MONITORING REPORT

Project: **BG 1000209 Reduction of greenhouse gases by gasification of Burgas Municipality**

Project proponent:	**Overgas Inc. AD, 5 Philip Kutev str.; Sofia 1407, Bulgaria**
Verification period:	**1st January 2011 – 31st December 2011;** **1st January 2012 – 30st November 2012**
Emission reductions:	**31 737 tCO_2e**
Type of verification:	**Second periodic**
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ABBREVIATIONS

AGDS	Automated Gas Distribution Station
CRM	Customer Relationship Management
EEC	End Energy Consumption
ELM	Equipment Lifecycle Management
ERU	Emission Reduction Unit
ETS	Emission Trading Scheme
FSERF	Fuel Switch Emission Reduction Factor
GDC	Gas Distribution Company
GDCIMS	Gas Distribution Companies Information Management System
GDN	Gas Distribution Network
GIS	Geographic Information System
GMB	Gas Measuring Board
GMS	Gas Measuring Station
GRB	Gas Regulation Board
GRMB	Gas Regulation and Measuring Board
GRMS	Gas Regulation and Measuring Station
GRS	Gas Regulation Station
JIP	Joint Implementation Project
LHV	Low Heating Value
LHV_{av}	Average Low Heating Value
NSI	National Statistical Institute
PDD	Project Design Document
SAMTS	State Agency for Metrology and Technical Surveillance
SCADA	Supervisory Control and Data Acquisition

1. GENERAL INFORMATION FOR THE PROJECT

The project "Reduction of Greenhouse Gas Emissions by Gasification of Burgas Municipality" is implemented under the Track 1 procedure of the Joint Implementation (JI) mechanism of the Kyoto Protocol according to the contract between the Government of the Kingdom of Denmark and Overgas Inc. AD. The project has been granted Letters of Approval by the Republic of Bulgaria and the Kingdom of Denmark and has passed the due determination.

This JI project is implemented under the Sectoral Scope 1 "Energy industries (renewable/ non-renewable sources)" and aims at reduction of greenhouse gases by:

- fuel switch from liquid and solid fuels and part of the electricity used by industrial, public and administrative consumers and households to natural gas;
- improvement of the energy efficiency of the combustion installations of the end users.

The Project Design Document (PDD) of the project has been subject to Determination by Det Norske Veritas AS. The Determination report states that the PDD has been prepared in accordance with the rules and requirements of Article 6 of the Kyoto Protocol and the guidelines for the implementation of Article 6 of the Kyoto Protocol in the Marrakech Accords (FCCC/CP/2001/13/ADD.2; 21 January 2002).

The initial and first periodic verification will take place in the year 2011 based on this Monitoring report encompassing the period 1 January 2008 – 31 December 2010 by TÜV SÜD Industrie Service GmbH. A second periodic verification will take place in the year 2012 for the period from 01.January 2011 to 30 November 2012 based on this Monitoring report encompassing the mentioned period.

The ERUs are generated by fuel switch from solid and liquid fuels and electricity to natural gas and by improvement of the energy efficiency of the combustion installations of the industrial, public and administrative, and residential end users in Burgas Municipality. The production, transportation and distribution of the electricity replaced by natural gas are included within the project boundaries as it is described in the PDD (*Annex 1: Block scheme of the fuels' supply after gasification and project boundaries*). Its emission factors are calculated particularly for Bulgaria in order to define the baseline scenarios of the Bulgarian electricity power system and calculate the annual Baseline Carbon Emission Factor the process of operation of the electric power sector. They are approved and officially published by the Ministry of Environment and Water[1].

Due to the negligible leakages during the transportation and delivery of the solid and liquid fuels, the intermediate storehouses for storage and sale are not included in the project boundaries. The natural gas leakages are not included in the project boundaries becouse the GDN is new, with high quality and reliability, and the anticipated leakages are insignificant.

Brief Description of project activity

On 30 August 2006, Gazosnabdyavane Burgas EAD was renamed to Burgasgas AD.

On 22 April 2009, Burgasgas AD was transformed by merger with three local Overgas Inc. AD' GDCs operational in South-East Bulgaria - Gazosnabdyavane Nova Zagora AD, Gazosnabdyavane Stara Zagora EAD and Yambolgas 92 AD. The newly transformed company was renamed to Overgas Iztok AD. Its joint stock capital amounts equivalent of 11 248 421 Euro. The shares owned by Overgas Inc. AD as of that time are 99.934%.

All transformations were duly approved by the State Energy and Water Regulatory Commission and by the respective District Courts.

[1] *Baseline study of Joint Implementation projects in the Bulgarian energy sector. Carbon emission factor, April 2005,*
http://www.moew.government.bg/recent_doc/international/climate/carbon_emission_joint.pdf
http://www.moew.government.bg/recent_doc/climate/Baseline%20CEF%20Summary.pdf

Overgas Iztok AD has licenses up to 3 June 2040 for the activities "Natural Gas Distribution" and "Natural Gas Delivery by End-Supplier" covering 14 municipalities in South-East Bulgaria including Burgas Municipality.

The above mentioned re-engineering and transformations did not affect the preparedness and the conditions for the JI project implementation.

The planned for the end of 2017 length of GDN and gas branched line is 270.1 km. From 1 Jan. 2011 to 30 Nov. 2012, 6.369 km GDN of steel and polyethylene gas pipelines with the respective facilities were constructed in Burgas Municipality. The information by years on the length of constructed pipelines and percentage from planned is presented in Table 1:

Description	2006	2007	2008	2009	2010	2011	2012
Gas pipe line (km)	27.635	23.260	19.214	3.897	0.314	2.237	4.132
In total (km)	27.635	50.895	70.109	74.006	74.320	76.557	80.689
In total (%)	10.2	18.7	25.8	27.1	27.3	28.3	29.9

Table 1. The constructed gas pipeline in the project territory by years.

The information on the number in total of end users by years and sectors is presented in Table 2:

Description	2006	2007	2008	2009	2010	2011	2012
Industrial sector	1	9	10	13	17	18	18
Administrative Sector	3	17	22	36	41	48	45
Residential sector	0	81	173	235	263	280	294
Total for all sectors	**4**	**107**	**205**	**284**	**321**	**346**	**357**

Table 2. The number of end users by sectors and by years.

In the period 1 Jan. 2011 - 30 Nov. 2012, the amount of natural gas delivered by pipeline to the end users located on the territory of Bourgas Municipality amounted totally 10 440 990 sm^3. The figures per year are as follows: 5 501 544 sm^3 in 2011 and 4 775 446 sm^3 in 2012.

During the monitoring period **31 737** ERUs have been generated. The figures per year are as follows: **18 099 ERUs** in 2011 and **13 638 ERUs** in 2012.

As a consequence of external factors beyond the control of Overgas Inc. AD as the gas crisis in the beginning of 2009, warmer winter seasons and the continuing economic crisis, certain slow-down in the growth trends of the connection of new users to the GDN and of the natural gas consumption has been noticed.

2. MAIN PRINCIPLES OF THE MONITORING PLAN

The Monitoring Plan described in the PDD is based on the following main principles:

- The total annual natural gas consumption of the end users by sectors will be used as an indicator to control and determine the greenhouse gas emissions with project implementation. This approach has been used because all fuels used before project beginning are replaced only by natural gas, and in the absence of this project end users would use fuels different from natural gas;
- The fuel switch emission reduction factor (FSERF) for each sector calculated according to the specific formula in the PDD is used to convert natural gas sales by sectors in emission reduction units (ERUs). The fuel switch emission reduction factors include the fuel switch effect and reduced energy consumption due to the increase of the efficiency of the combustion installations;
- For the monitoring of the baseline emissions of the project, as an indicator is used the reported statistical data on national level for the EEC and for the change in the fuel mix. In the case when the statistical data for reported year are unavailable at the moment of

preparation of the monitoring report, according to item D.4.1.1 of the PDD, the EEC and EEC fuel mix is recalculated based on the data for the fuel mix change from the information for the last two years before the reported year;

- The reported natural gas sales under this project in the industrial and public and administrative sectors include the users that have signed contracts with a clause for adding their ERUs to the total amount of ERs under the project "Reduction of greenhouse gas emissions by gasification of Burgas Municipality";
- In case of a change in the calorific value of the delivered natural gas on a monthly bases, a recalculation of natural gas quantity will be done taking into account the calorific value used for the calculations in the PDD;
- The any leakages of natural gas have to be calculated and their immateriality has to be proved annually.

The project monitoring includes the following stages:

- Monitoring of the baseline;
- Monitoring of the project emissions and of the generated Emission Reduction Units (ERU);
- Monitoring of the leakages.

The monitoring of the JI project is performed by the personnel of the "Ecology and Sustainable Development" department of Overgas Inc. AD. The employees have a high educational qualification and have participated in additional specialized trainings in the field of greenhouse gas emissions trading, environmental management systems, quality management systems, environmental impact assessment, etc.

3. REPORTING AND MANAGEMENT SYSTEMS

The Gas Distribution Companies Information Management System (***GDCIMS***) includes five modules: ***Customer Relationship Management (CRM)***, ***Billing***, ***Equipment Lifecycle Management (ELM)***, ***Reports*** and ***Information***.

The ***CRM*** module manages the database of all clients, including data for the combustion installations. The module serves also for tracking the customer's status – it displays the stage of customer's connection. The ***CRM*** module allows automatic issuing, generation and printing of related documents and contracts. It contains statistic and marketing data for the users – site type, gas pressure data, mode of use, level of continuity, agreed and consumed amounts of natural gas, etc. Data for the appliances which use natural gas – type of the gas appliances and their main technical parameters are managed in the module.

The ***Billing*** module uses a database for the consumption of natural gas by clients, generates invoices and allows remote control of the activities of natural gas delivery to the end users. The module works with data base which contains the main information necessary for the GDC's financial relations with the customer. The ***Billing*** module allows automatic invoice generation, which is made after conclusion of series of reports in the ***Reports*** module and printing letters of notification and bills for invoices. The payments are also indicated in it.

ELM is an information module for maintenance of the gas distribution networks infrastructure and the devices. It allows generation of information about the equipments in the GDN. The information contains data about the factory number of each equipment, maximum hourly consumption, input and output pressure, date of exploitation initiation, manufacturer and type of gas meter, etc. The module tracks the elements for electric and chemical protection and the status of the odorizing system. The module also generates information about exploitation status of the GDN, inspection and setting, as well as determined revision with disassembling of the equipment of the GDN.

The ***Reports*** module serves for preparation of various information. The readings of the gas meters of the end users are input in this module for the calculation of their monthly consumption of natural gas.

The ***Information*** module generates various information using the data managed by the other modules. This module is used for the generation of the data for the natural gas consumption by sectors, used for the calculation of the ERUs generated by the project.

The Automated System for Dispatch Control Overcomm 2.0 of the ***SCADA*** (***Supervisory Control and Data Acquisition***) system contributes for the high reliability of the measurements and accuracy of the data of controlled variables: pressure, temperature and consumption. It reports occurrence of deviations in the value of a measured parameter from the technological parameters and deviations in the operation of the measuring devices. The dispatch management is centralized; it is based in Sofia and it services all the GDCs affiliates of Overgas Inc. AD.

4. QUALITY MANAGEMENT AND ASSURANCE SYSTEM

The Quality Management System developed in Overgas Inc. AD allows for the proper documentation and management of the activities done in the company and in Overgas Iztok AD. The personnel is acquainted with and trained to implement and follow the approved procedures, instructions and work documents in the scope of their activity.

The maintenance of ***GDCIMS*** and Overcomm 2.0 systems, as well as the activities relevant to the exploitation, technical maintenance and servicing of the GDN and to the control over the deliveries of natural gas, are performed in accordance with the quality management system of Overgas Inc. AD and the GDCs. The procedures from the QMS are in compliance with the existing national legislation regulating the activities of Overgas Iztok AD. All activities are implemented by the appropriate staff in the company, which is selected and trained in accordance with the above mentioned procedures.

The QMS includes also a procedure for selection of employees requiring a high degree of education, professional experience, knowledge and skills for occupying a particular position.

A list of the procedures and instructions of Overgas Inc. AD's quality management system that are related to the monitoring of the JI project is presented in *Annex 2: List of the applicable procedures and instructions from the Quality Management System.*

Brief information about the quality control and quality assurance procedures relevant to the exploitation, technical maintenance and servicing of the GDN and to the control over the deliveries of natural gas is presented below in the respective sections of the Monitoring report.

5. MONITORED AND MEASURED PARAMETERS

For the preparation of the Monitoring report data were used from the monitoring and the measurement results of:

- Amounts of natural gas entered into the GDN – measured monthly by the Gas Measuring Station (GMS);
- Average low heating value of the natural gas – measured monthly by a licensed laboratory of the Bulgartransgas EAD;
- Amounts of natural gas transmitted and delivered to the end users by sectors – measured monthly by each user's gas measuring station or board;
- Statistical data on national level for the 2005-2011 years for EEC and EEC fuel mix for the each of three sectors;

Note: The official statistical information for EEC and EEC for the 2011 is not published by NSI to the time preparation of Monitoring Report. The information was provided by formal letter from NSI.

5.1. *Data archiving*

Paper and digital copies of the Monthly statements and monthly invoices for delivered by Bulgargas EAD natural gas and the Average Certificates for the quality of natural gas from Bulgartransgas EAD are archived and stored at Overgas Iztok AD and at Overgas Inc. AD's headquarters. Paper copies of the monthly invoices and statements for delivery to every user are stored at Overgas Iztok AD, while digital copies can be generated by the IMSGDC.

The data about the amount of natural gas delivered to the end users, as well as other data, necessary for the elaboration of the Monitoring report, are entered, stored and archived in the GDCIMS by authorized employees of Overgas Inc. and/or the Overgas Iztok AD and in Overgas CNG AD for CNG.

This information system contains all relevant information for the technical equipment, its maintenance and the consumption of natural gas by each client of the GDC from the stage of preliminary survey.

The all information entered in the modules of the ISMGDC is stored on a back-up hard drive at Overgas Iztok AD. The data are subsequently recorded on servers and a back-up copy is made on a back-up server every day.

The all documentation regarding the JI project "Reduction of Greenhouse Gas Emissions by Gasification of Burgas Municipality", relevant to the determination, monitoring, reporting and verification of the project is archived and kept on paper and digital copies at the "Ecology and Sustainable Development" Dept of Overgas Inc. AD. This information will be submitted to the company's archive after the project completion.

5.2. *Measurements of the monthly amounts of natural gas that enters into to GDN and the gas' low heating value*

The measurement of the natural gas delivered by Bulgargas EAD is performed monthly on the basis of a contract for delivery signed with Overgas Iztok AD. The delivered amounts are measured at the GMS by calibrated gas meters and electronic volume correctors, which are property of Bulgargas EAD.

To improve the management of the process of distribution and delivery of natural gas to the end users at the GSM additional electronic volume correctors, property of Overgas Iztok AD, are also installed. The devices are of the same type as the ones of Bulgargas EAD and are calibrated after it. They are connected to GPRS modems, which transmit in real time to the Central Dispatch Management via the GSM network data for gas consumption, temperature and pressure. The devices store archives with hourly, daily and monthly data for the amounts of natural gas and the technological parameters of the gas.

With regard to the amounts of natural gas that enters into the GDN, a monthly ***Delivery Statement*** is prepared and signed by both parties. The Delivery Statement includes information about the natural gas amount preliminarily ordered by the GDC and the actual amount invoiced and received. The difference between the readings on AGRS and the sum of readings from the meters installed at the branching with Central Heating Plant Lozovo is divided proportionally by mutual protocol. The volumes of natural gas used in Table 10, Table 12 and Table 13 are corrected according common rules for dividing of differences of readings. The copies of Acts for volume of delivered natural gas by Bulgargas and protrocls witt CHP Lozovo are presented in:

- *Annex 3.1 Acts for volume of natural gas delivered by Bulgargas EAD for 2011;*
- *Annex 3.2 Acts for volume of natural gas delivered by Bulgargas EAD for monitored period of 2012.*

The monthly Delivery Statements are accompanied by monthly ***Average certificate of the natural gas*** issued by Bulgargas EAD. This certificate includes information about the composition of the natural gas and it's Low Heating Value. Copies of the certificates are presented in:

- *Annex 4.1: Certificates of natural gas delivered by Bulgargas EAD to Overgas Iztok AD in 2011;*
- *Annex 4.2: Certificates of natural gas delivered by Bulgargas EAD to Overgas Iztok AD in 2012.*

For taking into account the influence of the low heating value of the natural gas delivered by Bulgargas EAD over the greenhouse gas emission reductions realized, the annual weighted average of the natural gas low heating value is calculated on the basis of the monthly certificates and the monthly statements for natural gas delivery.

5.3. Measurement of the monthly amount of transported and delivered natural gas to the end users

The conditions and the order for reporting the delivered by each GDC natural gas amounts are regulated by formal ***Rules for working with the users, General terms and conditions for selling natural gas to users for residential needs, Contract for distribution and delivery of natural gas,*** and ***Contract for transportation***.

The volumes of measured natural gas are transforming to the cubic meters at standard conditions. "Cubic meter at standard conditions" means the amount of natural gas in a volume of one cubic meter at a temperature of 293.15 K and absolute pressure of 0.101325 MPa.

According to the ***Rules for working with the users*** and regulations from Overgas Inc. AD's Quality Management System, two methods are applied to transform the measured amounts of natural gas into standard conditions:

- Use of special devices called volume correctors;
- Use of a fixed factor, based on the meteorological characteristics.

The transformation of the measured natural gas amounts into standard conditions for the industrial users is done using volume correctors within the measuring devices. The measurement of the amounts of natural gas delivered to the residential and "small" industrial users (at 100 mbar pressure and maximum hourly consumption less than 25 m^3/h) is done with the fixed factor, whose definition is described in the ***Rules for working with the users*** and in the ***PDD***.

In the presence of a volume corrector within the measuring device, the volume of the gas consumed V_{st} is read directly from the electronic corrector or from the counter of the gas meter if it is equipped with a built-in temperature mechanical corrector.

In the absence of a volume corrector within the measuring device, the volume of the natural gas consumed is calculated by the formula:

$$V_{st}=V_p*K_{tp} \quad (1),$$

where:

V_{st} volume in m^3 of natural gas under standard conditions (293.15 K and 101.325 kPa), recorded by the volume corrector or calculated manually by applying a factor;

V_p volume in m^3 of natural gas measured by the gas meter. It is difference of amount reported in the current period (V_{cp}) and the previous period (V_{pp});

K_{tp} factor for bringing gas meter readings into compliance with the standard conditions: t=20°C and P=1.01325 bar. The factor is product of the temperature (K_t) and the pressure (K_p) correction factors.

The natural gas consumption of the users in the industrial, public and administrative, and residential sectors is read manually every month by employees of Overgas Iztok AD. In case of an industrial or institutional client the reading of the metering device is done in the presence of a representative of the client, who confirms the accuracy of the reading. These users receive a monthly statement about the amount of natural gas delivered which is signed by the client and a representative of Overgas Iztok AD.

The readings of the gas meters are recorded in a protocol, which also contains the ID of the gas meter of the respective user and the gas meter's readings of the previous month. The data for consumption of each user are typed manually in the ***Reports*** module of the GDCIMS by authorized employee of the GDC. The ***Billing*** module of this system serves for generation of monthly invoices for all users in the three sectors.

5.4. Accuracy of the measurement data and measurement reliability

The high accuracy of the measurements of different parameters and data is guaranteed by the reliable and precise work of the gas meters, manometers, temperature converters, electronic correctors and pressure converters at the Gas Regulation Stations (GRS), Gas Regulation Boards (GRB), Gas Measuring Stations (GMS), Gas Measuring Boards (GMB), Gas Regulation and Measuring Stations (GRMS) and Gas Regulation and Measuring Boards (GRMB).

The delivered amounts of natural gas to the end users are measured on the user's property borderline with measurement devices (gas meters), which are subject to a type approval, an initial control and a subsequent periodic control in a defined time period according to the legislation of the Republic of Bulgaria.

The devices for natural gas measurement (gas meters) are subject to check-up by the State Agency for Metrology and Technical Surveillance (SAMTS) or by an authorized person as per art. 43, par. 4 of the ***Law on Measurements*** in the terms, defined with an Order of the chairman of SAMTS.

As per Order № A-102 of 5 March 2010 of the chairman of SAMTS the regularity for check-ups of the volume gas meters with deformable chambers (diaphragm) or with roots bodies (pistons) and of turbine gas meters for gas and additional devices for them is two years.
Accordin the new Order № A-441 of 13 October 2011 of the chairman of SAMTS the regularity for check-ups of the volume gas meters with deformable chambers (diaphragm) is four years. Its reduce the number of merological check-up of this type of meters for 2012.

For measurement of the users' natural gas consumption, Overgas Iztok AD is using diaphragm, roots and turbine gas meters. The company has certificates for gas meters type approval, as well as a passport with ID for each device. Overgas Iztok AD prepares annual schedules for subsequent metrological control of the measurement devices.

On the territory of Burgas municipality for the period 2011-2012 the metrological check-ups of 258 diaphragm and 56 roots and turbine gas meters, as well as of 95 electronic volume correctors have been scheduled. For the same period metrological check-ups of 195 diaphragm and 72 roots and turbine gas meters for natural gas, as well as of 103 electronic volume correctors have been performed

The metering device of Bulgargas EAD measuring the amount of natural gas entering into the GDN, which is used as cross-check parameter for the plausibility of the total consumption, is also calibrated.

In case a calibration of a metering device or a volume corrector is necessary, the device is disassembled and sent to an accredited laboratory for metrological check. Such devices are replaced by calibrated devices at the moment they are disassembled. A bilateral protocol is signed for the change, containing the readings of the unmounted and of the new device.

In case of failure of a metering device or a volume corrector, an average correction factor is applied for the determination of the consumption by the user. This factor is calculated using the consumption of similar users with similar metering devices in the same area or the consumption of the same user in the same month the previous year. A bilateral protocol stating the agreed consumption of natural gas was issued and signed by the consumer and a representative of the GDC. During the whole period from 2011 to 2012 there are no cases of failure of metering devices.

The reliability of the measured parameters is guaranteed by the implementation of ***Instruction G-02.02.04 for technical service of GDN facilities*** of Overgas Inc. AD. According to this instruction, the technical service and repair of the GRSs, GRBs, GRMSs and GRMBs should be requested by the GDCs. The regularity, scope and responsibilities for servicing and maintenance of the technical devices for measurement of natural gas amounts are detail described in the instruction.

In conformity with this instruction, revision with disassembling the equipment is performed with regard to the integrated system for centralized repair by the service company Overgas Serviz AD on the basis of contracts with Overgas Iztok AD and annual ***Schedules for revision with disassembling the equipment in the GDN devices (according to the Annex 2 of Instruction G-02.02.04)***, co-coordinated and approved by Overgas Iztok AD. For each revision with disassembling a bilateral ***Statement for performed revision with disassembling and setting the equipment in GDN devices*** is prepared. In the period 2011-2012 a total number of 13 revisions including disassembling and setting the equipment in devices in the GDN in Burgas were performed and the respective statements have been issued.
In accordance with ***Instruction G-02.02.04***, the data from the signed Statements is recorded in the ***Exploitation register (working document G-02.02.02-RD1)*** information for every technical servicing of the equipment is performed.

In the period 2011-2012, preventive maintenance of 1 131 equipments was performed (GRSs, GRBs, GRMSs, GRMBs, GMSs and GMBs) in order to ensure the continuity of the gas supply and the reliability of the equipment operations in the GDN. The figures per year are – for 2011 are 653 and for 2012 are 478. During this preventive maintenance taps, filters, valves and gaskets of the equipments were checked and in case of necessity were replaced.

5.5. Monitoring of the baseline emissions

The baseline monitoring activities are performed in the following sequence:

- Considering the statistical data for End Energy Consumption (EEC) by fuels and sectors on national level;
- Calculation of the fuel share changes in the end energy consumption by sectors for 2012;
- Correction of the fuel shares in the EEC by sectors on the project territory in accordance with the calculation of fuel mix changes on national level;
- Calculation of the baseline emissions.

Data for the fuel mix by sectors for the EEC on national level as it decrypted in item D.1.1.3 of PDD (p. 30 – p. 33) are taken from the National Statistical Institute[2] and presented in Table 4. At the present moment information for EEC is available for the years 2005, 2006, 2007, 2008, 2009, 2010 and 2011.

The sources of the data for each fuel are 6 files issued by Bulgarian National Statistical Institute: *EnergyBalanceBG2005.xls, EnergyBalanceBG2005.xls,_EnergyBalanceBG2006.xls, EnergyBalanceBG2007.xls, EnergyBalanceBG2008.xls, EnergyBalanceBG2009.xls and EnergyBalanceBG2010.xls (Annex 6) and formal letter from NSI for EEC for 2011 (Annex 7)*

[2] ***http://www.nsi.bg/otrasal-publikacii.php?otr=30***

Detail description of information for EEC for each type of fuel, sector and year is presented in Annex 5: *NSI_EEC_fuels_2004-2010_MR_05_12_12.xls*. For each input value are defined: Fail name, Sheet, and Cell.

Values for 2012 are calculated based on the information concerning the two years (2010 and 2011) preceding the reported year as it is described in PDD, item D.1.1.4.:

$$EEC_{i,k,2012} = ½(EEC_{i,k,2010}+EEC_{i,k,2011})$$

Where $EEC_{i,k,y}$ is the end energy consumption on national level for ***i*** type of fuel in sector ***k*** for the ***y*** year.

Sector	Fuel	2005	2006	2007	2008	2009	2010	2011	2012
Industrial sector	Residual fuel oil	208	203	178	130	99	86	71	78.5
	Gas oil	80	88	70	48	61	29	32	30.5
	Brown Coal	26	17	16	14	4	3	3	3
	Hard coal	-	-	-	-	-	-	-	-
	Biomass	-	-	-	-	-	-	-	-
	LPG	14	14	8	11	14	12	12	12
	Electricity	846	863	875	899	725	679	726	702.5
Public and administrative sector	Residual fuel oil	12	44	16	16	11	6	8	7
	Gas oil	20	21	33	44	55	33	22	27.5
	Brown Coal	2	2	1	2	2	1	1	1
	Hard coal	-	-	-	-	-	-	-	-
	Biomass	-	-	-	-	-	-	-	-
	LPG	1	0	0	0	0	5	7	6
	Electricity	533	596	608	647	639	696	717	706.5
Residential sector	Residual fuel oil	-					-	-	-
	Gas oil	2	2	1	1	2	2	1	1.5
	Brown Coal	39	52	24	28	37	29	42	35.5
	Hard coal	130	133	137	151	113	151	165	158
	Wood, wood waste	600	635	607	639	653	710	746	728
	LPG	25	26	25	22	24	20	27	23.5
	Electricity	778	800	806	862	886	908	938	923
Total		***3316***	***3496***	***3405***	***3514***	***3325***	***3370***	***3518***	***3444***

Table 3: Fuel mix in 1000 toe by sectors for the end energy consumption on national level from 2005 to 2012

Note: *According Table 2 in PPD (p. 15) the hard coal and biomass are not applicable to the industrial and administrative sectors; residual fuel oil is not applicable to the residential sector. Braun coal briquettes are not applicable for all tree sectors.*

5.6. Calculation of the fuel shares of the EEC in project region

The values of EEC on national level in Table 4 are used for the calculation of the fuel share on the EEC by sectors on the project territory (Formula 10 from PDD, p.34):

$$FF_{i,y} = EEC_{z,y} * SFM_{i,z,y},$$

Where:

$FF_{i,y}$ is the consumption of fuel i in the year ***y;***

$EEC_{z,y}$ is the corrected end energy consumption in sector ***z*** for the reported year ***y***;

$SFM_{i,z,y}$ is the corrected share of fuel ***i*** in sector ***z*** for the reported year ***y***;

The following assumptions and calculations are used for determination of $EEC_{z,y}$ *and* $SFM_{iz,y}$:

- The change from year to year of the total end energy consumption on the project region in sector ***z*** is proportional to the change of the same sector on national level:

$$EEC_{z,y} = EEC_{z,y-1} \cdot \frac{EEC_{Nz,y}}{EEC_{Nz,y-1}}$$

Where:

$EEC_{z,y}$ is the total end energy consumption of project region for ***y*** year;

$EEC_{z,y-1}$ is the total end energy consumption of project region for ***y-1*** year;

$EEC_{Nz,y}$ is the total end energy consumption of National level for ***y*** year;

$EEC_{Nz,y-1}$ is the total end energy consumption of National level for ***y-1*** year.

- the change of each component of the fuel mix of the end energy consumption in project region is also proportional for the change of the corresponding component on the national level.

$$FM^*_{i,z} = FB_{i,z} \cdot \frac{FM_{i,Nz}}{FB_{i,Nz}}$$

- For the normazation is used $EEC_{z,y}$, calculated above

$$FM_{i,z} = FM^*_{i,z} \cdot \frac{EEC_{z,y}}{\sum_k FM^*_{k,z}}$$

Where:

$FM^*_{i,z}$ is volume of ***i*** component, before normalization, of fuel mix in sector ***z*** for the reported year;

$EEC_{z,y}$ is the total end energy consumption in z sector of project region for ***y*** year;

$FB_{i,z}$ is volume of ***i*** component of fuel mix in sector ***z*** for the year before reported;

$FM_{i,z}$ is normalized volume of ***i*** component of fuel mix in z sector for the reported year;

Finally $SFM_{i,z,y}$ - the corrected share of fuel ***i*** in sector ***z*** for the reported year ***y*** is calculated according the following formula:

$$SFM_{i,z,y} = \frac{FM_{i,z}}{EEC_{z,y}};$$

The end energy consumption by market survey conducted by Market Test for 2005 (PDD, Table 2, p.15) and calculated volumes by years and by energy sources on project territory without the project implementation is shown in *Table 4:*

Energy source	2005	2006	2007	2008	2009	2010	2011	2012
Heavy fuel oil	293	322	264	209	157	138	121	130
Gas oil	303	332	394	437	501	374	274	340
Brown coal	16	16	9	11	8	6	8	7
Black and anthracite coal	281	291	291	320	241	323	356	340
Wood	430	461	429	450	463	505	535	521
LPG	50	34	28	28	34	27	34	30
Electricity	2 729	2 881	2 808	2 970	2 917	3094	3259	3204
Total	**4 101**	**4 337**	**4 224**	**4 425**	**4 322**	**4467**	**4587**	**4572**

Table 4: Energy consumption by energy sources without project implementation, TJ

5.7. Calculation of the total emissions without project implementation- Baseline

Following the procedure describe in PDD **B.1.4.** and information from Table 5 the quantity of the annual GHG emissions released in the project area without implementation of gasification up to 2012 ($BE_{z,y}$) is shown in *Table 5*.

Year	Industrial sector	Public and administrative sector	Residential sector	Total
2011	125272	153052	718879	997204
2012	120447	159286	705337	985070

Table 5: Greenhouse gas emissions without project implementation - baseline, tCO_2e

5.8. Calculation of the Fuel Switch Emission Reduction Factor with the corrected baseline

For the calculation of the generated emission reduction units according item D.1.4. of PDD are used fuel switch emission reduction factors. The factors are calculated after accomplishing the baseline monitoring and defining the expected emission reductions by sectors. The FSERF is obtained by dividing the expected emission reductions by the expected natural gas consumption. It quantifies the efficient emission reduction of the fuel switch from carbon rich solid and liquid fuels to natural gas in real conditions. The FSERF measures the amount of emission reduction units by sectors which are achieved with the sale of 1000 sm^3 natural gas.

The Fuel Switch Emission Reduction Factor is calculated using the formula:

$$FSERF_{y,z} = ERs_{y,z} / FF_{NG\,y,z}$$

Where:

$FSERF_{y,z}$ fuel switch emission reduction factor for a respective sector ***z*** during the year ***y***;

$ERs_{y,z}$ emission reductions for sector ***z*** during the year ***y*** in tCO_2e;

$FF_{NGy,z}$ The natural gas quantity that would be combusted in a respective sector ***z*** with the project implementation during the year ***y*** in 1000 sm^3.

The expected emission reductions by sectors ***$ERs_{y,z}$*** in PDD (p. 16) are calculated as a difference between calculated emission by each sector without (Table 5) and with project implementation.

The PDD baseline is determined in condition of permanent growth of the EEC of **2.52%** and maintaining the structure of the used energy sources – scenario II. The growth of the EEC by sectors is as follows: **2.2%** in the industrial sector, **4.9%** in the public and administrative sector and **1.8%** in the residential sector. The change in the structure of the used fuels as a

result of the stage-by-stage increase of the used natural gas in Burgas Municipality is as it is shown in Table 10 of PDD (p.43), based on the marketing investigation (sheet 'marketing', Bourgas_END_validatorV08.xls.)

The new calculated baseline hasn't permanent growing with constant factor for each of tree sectors. For the calculation of emission reductions for sector ***z*** during the year ***y*** is necessary to determine the structure of the used fuel mix as a result of the stage-by-stage increase of the used natural gas in Burgas Municipality based on calculated baseline (Table 4).

For the determination of expected fuel mix with the project implementation is assumed that the ratio of the quantity of each fuel from PDD baseline – scenario II to the calculated quantity of the same fuel from the monitoring baseline (item 5.6) is the same as the ratio of expected quantity of this fuel with project implementation from PDD (Table 10, p.43) to the quantity of this fuel relevant to the calculated baseline. The following formula is used:

$$FF^{*}_{project\_Mon,i,z,y} = FF_{project\_PDD,i,z,y} \cdot \frac{FF_{baseline\_Mon,i,z,y}}{FF_{baseline\_PDD,i,z,y}}$$

Where:

$FF^{*}_{project\_Mon,i,z,y}$ is the volume of fuel **i** that is combusted in a sector z with project implementation during the year ***y*** for Monitoring report in TJ before normalization;

$FF_{project\_PDD,i,z,y}$ is the volume of fuel **i** that would be combusted in a sector z with project implementation during the year ***y*** from PDD in TJ;

$FF_{baseline\_Mon,i,z,y}$ is the volume of fuel **i** that is combusted in a sector z without project implementation during the year ***y*** from present Monitoring report in TJ (item 5.6);

$FF_{baseline\_PDD,i,z,y}$ is the volume of fuel **i** that would be combusted in a sector z without project implementation during the year ***y*** in TJ from PDD (Table 3, p. 16 from PDD);

For the natural gas (NG) $FFbaseline_{PDD,NG,z,y}$ is equal to zero. The follow formula is used:

$$FF^{*}_{project\_Mon,NG,z,y} = FF_{project\_PDD,NG,z,y} \cdot \frac{\sum_{i} FF_{baseline\_Mon,i,z,y}}{\sum_{i} FF_{baseline\_PDD,i,z,y}}$$

The normalization is applied to assure that the ratio of EEC with and without project implementation is the same as it determined the PDD.

$$FF_{project\_Mon,i,z,y} = FF^{*}_{project\_PDD,i,z,y} \cdot \frac{EEC_{PDD,z,y}}{\sum_{i} FF^{*}_{project\_Mon,i,z,y}}$$

Where:

$FF_{project\_Mon,i,z,y}$ is the volume of fuel **i** that would be combusted in a sector z with project implementation during the year ***y*** for Monitoring report in TJ after normalization;

$EEC_{PDD,z,y}$ is the total end energy consumption in z sector of project region for ***y*** year from PDD (scenario II);

The change in the structure of the used fuels as a result of the stage-by-stage increase of the used natural gas in Burgas Municipality is shown in *Table 6:*

Energy source	***2006***	***2007***	***2008***	***2009***	***2010***	***2011***	***2012***
Heavy fuel oil	315	183	70	27	21	15	12
Gas oil	329	328	310	270	175	94	104
Brown coal	16	7	4	3	2	2	0
Black and anthracite coal	291	281	276	191	238	244	191
Wood	461	414	421	410	419	413	363
LPG	34	26	24	20	13	0	3
Electricity	271	2775	2862	2749	2831	2893	2828
Natural gas	20	192	419	600	714	851	983
Total	**4337**	**4207**	**4387**	**4275**	**4413**	**4512**	**4484**

Table 6: Structure of the energy sources with project implementation, TJ

Based on the calculated fuel consumption during the project implementation and emission factors the volume of greenhouse gas emissions is calculated by sectors and years according the D.1.1.2 of PDD. Data for greenhouse gas project emissions $PE_{z,y}$ for the period of 2011-2012 are given in *Table 7.*

Year	***Industrial sector***	***Public and administrative sector***	***Residential sector***	***Total***
2011	97885	138875	670745	907505
2012	96399	145454	647229	889082

Table 7: Greenhouse gas emissions with project implementation by sectors, tCO_2e

Finally fuel switch emission reduction factor for sector ***z***, for the year ***y***, $FSERF_{z,y}$ are calculated by the formula:

$$FSERF_{z,y} = (BE_{z,y} - PE_{z,y}) / FF_{NG\,y,zr}$$

$BE_{zr\,y}$ Baseline emissions for a respective sector during the year ***y*** in tCO_2e
$PE_{z,y}$ Project emissions for a sector ***z*** during the year ***y*** in tCO_{2e};

The calculated $FSERF_{z,y}$ are presented in Table 8:

Year	***Industrial sector***	***Public and administrative sector***	***Residential sector***
2011	**3.5273**	**2.6252**	**3.8398**
2012	**3.1831**	**1.8935**	**3.7302**

Table 8: FSERF for the project implementation by sectors

5.9. Balance of the amount of natural gas which entered into the GDN and delivered to the end users

According to ***Procedure P 03.00.00-2 for Control of Natural Gas Retail Sales*** the amount of natural gas delivered to the clients and the amount of natural gas that entered into the GDN are compared. The data are collected from the GDCIMS and from the monthly statements of Bulgargas EAD, and the reasons for the deviations are analyzed. The main reason is the different time of reporting. The monthly amounts of natural gas delivered to the GDCs are compared also to the data for the weekly amounts, which are received by the SCADA dispatch system in order to serve for the preparation of weekly operation reports.

The annual balance of the amount of natural gas input into the GDN and delivered to the end users in Burgas in the years 2011 and 2012 is presented in *Table 9*. The balance is prepared on the basis of the registered data for the natural gas amounts at the entrance (GDS) and at the exit (end users' installations) of the GDN.

Natural gas	***2011***		***2012***	
	sm³	***%***	***sm³***	***%***
Entered into the GDN	17360133	100.00%	12049984	100.00%
Delivered to the all users (JIP users and non-JIP user) – total	17526221	100.96%	12036446	100.11%
Difference	-166088	**-0.96%**	13538	**0.11%**

Table 9: Balance of natural gas amounts, entered into the GDN and delivered to the end users in Burgas in the years 2011 and 2012

The user in the industrial sector Kronospan Bulgaria EOOD is participant in the ETS and its consumption is beyond the JI project boundaries.

There is small difference between the amounts of natural gas at the entrance and at the exit of GDN of Overgaz Iztok AD. It is due mainly to the circumstance that Overgas Iztok AD and Toplofikatsiya – Burgas EAD (a company that operates the central heating network of the city) have common entry line at the GRS – Burgas of Bulgargas EAD, as well as to the different time of reporting. The simultaneous reporting of the readings for all end users is impossible, since the users' gas regulation and measuring stations and boards do not have remote reading. The natural gas amount needed for initial filling when commissioning large GDN sections also leads to deviations in the parameters.

The balance of the amounts of natural gas at the entrance and at the exit of GDN confirms the plausibility of the total gas consumption of the users.

5.10. Insignificance of the leakages, procedures for prevention and accidents' elimination

According to ***Instruction G-02.02.02 for technical service of linear section of GDN*** walk-through checks for breaking the integrity of the gas pipelines and for gas leakages and check-ups of the equipment status, etc. were performed daily, weekly, monthly or on every three months depending of the location of the pipelines. At the end of each walk-through check the information is recorded into the ***Exploitation register (working document G-02.02.02-RD1)***.

The deviations from the normal operation of the measuring devices and the telecommunications reported by the ***SCADA*** system are registered in ***Form for the current status of the equipment or a section of the GDN (working document F5-I1-6.3-012)*** and ***Failures of the telecommunication devices and the automated system for dispatch management (working document F6-I1-6.3-012)***. According to the information in these documents, occurrence of any deviations or failures in the functioning of the equipment and sections of the GDN, as well as of the telecommunications are dully watched and eliminated so their normal operation is restored.

In the period 2011-2012 totally 72 127 m underground gas pipeline networks were investigated for natural gas leakages. The figures per year are 38 143 m in 2011, 33 984 m in 2012.

The cases of natural gas leakage along the GDN are very rare and are due to accident leakages after breaking a distribution pipeline and to the scavenging before repairs and connections. The accidents are registered by Overgas Iztok AD in Statements of ascertainment.

According to the information about accidents during the period 2011-2012 from the Statements of ascertainment for the accidents occurred, the amounts of natural gas leaked are minimal. There are 11 accidents in 2011 and 9 in 2012.

Information for the natural gas leakages during these accidents is presented in *Table 10*.

	2011	***2012***
Amount of natural gas leaked, sm^3	7238	1330
Amount of natural gas entered into the GDN, sm^3	17359484	12049984
Share of total quantity, %	***0.041%***	***0.016%***

Table 10: Data for the amount of natural gas leaked during accidents in the GDN in Burgas in the monitored period

6. PROCEDURES FOR EMERGENCIES

The actions in case of occurrence of large-scale accidents are regulated in compliance with ***Plan for rescue, emergency and reconstruction works on the territory of GDC (Annex 2 to Procedure P 02.00.00-3)***. The plan includes preventive actions for non-admission of accidents' occurrence, forecasting the type and the consequences of accidents in the GDN, defining the actions and the obligations of the operational personnel.

In accordance with the Bulgarian legislation the activities in GDC in time of accidents and emergency situations are implemented following ***Procedure P 02.00.00-3 for elimination of an accident and its consequences***. In case of accident or emergency situation, information for the implemented changes and the reasons for them are elaborated, as well as protocols after investigating the reasons for the accidents occurred. In case of accident or emergency situation Overgas Iztok AD cooperates also with the users, the public supplier Bulgargas EAD and the state and municipal bodies.

The emergency readiness of Overgas Iztok AD is ensured by the development of an Emergency plan. This Emergency plan is agreed following the respective order with the Regional Service for Fire Safety and Rescue and with Civil Protection. Overgas Iztok EAD provides for the emergency technical equipment and instrumentation, as well as an emergency reserve of technological materials – elements of the GDN, and implements control over the emergency readiness – over the status of the technical equipment, the reserve and the efficiency of actions on the emergency plan. The emergency readiness in the GDC is regulated also by the state legislation and is subject of periodical planned and sudden control.

7. PROCESSING OF INITIAL DATA

The data on the amount of natural gas delivered to the end users is received in Overgas Inc. AD monthly according to the ***Procedure P 03.00.00-2 for Control of Natural Gas Retail Sales***. They are entered into the GDCIMS by authorized employee of Overgas Iztok AD. The data about the amount of consumed natural gas in each sector, used for the calculation of the generated greenhouse gases emission reductions of the project, are taken from the ***Information*** module of the GDCIMS.

To report the influence of the low heating value of the natural gas delivered, the amount of the consumed natural gas had to be corrected as it is envisaged in the Monitoring plan of the PDD. Toward that goal, a correction factor was used.

The data on the amount of the delivered natural gas by Bulgargas EAD in the Monthly Statements on delivery and the average low heating value of the natural gas in the Certificates of the natural gas are used for calculation of the correction factor. The correction factor calculation is made according to ***Formula 2*** and ***Formula 3***.

The average weighted value of natural gas's low heating value LHV_{av} is calculated on the basis of the monthly certificates and the monthly statements on delivery of natural gas to Overgas Iztok AD by Bulgargas EAD.

$$LHV_{av} = \Sigma\, Q_{NG\ m} * LHV_{NG,\ m} / Q_{NG\ y} \qquad (2),$$

Where:

$Q_{NG\ m}$ is the amount of natural gas delivered for the month ***m*** in 1000 sm^3;
$LHV_{NG,\ m}$ is the low heating value of the natural gas during the month ***m*** in GJ/1000m^3;
$Q_{NG\ y}$ is the amount of natural gas delivered for the year ***y*** in 1000 sm^3;

The correction factor for taking into account the influence of the low heating value of the delivered natural gas ***K*** is calculated according the formula:

$$K = LHV_{av} / LHV_{NG} \qquad (3)$$

where:

LHV_{NG} is the low heating value of the natural gas, used in the calculations in the PDD in GJ/1000m^3 (33.400 GJ/1000 m^3).

Information about the amounts entered into the GDN and its low heating value by months from the monthly statements and the certificates of the natural gas is presented in *Table 4*. The calculated annual weighted average for the years 2008, 2009 and 2010 are also presented in the table 11.

Month	2011		2012	
	Purchased natural gas, sm^3	LHV, kcal/m^3	Purchased natural gas, sm^3	LHV, kcal/m^3
January	1855536	8024	2010646	8042
February	1881367	8010	1406384	8043
March	1563793	7978	1341990	8028
April	1574978	8014	1265971	8044
May	1255844	8027	1255596	8059
June	1150744	8012	1211406	8073
July	1161570	8033	1087973	8050
August	1054965	8047	1045725	8039
September	1049174	8022	561999	8043
October	1335465	8032	334449	8052
November	1620885	8036	527845	8047
December	1855812	8037		
Total	17360133	-	12049984	-
LHV_{av}	-	8022	-	8047

Table 11: Amounts of natural gas entered into the GDN and low heating value of the gas in 2011 and 2012

The data for calculation of the correction factor ***K*** for the year 2011 and 2012 are presented in *Table 12*.

	2011	2012
Average low heating value of the delivered natural gas, kcal/m^3	8 022	8 047
Average low heating value of the delivered natural gas, GJ/1000 sm^3	33.587	33.691
Low heating value of the natural gas used in PDD, GJ/1000 sm^3	33.400	33.400
Correction factor for taking into account the influence of the low heating value of the natural gas	***1.006***	***1.009***

*Table 12: Correction factor **K** for taking into account the influence of the natural gas low heating value in 2011 and 2012*

8. CALCULATION OF THE EMISSION REDUCTIONS

According to the monitoring plan, the amount of greenhouse gas emission reductions is calculated by multiplying the annual consumption of natural gas in each sector by the FSERF for the respective sector for the reported year. For reporting, the amounts of natural gas delivered to the end users in every sector are corrected by a factor taking into account the low heating value of the gas. The calculation of the factor is made as described in ***5.8 Calculation of the Fuel Switch Emission Reduction Factor with the corrected baseline*** of the Monitoring report.

8.1. ERUs generated by the project

The amount of the emission reductions generated in the year is calculated by the formula:

$$ERU_{z,y} = FSERF_{z,y} * Q_{NG\ z,y} * K \quad (4),$$

Where:

$ERU_{z,y}$	is the amount of emission reduction units for the year ***y*** in the sector ***z***, tCO_2e;
$FSERF_{z,y}$	is the fuel switch emission reduction factor for sector ***z***, for the year ***y***, $tCO_2e/1000sm^3$;
$Q_{NG\ z,y}$	is the amount of natural gas delivered to sector ***z***, in the year ***y***, 1000 sm^3;
K	is the correction factor for taking into account the change of the low heating value of the delivered natural gas.

The calculations of the greenhouse gas emission reductions per year are presented in *Table 13* and 14.

Sector	***Natural gas consumption, sm^3***	***Correction factor for 2011***	***Corrected natural gas consumption sm^3***	***FSERF, tCO_2/ thousand sm^3***	***Greenhouse gas emission reductions, tCO_2e***
Industrial	**3493711**	1.006	**3513158**	3.5273	**12392**
Public and administrative	**1675008**	1.006	**1684331**	2.6252	**4422**
Residential	**332825**	1.006	**334678**	3.8398	**1285**
Total	**5501544**		**5532167**		**18099**

Table 13: ERUs realized in 2011, tCO_2e

Sector	***Natural gas consumption, sm^3***	***Correction factor for 2012***	***Corrected natural gas consumption, sm^3***	***FSERF, tCO_2/ thousand sm^3***	***Greenhouse gas emission reductions, tCO_2e***
Industrial	**3103.091**	1.009	**3130.006**	3.1831	**9963**
Public and administrative	**1412.675**	1.009	**1424.928**	1.8935	**2698**
Residential	**259.68**	1.009	**261.932**	3.7302	**977**
Total	**4775.446**		**4816.866**		**13638**

Table 14: ERUs realized in 2012 (01.01 – 30.11) , tCO_2e

The lack of double counting of greenhouse gas emission reductions is guaranteed by setting aside in the National Allocation Plan for the period 2008-2012 a special Reserve of allowances. The canceling of allowances from this Reserve is performed by the Environmental Executive Agency in accordance with the data presented in the Monitoring and Verification reports of all approved JI projects, implemented in Bulgaria. The lack of double counting in the project is guaranteed also by the exclusion of the natural gas consumption of Kronospan Bulgaria EOOD. This company is connected to the Overgas Iztok AD's GDN and possesses ETS allowances. The exclusion is written in the determined Project Design Document.

8.2. Results of the conducted monitoring

- In the period reported, from 1st January 2011 to 30st November 2012, the implementation of project lead to generation of **31 737 *ERUs*** (Item 8.1).
- The monitoring shows that the project boundaries, determined in the PDD, have not been changed (Item 1).
- The reporting of the amounts of natural gas, which enters into the GDN, is implemented at high degree of accuracy and is controlled by Bulgargas EAD and Overgas Iztok AD (Item 5.2).
- The data used for the calculation of the ERUs generated by the project implementation are accurate and reliable (Item 5.4).
- The leakages from the natural gas distribution are insignificant and have no impact on the final results (Item 5.6).
- The low heating value of the delivered natural gas in the period 2011-2012 has been in the range of 8050 ± 25 kcal/sm^3 (Table 12).

The calculation of the greenhouse gas emission reductions are performed in accordance with the Monitoring plan of the determined PDD and the ***Manual for elaboration of monitoring reports on the Joint Implementation projects of Overgas Inc. AD***.

The Excel worksheet file *Monitoring_Burgas_2011_2012_v1_05_12_2012_protected.xls (Annex5)*, containing the detailed calculations of the amount of the realized greenhouse gases emission reductions is integral part of the present Monitoring report.

9. ENVIRONMENTAL IMPACT

The switch from the traditional energy sources to natural gas leads to a reduction of the overall amount of the emissions and to an enhancement of the natural and urban environments. The amounts of the emission reductions of pollutants and greenhouse gases that are result of the replacement of traditional fuels and electricity by natural gas within the JI project are calculated annually. The information is submitted to the Public Communications Management Process of Overgas Inc. AD and to the GDCs.

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