MONITORING REPORT

JI0079 - CMM utilisation on the Joint Stock Company named Komsomolets Donbassa Coal Mine of DTEK (Donbasskaya Toplivnaya Energeticheskaya Kompanya)

Monitoring Report 04
Monitoring period
01/07/2011 to 30/06/2012

Version 1
24 July 2012

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Annexes

SECTION A. General project activity information

A.1 Title of the project activity:

CMM utilisation on the Joint Stock Company named Komsomolets Donbassa Coal Mine of DTEK (Donbasskaya Toplivnaya Energeticheskaya Kompanya)

A.2. JI registration number:

JI0079 / UA2000011, registered at 09/12/2008.

Details of the project approval can be found under Annex I of this Monitoring Report.

A.3. Short description of the project activity:

In this project CMM, which has been sucked out of the active coal mine DTEK MINE KOMSOMOLETS DONBASSA PJSC[1], has been utilised in two enclosed flares and two upgraded boilers. The methane has been burned to less harmful CO_2.

In this monitoring report credits, produced in the fourth monitoring period should be monitored for the purpose of the verification as Emission Reductions Units ERU.

Table-1 Amount of methane utilised for flaring and heat production

Unit	**period**	**CH_4 [t/period]**
Flares 3+4	01/07/2011 to 31/12/2011	2,946
Flares 3+4	01/01/2012 to 30/06/2012	2,867
Boilers 1+2	01/07/2011 to 31/12/2011	429
Boilers 1+2	01/01/2012 to 30/06/2012	1,144
Total	01/07/2011 to 30/06/2012	**7,386**

A.4. Monitoring period:

Start date 01/07/2011

End date 30/06/2012

Start day and end day included.

This fourth monitoring period follows up to the end of the third monitoring period. The end date has been set at the request of the DTEK MINE KOMSOMOLETS DONBASSA PJSC.

[1] The name of the coal mine changed to DTEK MINE KOMSOMOLETS DONBASSA, PUBLIC JOINT-STOCK COMPANY (DTEK MINE KOMSOMOLETS DONBASSA PJSC), see B.4. for justification.

A.5. Methodology applied to the project activity (incl. version number):

A.5.1. Baseline methodology:

The approved consolidated methodology ACM0008 / Version 03 "Consolidated baseline methodology for coal bed methane and coal mine methane capture and use for power (electrical or motive) and heat and/or destruction by flaring") has been used to identify the baseline scenario of the proposed JI project [ACM0008].

According to ACM0008 the methodological “Tool to determine project emissions from flaring gases containing methane”, EB 28 Meeting report, Annex 13, has been taken for the determination of the project emissions from flaring. In difference to the flaring tool a combustion efficiency of 99.5%, according to the IPCC guidelines (see also ACM0008 Version 1 and Version 2), has been taken into account instead of the default value of 90% as given in the flaring tool.

A.5.2. Monitoring methodology:

A monitoring plan provided by the “Approved consolidated baseline methodology ACM0008”, Version 03, Sectoral Scope: 8 and 10, EB28 is applied to the project [ACM0008].

Applicability requirements for the monitoring plan of the ACM008 methodology are identical to respective requirements of the baseline setting.

According to ACM0008 the methodological “Tool to determine project emissions from flaring gases containing methane”, EB 28 Meeting report, Annex 13, has been taken for the determination of the project emissions from flaring. In difference to the flaring tool a combustion efficiency of 99.5%, according to the IPCC guidelines (see also ACM0008 Version 1 and Version 2), has been taken into account instead of the default value of 90% as given in the flaring tool.

A.6. Status of implementation including time table for major project parts:

The installation of further units as stated in the PDD is delayed due to the lack of funds. The coal production decreased and the financial situation of the coal mine get worse. As only four of nine planned units have been installed, the planned amount of emission reductions could not be achieved.

Air shaft

The boilers 1+2 at Air Shaft have been upgraded with a CMM burner system and started operation in October 2009. A monitoring system for the boilers has been installed since January 28, 2010.
The installation of two cogeneration units is planned for the end of the third quarter of 2011 and one cogeneration unit will be installed on late 2011 or early 2012.

The maximum supply pressure from the existing central gas suction system turned out to be not sufficient for the supply of the flares and the boiler with gas. Both flares have been equipped with compressors for additional pressure generation. The key data of the compressors are given in Table-4.

Table-2 Status of Implementation

Unit	**Planned installation date, as stated in the PDD**	**firing capacity**	**Implementation status**
Central Shaft			
new boiler	Oct 2007	10 MW	Delayed, planned for 2012
flare No: 1	Sep 2007	5 MW	Delayed, planned for 2012
flare No: 2	Apr 2008	5 MW	Delayed, planned for 2012
Air Shaft № 3			
cogeneration unit 1	Sep 2008	approx. 3,6 MW	Delayed, planned for 2012
cogeneration unit 2	Sep 2008	approx. 3,6 MW	Delayed, planned for late 2012
cogeneration unit 3	Sep 2008	approx. 3,6 MW	Delayed, planned for late 2012
Two upgraded boilers	Oct 2007	2 x 10 MW	Installed in October 2009
flare No: 3	Sep 2007	5 MW	Installed in 2008
flare No: 4	Apr 2008	5 MW	Installed in 2008

Table-3 Data of installed units

Unit: Flare 3	
Manufacturer: OAO “NPAO Vniikompressormash” a subsidiary of Ukrrosmetal, Sumy, Ukraine	
Type:UKG-5/8	
Serial Numbers: 03-08	
Capacity: 5-8 MW	
Activity	**Status**
Date of commission	14/02/2008
Last major overhaul	None
Last inspection	June 2012 – Eco-Alliance
Start of operation	09/08/2008
Planned installation date [PDD]	Sept 2007

Unit: Flare 4	
Manufacturer: OAO “NPAO Vniikompressormash” a subsidiary of Ukrrosmetal, Sumy, Ukraine	
Type:UKG-5/8	
Serial Numbers: 04-08	
Capacity: 5-8 MW	
Activity	**Status**

Date of commission	14/02/2008
Last major overhaul	None
Last inspection	June 2012 – Eco-Alliance
Start of operation	27/10/2008
Planned installation date [PDD]	April 2008

Unit: Boiler 1	
Manufacturer: Biyskiy Kotelniy Zavod	
Type: E10-1,4R (KE-10/14 S)	
Serial Numbers: 62350	
Capacity: 10 t steam/h	
Activity	**Status**
Date of commission	1987
Last major overhaul	12.08.2008
Last inspection	22.03.2011 - Gosgorpromnadzor
Start of operation	October 2009
Planned installation date [PDD]	October 2007

Unit: Boiler 2	
Manufacturer: Biyskiy Kotelniy Zavod	
Type: E10-1,4R (KE-10/14 S)	
Serial Numbers: 62360	
Capacity: 10 t steam/h	
Activity	**Status**
Date of commission	1987
Last major overhaul	12.08.2008
Last inspection	22.03.2011- Gosgorpromnadzor
Start of operation	October 2009
Planned installation date [PDD]	October 2007

Table-4 Data of additionally installed compressors

Typ of compressor	rotary
Manufacture / Type	GR-85-24/1,5
Compressor discharge min, m³/sec or (m³/min)	0,17÷0,43 (10÷26)
Pressure difference, MPa or (kp/cm²)	0,01÷0,05 (0,1÷ 0,5)
Engine power max. kW	45
Frequency, 1/s or (RPM)	24,08÷49,25 (1445÷2955)

A.7. Intended deviations or revisions to the registered PDD:

There were no deviations or revisions to PDD during this monitoring period.

A.8. Intended deviations or revisions to the registered monitoring plan:

Monitoring Plan has been revised during third monitoring period because of the changes made in method of calculating of additional energy consumption. See < Revised Monitoring Plan-KD.V3.pdf>.

The calculation of the emission reductions is not calculated on a yearly basis, but for an individual period. Flow data and flare efficiency as well as the methane amount destroyed by flaring MD_{Fl} are calculated in 15 min. intervals in Excel sheets. The main emissions variables for project emissions, baseline emissions and emissions reductions are calculated on a monthly basis. Yearly sums and a total sum for the monitoring are calculated.

The flares have been equipped with compressors for additional pressure generation, so additional power, which is measured by power meters, is consumed by the project. The formula from the ACM0008 for additional project emissions from energy used to capture and use methane has been included in the revised Monitoring Plan. *

The formula for the calculation of project emissions from uncombusted methane has been updated. Formulae from the «Methodological “Tool to determine project emissions from flaring gases containing methane”» [AM_Tool]) have been applied, see Annex 4. The calculation of project emissions from uncombusted methane from flaring is now more accurate.*

The additional power consumption has been calculated using the Baseline Carbon Emission Factors for the Ukrainian power grid, which is given by NEIA [NEIA].
The consumed power amount has been measured with electric power meters, which have been installed 30/04/2010, see also Annex 4.*

New source for CO2 emission factor of fuel used for captive power or heat was taken. The factor is now calculated using the value for “Other Bituminous Coal” of 25.87 t C/TJ from “National Inventory Report of Anthropogenic Emissions from Sources and Absorption by Absorbers of Greenhouse Gases in Ukraine for 1990-2009” Baseline carbon emission factor for other bituminous coal approved in Ukraine.

*- *these deviations were determined during previous monitoring periods and are given for information*

A.9. Changes since last verification:

None.

A.10. Person(s) responsible for the preparation and submission of the monitoring report:

DTEK MINE KOMSOMOLETS DONBASSA PJSC[2]
- Vodopshin Roman Vasil’evich, Technical Director

Eco-Alliance OOO
- Vladimir Kasyanov, Managing director
- Pavel Shelegeda, Deputy Director
- Aleksandr Didenko, Monitoring Assistant
- Viktor Avtonomov, Monitoring Assistant

Carbon-TF B.V
- Dr. Jürgen Meyer, Managing Director
- Clemens Backhaus, Managing Director

[2] The name of the coal mine changed to DTEK MINE KOMSOMOLETS DONBASSA, PUBLIC JOINT-STOCK COMPANY (DTEK MINE KOMSOMOLETS DONBASSA PJSC), see B.4. for justification.

SECTION B. Key monitoring activities according to the monitoring plan for the monitoring period stated in A.4.

B.1. Monitoring equipment:

B.1.2. Table providing information on the equipment used (incl. manufacturer, type, serial number, date of installation, date of last calibration, information to specific uncertainty, need for changes and replacements):

Table-5 Monitoring equipment

ID	Data	Method	Manufacturer	Classification	Serial number	Range	Frequency of Measurement	Instal-lation	Place of the instalation	Uncertainty level of data	Calibration procedure	Last calibration (№ of the document)	Calibrator
1	CMM flow	Gas flow meter	SIEMENS	ME 1120-2CC22-1BA3	Flare №3: K2989B Flare №4: K2989A	298-1566 м3/h	Every 15 min	2008	Measuring pipeline	0.25%	Calibration made using procedures of Sumystandart-metrology Calibration frequency – 1 year	19/12/2011 passport to flow meter № K2989A 19/12/2011 passport to flow meter № K2989B	Sumystandart-metrology
2	Pressure difference	Pressure difference transmitter	SIEMENS	SITRANS P PED:SEP DS III 7MF4433-1CA02-1AB1-Z	Flare№3: N1-W401-9002993 Flare№4: N1-W401-9002992	0…60 mBar	Every 15 min	2008	Measuring pipeline (Gas flow meter)	0.25%	Calibration made using procedures of Sumystandart-metrology Calibration frequency – 1 year	11/10/2011 certificate № 2175 02/11/2011 certificate № 2174	Sumystandart-metrology
3	Pressure	Pressure transmitter	SIEMENS	SITRANS P Serie Z	Flare№3: AZB/W1196798 until 26/01/2012 AZB/AN174263 Flare№4: AZB/W7153229	0…1,6 Bar (abs.)	Every 15 min	2010	Measuring pipeline (Corps of the Gas flow meter)	0.25%	Calibration made using procedures of Sumystandart-metrology Calibration frequency – 1 year	02/11/2011 certificate № 2173 for AZB/W1196798 By manufacturer for AZB/AN174263 18/10/2011	Sumystandart-metrology

												certificate № 2076	
4	Tempera-ture	Resistance thermo-meter	JSC “Tera”, Chernigov	TSPU 1-3N Pt-100 0,5% 80Ф8	Flare№3: 08259 (№08262 was used till March 2010) Flare№4: 08269	-50…+250°C	Every 15 min	Flare№3 2010 Flare№4 2008	Measuring pipeline (After the Gas flow meter)	0.5%	Calibration made using procedures of Sumystandart-metrology Calibration frequency – 1 year	11/10/2011 passport to Resistance thermometer № 08259, 11/10/2011 passport to Resistance thermometer № 08269	Sumystandart-metrology
5	Flame Tempera-ture	Thermo-couple	Herth GmbH	Type S, Pt/PtRh	Flare №3: 69884 until 03/10/2011 78648 Flare №4: 71088 until 03/10/2011 78934	0…+1500°C	Every 15 min	10/2011	Pipe of the Flare	± 1.5 K in the range from [0-600°C]**) 0.25% from value above 600°C**)	none, thermocouple is supposed to be changed at least one time per year, according to the flaring tool	none	None
6	CH4 concentra-tion	Infrared measure-ment	SIEMENS	ULTRAMAT 23	Flare№3: N1 W4-339	CH4 0…20/100% CO2 0…20/100% O2 0…5/25%	Every 15 min	2008	Distributive apartment of the Flare	2.0%	Calibration made using procedures of Sumystandart-metrology Calibration frequency – 1 year Calibrations made using procedures of Eco-Alliance every two weeks	18/10/2011 passport to gasanalizer № N1 W4-339 (03-08)	Sumystandart-metrology Eco-Alliance
7	NMHC concentra-tion	Gas chromat-ography	„Chromatograph“	Gasochrom 3101 LHM-8MD	75	0…100%	Yearly	no data	MAKNII	0.001%	Calibration made using procedures of MAKNII Calibration frequency – 1 year	07/11/2011	MAKNII

8	Electric power	Watthour-meter	business «Concern ENERGYMEASURE»	CE6803V	Flare №3: 086568070787744 1 Flare №4: 086568070789405 9	-	Continuous	30.04.2010	Distributive apartment of the Flare	1.0%	Initial calibration made using procedures of manufacturer. Further calibrations made using procedures of Sumystandart-metrology Calibration frequency – 16 years	07/2008	business Concern «ENERGYMEASURE»
9	Electric power	Transformer of electric current	"Umansky zavod "Megommetr"	T 0,66 UZ 0,66 kV 50 Hz 300/5A	Flare №3: 09553	0…0,66 kV (300/5A)	Continuous	2010	Distributive apartment of the Flare	0.5%	Initial calibration made using procedures of manufacturer. Further calibrations made using procedures of Sumystandart-metrology Calibration frequency – 4 years	01/2010	MEGOMMETR
10	Electric power	Transformer of electric current	"Umansky zavod "Megommetr"	T 0,66 UZ 0,66 kV 50 Hz 300/5A	Flare №3: 08233	0…0,66 kV (300/5A)	Continuous	2010	Distributive apartment of the Flare	0.5%	Initial calibration made using procedures of manufacturer. Further calibrations made using procedures of Sumystandart-metrology Calibration frequency – 4 years	01/2010	MEGOMMETR
11	Electric power	Transformer of electric current	"Umansky zavod "Megommetr"	T 0,66 UZ 0,66 kV 50 Hz 300/5A	Flare №3: 23934	0…0,66 kV (300/5A)	Continuous	2010	Distributive apartment of the Flare	0.5%	Initial calibration made using procedures of manufacturer. Further calibrations made using procedures of Sumystandart-metrology Calibration frequency – 4	03/2010	MEGOMMETR

											years		
12	Electric power	Transformer of electric current	“Umansky zavod “Megommetr“	T 0,66 UZ 0,66 kV 50 Hz 300/5A	Flare №4: 22518	0…0,66 kV (300/5A)	Continuous	2010	Distributive apartment of the Flare	0.5%	Initial calibration made using procedures of manufacturer. Further calibrations made using procedures of Sumystandart-metrology Calibration frequency – 4 years	02/2010	MEGOMMETR
13	Electric power	Transformer of electric current	“Umansky zavod “Megommetr“	T 0,66 UZ 0,66 kV 50 Hz 300/5A	Flare №4: 23607	0…0,66 kV (300/5A)	Continuous	2010	Distributive apartment of the Flare	0.5%	Initial calibration made using procedures of manufacturer. Further calibrations made using procedures of Sumystandart-metrology Calibration frequency – 4 years	03/2010	MEGOMMETR
14	Electric power	Transformer of electric current	“Umansky zavod “Megommetr“	T 0,66 UZ 0,66 kV 50 Hz 300/5A	Flare №4: 23913	0…0,66 kV (300/5A)	Continuous	2010	Distributive apartment of the Flare	0.5%	Initial calibration made using procedures of manufacturer. Further calibrations made using procedures of Sumystandart-metrology Calibration frequency – 4 years	02/2010	MEGOMMETR
15	CMM flow	Gas flow meter	“Energoteh“	no data(d=151,858)	Boiler №1: 77777	169…3200 m3/h	Every 15 min	2010	Measuring pipeline before boiler №1	0.25%	Calibration made using procedures of Sumystandart-metrology Calibration frequency – 1 year	20/10/2011 passport to flow meter № 77777	Sumystandart-metrology

16	CMM flow	Gas flow meter	"Energoteh"	no data(d=151,858)	Boiler №2: 77778	169…3200 m3/h	Every 15 min	2010	Measuring pipeline before boiler №2	0.25%	Calibration made using procedures of Sumystandart-metrology Calibration frequency – 1 year	20/10/2011 passport to flow meter № 77778	Sumystandart-metrology
17	Pressure difference	Pressure difference transmitter	APLISENS	PR-28	Boiler №1: 11092049	0…2,5kPa	Every 15 min	2010	Measuring pipeline before boiler №1 (Gas flow meter)	0.25%	Calibration made using procedures of Sumystandart-metrology Calibration frequency – 1 year	18/10/2011 certificate № 2014	Sumystandart-metrology
18	Pressure difference	Pressure difference transmitter	APLISENS	PR-28	Boiler №2: 02100076	0…2,5kPa	Every 15 min	2010	Measuring pipeline before boiler №2 (Gas flow meter)	0.25%	Calibration made using procedures of Sumystandart-metrology Calibration frequency – 1 year	18/10/2011 certificate № 2013	Sumystandart-metrology
19	Pressure	Pressure transmitter	SIEMENS	SITRANS P series Z	Boiler №1: AZB/W5132860	0…1,6 Bar	Every 15 min	2010	Measuring pipeline before boiler №1 (Before Gas flow meter)	0.25%	Calibration made using procedures of Sumystandart-metrology Calibration frequency – 1 year	18/10/2011 certificate № 2008	Sumystandart-metrology
20	Pressure	Pressure transmitter	SIEMENS	SITRANS P series Z	Boiler №2: AZB/X1110846 until 26/08/2011 AZB/X1110849	0…1,6 Bar	Every 15 min	2010	Measuring pipeline before boiler №2 (Before Gas flow meter)	0.25%	Calibration made using procedures of Sumystandart-metrology Calibration frequency – 1 year	18/10/2011 certificate № 2007	Sumystandart-metrology
21	Tempera-ture	Resistance thermo-meter	JSC "Tera", Chernigov	TSPU 1-3N Pt-100 0,5%	Boiler №1: 09440	-50...+250°C	Every 15 min	2010	Measuring pipeline before boiler №1 (After Gas flow meter)	0.5%	Calibration made using procedures of Sumystandart-metrology Calibration frequency – 1 year	18/10/2011 passport to Resistance thermometer № 09440	Sumystandart-metrology
22	Tempera-ture	Resistance thermo-meter	JSC "Tera", Chernigov	TSPU 1-3N Pt-100 0,5%	Boiler №2: 08247	-50...+250°C	Every 15 min	2010	Measuring pipeline before boiler №2 (After Gas flow meter)	0.5%	Calibration made using procedures of Sumystandart-metrology Calibration frequency – 1 year	18/10/2011 passport to Resistance thermometer № 08247	Sumystandart-metrology

23	Steam flow	Steam flow meter	"Energoteh"	no data (d=96,430)	Boiler №1: 3 until 26/08/2011 919191	0,5566…10,61 472 ton/h	Every 15 min	2010	Measuring pipeline after boiler №1	0.25%	Calibration made using procedures of Sumystandart-metrology Calibration frequency – 1 year	20/10/2011 passport to flow meter № 919191	Sumystandart -metrology
24	Steam flow	Steam flow meter	"Energoteh"	no data (d=96,430)	Boiler №2: 919192	0,5566…10,61 472 ton/h	Every 15 min	2010	Measuring pipeline after boiler №2	0.25%	Calibration made using procedures of Sumystandart-metrology Calibration frequency – 1 year	20/10/2011 passport to flow meter № 919192	Sumystandart -metrology
25	Steam Pressure difference	Pressure difference transmitter	APLISENS	PR-28	Boiler №1: 06091154	0…63kPa	Every 15 min	2010	Measuring pipeline after boiler №1 (Steam flow meter)	0.25%	Calibration made using procedures of Sumystandart-metrology Calibration frequency – 1 year	18/10/2011 certificate № 2011	Sumystandart -metrology
26	Steam Pressure difference	Pressure difference transmitter	APLISENS	PR-28	Boiler №2: 06091155	0…63kPa	Every 15 min	2010	Measuring pipeline after boiler №2 (Steam flow meter)	0.25%	Calibration made using procedures of Sumystandart-metrology Calibration frequency – 1 year	18/10/2011 certificate № 2012	Sumystandart -metrology
27	Steam Pressure	Pressure transmitter	APLISENS	PC-28	Boiler №1: 03081167	0…1,6MPa	Every 15 min	2010	Measuring pipeline after boiler №1 (Before Steam flow meter)	0.25%	Calibration made using procedures of Sumystandart-metrology Calibration frequency – 1 year	18/10/2011 certificate № 2010	Sumystandart -metrology
28	Steam Pressure	Pressure transmitter	APLISENS	PC-28	Boiler №2: 03081169	0…1,6MPa	Every 15 min	2010	Measuring pipeline after boiler №2 (Before Steam flow meter)	0.25%	Calibration made using procedures of Sumystandart-metrology Calibration frequency – 1 year	18/10/2011 certificate № 2009	Sumystandart -metrology

29	Steam Tempera-ture	Resistance thermo-meter	JSC “Tera”, Chernigov	TSPU 1-3N Pt-100 0,5%	Boiler №1: 09446	-50...+250°C	Every 15 min	2010	Measuring pipeline after boiler №1 (After Steam flow meter)	0.5%	Calibration made using procedures of Sumystandart-metrology Calibration frequency – 1 year	15/10/2010 passport to Resistance thermometer № 09446	Sumystandart -metrology
30	Steam Tempera-ture	Resistance thermo-meter	JSC “Tera”, Chernigov	TSPU 1-3N Pt-100 0,5%	Boiler №2: 09449	-50...+250°C	Every 15 min	2010	Measuring pipeline after boiler №1 (After Steam flow meter)	0.5%	Calibration made using procedures of Sumystandart-metrology Calibration frequency – 1 year	18/10/2011 passport to Resistance thermometer № 09449	Sumystandart -metrology
31	Water tempera-ture	Resistance thermome-ter	JSC “Tera”, Chernigov	TSPU 1-3N Pt-100 0,5%	Boiler №1: 09447	-50...+250°C	Every 15 min	2010	Measuring pipeline before boiler №1	0.5%	Calibration made using procedures of Sumystandart-metrology Calibration frequency – 1 year	18/10/2011 passport to Resistance thermometer № 09447	Sumystandart -metrology
32	Water tempera-ture	Resistance thermome-ter	JSC “Tera”, Chernigov	TSPU 1-3N Pt-100 0,5%	Boiler №2: 09450	-50...+250°C	Every 15 min	2010	Measuring pipeline before boiler №2	0.5%	Calibration made using procedures of Sumystandart-metrology Calibration frequency – 1 year	18/10/2011 passport to Resistance thermometer № 09450	Sumystandart -metrology
33	CH4 concentrat ion	Infrared measure-ment	SIEMENS	ULTRAMAT 23	N1 W4-340	CH4 0…20/100% CO2 0…20/100% O2 0…5/25%	Every 15 min	2010	In the boiler-house	2.0%	Calibration made using procedures of Sumystandart-metrology Calibration frequency – 1 year Calibrations made using procedu-es of Eco-Alliance every two weeks	18/10/2011 passport to gasanalizer № N1 W4-340 (04-08)	Sumystandart -metrology Eco-Alliance

*) FSV: full scale value
**) Fixed within EN 60584-2: 1996, Type S, Class 2

B.1.3. Involvement of Third Parties:

- The lab analysis for the determination of the NMHC concentration has been done by MAKNII
- The regular calibrations of CH_4-concentration meters in the flares have been done by Eco-Alliance
- Calibration of the monitoring equipment has been done by SumyStandartmetrology
- Eco-Alliance supported the coal mine with the collecting of the monitoring data.
- Carbon-TF has supervised the data for plausibility and completeness.

B.2. Data collection (accumulated data for the whole monitoring period):

B.2.1. List of fixed default values:

Table-6 List of ex-ante fixed values

ID number	Data variable	Source of data	Data unit	Comment
P8, B49 $CEF_{ELEC,PJ}$	CO_2 emission factor of $CONS_{ELEC,PJ}$	National Environmental Investment Agency of Ukraine, NEIA	tCO_2/MWh	Official Ukrainian data have been published on 12/05/2011 at the NEIA website. According to the information given in the PDD this data is taken into account. Set to: 1.063 t CO_2 / MWh (2011 and 2012) Value for thermal power plants which are connected to the Ukrainian Power grid. [NEIA]
P13 Eff_{FL}	Flare combustion efficiency	PDD / revised monitoring plan ID-5 (T_{flare})	%	Set to: 99.5 % for T_{flare} > 850℃ 90.0 % for 500℃ < T_{flare} < 850℃ 0.0 % for T_{flare} < 500℃
P16 Eff_{ELEC}	Efficiency of methane destruction/ oxidation in power plant	ACM0008 / IPCC	%	Set to 99.5 % (IPCC)
P19 Eff_{HEAT}	Efficiency of methane destruction / oxidation in heat plant	ACM0008 / IPCC	%	set at 99.5% (IPCC)
P23, B19 CEF_{CH4}	CO_2 emission factor for combusted methane	ACM0008 / IPCC	t CO_2/t CH_4	set at 2.75 t CO_2/t CH_4
P28, B18 GWP_{CH4}	Global warming potential of methane	ACM0008 / IPCC	t CO_{2eq}/t CH_4	set at 21

B55 $EF_{CO2,Coal}$	CO_2 emission factor of fuel used for captive power or heat	National Environmental Investment Agency of Ukraine, NEIA	tCO_2/MWh	set to 0.3415 tCO_2/MWh Using the value for "Other Bituminous Coal" of 25.87 t C/TJ, [NEIA-2]
B57 Eff_{heat}	Energy efficiency of heat plant	Boiler pass	%	91 % old coal boiler 91 % upgraded boiler

B.2.2. List of variables:

Table-7 List of variables – struck through symbols are not used in this monitoring report (this variables are referring to project components which are not installed yet)

ID number	Data variable	Source of data (ID Numbers from table 5)	Data unit	Comment
P1 PE	Project emissions	calculated	tCO_{2eq}	calculated using formulae from the revised monitoring plan
P2 PE_{ME}	Project emissions from energy use to capture and use methane	calculated	tCO_{2eq}	calculated using formulae from the revised monitoring plan
P3 PE_{MD}	Project emissions from methane destroyed	calculated	tCO_{2eq}	calculated using formulae from the revised monitoring plan
P4 PE_{UM}	Project emissions from uncombusted methane	calculated	tCO_{2eq}	calculated using formulae from the revised monitoring plan
P5 $CONS_{ELEC,PJ}$	Additional electricity consumption by project	measured ID's- 8, 9, 10, 11, 12, 13, 14	MWh	cumulative value, measured
P9 PE_{Flare}	Project emissions from flaring	calculated	$t\ CO_{2eq}$	calculated using formulae from the revised monitoring plan
P11 MD_{FL}	Methane destroyed by flaring	calculated	$t\ CH_4$	calculated using formulae from the revised monitoring plan
P12 MM_{FL}	Methane sent to flare	measured ID's- 1, 2,3,4,6,	$t\ CH_4$	
~~P14~~ ~~MD_{ELEC}~~	~~Methane destroyed by power generation~~	~~Calculated~~	~~$t\ CH_4$~~	~~calculated using formulae from the revised monitoring plan~~
~~P15~~ ~~MM_{ELEC}~~	~~Methane sent to power generation~~	~~measured~~	~~$t\ CH_4$~~	
P17 MD_{HEAT}	Methane destroyed by heat generation	calculated	$t\ CH_4$	calculated using formulae from the revised monitoring plan
P18 MM_{HEAT}	Methane sent to heat generation	measured	$t\ CH_4$	

P24 CEF_{NMHC}	CO_2 emission factor for combusted non methane hydrocarbons (various)	calculated	-	Calculated if applicable
P25 PC_{CH4}	Concentration of methane in extracted gas	measured ID-6	%	
P26 PC_{NMHC}	NMHC concentration in coal mine gas	measured ID-7	%	Used to check if more than 1% of emissions and to calculate r
P27 r	Relative proportion of NMHC compared to methane	calculated	%	Calculated if applicable, based on the lab analysis.
B1 BE	Baseline emissions	calculated	t CO_{2eq}	calculated using formulae from the revised monitoring plan
B3 BE_{MR}	Baseline emissions from release of methane into the atmosphere that is avoided by the project activity	calculated	t CO_{2eq}	calculated using formulae from the revised monitoring plan
B4 BE_{Use}	Baseline emissions from the production of power, heat or supply to gas grid replaced by the project activity	calculated	t CO_{2eq}	calculated using formulae from the revised monitoring plan
B14 CMM_{PJ}	CMM captured in the project activity	calculated	t CH_4	sum of flow meters
~~B46~~ ~~GEN~~	~~electricity generation by project~~	~~measured~~	~~MWh~~	
B47 HEAT	Heat generation by project	measured	MWh	
T_{flare}	Flame temperature of the flare	measured ID - 5	℃	

B.2.3. Data concerning GHG emissions by sources of the project activity

Table-8 GHG emissions by sources of the project activity – struck-through symbols are not used in this monitoring report (this variables are referring to project components which are not installed yet)

ID number	**Data variable**	**Source of data** (ID Numbers from table 5)	**Data unit**	**Comment**
P12 MM_{FL}	Methane sent to flare	measured ID's- 1, 2,3,4,6,	t CH_4	
~~P15~~ ~~MM_{ELEC}~~	~~Methane sent to power generation~~	~~measured~~	~~t CH_4~~	
P18 MM_{HEAT}	Methane sent to heat generation	measured	t CH_4	

B.2.4. Data concerning GHG emissions by sources of the baseline

Table-9 GHG emissions by sources of the baseline – struck through symbols are not used in this monitoring report (this variables are referring to project components which are not installed yet)

ID number	Data variable	Source of data	Data unit	Comment
B14 CMM_{PJ}	CMM captured in the project activity	calculated	t CH_4	sum of flow meters
~~B46 GEN~~	~~electricity generation by project~~	~~measured~~	~~MWh~~	
B47 HEAT	Heat generation by project	measured	MWh	

B.2.5. Data concerning leakage

Not applicable.

B.2.6. Data concerning environmental impacts

DTEK works on reducing greenhouse gas emissions at power plans and also at coal mines. A pilot project was launched in 2007 at the DTEK MINE KOMSOMOLETS DONBASSA PJSC.
After a series of activities, the efficiency of degassing is raised up to 50-60%.
In the first phase two thermal utilisation units have been installed. In the second phase two boilers have been upgraded and CMM has been used in these boilers for heat production. These activities have lead to the significant decrease of different pollutant emissions into the atmosphere. Due to the fact that methane is now burned in flares and boilers there is a considerable emission reduction of this gas generally on the mine and at the Air Shaft #3 the methane emissions have reached almost zero. Also the amount of burned coal have decreased that have lead to reduction of inorganic dust, carbon dust and heavy metals into the atmosphere.
In the next phases CMM should be used in gas engines for power generation.

B.3. Data processing and archiving (incl. software used):

The data are collected, processed and stored using a Siemens SIMATIC PLC S7 system and Siemens WINCC programming software. All data is stored in the internal memory about 2 GB. One time per hour the data are sent via GPS to an Internet-based Server data base. Further on the data is sent to the workstation of Eco-Alliance with frequency 1 time per week, per month and per year and archived quarterly and annually on the CD.
The data can be read any time from the internet data base by authorised personnel. The utilised methane amount is automatically calculated and stored in the PLC. As all input data are stored, the automatically calculation can by checked in retrospect any time.

For plausibility checks and potential data back up the data logged in the hand written journals of the suction system can be taken.

In case of problems with data transferring to the server the data can be recovered from the internal memory of the unit's computer where it's stored for 7 days.

B.4. Special event log:

None.

SECTION C. Quality assurance and quality control measures

C.1. Documented procedures and management plan:

C.1.1. Roles and responsibilities:

The general project management is implemented by the Technical Director of the DTEK MINE KOMSOMOLETS DONBASSA PJSC through supervising and coordinating activities of his subordinates, such as the Director of Capital Development, the Deputy Director on surface degasification, heat technician, head of safety engineering departments, etc.
Daily a group of mechanics and electricians who are responsible for the measures and maintenance of all technological equipment and measuring instruments are present on-site. There are two shifts, 12 h each. For every shift there is one person on-duty responsible for the proper operation and keeping of the journals.
The monitoring system is supervised by the administration of the coal mine under the existing control and reporting system. The general supervision of the electronically monitoring system is executed by Eco-Alliance, who is consultant for the coal mine.

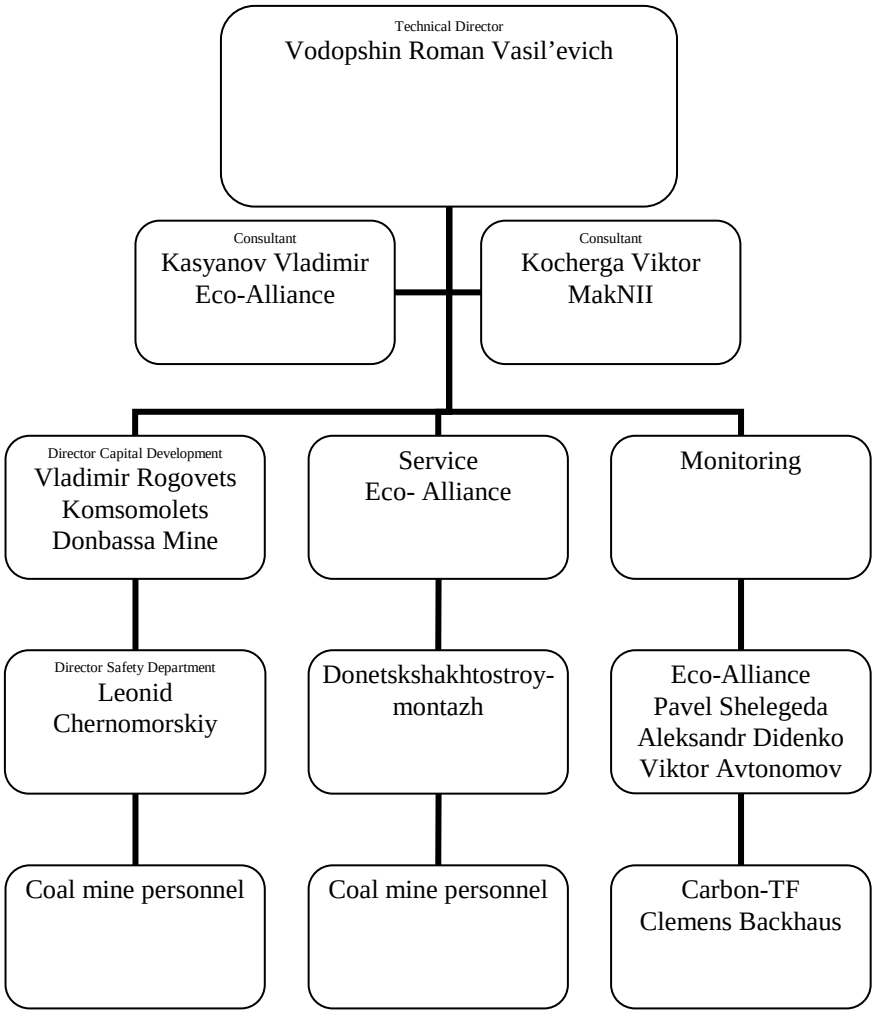

Figure 1 – Organigram

C.1.2. Trainings:

The employees responsible for the monitoring control have been trained on–the–job during the installation of the system. Before installation of the gas equipment on the boilers the personnel of the boiler house have received training in “Donetsk centre of personnel preparing” (Horlovka) on specialty “Personnel serving individual boilers working on gas fuel”.
The responsible personnel of Eco-Alliance have been trained on the handling with CMM-utilisation units and the applied monitoring systems, during several practical courses in Germany. In this courses which has been carried out by A-TEC Anlagentechnik GmbH, a Joint-Venture participant of Eco-Alliance, also the basic principles of emissions trading and the background of the monitoring has been explained.
A-TEC Anlagentechnik GmbH is already running several CMM utilisation plants and monitoring systems in Germany.
These trained personnel is the basis of a team of engineers, which had established a specialised service team in the Ukraine and had instructed further operating and monitoring personnel, as well for this project.

No new personnel training have been carried out because no new equipment have been installed and no new personnel have been recruited.

C.2. Involvement of Third Parties:

- Sumystandartmetrology, has been involved for the yearly examination and calibrations of the measurement equipment
- MakNII Institute, the “State Makeyevka Institute for Research and Education for Safe Work in the Coal Mining Industry”, a subsidiary of the “Ukrainian Ministry for Fuel and Energy”, has been involved for the lab analysis (NMHC) of the CMM.
- Eco-Alliance has been involved for monitoring and service of the flares

C.3. Internal audits and control measures:

Every 2 weeks a monitoring engineer from Eco-Alliance makes audits and remarks this in the operation journals of flares and boilers. The mechanics on duty of boilerhouse and vacuum-pump station from the DTEK MINE KOMSOMOLETS DONBASSA PJSC make daily audits.

The monitoring engineer (Eco-Alliance) checks the data from web-site every day and makes internal reports.

Eco-Alliance makes service audits every month.

C.4. Troubleshooting procedures:

The general troubleshooting for the whole coal mine is available at the coal mine. The coal mine personnel are instructed to follow the procedures.
The flares are automatically shut down in case of faults. Internal trouble shooting procedures are available inside the flares.
The boilers shut down with gas valve cutter automatically in case of emergency. Light and sound alarm is activated. Staff on duty closes valves of the gas supply to the boilers, open blowing bleeders, ventilate the boilers, then determines the cause of boiler stopping and removes it.
The electronic monitoring system is checked every day by authorized personnel of Eco-Alliance. In case of finding any incorrectness an appropriate report is made to the service team which moves on site as fast as possible. The service team determines the possible reasons of the incorrectness and amends them (replace the measuring sensors, adjust software, etc.).

SECTION D. Calculation of GHG emission reductions

D.1. Table providing the formulas used:

Table-10 Formulae used taken from the revised monitoring plan, struck-through symbols are not used in this monitoring report (this symbols are referring to project components which are not installed yet).

ID number	Data variable	Nr	Formula
P1 PE_y	Project emissions	(1)	$PE = PE_{ME} + PE_{MD} + PE_{UM}$
P2 PE_{ME}	Project emissions from energy use to capture and use methane	(2)	$PE_{ME} = CONS_{ELEC,PJ} \times CEF_{ELEC,PJ}$
P3 PE_{MD}	Project emissions from methane destroyed	(3)	$PE_{MD} = (MD_{FL} + \sout{MD_{ELEC}} + MD_{HEAT}) \times (CEF_{CH4} + r \times CEF_{NMHC})$
P4 PE_{UM}	Project emissions from uncombusted methane	(9)	$PE_{UM} = GWP_{CH4} \times [\sout{MM_{ELEC} \times (1 - Eff_{ELEC})} + MM_{HEAT} \times (1 - Eff_{HEAT})] + PE_{Flare}$
P5, $CONS_{ELEC}$	Additional electricity consumption by the project	(2a)	$CONS_{ELEC,PJ} = \sum_{i=1}^{n} CONS_{ELEC,i}$
P11 MD_{FL}	Methane destroyed by flaring	(5)	$MD_{FL} = \sum_{i=1}^{n} MM_{FL,i} \times \eta_{flare,i}$
\sout{P14 MD_{ELEC}}	\sout{Methane destroyed by power generation}	\sout{(7)}	\sout{$MD_{ELEC} = MM_{ELEC} \times Eff_{ELEC}$}
P17 MD_{HEAT}	Methane destroyed by heat generation	(8)	$MD_{HEAT} = MM_{HEAT} \times Eff_{HEAT}$
PE_{Flare}	Project emissions from flaring	(9a)	$PE_{Flare} = (MM_{Fl} - MD_{Fl}) \times GWP_{CH4}$
P27 r	Relative proportion of NMHC compared to methane	(4)	$r = PC_{NMHC} / PC_{CH4}$
B1 BE_y	Baseline emissions	(10)	$BE = BE_{MR} + BE_{Use}$
B3 $BE_{MR,y}$	Baseline emissions from release of methane into the atmosphere that is avoided by the project activity	(14)	$BE_{MR} = CMM_{PJ} \times GWP_{CH4}$
B4 $BE_{Use,y}$	Baseline emissions from the production of power, heat or supply to gas grid replaced by the project activity	*(24)*	$BE_{Use} = \sout{GEN * EF_{ELEC} +} (HEAT / Eff_{HEAT,coal}) * EF_{HEAT}$
B14 CMM_{PJ}	CMM captured and destroyed in the project activity	*(14a)*	$CMM_{PJ} = \sum_{i=1}^{n} MM_i$
ER	Emission reductions	(18)	$ER = BE - PE$

The formulae included in the monitoring plan are taken from the CDM Methodology ACM0008 respective the revised monitoring plan.

D.2. Description and consideration of measurement uncertainties and error propagation:

Some minor errors which have been identified in hand written operation journals have been corrected. Mistakes were made during the writing the electronic data from the monitor into handwritten journals.

D.3. GHG emission reductions (referring to B.2. of this document):

The tables below provide yearly values. Monthly values are calculated and can be verified in the Excel-Spreadsheet “ER-KD-2011-07-01 to 2012-06-30.V1.xls”.

Period	**Prospected emission reductions, PDD [t CO_{2eq}]**		**Monitored emission reductions [t CO_{2eq}]**	
	Full year	Proportionally for the monitoring period	in tonnes and percentage of prospected emissions	
01/11/2010 to 31/12/2010	339,880	169,940	61,245	36,0%
01/01/2011 to 30/06/2011	338,463	169,232	75,926	44.9%
Total 01/11/2010 to 30/06/2011	**678,343**	**339,172**	**137,171**	**40,4%**

The installation of several units as stated in the PDD is delayed due to the Global Financial Crisis and lack of methane amount.

D.3.1. Project emissions:

Monitored project emissions [t CO2eq / a]			
period	01/07/2011-31/12/2011	01/01/2012-30/06/2012	**Total 2011-2012**
methane destruction			
flaring	8,795	8,556	17,351
heat generation	1,220	3,249	4,469
power generation	0	0	0
additional power consumption			
Flare compressors	66	66	132
Total	10,081	11,871	21,952

D.3.2. Baseline emissions:

Monitored baseline emissions [t CO_2eq / a]			
period	01/07/2011-31/12/2011	01/01/2012-30/06/2012	**Total 2011-2012**
release of methane that is avoided by the project			

flaring	61,854	60,212	122,066
heat generation	9,018	24,017	33,035
power generation	0	0	0
production of heat that is displaced by the project	454	3,569	4,023
production of power that is displaced by the project	0	0	0
Total	71,326	87,797	159,123

D.3.3. Leakage:

Not applicable.

D.3.4. Summary of the emissions reductions during the monitoring period:

Project emissions and emission reductions during the 3rd verification period				
period	Monitored project emissions (tonnes of CO2 equivalent)	Monitored leakage (tonnes of CO2 equivalent	Monitored baseline emissions (tonnes of CO2 equivalent)	Monitored emissions reductions (tonnes of CO2 equivalent)
01/07/2011 to 31/12/2011	10,081	-	71,326	61,245
01/01/2012 to 30/06/2012	11,871	-	87,797	75,926
Total (tonnes of CO2 equivalent)	**21,952**	**-**	**159,123**	**137,171**

Annex 1

REFERENCES

- Project Design Document; Version 04, dated 2008-04-14
- Final Determination Report for the project: JI0079 CMM utilisation on the Joint Stock Company named Komsomolets Donbassa Coal Mine of DTEK (Donbasskaya Toplivnaya Energeticheskaya Kompanya), Report No: 2008-200 Rev 02, by DNV Det Norske Veritas, dated 2008-09-18
- Letter of Approval, Nr. M000011, issued on 2007-10-03 by the Ukraine (host party)
- Letter of Approval, Nr. 2007JI04, issued on 2007-11-26 by the Kingdom of the Netherlands (investor party)
- Letter of Endorsment, Nr. 11439/10/310, issued on 2006-12-22 by the Ukrainian Ministry of Environmental Protection
- supporting evidence documents provided by the coal mine
- revised monitoring plan, ver. 3 dated 2011-08-05

[IPCC] Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories, Reference Manual (Volume 3), Chapter Energy, 1.4.1 Unoxidized Carbon, Page 1.32, 1996, http://www.ipcc-nggip.iges.or.jp/public/gl/invs6a.htm

[ACM0008] Approved consolidated baseline methodology ACM0008 – Consolidated baseline methodology for coal bed methane and coal mine methane capture and use for power (electrical or motive) and heat and/or destruction by flaring, version 03, EB28 http://cdm.unfccc.int/methodologies/PAmethodologies/approved.html

[AM_Tool_07] Methodological “Tool to determine project emissions from flaring gases containing methane”, EB 28, Meeting report, Annex 13 http://cdm.unfccc.int/Reference/tools/index.html

[DTEK] Donbasskaya Toplivnaya Energeticheskaya Kompanya

[NEIA] Information given by the National Environmental Investment Agency of Ukraine NEIA http://www.neia.gov.ua

[NEIA-2] Baseline carbon emission factor for other bituminous coal approved in Ukraine: 25.87 t C/TJ (National Inventory Report of Anthropogenic Emissions from Sources and Absorption by Absorbers of Greenhouse Gases in Ukraine for 1990-2009, Table P4.7)

Annex 2

Installation scheme including metering positions

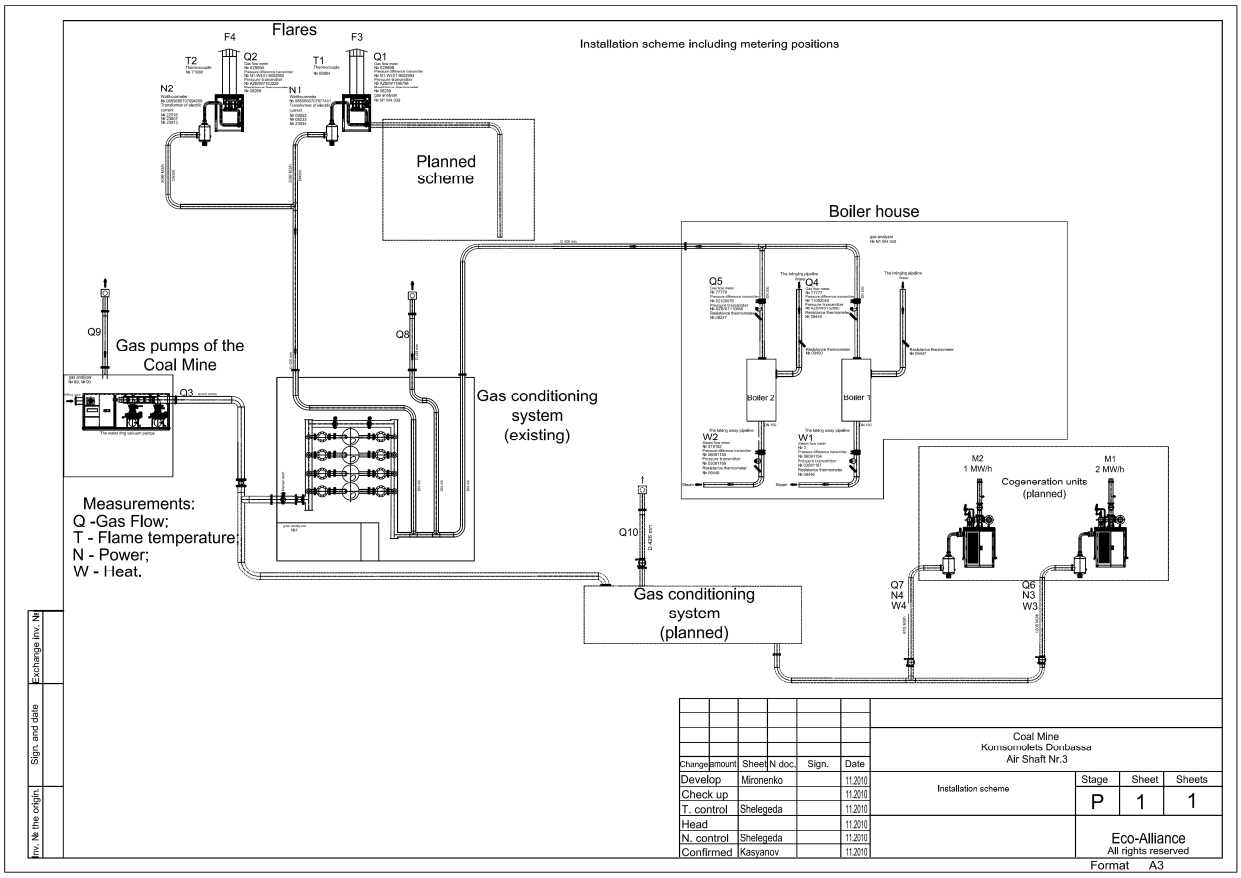

Figure-2 Installation scheme – DTEK MINE KOMSOMOLETS DONBASSA PJSC, Air Shaft Nr.3

Annex 3

Data flowchart

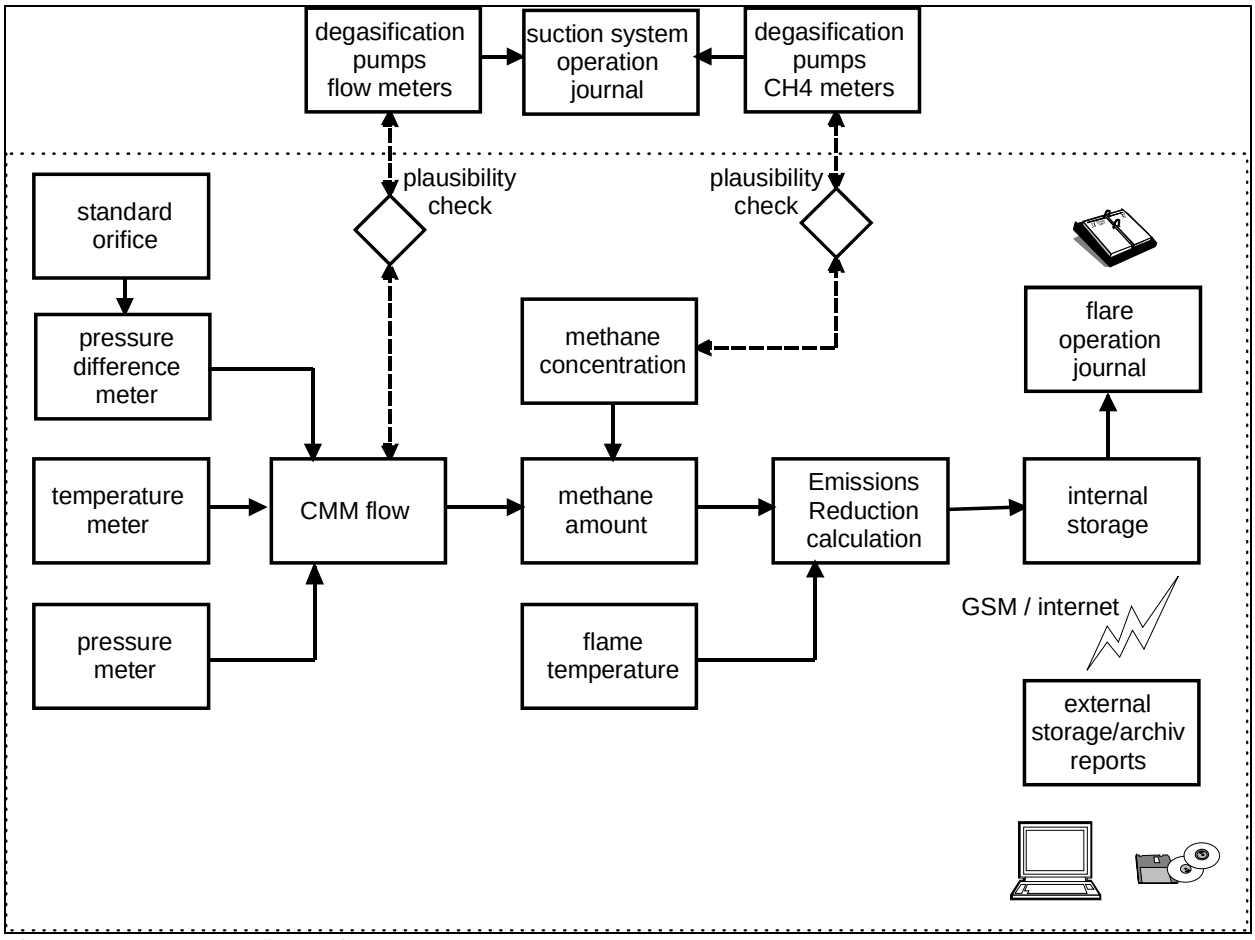

Figure-3 Data flow scheme

Annex 4

Deviations from the monitoring plan as stated in the PDD

A4.1 Project emissions from flaring

The formula for the calculation of project emissions from uncombusted methane has been updated. The calculation of project emissions from uncombusted methane from flaring are now more accurate.

In the PDD the formula for project emissions from uncombusted methane is given as per:

$PE_{UM} = GWP_{CH4} \times [(MM_{FL} \times (1 - Eff_{FL}) + MM_{ELEC} \times (1 - Eff_{ELEC}) + MM_{HEAT} \times (1 - Eff_{HEAT})]$ (9) old

In the revised monitoring plan the formula (9) has been replaced by the following formula:

$PE_{UM} = GWP_{CH4} \times [MM_{ELEC} \times (1 - Eff_{ELEC}) + MM_{HEAT} \times (1 - Eff_{HEAT})] + PE_{flare}$ (9) new

PE_{Flare} is calculated using adopted formulae from the «Methodological "Tool to determine project emissions from flaring gases containing methane"» [AM_Tool] and ACM0008 Version 5. The original formulae refer to a yearly basis. The formulae have been adapted in the revised monitoring plan to variable monitoring periods:

The original formulae are:

$$PE_{flare} = \sum_{i=1}^{n} TM_{RG,i} x (1 - \eta_{flare,i}) x \frac{GWP_{CH4}}{1000} \quad (9a)$$

where:

PE_{flare}	Project emissions from flaring in the regarded period (t CO_{2eq})
$TM_{RG,i}$	Mass flow rate of methane in the regarded interval i (kg/interval)
$\eta_{flare,i}$	flare efficiency in the interval i
GWP_{CH4}	Global warming potential of methane (21 t CO_{2eq}/t CH_4)
n	number of samples (intervals) in the regarded period

and

$MD_{FL} = MM_{FL} – (PE_{flare}/GWP_{CH4})$ (5)

where:

MD_{FL}	Methane destroyed through flaring in the regarded period (t CH_4)
MM_{FL}	Methane sent to flaring in the regarded period (t CH_4)
PE_{flare}	Project emissions from flaring in the regarded period (t CO_{2eq})
GWP_{CH4}	Global warming potential of methane (21 t CO_{2eq}/t CH_4)

In the revised monitoring plan and this monitoring report, formulae 9a and 5, see above have been resolved to fit better to the monitored data.

The project emissions from flaring are calculated using the equation:

$PE_{flare} = (MM_{Fl} - MD_{FL}) * GWP_{CH4}$ (9a)

where:

PE_{flare}	Project emissions from flaring in the regarded period (t CO_{2eq})

MD_{ELEC}	Methane destroyed through power generation (t CH_4)
MM_{ELEC}	Methane measured sent to power plant (t CH_4)
GWP_{CH4}	Global warming potential of methane (21 t CO_{2eq}/t CH_4)

The formula for the methane destroyed through flaring is:

$$MD_{FL} = \sum_{i=1}^{n} MM_{FL,i} x \eta_{flare,i} \quad (5)$$

where:

MD_{FL}	Methane destroyed through flaring (t CH_4)
$MM_{FL,i}$	Methane sent to flaring in the interval i (t CH_4)
$\eta_{flare,i}$	Efficiency of methane destruction/oxidation in flare in the interval i, see below
n	number of samples (intervals) in the regarded period

The interval is set to 15 min during the monitoring period, which is more accurate than the 1 h intervals from the «Methodological “Tool to determine project emissions from flaring gases containing methane”» [AM_Tool])

For $\eta_{flare,i}$ three different values are taken, depending on the current combustion temperature $T_{Flame,i}$ of the flare in the interval i:

$T_{Flame,i}$	$\eta_{flare,i}$	Source
> 850℃	99.5%	[PDD, revised monitoring plan Section D.1.1 and Annex 3]
500-850℃	90.0%	[AM_Tool_07-15]
< 500℃	0%	[AM_Tool_07-15]

where:

$T_{Flame,i}$	Flame temperature of the flare in the regarded interval i (℃)
$\eta_{flare,i}$	flare efficiency in the interval i

Annex 5

Differences between the determined PDD and implemented project

There is difference between the determined PDD and implemented project.

The name of the Coal Mine has been changed per 29/04/2011. The old name OPEN JOINT STOCK COMPANY COAL MINE KOMSOMOLETS DONBASSA is no longer valid, the new name is:

Full name: DTEK MINE KOMSOMOLETS DONBASSA, PUBLIC JOINT-STOCK COMPANY;

Short name: DTEK MINE KOMSOMOLETS DONBASSA PJSC.

The identifying number and domicile of the legal entity as well as the place of registration remain unchanged.

The conditions defined by paragraph 33 of the JI guidelines are still met for the project.

- The physical location of the project has not changed.
- The emission sources have not changed.
- The baseline scenario has not changed.
- The changes are consistent with the JI specific approach and/or the clean development mechanism (CDM) methodology upon which the determination was prepared for the project.

Annex 6

Photo of the plant

Figure-4 Flare 3 and Flare 4 – DTEK MINE KOMSOMOLETS DONBASSA PJSC, Air Shaft Nr.3