the Boiler-Turbine Department of the TPP. The reports are sent to the TPD.

The natural gas consumption is being monitored by the Gas Distribution System. The daily reports are also sent to the TPD.

## JI PROJECT MONITORING REPORT

14

The data of the Net Caloric Value of the fuel is being provided to the TPD by the certified laboratory of the TPP daily.

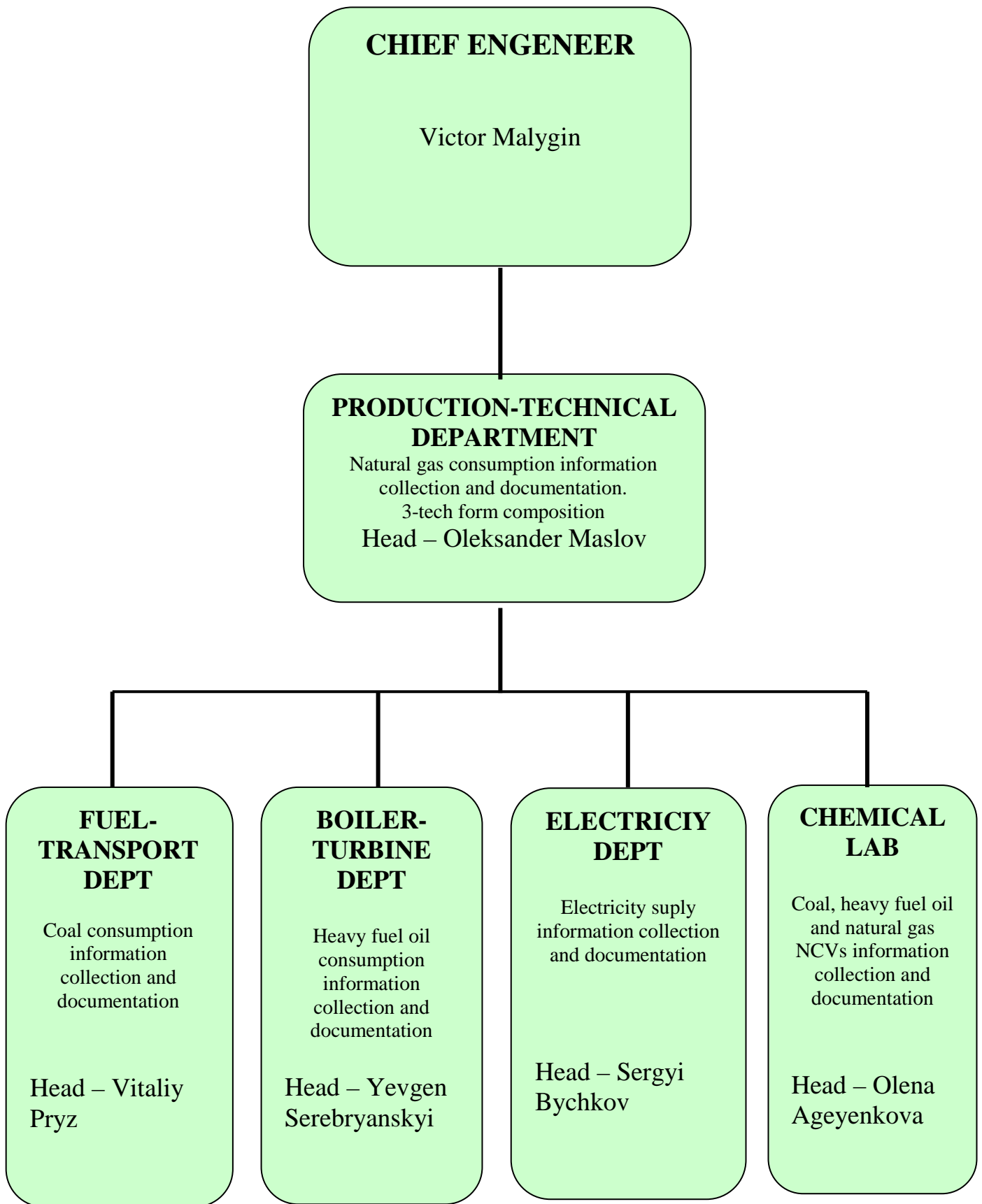
The TPD collects all the data and calculate the Specific Fuel Rate daily. After that, the data is being summarized in the monthly reports and in the annual report called “3-tech” Form.

All the measures are being sent to the project manager of the “ECO-ELTA” company, who collects the data, calculates the emission, emission reductions and creates a monitoring report.

All the data shall be stored in the paper and electronic form at the TPP and in the data base of the “ECO-ELTA” company during all lifetime of the project.

All the data needed for the ERUs calculation, generated by the Project will be stored for at least 2 years after the last ERUs transaction (the “Skhidenergo” Ltd. Order #202 dated 09.09.2010).

**B.1. The monitoring information flow at the TPP**



**B.2. Monitoring equipment.**

As it was mentioned, all the data, needed for the monitoring are shown in the 3-tech form “technical-economic parameters of the equipment operation”. But this information is being crosschecked by the metering equipment indications and calculations. The information about the crosscheck is provided below

**B.2.1. Electricity supply meters.**

During the Monitoring Period all the electricity meters were replaced at the TPP for the new more reliable ones. The information about the meters is provided in the tables B.1 (before the replacement) and B.2 (after the replacement).

*Table B.1. The measuring instruments, used for the electricity supply metering during monitoring period (before the replacement)*

№	Instrument	Connection	Work parameter	Functionality	Type of the meter	Serial number	Level of accuracy	Installation date	Date of the last calibration	Date of the next calibration	Calibration organization*
1	2	3	4	5	6	7	8	9	10	11	12
1	<u>Electricity meter</u>	<u>Pobeda Mykhaylivka-1</u>	KWh	main	EA02-RAL-P4C-4W	01198723	0,2s	09.2009y	08.2009y	08.2015y	LCSM
2	<u>Electricity meter</u>		KWh	dupl	EA02-RAL-C4-W	01147086	0,2s	07.2007y	11.2006y	11.20012y	Elstermetronika



## JI PROJECT MONITORING REPORT

16

3	<u>Electricity meter</u>	<u>Mykhaylivka-1</u>	KWh	main	EA02-RAL-P4C-4W	01198738	0,2s	09.2009y	08.2009y	08.2015y	LCSM
4	<u>Electricity meter</u>		KWh	dupl	EA02-RAL-C4-W	01147061	0,2s	07.2007y	11.2006y	11.2012y	Elstermetronika
5	<u>Electricity meter</u>	<u>Mykhaylivka -2</u>	KWh	main	EA02-RAL-P4C-4W	01198727	0,2s	10.2009y	08.2009y	08.2015y	LCSM
6	<u>Electricity meter</u>		KWh	dupl	EA02-RAL-C4-W	01147078	0,2s	07.2007y	11.2006y	11.2012y	Elstermetronika
7	<u>Electricity meter</u>	<u>Mykhaylivka -3</u>	KWh	main	EA02-RAL-P4C-4W	01198720	0,2s	09.2009y	08.2009y	08.2015y	LCSM
8	<u>Electricity meter</u>		KWh	dupl	EA02-RAL-C4-W	01147050	0,2s	07.2007y	11.2006y	11.2012y	Elstermetronika
9	<u>Electricity meter</u>	<u>Mykhaylivka -4</u>	KWh	main	EA02-RAL-P4C-4W	01198725	0,2s	09.2009y	08.2009y	08.2015y	LCSM
10	<u>Electricity meter</u>		KWh	dupl	EA02-RAL-C4-W	01147030	0,2s	07.2007y	11.2006y	11.2012y	Elstermetronika
11	<u>Electricity meter</u>	<u>Komunarska-1</u>	KWh	main	EA02-RAL-P4C-4W	01198719	0,2s	10.2009y	08.2009y	08.2015y	LCSM
12	<u>Electricity meter</u>		KWh	dupl	EA02-RAL-C4-W	01147057	0,2s	07.2007y	11.2006y	11.2012y	Elstermetronika
13	<u>Electricity meter</u>	<u>Komunarska -2</u>	KWh	main	EA02-RAL-P4C-4W	01198743	0,2s	09.2009y	08.2009y	08.2015y	LCSM
14	<u>Electricity meter</u>		KWh	dupl	EA02-RAL-C4-W	01147055	0,2s	07.2007y	11.2006y	11.2012y	Elstermetronika
15	<u>Electricity meter</u>	<u>Kirova-1</u>	KWh	main	EA02-RAL-P4C-4W	01198748	0,2s	09.2009y	08.2009y	08.2015y	LCSM
16	<u>Electricity meter</u>		KWh	dupl	EA02-RAL-C4-W	01147066	0,2s	07.2007y	11.2006y	11.2012y	Elstermetronika
17	<u>Electricity meter</u>	<u>Kirova-2</u>	KWh	main	EA02-RAL-P4C-4W	01198730	0,2s	09.2009y	08.2009y	08.2015y	LCSM
18	<u>Electricity meter</u>		KWh	dupl	EA02-RAL-C4-W	01147040	0,2s	07.2007y	11.2006y	11.2012y	Elstermetronika

## JI PROJECT MONITORING REPORT

17

19	<u>Electricity meter</u>	<u>Uvileyna</u>	KWh	main	EA02-RAL-P4C-4W	01198717	0,2s	09.2009y	08.2009y	08.2015y	LCSM
20	<u>Electricity meter</u>		KWh	dupl	EA02-RAL-C4-W	01147043	0,2s	07.2007y	11.2006y	11.2012y	Elstermetronika
21	<u>Electricity meter</u>	<u>Lisychanska</u>	KWh	main	EA02-RAL-P4C-4W	01198746	0,2s	04.2010y	08.2009y	08.2015y	LCSM
22	<u>Electricity meter</u>		KWh	dupl	EA02-RAL-C4-W	01147073	0,2s	07.2007y	11.2006y	11.2012y	Elstermetronika
23	<u>Electricity meter</u>	<u>Sysoyevo</u>	KWh	main	SL – 7000	36043255	0,2s	03.2008y	1q.2008y	1q.2014y	SE ”Donetskstandar tmetrologiya”
24	<u>Electricity meter</u>		KWh	dupl	SL - 7000	36043252	0,2s	12.2005y	4q.2005y	4q.2011y	SE ”Donetskstandar tmetrologiya”
25	<u>Electricity meter</u>	<u>OVV-220 kV</u>	KWh	main	EA02-RAL-P4C-4W	01198736	0,2s	09.2009y	08.2009y	08.2015y	LCSM
26	<u>Electricity meter</u>		KWh	dupl	EA02-RAL-C4-W	01147092	0,2s	07.2007y	11.2006y	11.2012y	Elstermetronika
27	<u>Electricity meter</u>	<u>ShSOVV-220 kV</u>	KWh	main	SL 7000	36043254	0,2s	12.2005y	4q.2005y	4q.2011y	YI «Донецкстандар тметролоуия»
28	<u>Electricity meter</u>		KWh	dupl	EA02-RAL-P4C-4W	01198726	0,2s	10.2009y	08.2009y	08.2015y	LCSM
29	<u>Electricity meter</u>	<u>Kosiora</u>	KWh	main	EA02-RAL-P4C-4W	01198740	0,2s	07.2010y	03.2010y	03.2016y	LCSM
30	<u>Electricity meter</u>		KWh	dupl	EA02-RAL-C4-W	01147056	0,2s	07.2007y	11.2006y	11.2012y	Elstermetronika
31	<u>Electricity meter</u>	<u>Kirova</u>	KWh	main	EA02-RAL-P4C-4W	01198745	0,2s	10.2009y	08.2009y	08.2015y	LCSM
32	<u>Electricity meter</u>		KWh	dupl	EA02-RAL-C4-W	01147063	0,2s	07.2007y	11.2006y	11.2012y	Elstermetronika
33	<u>Electricity meter</u>	<u>Luhanska</u>	KWh	main	EA02-RAL-P4C-4W	01198729	0,2s	10.2009y	08.2009y	08.2015y	LCSM

## JI PROJECT MONITORING REPORT

18

34	<u>Electricity meter</u>		KWh	dupl	EA02-RAL-C4-W	01147071	0,2s	07.2007y	11.2006y	11.2012y	Elstermetronika
35	<u>Electricity meter</u>	Petrovska	KWh	main	EA02-RAL-P4C-4W	01198741	0,2s	10.2009y	08.2009y	08.2015y	LCSM
36	<u>Electricity meter</u>		KWh	dupl	EA02-RAL-C4-W	01147031	0,2s	01.2008y	11.2006y	11.2012y	Elstermetronika
37	<u>Electricity meter</u>	Novoaydarska	KWh	main	EA02-RAL-P4C-4W	01198744	0,2s	10.2009y	08.2009y	08.2015y	LCSM
38	<u>Electricity meter</u>		KWh	dupl	EA02-RAL-C4-W	01147038	0,2s	07.2007y	11.2006y	11.2012y	Elstermetronika
39	<u>Electricity meter</u>	Novoaydarska NPS	KWh	main	EA02-RAL-P4C-4W	01198735	0,2s	10.2009y	08.2009y	08.2015y	LCSM
40	<u>Electricity meter</u>		KWh	dupl	EA02-RAL-C4-W	01147060	0,2s	12.2007	11.2006y	11.2012y	Elstermetronika
41	<u>Electricity meter</u>	Schastya	KWh	main	EA02-RAL-P4C-4W	01198718	0,2s	10.2009y	08.2009y	08.2015y	LCSM
42	<u>Electricity meter</u>		KWh	dupl	EA02-RAL-C4-W	01147087	0,2s	07.2007y	11.2006y	11.2012y	Elstermetronika
43	<u>Electricity meter</u>	Poliv	KWh	main	EA02-RAL-P4C-4W	01198721	0,2s	10.2009y	08.2009y	08.2015y	LCSM
44	<u>Electricity meter</u>		KWh	dupl	EA02-RAL-C4-W	01147059	0,2s	07.2007y	11.2006y	11.2012y	Elstermetronika
45	<u>Electricity meter</u>	OVV-110 kV	KWh	main	EA02-RAL-P4C-4W	01198739	0,2s	10.2009y	08.2009y	08.2015y	LCSM
46	<u>Electricity meter</u>		KWh	dupl	EA02-RAL-C4-W	01147075	0,2s	03.2008y	01.2008y	01.2014y	LCSM
47	<u>Electricity meter</u>	9TG	KWh	main	AIR-3-OL-C4T	01013158	0,2	03.2011y	01.2011y	03.2017y	LCSM
48	<u>Electricity meter</u>		KWh	dupl	CTK3-02Q2T3Mt	36053	0,2	03.2007y	12.2006y	12.2012y	Telekartpribor
49	<u>Electricity meter</u>	10TG	KWh	main	AIR-3-OL-C4T	01015404	0,2	11.2009y	09.2009y	09.2015y	LCSM

## JI PROJECT MONITORING REPORT

19

50	<u>Electricity meter</u>		KWh	dupl	CTK3-02Q2T3Mt	36051	0,2	03.2007y	12.2006y	12.2012y	Telekartpribor
51	<u>Electricity meter</u>	11TG	KWh	main	AIR-3-OL-C4T	01013143	0,2	04.2010y	03.2010y	03.2016y	LCSM
52	<u>Electricity meter</u>		KWh	dupl	CTK3-02Q2T3Mt	36054	0,2	03.2007y	12.2006y	12.2012y	Telekartpribor
53	<u>Electricity meter</u>	13TG	KWh	main	AIR-3-OL-C4T	01015420	0,2	03.2010y	09.2009y	09.2015y	LCSM
54	<u>Electricity meter</u>		KWh	dupl	CTK3-02Q2T3Mt	36049	0,2	03.2007y	12.2006y	12.2012y	Telekartpribor
55	<u>Electricity meter</u>	14TG	KWh	main	AIR-3-OL-C4T	01013154	0,2	10.2009y	07.2009y	07.2015y	LCSM
56	<u>Electricity meter</u>		KWh	dupl	CTK3-02Q2T3Mt	36050	0,2	03.2007y	12.2006y	12.2012y	Telekartpribor
57	<u>Electricity meter</u>	15TG	KWh	main	AIR-3-OL-C4T	01013152	0,2	05.2010y	03.2010y	10.2016y	LCSM
58	<u>Electricity meter</u>		KWh	dupl	CTK3-02Q2T3Mt	36052	0,2	03.2007y	12.2006y	12.2012y	Telekartpribor
59	<u>Electricity meter</u>	KTP DOK	KWh	main	CTK3-10Q2T3Mt	36098	1,0	06.2007y	12.2006y	12.2012y	Telekartpribor
60	<u>Electricity meter</u>	Novy ochisny sporudy 1	KWh	main	EA05-RL-C3-W	01147100	0,5s	03.2008y	01.2008y	01.2014y	LCSM
61	<u>Electricity meter</u>	Novy ochisny sporudy 1a	KWh	main	EA05-RL-C3-W	01147107	0,5s	03.2008y	01.2008y	01.2014y	LCSM
62	<u>Electricity meter</u>	KTP Pischanyi karyer	KWh	main	CTK3-10Q2T3Mt	36044	1,0	04.2009y	06.2008y	06.2014y	LCSM
63	<u>Electricity meter</u>	KTP EUM	KWh	main	CTK3-10Q2T3Mt	36047	1,0	06.2007y	12.2006y	12.2012y	Telekartpribor
64	<u>Electricity meter</u>	KTP ABZ	KWh	main	CTK3-10Q2H4Mt	36092	1,0	06.2007y	12.2006y	12.2012y	Telekartpribor
65	<u>Electricity meter</u>	ZTP of the ORS's Base	KWh	main	CTK3-10Q2H4Mt	36093	1,0	06.2007y	12.2006y	12.2012y	Telekartpribor

## JI PROJECT MONITORING REPORT

20

66	<u>Electricity meter</u>	KTP ATC	KWh	main	CTK3-10Q2H4Mt	36094	1,0	06.2007y	12.2006y	12.2012y	Telekartpribor
67	<u>Electricity meter</u>	«Socis» Ltd.	KWh	main	CTK3-10Q2T3Mt	36045	1,0	07.2007y	12.2006y	12.2012y	Telekartpribor
68	<u>Electricity meter</u>	“Zhylposyolok”	KWh	main	EA05-RAL-C3-W	01147098	0,5s	07.2009y	07.2009y	07.2015y	LCSM
69	<u>Electricity meter</u>	Prudova nasosna	KWh	main	SL 761B071	53000381	0,2s	12.2008y	12.2008y	12.2016y	LCSM

*Table B.2. The measuring instruments, used for the electricity supply metering during monitoring period (after the replacement)*

№	Instrument	Connection	Work parameter	Functionality	Type of the meter	Serial number	Level of accuracy	Installation date	Date of the last calibration	Date of the next calibration	Calibration organization*
1	2	3	4	5	6	7	8	9	10	11	12
1	<u>Electricity meter</u>	Pobeda	KWh	main	Actaris SL7000	53105781	± 0,2 %	3q. 2011 y.	2q. 2011 y.	2q. 2017 y.	*
2	<u>Electricity meter</u>		KWh	dupl	Actaris SL7000	53105806	± 0,2 %	3q. 2011 y.	2q. 2011 y.	2q. 2017 y.	*
3	<u>Electricity meter</u>	Mykhaylivka-1	KWh	main	Actaris SL7000	53105788	± 0,2 %	3q. 2011 y.	2q. 2011 y.	2q. 2017 y.	*
4	<u>Electricity meter</u>		KWh	dupl	Actaris SL7000	53105789	± 0,2 %	3q. 2011 y.	2q. 2011 y.	2q. 2017 y.	*

## JI PROJECT MONITORING REPORT

5	<u>Electricity</u> <u>meter</u>	Mykhaylivka -2	KWh	main	Actaris SL7000	53105795	± 0,2 %	3q. 2011 y.	2q. 2011 y.	2q. 2017 y.	*
6	<u>Electricity</u> <u>meter</u>		KWh	dupl	Actaris SL7000	53105792	± 0,2 %	3q. 2011 y.	2q. 2011 y.	2q. 2017 y.	*
7	<u>Electricity</u> <u>meter</u>	Mykhaylivka -3	KWh	main	Actaris SL7000	53105798	± 0,2 %	3q. 2011 y.	2q. 2011 y.	2q. 2017 y.	*
8	<u>Electricity</u> <u>meter</u>		KWh	dupl	Actaris SL7000	53105803	± 0,2 %	3q. 2011 y.	2q. 2011 y.	2q. 2017 y.	*
9	<u>Electricity</u> <u>meter</u>	Mykhaylivka -4	KWh	main	Actaris SL7000	53105816	± 0,2 %	3q. 2011 y.	2q. 2011 y.	2q. 2017 y.	*
10	<u>Electricity</u> <u>meter</u>		KWh	dupl	Actaris SL7000	53105809	± 0,2 %	3q. 2011 y.	2q. 2011 y.	2q. 2017 y.	*
11	<u>Electricity</u> <u>meter</u>	Komunarska-1	KWh	main	Actaris SL7000	53105800	± 0,2 %	3q. 2011 y.	2q. 2011 y.	2q. 2017 y.	*
12	<u>Electricity</u> <u>meter</u>		KWh	dupl	Actaris SL7000	53105808	± 0,2 %	3q. 2011 y.	2q. 2011 y.	2q. 2017 y.	*
13	<u>Electricity</u> <u>meter</u>	Komunarska -2	KWh	main	Actaris SL7000	53105795	± 0,2 %	3q. 2011 y.	2q. 2011 y.	2q. 2017 y.	*
14	<u>Electricity</u> <u>meter</u>		KWh	dupl	Actaris SL7000	53105797	± 0,2 %	3q. 2011 y.	2q. 2011 y.	2q. 2017 y.	*
15	<u>Electricity</u> <u>meter</u>	Kirova-1	KWh	main	Actaris SL7000	53105785	± 0,2 %	3q. 2011 y.	2q. 2011 y.	2q. 2017 y.	*

## JI PROJECT MONITORING REPORT

16	<u>Electricity</u> <u>meter</u>		KWh	dupl	Actaris SL7000	53105811	± 0,2 %	3q. 2011 y.	2q. 2011 y.	2q. 2017 y.	*
17	<u>Electricity</u> <u>meter</u>	Kirova-2	KWh	main	Actaris SL7000	53105798	± 0,2 %	3q. 2011 y.	2q. 2011 y.	2q. 2017 y.	*
18	<u>Electricity</u> <u>meter</u>		KWh	dupl	Actaris SL7000	53105777	± 0,2 %	3q. 2011 y.	2q. 2011 y.	2q. 2017 y.	*
19	<u>Electricity</u> <u>meter</u>	Uvileyna	KWh	main	Actaris SL7000	53105817	± 0,2 %	3q. 2011 y.	2q. 2011 y.	2q. 2017 y.	*
20	<u>Electricity</u> <u>meter</u>		KWh	dupl	Actaris SL7000	53105812	± 0,2 %	3q. 2011 y.	2q. 2011 y.	2q. 2017 y.	*
21	<u>Electricity</u> <u>meter</u>	Lisychanska	KWh	main	Actaris SL7000	53105778	± 0,2 %	3q. 2011 y.	2q. 2011 y.	2q. 2017 y.	*
22	<u>Electricity</u> <u>meter</u>		KWh	dupl	Actaris SL7000	53105793	± 0,2 %	3q. 2011 y.	2q. 2011 y.	2q. 2017 y.	*
23	<u>Electricity</u> <u>meter</u>	Sysoyevo	KWh	main	Actaris SL7000	36043254	± 0,2 %	3q. 2011 y.	2q. 2011 y.	2q. 2017 y.	*
24	<u>Electricity</u> <u>meter</u>		KWh	dupl	Actaris SL7000	53105783	± 0,2 %	3q. 2011 y.	2q. 2011 y.	2q. 2017 y.	*
25	<u>Electricity</u> <u>meter</u>	OVV-220 kV	KWh	main	Actaris SL7000	53105771	± 0,2 %	3q. 2011 y.	2q. 2011 y.	2q. 2017 y.	*
26	<u>Electricity</u> <u>meter</u>		KWh	dupl	Actaris SL7000	53105773	± 0,2 %	3q. 2011 y.	2q. 2011 y.	2q. 2017 y.	*

## JI PROJECT MONITORING REPORT

27	<u>Electricity</u> <u>meter</u>	ShSOVV-220 кV	KWh	main	Actaris SL7000	36043256	± 0,2 %	3q. 2011 y.	2q. 2011 y.	2q. 2017 y.	*
28	<u>Electricity</u> <u>meter</u>		KWh	dupl	Actaris SL7000	53118178	± 0,2 %	3q. 2011 y.	2q. 2011 y.	2q. 2017 y.	*
29	<u>Electricity</u> <u>meter</u>	Kosiora	KWh	main	Actaris SL7000	53112262	± 0,5 %	3q. 2011 y.	2q. 2011 y.	2q. 2017 y.	*
30	<u>Electricity</u> <u>meter</u>		KWh	dupl	Actaris SL7000	53112264	± 0,5 %	3q. 2011 y.	2q. 2011 y.	2q. 2017 y.	*
31	<u>Electricity</u> <u>meter</u>	Kirova	KWh	main	Actaris SL7000	53112259	± 0,5 %	3q. 2011 y.	2q. 2011 y.	2q. 2017 y.	*
32	<u>Electricity</u> <u>meter</u>		KWh	dupl	Actaris SL7000	53112290	± 0,5 %	3q. 2011 y.	2q. 2011 y.	2q. 2017 y.	*
33	<u>Electricity</u> <u>meter</u>	Luhanska	KWh	main	Actaris SL7000	53112252	± 0,5 %	3q. 2011 y.	2q. 2011 y.	2q. 2017 y.	*
34	<u>Electricity</u> <u>meter</u>		KWh	dupl	Actaris SL7000	53112253	± 0,5 %	3q. 2011 y.	2q. 2011 y.	2q. 2017 y.	*
35	<u>Electricity</u> <u>meter</u>	Petrovska	KWh	main	Actaris SL7000	53112300	± 0,5 %	3q. 2011 y.	2q. 2011 y.	2q. 2017 y.	*
36	<u>Electricity</u> <u>meter</u>		KWh	dupl	Actaris SL7000	53112307	± 0,5 %	3q. 2011 y.	2q. 2011 y.	2q. 2017 y.	*
37	<u>Electricity</u> <u>meter</u>	Novyi Aydar	KWh	main	Actaris SL7000	53112280	± 0,5 %	3q. 2011 y.	2q. 2011 y.	2q. 2017 y.	*



## JI PROJECT MONITORING REPORT

38	<u>Electricity</u> <u>meter</u>		KWh	dupl	Actaris SL7000	53112254	± 0,5 %	3q. 2011 y.	2q. 2011 y.	2q. 2017 y.	*
39	<u>Electricity</u> <u>meter</u>	Novoaydarska NPS	KWh	main	Actaris SL7000	53112257	± 0,5 %	3q. 2011 y.	2q. 2011 y.	2q. 2017 y.	*
40	<u>Electricity</u> <u>meter</u>		KWh	dupl	Actaris SL7000	53112258	± 0,5 %	3q. 2011 y.	2q. 2011 y.	2q. 2017 y.	*
41	<u>Electricity</u> <u>meter</u>	Schastya	KWh	main	Actaris SL7000	53112288	± 0,5 %	3q. 2011 y.	2q. 2011 y.	2q. 2017 y.	*
42	<u>Electricity</u> <u>meter</u>		KWh	dupl	Actaris SL7000	53112309	± 0,5 %	3q. 2011 y.	2q. 2011 y.	2q. 2017 y.	*
43	<u>Electricity</u> <u>meter</u>	Poliv	KWh	main	Actaris SL7000	53112270	± 0,5 %	3q. 2011 y.	2q. 2011 y.	2q. 2017 y.	*
44	<u>Electricity</u> <u>meter</u>		KWh	dupl	Actaris SL7000	53112271	± 0,5 %	3q. 2011 y.	2q. 2011 y.	2q. 2017 y.	*
45	<u>Electricity</u> <u>meter</u>	OVV-110 kV	KWh	main	Actaris SL7000	53112266	± 0,5 %	3q. 2011 y.	2q. 2011 y.	2q. 2017 y.	*
46	<u>Electricity</u> <u>meter</u>		KWh	dupl	Actaris SL7000	53112256	± 0,5 %	3q. 2011 y.	2q. 2011 y.	2q. 2017 y.	*
47	<u>Electricity</u> <u>meter</u>	9TG	KWh	main	Actaris SL7000	53105813	± 0,2 %	3q. 2011 y.	2q. 2011 y.	2q. 2017 y.	*
48	<u>Electricity</u> <u>meter</u>		KWh	dupl	Actaris SL7000	53105813	± 0,2 %	3q. 2011 y.	2q. 2011 y.	2q. 2017 y.	*

## JI PROJECT MONITORING REPORT

49	<u>Electricity</u> <u>meter</u>	10TG	KWh	main	Actaris SL7000	53101787	± 0,2 %	3q. 2011 y.	2q. 2011 y.	2q. 2017 y.	*
50	<u>Electricity</u> <u>meter</u>		KWh	dupl	Actaris SL7000	53101792	± 0,2 %	3q. 2011 y.	2q. 2011 y.	2q. 2017 y.	*
51	<u>Electricity</u> <u>meter</u>	11TG	KWh	main	Actaris SL7000	53118179	± 0,2 %	3q. 2011 y.	2q. 2011 y.	2q. 2017 y.	*
52	<u>Electricity</u> <u>meter</u>		KWh	dupl	Actaris SL7000	53105782	± 0,2 %	3q. 2011 y.	2q. 2011 y.	2q. 2017 y.	*
53	<u>Electricity</u> <u>meter</u>	13TG	KWh	main	Actaris SL7000	53118200	± 0,2 %	3q. 2011 y.	2q. 2011 y.	2q. 2017 y.	*
54	<u>Electricity</u> <u>meter</u>		KWh	dupl	Actaris SL7000	35105779	± 0,2 %	3q. 2011 y.	2q. 2011 y.	2q. 2017 y.	*
55	<u>Electricity</u> <u>meter</u>	14TG	KWh	main	Actaris SL7000	53118207	± 0,2 %	3q. 2011 y.	2q. 2011 y.	2q. 2017 y.	*
56	<u>Electricity</u> <u>meter</u>		KWh	dupl	Actaris SL7000	53105780	± 0,2 %	3q. 2011 y.	2q. 2011 y.	2q. 2017 y.	*
57	<u>Electricity</u> <u>meter</u>	15TG	KWh	main	Actaris SL7000	53118210	± 0,2 %	3q. 2011 y.	2q. 2011 y.	2q. 2017 y.	*
58	<u>Electricity</u> <u>meter</u>		KWh	dupl	Actaris SL7000	53105814	± 0,2 %	3q. 2011 y.	2q. 2011 y.	2q. 2017 y.	*
59	<u>Electricity</u> <u>meter</u>	KTP DOK	KWh	main	Actaris SL7000	53112298	± 0,5 %	3q. 2011 y.	2q. 2011 y.	2q. 2017 y.	*

## JI PROJECT MONITORING REPORT

60	<u>Electricity</u> <u>meter</u>	Novy ochisny sporudy 1	KWh	main	Actaris SL7000	53112279	± 0,5 %	3q. 2011 y.	2q. 2011 y.	2q. 2017 y.	*
61	<u>Electricity</u> <u>meter</u>	Novy ochisny sporudy 1a	KWh	main	Actaris SL7000	53112282	± 0,5 %	3q. 2011 y.	2q. 2011 y.	2q. 2017 y.	*
62	<u>Electricity</u> <u>meter</u>	KTP Pischanyi karyer	KWh	main	Actaris SL7000	53112272	± 0,5 %	3q. 2011 y.	2q. 2011 y.	2q. 2017 y.	*
63	<u>Electricity</u> <u>meter</u>	KTP EUM	KWh	main	Actaris SL7000	53112306	± 0,5 %	3q. 2011 y.	2q. 2011 y.	2q. 2017 y.	*
64	<u>Electricity</u> <u>meter</u>	KTP ABZ	KWh	main	Actaris SL7000	53112286	± 0,5 %	3q. 2011 y.	2q. 2011 y.	2q. 2017 y.	*
65	<u>Electricity</u> <u>meter</u>	ZTP of the ORS's Base	KWh	main	Actaris SL7000	53112268	± 0,5 %	3q. 2011 y.	2q. 2011 y.	2q. 2017 y.	*
66	<u>Electricity</u> <u>meter</u>	<u>KTP ATC</u>	KWh	main	Actaris SL7000	53112289	± 0,5 %	3q. 2011 y.	2q. 2011 y.	2q. 2017 y.	*
67	<u>Electricity</u> <u>meter</u>	«Socis» Ltd.	KWh	main	Actaris SL7000	53112273	± 0,5 %	3q. 2011 y.	2q. 2011 y.	2q. 2017 y.	*
68	<u>Electricity</u> <u>meter</u>	“Zhylposyolok”	KWh	main	Actaris SL7000	53112265	± 0,5 %	3q. 2011 y.	2q. 2011 y.	2q. 2017 y.	*
69	<u>Electricity</u> <u>meter</u>	1T-220	KWh	main	Actaris SL7000	53112265	± 0,5 %	3q. 2011 y.	2q. 2011 y.	2q. 2017 y.	*
70	<u>Electricity</u> <u>meter</u>	2T-220	KWh	main	Actaris SL7000	53112265	± 0,5 %	3q. 2011 y.	2q. 2011 y.	2q. 2017 y.	*

## JI PROJECT MONITORING REPORT

71	<u>Electricity</u> <u>meter</u>	9T-220	KWh	main	Actaris SL7000	53112265	± 0,5 %	3q. 2011 y.	2q. 2011 y.	2q. 2017 y.	*
72	<u>Electricity</u> <u>meter</u>	10T-220	KWh	main	Actaris SL7000	53112265	± 0,5 %	3q. 2011 y.	2q. 2011 y.	2q. 2017 y.	*
73	<u>Electricity</u> <u>meter</u>	11T-220	KWh	main	Actaris SL7000	53112265	± 0,5 %	3q. 2011 y.	2q. 2011 y.	2q. 2017 y.	*
74	<u>Electricity</u> <u>meter</u>	13T-220	KWh	main	Actaris SL7000	53112265	± 0,5 %	3q. 2011 y.	2q. 2011 y.	2q. 2017 y.	*
75	<u>Electricity</u> <u>meter</u>	14T-220	KWh	main	Actaris SL7000	53112265	± 0,5 %	3q. 2011 y.	2q. 2011 y.	2q. 2017 y.	*
76	<u>Electricity</u> <u>meter</u>	15T-220	KWh	main	Actaris SL7000	53112265	± 0,5 %	3q. 2011 y.	2q. 2011 y.	2q. 2017 y.	*
77	<u>Electricity</u> <u>meter</u>	1T-110	KWh	main	Actaris SL7000	53112265	± 0,5 %	3q. 2011 y.	2q. 2011 y.	2q. 2017 y.	*
78	<u>Electricity</u> <u>meter</u>	2T-110	KWh	main	Actaris SL7000	53112265	± 0,5 %	3q. 2011 y.	2q. 2011 y.	2q. 2017 y.	*
79	<u>Electricity</u> <u>meter</u>	201T	KWh	main	Actaris SL7000	53112265	± 0,5 %	3q. 2011 y.	2q. 2011 y.	2q. 2017 y.	*
80	<u>Electricity</u> <u>meter</u>	202T	KWh	main	Actaris SL7000	53112265	± 0,5 %	3q. 2011 y.	2q. 2011 y.	2q. 2017 y.	*
81	<u>Electricity</u> <u>meter</u>	203T	KWh	main	Actaris SL7000	53112265	± 0,5 %	3q. 2011 y.	2q. 2011 y.	2q. 2017 y.	*

## JI PROJECT MONITORING REPORT

82	<u>Electricity</u> <u>meter</u>	204T	KWh	main	Actaris SL7000	53112265	± 0,5 %	3q. 2011 y.	2q. 2011 y.	2q. 2017 y.	*
83	<u>Electricity</u> <u>meter</u>	1 TSN	KWh	main	Actaris SL7000	53112265	± 0,5 %	3q. 2011 y.	2q. 2011 y.	2q. 2017 y.	*

- as all the meters in shown in the table B.1 were installed in 2011, the calibrations were made by the manufacturer.

In the Monitoring Period (1.04.2011 – 31.12.2011) Luhanskaya TPP supplied to the National Grid **3 453 086** MWh of the electrical energy.

\* - See Section B.2.3 QA/QC

### B.2.2. Fuel consumption

*Table B.3. Coal scales used in the monitoring period.*

№	Instrument	Work parameter	Type of the meter	Serial number	Accuracy level	Installation date	Date of the last calibration	Date of the next calibration	Calibration organization
1	Electronic strain railroad scales VVET-75.EP-0.P SD TU U 29.2- 19377931-001-2006	tons	scales	243	0,15	06.11.08	27.10.10	27.10.11	LCSM

## JI PROJECT MONITORING REPORT

2	Electric-strain conveyor scales RAMSEY 14	tons	scales	9430428	± 0.5%	28.04.10	28.04.10	27.04.11	LCSM
3	Electric-strain conveyor scales RAMSEY 14	tons	scales	9430429	± 0.5%	28.04.10	28.04.10	27.04.11	LCSM

The heavy fuel oil consumption per period is defined by the stationary measuring instrument (log scale), which is mounted on the each heavy fuel oil tank in accordance with the project. According to the calibration table of the each tank, the heavy fuel oil level, measured with the log scale, is evaluated into the heavy fuel oil level in tons. The difference between the levels, measured at the beginning and the end of the period, shows the heavy fuel oil consumption in the period.

The natural gas consumption is measured by the meter, which is mounted at the AGDS owned by the “Luhanskgas” Company and fixed by signing by the Luhanskaya TPP, “Luhanskgas” Company a monthly act.

<b>B.1.3. QA/QC:</b>
----------------------

>>

The equipment calibration is done by the organizations, shown in the tables B.1, B.2 and B.3 in the following way:

\* - as all the meters were installed in 2011, the calibrations were made by the manufacturer.

LCSM – Luhansk SCSMS

**B.3. The List of values, used for the GHG emission reduction calculation::**

>>

*Table B.4. Default values*

Data variable	Source of data	Data unit	Value / Comment
<b><i>OXID<sub>iy</sub></i></b> Oxidation factor of the fuel <i>i</i> in year <i>y</i>	The IPCC 1996 Guidelines for National Greenhouse Gas Inventories <sup>7</sup> and the “National GHG Inventory Report” (Inventory) of Ukraine for 1990 - 2010 <sup>8</sup>	Share of the fuel oxidised, comperative data (%)	According to the Inventory <b><i>OXID<sub>iy</sub></i></b> for the coal used at the Luhanskaya TPP in 2009 (the latest reported year) was <b>0,946<sup>9</sup></b> ; heavy fuel oil – <b>0.99</b> (99%) (IPCC data); natural gas – <b>0.995</b> (99.5%) (IPCC data).
<b><i>EF<sub>iy</sub></i></b> CO2 emission factor of the fuel <i>i</i> consumed in year <i>y</i>	The IPCC 1996 Guidelines for National Greenhouse Gas Inventories <sup>10</sup> and the “National GHG Inventory	Tons of CO2 / TJ	<b><i>EF<sub>iy</sub></i></b> for the coal – <b>0,09167</b> tons of CO2 per GJ. According to the Inventory, the carbon emission factor of the coal,

<sup>7</sup> <http://www.ipcc-nggip.iges.or.jp/public/gl/invs6a.htm>

<sup>8</sup> [http://unfccc.int/national\\_reports/annex\\_i\\_ghg\\_inventories/national\\_inventories\\_submissions/items/6598.php](http://unfccc.int/national_reports/annex_i_ghg_inventories/national_inventories_submissions/items/6598.php)

<sup>9</sup> [http://unfccc.int/national\\_reports/annex\\_i\\_ghg\\_inventories/national\\_inventories\\_submissions/items/6598.php](http://unfccc.int/national_reports/annex_i_ghg_inventories/national_inventories_submissions/items/6598.php), p. 444, table. P2 16

<sup>10</sup> <http://www.ipcc-nggip.iges.or.jp/public/gl/invs6a.htm>

	<p>Report” (Inventory) of Ukraine for 1990 - 2010<sup>11</sup></p>	<p>used at the Luhanskaya TPP in 2009 (the latest reported year) was <b>26,5</b> tons of C / TJ<sup>12</sup>. To calculate the carbon dioxide (CO<sub>2</sub>) emission factor we use the transformation coefficient CO<sub>2</sub>/C = <b>44 / 12</b>. Thus, for the Project and Baseline emission and the Emission reductions calculation for the Project the CO<sub>2</sub> emission factor <b>97,17</b> tons of CO<sub>2</sub>/TJ, or <b>0,09717</b> tons of CO<sub>2</sub>/GJ was used for the coal); <b><i>EF<sub>ij</sub></i></b> for the</p>
--	--	--

<sup>11</sup>[http://unfccc.int/national\\_reports/annex\\_i\\_ghg\\_inventories/national\\_inventories\\_submissions/items/6598.php](http://unfccc.int/national_reports/annex_i_ghg_inventories/national_inventories_submissions/items/6598.php)

<sup>12</sup> [http://unfccc.int/national\\_reports/annex\\_i\\_ghg\\_inventories/national\\_inventories\\_submissions/items/6598.php](http://unfccc.int/national_reports/annex_i_ghg_inventories/national_inventories_submissions/items/6598.php), p. 443, table. P2 13

<sup>13</sup>[http://unfccc.int/national\\_reports/annex\\_i\\_ghg\\_inventories/national\\_inventories\\_submissions/items/6598.php](http://unfccc.int/national_reports/annex_i_ghg_inventories/national_inventories_submissions/items/6598.php), p. 437, table. P2 8



		<p><b>heavy fuel oil –</b> 77.4 tons of CO<sub>2</sub>/TJ (<b>21.1 tons</b> <b>of C/TJ</b>) (IPCC data);</p> <p><b><i>E<sub>Fi</sub></i> for the</b> <b>natural gas –</b> <b>0,0556</b> tons of CO<sub>2</sub> per GJ.</p> <p>According to the Inventory, the carbon emission factor of natural gas used in Ukraine in 2010 (the latest reported year) was <b>15,17</b> tons of C / TJ<sup>13</sup>. To calculate the carbon dioxide (CO<sub>2</sub>) emission factor we use the transformation coefficient CO<sub>2</sub>/C = <b>44 / 12</b>. Thus, for the Project and Baseline emission and the Emission</p>
--	--	---

			reductions calculation for the Project the CO2 emission factor <b>55,62</b> tons of CO2/TJ, or <b>0,0556</b> tons of CO2/GJ was used for the natural gas).
<b>SFR<sub>b</sub></b> Specific Fuel Rate in the Baseline Scenario	Project Design Document	tef / MWh (GJ / MWh)	0,4379 tef / MWh (12,8305 GJ / MWh)

Table B.4. Variables

Data variable	Source of data	Data unit	Value / Comment
<b>SFR<sub>y</sub></b> Specific Fuel Rate in year y	Calculated and fixed in the 3-tech Form	tef / MWh (GJ / MWh)	The average value for the Monitoring Period (01.04.2011 – 31.12.2011) is 0,4298 tef / MWh (12,5944 GJ / MWh);
<b>SF<sub>i</sub></b> The share of fuel <i>i</i> consumed for energy production in year y	Calculated and fixed in the 3-tech Form	Comperative data (%)	For the Monitoring Period (01.04.2011 – 31.12.2011): Coal – 98,0%; Heavy fuel oil –

			0,1%. Natural gas – 1,9%.
<i><b>AELS<sub>y</sub></b></i> The amount of the electricity supplied to the grid in year <i>y</i>	3-tech form and Electricity meters (counters)	MWh	For the Monitoring Period (01.04.2011 – 31.12.2011): 3 453 086 MWh.

**B.3. Leackage:**

>>

Not applicable.

**B.4. Environmental impacts:**

>>

According to the current Ukrainian laws and requirements the measurement of the pollution of dust, soot, NO<sub>x</sub>, CO, etc. should be monitored and documented. These parameters are reflected in the standard form 2TP-Air (the latest edition was approved by the National Statistics Committee of Ukraine Order №223 dated 30.06.2009). The TPP also receives the Pollution Permission from the Ministry of the Environmental Protection of Ukraine.

**B.5. Sustainable Development**

>>

The Project implementation is very important for the region and also for the whole energy sector of Ukraine. The Project significantly improves the ecological situation due to the specific fuel rate lowering and the implementation of the new gas-purification system. All that leads to the GHG emission lowering as far as the

pollution level lowering. Besides, the Project is the leading and the pioneer one in the technological level and the equipment usage. It sets the reference point for the whole energy sector of Ukraine. The Project significantly improves the quality of the energy produced and the reliability of its supply. Moreover, the Project creates new jobs for the high qualification personnel in the region.

<b>SECTION C. Calculations of the GHG emission reductions</b>
---

<b>C.1. <u>Project emission:</u></b>
--------------------------------------

>>

The calculation of the Project Emission ( $PE_y$ ) is made using the formula:

$$PE_y = \sum(SFR_y * SF_{iy} * OXID_{iy} * EF_{iy}) * AELS_y,$$

where:

$PE_y$  – Project emission in year  $y$  (tons of CO<sub>2</sub> equivalent);

$SFR_y$  – specific fuel rate of the TPP in year  $y$  (GJ/MWh);

$SF_{iy}$  – share of fuel  $i$  (coal, natural gas or a heavy fuel oil), consumed by the TPP in year  $y$ ;

$OXID_{iy}$  - oxidation factor of the fuel  $i$  consumed by the TPP in year  $y$ ;

$EF_{iy}$  – CO<sub>2</sub> emission factor of the fuel  $i$  consumed by the TPP in year  $y$  (tons of CO<sub>2</sub>/GJ);

$AELS_y$  - the amount of the electricity supplied to the grid in year  $y$  (MWh).

The calculations are made on the monthly basis and the final result is the sum of the monthly calculations.

*Table C.1. Project emission in the Monitoring Period*

<b>Period</b>	<b>Project Emission (tons of CO2 equivalent)</b>
<i>April</i>	389 957
<i>May</i>	381 149
<i>June</i>	433 117
<i>July</i>	484 645
<i>August</i>	508 376
<i>September</i>	408 865
<i>October</i>	411 638
<i>November</i>	425 892
<i>December</i>	522 690
<b>Total 1.04.2011 – 31.12.2011</b>	<b>3 966 329</b>

The example of the monthly calculation:

In August 2011 Luhanskaya TPP supplied to the Grid 439 632 MWh (*AELS*) of the electrical energy. The Specific Fuel Rate (*SFR*) this month was 0,4302 tef/MWh (12,6049 GJ / MWh). The fuel mix combusted (*SFi*) in August was – coal – 99,5%; heavy fuel oil – 0,0%; natural gas – 0,5%. Thus Project Emission (*PE*) in August was:

$$PE = ((12,6049 * 0,995 * 0,946 * 0,09717) + (12,6049 * 0,005 * 0,995 * 0,0556)) * 439 632 = \mathbf{508 376} \text{ tons of CO2 equivalent.}$$

**C.2. Baseline emission:**

>>

The calculation of the Baseline Emission ( $BE_y$ ) is made using the formula:

$$BE_y = \sum (SFR_b * SF_{iy} * OXID_{iy} * EF_{iy}) * AELS_y ,$$

where:

$BE_y$  – Baseline emission in year  $y$  (tons of CO<sub>2</sub> equivalent);

$SFR_b$  – specific fuel rate of the TPP in the Baseline Scenario (GJ/MWh);

$SF_{iy}$  – share of fuel  $i$  (coal, natural gas or a heavy fuel oil), consumed by the TPP in year  $y$ ;

$OXID_{iy}$  - oxidation factor of the fuel  $i$  consumed by the TPP in year  $y$ ;

$EF_{iy}$  – CO<sub>2</sub> emission factor of the fuel  $i$  consumed by the TPP in year  $y$  (tons of CO<sub>2</sub>/GJ);

$AELS_y$  - the amount of the electricity supplied by the TPP to the National Grid in year  $y$  (MWh).

The calculations are made on the monthly basis and the final result is the sum of the monthly calculations.

*Table C.2. Baseline Emission in the Monitoring Period*

<b>Period</b>	<b>Baseline Emission (tons of CO2 equivalent)</b>
<i>April</i>	407 255
<i>May</i>	383 337
<i>June</i>	435 304
<i>July</i>	486 422
<i>August</i>	517 475
<i>September</i>	413 301
<i>October</i>	420 668
<i>November</i>	438 097
<i>December</i>	539 443
<b>Total 1.04.2011 – 31.12.2011</b>	<b>4 041 302</b>

The example of the monthly calculation:

In August 2011 Luhanskaya TPP supplied to the Grid 439 632 MWh (*AELS*) of the electrical energy. The Baseline Specific Fuel Rate (*SFRb*) is 0,4379 tef/ MW (12,8305 GJ / MWh). The fuel mix combusted (*SFi*) in August was – coal – 99,5%; heavy fuel oil – 0,0%; natural gas – 0,5%. Thus Baseline Emission (*BE*) in August was:

$$BE = ((12,8305 * 0,995 * 0,946 * 0,09717) + (12,8305 * 0,005 * 0,995 * 0,0556)) * 439 632 = \mathbf{517 475} \text{ tons of CO2 equivalent.}$$

<b>C.3. Leakage:</b>
----------------------

>>

Not applicable.



**C.4. Emission Reductions:**

&gt;&gt;

$$ER_y = BE_y - PE_y \quad ,$$

Where:

$ER_y$  – the emission reductions achieved by the project activity in year  $y$ , tons of CO<sub>2</sub> equivalent;

$BE_y$  – the baseline CO<sub>2</sub> emission in year  $y$ , tons of CO<sub>2</sub> equivalent;

$PE_y$  – the project CO<sub>2</sub> emission in year  $y$ , tons of CO<sub>2</sub> equivalent.

The example of the monthly calculation:

In August 2011 the baseline emission ( $BE$ ) was 517 475 tons of CO<sub>2</sub> equivalent.

The Project emission for that period were 508 376 tons of CO<sub>2</sub> equivalent. Thus, the emission reductions in August 2011 were:

$$ER = 517\,475 - 508\,376 = \mathbf{9\,099} \text{ tons of CO}_2 \text{ equivalent.}$$

*Table C.3. Emission Reductions in the Monitoring Period*

<b>Period</b>	<b>Emission Reductions (tons of CO2 equivalent)</b>
<i>April</i>	17 298
<i>May</i>	2 188
<i>June</i>	2 187
<i>July</i>	1 777
<i>August</i>	9 099
<i>September</i>	4 436
<i>October</i>	9 030
<i>November</i>	12 205
<i>December</i>	16 753
<b>Total 1.04.2011 – 31.12.2011</b>	<b>74 973</b>