



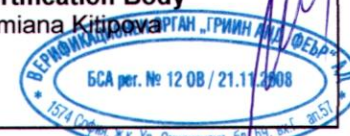
# VERIFICATION REPORT

for  
New cogeneration power station for  
combined production of heat and electricity  
in District Heating Bourgas, Bulgaria

**MONITORING PERIOD: 1 JANUARY 2012 TO 30 November 2012**

REVISION № 01

**Green and Fair**

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<b>Subject:</b>			Fifth Periodic Verification									
<b>Executing Operational Unit:</b>												
Green and Fair, Bulgaria, 8 Sv.Kliment Ohridski Boulevard, Sofia 1756 p.b.44												
<b>Project Participant (client):</b>												
1) Toplofikacia Burgas Jsc, 2) Danish Energy Authority (Buyer country of emission reductions)												
<b>Project Title</b>			"New cogeneration power station for combined production of heat and electricity in District Heating Bourgas, Bulgaria"									
<b>Monitoring period:</b>			01-01-2012 to 30-11-2012									
<b>First Monitoring Report (version/date)</b>			Version 01 / 05-12-2012									
<b>Final Monitoring Report (version/date)</b>			Version 01 / 05-12-2012									
<p><b>Summary:</b> Green and Fair has been ordered by DHC Bourgas JSC to carry out the Fifth periodic verification of the determined JI track 1 project "New cogeneration power station for combined production of heat and electricity in District Heating Bourgas, Bulgaria" that is registered by the Bulgarian DFP (see the following link: <a href="http://www.moew.government.bg/recent_doc/international/climate/Approved%20projects_tablica_EN_publikuvane.pdf">http://www.moew.government.bg/recent_doc/international/climate/Approved%20projects_tablica_EN_publikuvane.pdf</a> ). The project comprises the design, construction and operation for new cogeneration power station for combined production of heat and electricity in District Heating Bourgas including 6 gas engines with a total power capacity of 17,82 MWel (CHP: combined heat and power). Three of the gas engines have single output of 3.125 MWel / 3.19 MWth and the other three - 2,394 MWth/2,814 MWel. The cogeneration installation is used for producing of heat and electrical energy. The produced energy is sold to the residences, municipal and industrial customers of city of Bourgas. The management of DHC Bourgas JSC is responsible for the preparation of the GHG emissions data and the reported GHG emission reductions. A document review, followed by a site visit was conducted to verify the information submitted by the project participant regarding the present verification period. Based on the assessment carried out, the verifier confirms the following: • the project has been implemented and operated in accordance with the description given in the registered PDD (Project Design Document Version 2 of March 2006), and amendment to the determination.</p> <p>The verifier can confirm that the GHG emission reduction for the whole monitoring period is calculated without material misstatements. Our opinion relates to the project's GHG emissions and resulting GHG emissions reductions reported and related to the valid and registered project baseline and monitoring, and its associated documents. Based on the information we have seen and evaluated we confirm the following statement:</p> <p><b>Reporting period:</b> Assessment and evaluation per 01-01-2012 to 30-11-2012</p> <p><b>Verified baseline emissions, project emissions and emission reductions:</b></p> <table border="1"> <thead> <tr> <th>Year</th><th>30<sup>th</sup> of November 2012</th></tr> </thead> <tbody> <tr> <td>Baseline emissions</td><td>122 911 t CO<sub>2eq</sub></td></tr> <tr> <td>Project emissions</td><td>65 532 t CO<sub>2eq</sub></td></tr> <tr> <td>Emission reductions</td><td>57 379 t CO<sub>2eq</sub></td></tr> </tbody> </table> <p>Based on the information we have seen and evaluated, we confirm that the implementation of the project resulted in total 57,379 t CO<sub>2e</sub> of ERUs during the verification period 01-01-2012 to 30-11-2012.</p>					Year	30 <sup>th</sup> of November 2012	Baseline emissions	122 911 t CO <sub>2eq</sub>	Project emissions	65 532 t CO <sub>2eq</sub>	Emission reductions	57 379 t CO <sub>2eq</sub>
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<b>Assessment Team Leader:</b> Dr.eng. Evgeni Sokolovski <b>Assessment Team Members:</b> Dr.Petar Petrov <b>Trainees:</b> Kalinka Burneva			<b>Veto Person: Certification Body responsible:</b> Rumiana Kitanova 									

**Abbreviations**

AIE	Accredited Independent Entity
CAR	Corrective Action Request
CER	Certified Emission Reduction
CMP	Conference of the Parties serving as the Meeting of the Parties to the Kyoto Protocol
CO2e	Carbon dioxide equivalent
CR / CL	Clarification Request
DNA	Designated National Authority
EF	Emission Factor
EIA / EA	Environmental Impact Assessment / Environmental Assessment
ER	Emission Reduction
FAR	Forward Action Request
GHG	Greenhouse Gas(es)
GWP	Global Warming Potential
IPCC	Intergovernmental Panel on Climate Change
IRL	Information Reference List
JI	Joint Implementation
JISC	JI Supervisory Committee
KP	Kyoto Protocol
MP	Monitoring Plan
MR	Monitoring Report
NG	Natural Gas
OM	Operational Margin
PDD	Project Design Document
PP	Project Participant

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# 1 INTRODUCTION

The project participant (PP.), District Heating Bourgas, has commissioned Green and Fair to verify the emission reductions of its JI project „New cogeneration power station for combined production of heat and electricity in District Heating Bourgas, Bulgaria” (hereafter called “the project”), UNFCCC JI Reference Number BG1000153. The order comprises the Fifth periodic verification and is related to emission reductions achieved during 01 January 2012 to 30 November 2012.

According to INSTRUCTION FOR APPROVAL OF PROJECTS GENERATING EMISSION REDUCTION UNITS UNDER TRACK I OF THE JOINT IMPLEMENTATION MECHANISM, issued by the Bulgarian Minister of Environmental and Water with Ordinance No RD 417 from 28.04.2010, Chapter III, Art. 20. (1) An independent verifier for the purpose of this chapter may be any organization under art. 10, paragraph 2 herein as well as organisations accredited by the Executive agency Bulgarian Accreditation Office according to the requirements of the European Union Greenhouse Gas Emission Trading Scheme, provided the scope of the Joint Implementation project concerned coincides with the scope of projects for which the organisation concerned is accredited.

Green and Fair is accredited by the Executive agency Bulgarian Accreditation Office according to the requirements of the European Union Greenhouse Gas Emission Trading Scheme with the certificate № 120B. The scope of accreditation includes the following activities: combustion installations from activities listed in Annex I of the EU ETS Directive, Mineral Oil Refineries as listed in Annex I to the EU ETS Directive, Coke Ovens as listed in Annex I to the EU ETS Directive, Metal Ore Roasting and Sintering Installations as listed in Annex I to the EU ETS Directive, Installations for the Production of Pig Iron and Steel including Continuous Casting as listed in Annex I to the EU ETS Directive, Installations for the Production of Cement Clinker as listed in Annex I to the EU ETS Directive, Installations for the Production of Lime as listed in Annex I to the EU ETS Directive, Installations for the Manufacture of Glass as listed in Annex I to the EU ETS Directive, Installations for the Manufacture of Ceramic Products as listed in Annex I to the EU ETS Directive, Pulp and Paper producing Installations as listed in Annex I to the EU ETS Directive, Combustion installations - emitting less than 25,000 t CO<sub>2</sub> per year and only fossil fuels burnt (no biomass, no waste).

This report summarizes based on a desk-review, an on-site assessment and follow-up interviews and interactions through corrective action and clarification requests, the final results of the verification of the reported emission reductions and the determination whether the project has been implemented in accordance with the PDD and the previous determination, and whether the monitoring occurred in accordance with the monitoring plan included in the PDD and the relevant annexes.

It is based on the JI Determination and Verification Manual (DVM) in its first version, published in December 2009 by the Joint Implementation Supervisory Committee (JISC) of UNFCCC.

Green and Fair has applied a rule-based approach for the verification of the project. The principles of accuracy, completeness, relevance, reliability and credibility were combined with a conservative approach to establish a traceable and transparent verification opinion.

This report includes the findings of the Fifth periodic verification. Fifth periodic verification has been performed as one integrated activity. It consisted of a desk review of the project documents including PDD, monitoring plan, determination report, amendment to the determination, monitoring report and

further documentation. The results of the determination were documented by TÜV SÜD Industrie Service GmbH in the report: "Determination of the „New cogeneration power station for combined production of heat and electricity in District Heating Bourgas, Bulgaria" Report No. 748648, Revision 01 dated 5th March 2005. Amendment to the Determination were documented by TÜV Rheinland Immissionschutz und Energiesysteme GmbH in the report: "Opinion on the Post Determination" (Statement) Changes made to new cogeneration power station for combined production of heat and electricity in District Heating Bourgas, Bulgaria., Report No.21212062, Revision 1.1 dated 17th June 2010, based on DHC Bourgas Report titled "Changes made in the JI project "New cogeneration power station for combined production of heat and electricity in District Heating Bourgas, Bulgaria"", dated 16th June 2010.

## 1.1 Objective

Verification is the periodic independent review by the AIE of the monitored reductions in GHG emissions during defined verification period. The objective of the initial verification is to verify that the project is implemented as planned and described in the PDD, to confirm that the monitoring system is in place and fully functional, and to assure that the project will generate verifiable emission reductions. The objective of the periodic verification is the review and ex post determination by an AIE of the GHG emission reductions. It includes the verification of the data given in the monitoring report by checking the monitoring records and the emissions reduction calculation.

The verification follows UNFCCC criteria referring to the Kyoto Protocol criteria, the JI rules and modalities, and the subsequent decisions by the JISC, as well as the host country criteria.

## 1.2 Scope

Green and Fair follows a risk-based approach in the verification. This focuses on the identification of significant risks related to the implementation of the monitoring plan and the resultant emission reductions to ensure they are free from material misstatement. In the absence of the monitoring plan becoming final under the JI track 1 procedures at the time of the verification, the verification, was conducted based on the monitoring plan contained in the report: "Changes made in the JI project "New cogeneration power station for combined production of heat and electricity in District Heating Bourgas, Bulgaria"", dated 16th June 2010, determined as of the date of commencement of the verification activity and deemed to be final. Subsequent changes to the monitoring plan, if any, shall be considered in the respective subsequent periodic verifications as applicable, Green and Fair focusing on the identification of significant risks of the project implementation and the generation of ERUs. The verification is not meant to provide any consulting towards the Client. However, stated requests for forward actions and/or corrective actions may provide input for improvement of the project monitoring towards reductions in the GHG emissions.

Green and Fair has, based on the recommendations in the JI Determination and Verification Manual (DVM), the CDM Validation and Verification Manual (CDM-VVM) and the IETA Validation and Verification Manual (IETA-VVM) published by International Emission Trading Association (IETA) employed a risk-based approach in the verification, focusing on the identification of significant risks of the project implementation and the generation of ERUs.

The verified monitoring report for the period 01-01-2012 to 30-11-2012 is intended to be made publicly available together with this verification report on the Ministry of Environment and Water, Executive

Environmental Agency's web page in accordance with the Instruction for Approval of Projects Generating Emission Reduction Units under the "Joint Implementation" Mechanism, as published in May 2010 on the Ministry of Environment and Water's website.

### 1.3 GHG Project Description

Project title	: New cogeneration power station for combined production of heat and electricity in District Heating Bourgas, Bulgaria
Jl POD reference	: j l Project Design Document Version 2, March 2006
Determination	: Determination Report No. 748 648 Rev. 01, 2006-05-03; "Opinion on the Post Determination" (Statement), Report No.21212062, Revision 1.1 dated 17th June 2010.
Crediting period	: (1 January 2008 - 31 December 2012)
Project location	: Bourgas, Bulgaria
Project participants	: DHC Bourgas, Danish Energy Authority

The project comprises the design, construction and operation for new cogeneration power station for combined production of heat and electricity in District Heating Bourgas including 6 gas engines with a total power capacity of 17,82 MWeI (CHP: combined heat and power).

Three of the gas engines have single output of 3.125 MWeI / 3.19 MWth and the other three - 2,394 MWth/2,814 MWeI.

The cogeneration installation is used for producing of heat and electrical energy. The produced energy is sold to the residences, municipal and industrial customers of city of Bourgas.

The project includes 6 x 16V25SG "WARTSILA" gas engines coupled with AMG710Mm6 "ABB" generators. The cogeneration installation is situated at a separate territory within the DHC, north from the Administrative building.

The natural gas is supplied from the existing gas-distribution system located at 160 m from the cogeneration station. It is also foreseen the construction of a new gas pipe diversion DN 100 mm starting from gas-distribution system with a nominal pressure 0.6 MPa, which will ensure undependable supply of natural gas and measurement of the cogeneration system consumption; It is also foreseen a new heat pipeline, which is included as circulation circle, part from a return main pipeline. The heat energy received from the cooling systems and the exhaust gases of the gas engines, through this pipeline is supplied to the heat network.

The operating regime is year-round. The necessary thermal load in the heating season is added from the existing boilers. In the summer season the thermal load for hot water is covered with optimal chosen number of operating modules.

The produced electricity, without the auxiliary needs, is exported to the national electricity system.

Each separate cogeneration module includes engine, generator, turbo-compressor, silencer, and heat exchanger for cooling of the oil system, heat exchanger for cooling of the water "jacket", heat exchanger for the exhaust gases, gas regulating system, pumps, armatures, and control system.

The control and the regulation of the technological process of electricity production and heat production in the cogeneration system are automated.

## 2 METHODOLOGY

The verification is as a desk review and field visit including discussions and interviews with selected experts and stakeholders.

### 2.1 Verification Process

The verification process is based on the approach depicted in the Validation and Verification Manual. Standard auditing techniques have been adopted for the verification process. The verification team performs first a desk review, followed by an on-site visit, which results in the formation of a protocol that includes all the findings. The next step involves the evaluation of the findings through direct communication with the PPs and then finally the preparation of the verification report. This verification report and other supporting documents then undergo an internal quality control before submission to the Bulgarian DFP.

The above version of the monitoring report serves as the basis for the assessment presented herewith.

Studying the existing documentation belonging to this project, it was obvious that the competence and capability of the audit team performing the verification has to cover at least the following aspects:

- Knowledge of Kyoto Protocol and the Marrakech Accords
- Environmental and Social Impact Assessment
- Quality assurance
- Technical aspects of cogeneration systems
- Monitoring technologies and concepts
- Political, economical and technical conditions in host country
- Knowledge of the Guidelines of the Joint Implementation Supervisory Committee for Joint Implementation under Track 2
- Knowledge of the National Guidelines of the Designated Focal Point of Bulgaria for Joint Implementation under Track 1

### 2.2 Verification Team

The appointment of the verification team takes into account the technical area(s), sectoral scope(s) and relevant host country experience required amongst team members for verifying the ER achieved by the project activity in the relevant monitoring period for this verification. The verification team consisted of the following members:

Name	Qualification	Coverage of scope	Coverage of technical expertise	Host country experience
<b>Evgeni Sokolovski</b>	<b>ATL</b>	✓	✓	✓
Petar Petrov	GHG-A	✓	✓	✓
Kalinka Burneva	GHG-Trainee			✓

Dr. Evgeni Sokolovski is a lead verifier for EU ETS at Green and Fair with more than 100 verifications. He is an environmental engineer. He has work experience in the field of industrial environmental technology and protection and also in technical environmental projects. Dr. Sokolovski has attended in a



number of JA verifications as local expert for TÜV Rheinland Immissionschutz und Energiesysteme GmbH. Dr. Sokolovski is a lecturer in the University of Chemical Technology and Metallurgy.

Dr. Petar Petrov is a auditor for EU ETS at Green and Fair, and he is licensed as expert for Environmental Impact Assessment (EIA). He has work experience in the field of industrial environmental technology and protection and also in technical environmental projects.

Kalinka Burneva is an auditor at Green and Fair, and she is a lead auditor for ISO 9001:2008. She has work experience in quality audits.

## 2.3 Review of Documents

The verification is performed primarily based on the review of the project documentation, including the PDD, determination report and the amendment to the determination,. GREEN AND FAIR requested the PP to present supporting information and documents and these were reviewed by GREEN AND FAIR. Through the process of the verification, the monitoring report and the supporting documents were evaluated to confirm the actions taken by the PP to the CARs and Cts issued by GREEN AND FAIR.

The audit team has been provided with various documents showing the implementation of the project, such as procedures, manuals, equipment characteristics and further documents. Based on these documents, an on-site assessment for the periodic verification was carried out in December 2012. The documents reviewed by GREEN AND FAIR are listed in Appendix A.

## 2.4 On-site Assessment and follow-up

On 05/12/2012 Green and Fair performed a physical site inspection and on-site interviews with project stakeholders to confirm selected information and to resolve issues identified in the document review. Representatives of District Heating Bourgas and Eko Analiz Ltd were interviewed.

On-site assessment was conducted as defined in the schedule as detailed below.

Date	Place	Subject
05/12/2012	DHC Bourgas	<p>Opening meeting</p> <ul style="list-style-type: none"> <li>• confirm the implementation and operation of the project,</li> <li>• review the data flow for generating, aggregating and reporting the monitoring parameters,</li> <li>• confirm the correct implementation of procedures for operations and data collection,</li> <li>• cross-check the information provided in the MR documentation with other sources,</li> <li>• check the monitoring equipment against the requirements of the PDD and the approved methodology, including calibrations, maintenance, etc.,</li> <li>• review the calculations and assumptions used to obtain the GHG data and ER,</li> <li>• identify if the quality control and quality assurance procedures are in place to prevent or correct errors or omissions in the reported parameters.</li> </ul> <p>Closing meeting</p>

The list of individuals interviewed is as detailed in Appendix B

## 2.5 Quality of Evidence to Determine Emission Reductions

Among several evidence items submitted, the following relevant and reliable evidence material have been used by the audit team during the verification process:

1. Instructions for calibration of the measuring devices, data processing and archiving, listed in Annex 1 in the MR;
2. Natural gas consumption – protocols for consumption and calibration of measuring devices, listed in Annex 2 in the MR;
3. Certificates of the natural gas delivered by Bulgargas EAD to District Heating Bourgas for the period 01.01.2012 – 30.11.2012, listed in Annex 2 in the MR;
4. Calibration Certificates for the natural gas meters, listed in Annex 2 in the MR;
5. Heavy fuel consumption – protocols for consumption and calibration of measuring devices, listed in Annex 3 in the MR;
6. Monthly statements for the total heat production, own needs and net heat production by District Heating Bourgas for the period 01.01.2012 – 30.11.2012, listed in Annex 5 in the MR;
7. Calibration Certificates for the heat meters, listed in Annex 5 in the MR;
8. Monthly statements for the total electricity production, own needs and net electricity production by District Heating Bourgas for the period 01.01.2012 – 30.11.2012, listed in Annex 4 in the MR;
9. Calibration Certificates for the electricity meters, listed in Annex 4 in the MR;
10. Monthly statements for buying and selling of electricity between Natsionalna Elektricheska Kompania EAD and District Heating Bourgas for the period 01.01.2012 – 30.11.2012, listed in Annex 4 in the MR.

Sufficient evidence covering the full verification period in the required frequency is available to validate the figures stated in the final MR. Specific cross-checks have been done in cases that further sources were available. The monitoring report's figures were checked by the audit team against the raw data. The data collection system meets the requirements of the monitoring plan as per the methodology.

## 2.6 Resolution of Clarification, Corrective and Forward Action Requests

The objective of this phase of the verification is to raise the requests for corrective actions and clarification and any other outstanding issues that needed to be clarified for Green and Fair positive conclusion on the GHG emission reduction calculation.

Findings established during the initial verification can either be seen as a non-fulfillment of criteria ensuring the proper implementation of a project or where a risk to deliver high quality emission reductions is identified.

Corrective Action Requests (CAR) are issued, where:

- i) there is a clear deviation concerning the implementation of the project as defined by the PDD;
- ii) requirements set by the MP or qualifications in a verification opinion have not been met;
- iii) or there is a risk that the project would not be able to deliver (high quality) ERUs.

Forward Action Requests (FAR) are issued, where:

- iv) the actual status requires a special focus on this item for the next consecutive verification, or
- v) an adjustment of the MP is recommended.
- vi) The verification team may also use the term Clarification Request (CL), which would be where: additional information is needed for the full clarification of an issue.

## **2.7 Internal Quality Control**

As a final step of verification, the final documentation including the verification report and annexes have to undergo an internal quality control by the Green and Fair. The verification report has to be finally approved by the Head of the verification body. If the documents have been satisfactorily approved, the Request for Issuance is submitted to the Bulgarian DFP along with the relevant documents.

## **3 VERIFICATION RESULTS**

In the following sections, the results of the verification are stated. The verification results related to the project performance as documented and described in the final PDD and Monitoring Report (05-12-2012, version 1). The verification findings for each verification subject are presented below:

### **3.1 FARs from Previous Verification**

The verification team confirms that all FARs (FAR#1 and FAR#2) presented in the verification report № 0368494 Version 3.0/13.12.2008 from Lloyd's Register Quality Assurance Ltd (LRQA), have been correctly resolved by the PPs. The verification team confirms that FAR#1 presented in the verification report № 07 Revision 01/28.03.2012 from Green and Fair, haven't been correctly resolved by the PPs. Amendment to the Determination were documented by TÜV Rheinland Immissionschutz und Energiesysteme GmbH in the report: "Opinion on the Post Determination" (Statement) Changes made to new cogeneration power station for combined production of heat and electricity in District Heating Bourgas, Bulgaria., Report No.21212062, Revision 1.1 dated 17th June 2010 based on DHC Bourgas Report titled "Changes made in the JI project "New cogeneration power station for combined production of heat and electricity in District Heating Bourgas, Bulgaria"", dated 16th June 2010.

### **3.2 Project Implementation in accordance with the registered Project Design Document**

The project activity as described in the PDD Version 2 dated March 2006 was determined by TUV Industrie Service GmbH TUV SUD Group. The outcome of the determination report No, 748 648 Revision 01 dated 03 May 2006 is that no confirmation is given with respect to compliance with the requirements of Kyoto Protocol and the relevant guidelines of the Bulgarian Designated National Authority.

Equipment of this project activity is installed as described in the PDD / baseline study and the monitoring plan and the monitoring report of Toplofikacia Burgas Jsc of December 2012. It can be stated, that the way the production data is obtained is consistent with the way the historical data had been determined. Main measurement equipments are in place and calibrated. The existing metering systems have been identified and checked. Responsibility for installation and operation of the equipment is within sites employees. The equipment is calibrated periodically as proven during the on-site visit. The project boundaries have not been changed.

### 3.3 Compliance of the Monitoring Plan with the Monitoring Methodology

The monitoring plan is in accordance with the approved project specific methodology, applied by the proposed JI project activity. Neither a revision nor a deviation to the monitoring plan has been requested to the JISC.

### 3.4 Compliance of the Monitoring with the Monitoring Plan

The monitoring has been carried out in accordance with the monitoring plan contained in the registered PDD and Amendment to the Determination. All parameters were monitored and determined as per the Monitoring Plan listed in DHC Bourgas Repor titled “Changes made in the JI project “New cogeneration power station for combined production of heat and electricity in District Heating Bourgas, Bulgaria””, dated 16th June 2010.

The verification of the parameters required by the monitoring plan is provided as follows:

Data/Parameter	CEO
Data unit	MWh
Description	Net electricity from new CHP
Time of determination/monitoring	Determined ex post
Source of data (to be) used	Measuring device of the DHC

Data/Parameter	CAHO
Data unit	MWh
Description	Heat output to covering the heat demand of the DHC
Time of determination/monitoring	Determined ex post
Source of data (to be) used	Measuring devices of the DHC

Data/Parameter	EFel
Data unit	tCO <sub>2</sub> /MWh
Description	Emission factor for Bulgarian power grid, forecast Maximum demand, Dispatch data adjusted_OM_EF, fossil fuels
Time of determination/monitoring	Determined ex ante
Source of data (to be) used	“Baseline Study of Joint Implementation projects in the Bulgarian Energy Sector <sup>1</sup> ”
Value of data applied (for ex ante calculations/determinations)	2007 – 1.156 2008 – 1.059 2009 – 0.947 2010 – 0.908 2011 – 0.884 2012 – 0.833

<sup>1</sup> [http://www.moew.government.bg/recent\\_doc/international/climate/carbon\\_emission\\_joint.pdf](http://www.moew.government.bg/recent_doc/international/climate/carbon_emission_joint.pdf)

### 3.5 Assessment of Data and Calculation of Greenhouse Gas Emission Reductions

All data has been available and all the parameters have been monitored in accordance with the monitoring plan. The reported data have been cross-checked against other sources available.

The verifier confirms that the methods and formulae used to obtain the baseline, project and leakage emissions are appropriate. The same has been done in accordance with the methods and formulae described in the registered monitoring plan and applicable methodology. The verifier confirms that the monitoring report includes all parameters and the monitored data at the intervals required by the methodology, PDD and Amendment to the Determination.

The verifier confirms that all the emission factors and default values have been correctly justified. All the emission factors and default values are explicitly mentioned in the monitoring report.

## 4 FIFTH PERIODIC VERIFICATION FINDINGS

The verifier can confirm that the published MR and related documents are complete and verifiable in accordance with the JI requirements. All the findings raised by the verification team, the responses by the PPs and the conclusion from the team are presented in Annex C. The means of verification and resulting changes in the MR or related documents are identified in the following table:

<b>Action requested to project participants (incl. CAR, CL or FAR)</b>	<b><i>Summary of project owner response</i></b>
<b>FAR 01</b> The Annex 1 in the MR for the next periodic verification should be translated in English – extremely helpful for foreign verifiers.	



## 5 VERIFICATION STATEMENT

Green and Fair has performed the Fifth periodic verification of the emission reductions the JI project „New cogeneration power station for combined production of heat and electricity in District Heating Bourgas, Bulgaria, UNFCCC JI Reference Number BG1000153. The order comprises the Fifth periodic verification and is related to emission reductions achieved during 01 January 2012 to 30 November 2012. The verification is based on the currently valid documentation of the UN Framework Convention on Climate Change (UNFCCC).

The cogeneration installation is used for producing of heat and electrical energy. The produced energy is sold to the residences, municipal and industrial customers of city of Bourgas. The management of DHC Burgas JSC is responsible for the preparation of the GHG emissions data and the reported GHG emission reductions. A document review, followed by a site visit was conducted to verify the information submitted by the project participant regarding the present verification period. Based on the assessment carried out, the verifier confirms the following: the project has been implemented and operated in accordance with the description given in the registered PDD (Project Design Document Version 2 of March 2006), and amendment to the determination.

The verifier can confirm that the GHG emission reduction for the whole monitoring period is calculated *without material misstatements*. Our opinion relates to the project's GHG emissions and resulting GHG emissions reductions reported and related to the valid and registered project baseline and monitoring plan, and its associated documents. Based on the information we have seen and evaluated we confirm the following statement:

**Reporting period:** Assessment and evaluation per 01-01-2012 to 30-11-2012

**Verified baseline emissions, project emissions and emission reductions:**

Year	30 <sup>th</sup> of November 2012
Baseline emissions	122 911 t CO <sub>2eq</sub>
Project emissions	65 532 t CO <sub>2eq</sub>
Emission reductions	57 379 t CO <sub>2eq</sub>

Based on the information we have seen and evaluated, we confirm that the implementation of the project resulted in total 57,379 t CO<sub>2e</sub> of ERUs during the verification period 01-01-2012 to 30-11-2012.

The project has continuously generated emission reductions as JI project in the Fifth periodic verification of the first commitment period of the Kyoto Protocol from 2008 to 2012 in accordance with the National Guidelines of the Bulgarian Designated Focal Point for generation of Emission Reduction Units under Track I of the "Joint Implementation" mechanism under Article 6 of the Kyoto Protocol.

Sofia, 14.12.2012  
Evgeni Sokolovski

Lead verifier



Rumiana Kitipova

Chief Executive Officer



## 6 APPENDIXES

### Appendix A: List of documents reviewed

#### Category A documents (documents from the PP)

1. Letter of Approval by the Bulgarian Ministry for Environment and Water
2. Licence for Thermal Energy production
  - Licence for Thermal energy Transportation
  - Decision P-036/17.04,2006 for changing of existing Licence for Thermal Energy
  - Production and including Electricity Production
3. Letter to Danish Energy Agency explaining the delay in project implementation
4.
  - Permit for operation of constructed Installation for combined production of electrical and thermal energy in DHC Bourgas
  - Report from the State commission for establishing the conditions to operate
  - Installation for combined production of electrical and thermal energy in DHC Bourgas
  - Report for 72-hours tests
  - Act to establish the suitability to operate and accept construction works
5.
  - Contract for sale of electrical energy between DHC Bourgas and NEK
  - Contract for connecting to grid of independent producer of electrical energy
6. Equipment purchasing contracts
7. General layout plan, Scheme of DHC Bourgas, Scheme of the natural gas supply system, Schemes of electricity system
8. Financial documents: Investment reference. Inventory records, Invoice for purchasing of equipment, accountancy balance, Income report, Report for change of own capital for 2007, Explanatory notes to the financial report for 2007, report from independent financial auditor
9. Contract with Bulgar gas, prognosis for gas supply, monthly invoices, monthly reports for the consumed natural gas. Limit cards for accounting of the consumed natural gas (monthly), Monthly reports for the consumed natural gas in the plant facilities
10. Report for the main production and technical parameters for the combined production in DHC Bourgas, Report for the consumed fuel in DHC Bourgas, Electricity generated by DHC Bourgas (total). Electricity generated by each of the co-generation units (monthly) - a set of these documents b prepared for each month
11. Electricity diagram. List of the electricity measuring points, Heat diagram and list of the heat measuring points, Set of monthly (i) Report for electricity parameters, (ii) Production data, (iii) natural gas consumption protocol and certificate for the composition of natural gas for the period
12. Invoices NEK and monthly reports for produced/consumed electricity for the period
13. Instruction for monitoring, reporting and responsibilities for reporting of natural gas data, rev. 03
14. Monthly management review reports

15. Decision for issuing of IPPC permit 33/2005 and decision for updating of IPPC permit 33/2007
16. Training program and training records
17. Information from Bulgar gas about methods and equipment used for determination of gas composition (including LCV), Contract with Unisist Engineering for design and construction of new central gas metering point
18. Calibration records
19. Report for the monthly electricity consumption and production for the period 01.01.2012 – 30.11.2012, Work hours of the boilers and fuel consumption
20. Instruction for the operation of installation for combined production of electricity and heat
21. Instruction for the operation of gas regulating point
22. Heavy fuel oil inventory and other data: Report for conducted inventory of the available on stock heavy fuel oil in DHC Bourgas for the period 01.01.2012 – 30.11.2012, accountancy records.
23. Maintenance program
24. Technical parameters of the co-generation units
25. Monitoring report December 2012
26. Instruction for quality control and methodology for calculation and processing of data related to estimation of emission reductions with plans showing the locations of metering devices.
27. "Opinion on the Post Determination" (Statement) Changes made to new cogeneration power station for combined production of heat and electricity in District Heating Bourgas, Bulgaria., TÜV Rheinland Report No.21212062, Revision 1.1 dated 17th June 2010.
28. DHC Bourgas Report titled "Changes made in the JI project "New cogeneration power station for combined production of heat and electricity in District Heating Bourgas, Bulgaria"", dated 16th June 2010.

**Category B documents (other documents referenced)**

1. PDD "New cogeneration power station for combined production of heat and electricity in District Heating Bourgas, Bulgaria". version 2, March 2006
2. Determination report TUV SUD 748 648, revision 01, 03 May 2006
3. ACMOQ02 Consolidated Baseline Methodology for grid-connected electricity generation from renewable sources, Version 07
4. AMS I.D, Simplified baseline and monitoring methodology for small scale CDM project activity - Grid connected renewable electricity generation, Version 13
5. Guidelines for users of the Joint Implementation Project Design Form
6. Guidance on Criteria for Baseline Setting and Monitoring
7. "Baseline Study of Joint Implementation projects in the Bulgarian Energy Sector-  
[http://www.moew.government.bg/recent\\_doc/international/climate/carbon\\_emission\\_joint.pdf](http://www.moew.government.bg/recent_doc/international/climate/carbon_emission_joint.pdf)
8. REPUBLIC OF BULGARIA, MINISTRY OF ENVIRONMENT AND WATER, EXECUTIVE ENVIRONMENT AGENCY: NATIONAL INVENTORY REPORT 2012 for Greenhouse Gas Emissions, Submission under the UNFCCC and the Kyoto Protocol, dated April, 2012
9. NEK-EAD file: Baseline CEF Report "BASELINE STUDY OF JOINT IMPLEMENTATION PROJECTS IN THE BULGARIAN ENERGY SECTOR, CARBON EMISSION FACTOR" (2005)
10. NEK-EAD: Baseline Carbon Emission Factor of Bulgarian Electricity and Heat Power System Co-gen file: Carbon Emission Factor 18.11.2005.xls

11.Approved baseline monitoring methodology AM0014/Version04 “Natural gas-based package cogeneration”

## Appendix B: List of persons interviewed

Name	Company	Position
Mr. Valyo Ducheve	DHC Bourgas	Executive Director, Member of the Board of Directors
Mr. Atanas Kumanov	DHC Bourgas	Managing Director Energy Production, Transportation and Distribution
Mrs. Tetyana Ducheve	DHC Bourgas	Head of Production and Technical Department
Mr. Georgi Kodzhebashev	DHC Bourgas	Chief Power Engineer
Mr. Boris Metodiev	Eko Analiz Ltd - consultant	Head Expert



## Appendix C: Green and Fair Verification Protocol

Table 1. Check list for verification

DVM Para-graph	Check item	Initial finding	Action requested to project participants (incl. CAR, CL or FAR)	Review of project participants' action	Conclusion
<b>Project approvals by Parties involved</b>					
90	Has the DFPs of at least one Party involved, other than the host Party, issued a written project approval when submitting the first verification report to the secretariat for publication in accordance with paragraph 38 of the JI guidelines, at the latest?	<b>Yes, Bulgaria and The Danish Energy Authority have issued LoAs based on the MOU between both countries.</b>	N/A	N/A	OK
91	Are all the written project approvals by Parties involved unconditional?	<b>Yes, they are</b>	N/A	N/A	OK
<b>Project implementation</b>					
92	Has the project been implemented in accordance with the PDD regarding which the determination has been deemed final and is so listed on the UNFCCC JI website?	<b>Yes The website of JISC is in preparation also for display of JI projects under Track 1, which is only under the responsibility of the host country's DFP.</b>	<b>See Verification Report, chapter 3.1</b>	<b>See Verification Report, chapter 3.1</b>	OK
93	What is the status of operation of the project during the monitoring period?	<b>The project operates since 15 December 2006.</b>	N/A	N/A	OK
<b>Compliance with monitoring plan</b>					
94	Did the monitoring occur in accordance with the monitoring plan included in the PDD regarding which the determination has been deemed final and is so listed on the UNFCCC	<b>The monitoring occurred in accordance with the monitoring</b>	<b>See Verification Report, chapter 3.4</b>	<b>See Verification Report, chapter 3.4</b>	OK



	JI website?	<b>plan.</b>			
<b>95 (a)</b>	For calculating the emission reductions or enhancements of net removals, were key factors, e.g. those listed in 23 (b) (i)-(vii) above, influencing the baseline emissions or net removals and the activity level of the project and the emissions or removals as well as risks associated with the project taken into account, as appropriate?	<b>When calculating the emission reductions all key factors have been considered.</b>	<b>See Verification Report, chapter 3</b>	<b>See Verification Report, chapter 3</b>	<b>OK</b>
<b>95 (b)</b>	Are data sources used for calculating emission reductions or enhancements of net removals clearly identified, reliable and transparent?	<b>The input data have been cross-checked with the raw data during the on-site assessment. The applied data sources are reliable and transparent.</b>	<b>See Verification Report, chapter 3</b>	<b>See Verification Report, chapter 3</b>	<b>OK</b>
<b>95 (c)</b>	Are emission factors, including default emission factors, if used for calculating the emission reductions or enhancements of net removals, selected by carefully balancing accuracy and reasonableness, and appropriately justified of the choice?	<b>The applied grid emission factors and other emission factors are from credible sources.</b>	<b>See Verification Report, chapter 3 The most conservative grid emission factors have been applied.</b>	<b>See Verification Report, chapter 3 The most conservative grid emission factors have been applied.</b>	<b>OK</b>
<b>95 (d)</b>	Is the calculation of emission reductions or enhancements of net removals calculated based on conservative assumptions and the most plausible scenarios in a transparent manner?	<b>The calculations are based on the monitored data, recorded from calibrated monitoring devices ex-post and from conservative parameters and data determined ex-ante.</b>	<b>See Verification Report, chapter 3</b>	<b>See Verification Report, chapter 3</b>	<b>OK</b>
<b>Revision of monitoring plan</b>					
	<i>Applicable only if monitoring plan is revised by project participants</i>				
<b>99 (a)</b>	Did the project participants provide an	<b>1.) According to the</b>	<b>See Verification</b>	<b>Amendment to the</b>	<b>OK</b>

	appropriate justification for the proposed revision?	<p><b>recommendations of the DFP of Bulgaria a revision of the applied grid emission factor has been proposed as an option to the used default value.</b></p> <p><b>2.) It is planned also to replace the current measuring of a value for the efficiency of the back-up boilers by a default value for the efficiency of these boilers based on approved baseline monitoring methodology AM0014</b></p>	<p><b>Report, chapter 3.4</b></p> <p><b>The most conservative grid emission factors have been applied. A revision from the default value to the local value has to be agreed by the Parties involved. The emissions of CH<sub>4</sub> and N<sub>2</sub>O from burning processes and emissions form CH<sub>4</sub> leakages are not included in the determined PDD</b></p>	<p><b>Determination were documented by TÜV Rheinland Immissionschutz und Energiesysteme GmbH in the report: "Opinion on the Post Determination" (Statement)</b></p> <p><b>Changes made to new cogeneration power station for combined production of heat and electricity in District Heating Bourgas, Bulgaria., Report No.21212062, Revision 1.1 dated 17th June 2010.</b></p>	
<b>99 (b)</b>	Does the proposed revision improve the accuracy and/or applicability of information collected compared to the original monitoring plan without changing conformity with the relevant rules and regulations for the establishment of monitoring plans?	<b>The revision would improve the specific accuracy..</b>	<b>See Verification Report, chapter 3 and DVM § 99 (a).</b>	<b>See Verification Report, chapter 3 and DVM § 99 (a).</b>	<b>OK</b>
<b>Data management</b>					
<b>101 (a)</b>	Is the implementation of data collection procedures in accordance with the monitoring plan, including the quality control and quality assurance procedures?	<b>Specific data collection procedures, quality control and quality assurance procedures</b>	<b>See Verification Report, chapter 3</b>	<b>See Verification Report, chapter 3</b>	<b>OK</b>

		have been defined by DHC Bourgas.			
<b>101 (b)</b>	Is the function of the monitoring equipment, including its calibration status, is in order?	The verification team has checked all monitoring devices and associated calibration protocols. Further improvements will be implemented.	See Verification Report, chapter 3	See Verification Report, chapter 3	OK
<b>101 (c)</b>	Are the evidence and records used for the monitoring maintained in a traceable manner?	Yes, the evidence and records used for the monitoring are maintained in a transparent manner and could be re-traced by the verification team.	See Verification Report, chapter 3	See Verification Report, chapter 3	OK
<b>101 (d)</b>	Is the data collection and management system for the project in accordance with the monitoring plan?	The data collection and the management system is in compliance with the monitoring plan and with the previous periodic verification.	See Verification Report, chapter 3	See Verification Report, chapter 3	OK

Table 2: List of CARs, CLs and FARs from desk review and on-site assessment

Table 2a: Initial List of Corrective Action Requests (CARs) for DHC Bourgas			
<i>Corrective Action Requests</i>	<i>Reference</i>	<i>Summary of project owner response</i>	<i>Determination/verification team conclusion</i>
NO			

<b>Table 2b: Initial List of Clarification Requests (CLs) for DHC Bourgas</b>			
<i>Clarification Request (CL)</i>	<i>Reference</i>	<i>Summary of project owner response</i>	<i>Determination/verification team conclusion</i>
<b>NO</b>			

<b>Table 2c: Initial List of Forward Action Requests (FARs) for DHC Bourgas</b>			
<b>Draft FARs provided by validation team</b>	<b>Reference</b>	<b>Summary of project owner response</b>	<b><i>Determination/verification team conclusion</i></b>
<b>FAR 01</b>  The Annex 1 in the MR for the next periodic verification should be translated in English – extremely helpfull for foreign verifires.			