



**The World Bank
Carbon Finance Unit**

**Determination on Monitoring Report
- for Year 2008 -**

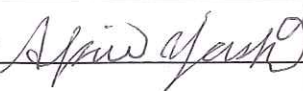
**5th Periodic Determination on Monitoring
of
Bulgaria Sofia District Heating Project**

June 4, 2009

JCI CDM Center

Report No. JCI-CDM-DOM-08-001

Revision No. 00

Date of first issue: June 4, 2009	Project No.: JCI-CDM-DOM-08-001
Approved by: YOSHIDA Akio 	Organisational unit: JCI CDM Center
Client: World Bank Carbon Finance Unit	Client ref.:

Summary:

After the desk review of the monitoring report for the period from January 1st 2008 until December 31st 2008, prepared by Toplofikacia Sofia JSC, which was submitted to JCI on February 25, 2009, JCI Assessment Team has done the on-site assessment of the 5th periodic determination on monitoring at Toplofikacia Sofia JSC, Sofia CHP Site, Sofia East CHP and Hadji Dimitar Heat Only Boiler, Sofia, Bulgaria during March 23 to March 24, 2009 for the Sofia District Heating Project.

The summary of this Periodic Determination on Monitoring through the on-site assessment is shown below and detailed in this report and the attachments.

1. It was confirmed that there were no remaining CARs and CLARs which have been addressed in the 1st ~ 4th Periodic Determination on Monitoring Report".



2. Total Project Emissions reductions (tonnes CO_{2e}):

Project Emissions reductions, amount **278,471 tonnes CO_{2e}** was determined appropriately for the period of January 1st 2008 until December 31st 2008, which is requested in the summary yearly results in the Data sheet of the Tracking Database Workbook of the monitoring report.

The yearly Project Emission Reductions are:

Year	ERs verified t CO _{2e}
2004	148,953
2005	238,978
2006	275,321
2007	262,210
2008	278,471
Total	1,203,933

3. Total Project Emission reductions (tonnes CO_{2e}) for the whole project monitored period 01.01.2004 to 31.12.2008 amount to **1,203,933 tonnes CO_{2e}**.

Report No.: JCI-CDM-DOM-08-001	Subject Group:
Report title: 5 th Periodic Determination on Monitoring of Bulgaria Sofia District Heating Project	
Work carried out by: SATO Hideyuki, OKADA Masaki  Vladimir Kanev	
Work verified by: SATO Hideyuki 	
Date of this revision:	Rev. No.: Number of pages: 13

Indexing terms

- ☒ No distribution without permission from the Client or responsible organizational unit
- ☐ Limited distribution
- ☐ Unrestricted distribution

Abbreviations

AAU	Assigned Amount Unit
CAR	Corrective Action Request
CDM	Clean Development Mechanism
CFU	Carbon Finance Unit, World Bank
CLAR	Clarification Request
CHP	Combined Heat and Power Plant
DHR	District Heating Region
EMS	Environment Management Plan
ER	Emission Reduction
ERU	Emission Reduction Unit
ERPA	Emission Reductions Purchase Agreement
FAR	Forward Action Request
GHG	Green House Gas
HOB	Heat Only Boiler
HP	Heat Plant
IE	Independent Entity
IETA	International Emission Trading Association
JCI	Japan Consulting Institute
MMS	Management and Monitoring System
MP	Monitoring Plan
PAD	Project Appraisal Document
PCF	Prototype Carbon Fund
PDD	Project Design Document
PT	Performance Test
QA	Quality Assurance
QC	Quality Control
RIOS	Regional Environmental Inspection
TOR	Terms of Reference
TS	Toplofikacia Sofia JSC
UNFCCC	United Nations Framework Convention for Climate Change

<i>Table of Contents</i>	<i>Page</i>
1 INTRODUCTION	- 1 -
1.1 Objective	- 1 -
1.2 Scope	- 1 -
1.3 Description of the Project Activity	- 1 -
2 METHODOLOGY	- 3 -
2.1 Review of Documentation	- 3 -
2.2 Site Visits	- 4 -
2.3 Assessment	- 5 -
2.4 Reporting of Findings	- 5 -
3 DETERMINATION ON MONITORING FINDINGS	- 7 -
3.1 Remaining Issues, CARs, FARs from Previous Validation or Verification	- 7 -
3.2 Project Implementation	- 7 -
3.3 Completeness of Monitoring	- 7 -
3.4 Accuracy of Emission Reduction Calculations	- 7 -
3.5 Quality of Evidence to Determine Emission Reductions	- 7 -
3.6 Management System and Quality Assurance	- 8 -
4 PROJECT SCORE CARD	- 9 -
5 DETERMINATION ON MONITORING STATEMENT	- 11 -
6 REFERENCES	- 13 -

Annex 1: 5th Periodic Determination on Monitoring Checklist

Annex 2: Summary of On-site Assessment

1) Summary of On-site Assessment

2) Main Documents / Data List obtained during the On-site Assessment

Annex 3 Monitoring Report (2008) issued on February 23, 2009

Annex 4 Tracking Database Excel Workbook (2008) issued on February 20, 2009

1 INTRODUCTION

As an Applicant Independent Entity (AIE), Japan Consulting Institute (JCI) performed the 5th Periodic Determination on Monitoring of Bulgaria Sofia District Heating Project, receiving an order from CFU for the execution of a Periodic Determination on Monitoring on the project for the period January 1st 2008 until December 31st 2008. This Periodic Determination on Monitoring is performed on the basis of TOR of CFU and currently valid conditions of CDM / JI stated in Kyoto Protocol, Marrakech Accords and the decisions of JI Supervisory Committee.

Assessment Team

Team Leader	:	SATO Hideyuki
Team Member	:	OKADA Masaki
Team Member	:	Vladimir Kanev
Local Expert	:	Todor Donchev

1.1 Objective

Objective of the Periodic Determination on Monitoring is to review and verify whether all the project activities are implemented as planned, and are in accordance with the latest version of the PDD, issued on October 22, 2007, i.e., all the physical features of the project including monitoring system are in place and fully functional, project has been operated smoothly without any serious trouble, monitoring of the data has been carried out fairly and monitoring data reflects and covers for the whole monitored period all requirements of the latest PDD, and the GHG data of high quality have been collected and reported as originally planned through the period of January 1st 2008 to December 31st 2008 under a risk management at sufficient level.

1.2 Scope

JCI has performed the Periodic Determination on Monitoring of the Bulgaria Sofia District Heating Project according to the requirement of CFU set as part of the MP for this specific project. Progress of the project, establishment and implementation of the quality assurance system and the procedures of data management / control system have been assessed on site in accordance with the IETA / PCF Validation and Verification Manual / Check List. The monitoring data and the result of the Tracking Database Workbook calculation prepared by Toplofikacia Sofia as the basis of the assessment of the Periodic Determination on Monitoring Report has also been reviewed. Additionally, this Periodic Determination on Monitoring is based on currently valid documentation of UNFCCC. In this context, the relevant documents are the "Marrakech Accord" and the decision of COP/MOP.

1.3 Description of the Project Activity

Project Parties:	Bulgaria, The World Bank CFU
Title of project activity:	Bulgaria, Sofia District Heating Project
Project Entity:	Toplofikacia Sofia AD District Heating Company 23, Jastrebetz str. Sofia, Bulgaria TEL: +359 2 8593171 E-mail address: amarkova@toplo.bg Director: Ms. Anastasiya Markova

Location of the project activity: 1680 Sofia, Bulgaria

Outline of the Project

The aim of the project is to rehabilitate the district heating (DH) system in the city of Sofia by rehabilitating 60 km of pipes and replacement of pipe insulation (the total length of the DH system is 900 km), replacement of 10,000 substations, frequency control for the electric motors for the hot water supply pumps and installation of valves, compensators, heat exchanger and pumps, which supply heat to the individual consumers. The substations are being operated with modern controls and monitoring equipment that has resulted in increased operating efficiency of the DH system.

The goal of the project is to reduce heat losses and improve efficiency of the network so energy consumption will be reduced and to lower grid electricity consumption and hence reduce CO₂ emissions.

Those effects are planned to bring GHG emission reductions of total minimum 2,174,058 tonnes CO_{2e} as a result of the project activity through the project life, i.e., 2004 to 2012. (836,132 tCO_{2e} determined AAUs for the period 2004~2007 and 1,337,926 tCO_{2e} estimated ERU for 2008~2012)

2 METHODOLOGY

The IETA / PCF Validation and Verification Manual / Checklist are utilized to secure the transparency and credibility of the determination on monitoring. The Periodic Determination on Monitoring Checklist, reinforced with the additional items to cover the check points required to be verified specifically for the project, covers following items and helps the assessment team to perform the work with high degree of credibility.

Areas covered by the checklist

- (1) Required Basic data
- (2) Data Management System / Controls
- (3) GHG calculation procedures and management control testing
- (4) Detailed audit testing of residual risk areas and random testing

The Periodic Determination on Monitoring Checklist is utilized as follows

- (1) Systemizing, detailing and clarifying the conditions of Emission Reduction Purchasing
- (2) Securing the transparency of the determination on monitoring process on the documentation of the result.
- (3) Securing the credibility of the determination on monitoring based on the designated standard.

First of all, the desk review was performed based on the following monitoring report prepared by Toplofikacia Sofia which was submitted on February 25, 2009.

- (1) The report for 2008 with data according to the latest MP of the Project, including its new requirements
- (2) The result of the Tracking Database Workbook calculation

After the desk review, the On-site Assessment was performed.

Duration of the determination

Desk review: From March 2, 2009 to March 20, 2009

On-site Assessment: From March 23, 2009 to March 24, 2009

Reporting: From April 02, 2009 to May18, 2009

2.1 Review of Documentation

Following documents and data are reviewed in order to verify the project activities at the desk review and the site.

- (1) Monitoring report
- (2) Organization Chart

- (3) Technological charts for distribution network, gas and heavy oil fuel supply and electricity generation/consumption and steam generation/distribution
- (4) Management Manual/Instructions
- (5) Calibration and maintenance record of key instruments
- (6) General information about operation of CHP, HP and HOB of TS
- (7) General information on data collection and billing from substations
- (8) Tracking Database Workbook
- (9) Actual operation results of CHP
- (10) Actual operation results of HP
- (11) Actual operation results of TS
- (12) Total amount of steam supplied for Heating
- (13) Total amount of generated electricity
- (14) Key input data
- (15) Manual input data
- (16) Training record of operators
- (17) Emergency plan

2.2 Site Visits

Assessment team has visited the site for On-Site Assessment from March 23 to March 24, 2009. The objectives of the assessment is to verify that the project is implemented, monitored and reported as planned.

The interviewed persons at the site are described in following Table 2.1 and the Summary of the On-site Assessment in Annex 2.

Table 2.1 List of Interviewed Persons

	Organization	Name of person	Title
	Toplofikacia Sofia JSCo	Anastasiya Markova	PIU Manager, Director Electric and Heat Production
		Stefan Dochev	PCF Project Manager, Director
		Marina Popova	Head of Department
		Lyubomir Lyubomirov	Production Department Manager of Sofia CHP
		Vasil Alexsandrov	Electricity Production Manager of CHP Toplofikacia Sofia JSCo/ Sofia East CHP
		Petar Dimitrov	Director Sofia East District Heating and Director Sofia East CHP
		Vladimir Vodenicharski	Deputy Director SE DH and Deputy Director Sofia East CHP
		Nikola Goranov	Production Department Manager of CHP Toplofikacia Sofia JSCo/ Local Heat Only Boiler HOB Hadji Dimitar Site
		Tzvetan Popov	Director of HOB – the 3 sites – Hadji Dimitar, Suha Reka and Levski G
		Rumen Milenov	Manager HOB Hadji Dimitar

2.3 Assessment

The Assessment has been done as follows;

- (1) Investigation of whether all relevant equipment are operated properly, function as anticipated and are maintained fairly at randomly selected CHP Sofia, CHP Sofia East, HOB Hadji Dimitar and gas supply stations.
- (2) Confirmation that actual works for the Project have been executed and random check of operation/maintenance/calibration
- (3) Confirmation of environmental and social impacts.
- (4) Interviews with the Project management, QA manager and operating and maintenance staffs.
- (5) Observations in order to check the risks for inappropriate operation and data collection procedures.
- (6) Reviews on information flows for generating, aggregating /collecting and reporting the selected monitored parameters.
- (7) Check the monitoring report/annual reports data and the relevant raw data.
- (8) Comparison with the data inputted in the Tracking Database Workbook prepared by the person is in charged input and the operation data collected by the operators.
- (9) Re-calculation of GHG emission reductions by using the Tracking Database Workbook attached in the MP and the monitoring report /Workbook submitted on February 2, 2008.
- (10) Check the evidence to be provided by the project owners that demonstrates that all metering equipments are calibrated.
- (11) Auditing of the required procedures, routines, and documentations to check their proper application.
- (12) Assessment of all the data collection, analysis and transmission procedures all along the chain from the project facilities to CFU, in order to ensure that CFU receives relevant, complete and synthetic information to execute payments under the confidential Emission Reductions Purchase Agreement.
- (13) Check of external audit reports for TS for 2008
- (14) Verification of CARs and CLARs from the “1st ~ 4th Periodic Determination on Monitoring Report”

2.4 Reporting of Findings

Findings established during the assessment may be that:

- i) the determination on monitoring is not able to obtain sufficient evidence for the reported emission reductions or part of the reported emission reductions. In this case these emission reductions shall not be verified and certified;
- ii) the determination on monitoring has identified material misstatements in the reported emission reductions. Emission reductions with material misstatements shall be discounted based on the verifier’s ex-post determination of the achieved emission reductions.

A Forward Action Requests (FAR) should be issued, where:

- the actual project monitoring and reporting practices requires attention and /or adjustment for the next consecutive determination on monitoring period, or
- an adjustment of the MP is recommended.

In the context of FARs, risks have been identified, which may endanger the delivery of high quality AAUs and ERUs in the future, i.e. by deviations from standard procedures as defined by the MP. As a consequence, such aspects should receive a special focus during the next consecutive determination on monitoring. A FAR may originate from lack of data sustaining claimed emission reductions.

A Corrective Action Requests (CARs) should be issued, where:

- mistakes are made with a direct influence on emission reductions amount
- there is an unacceptable risk as a project or a risk that the emission reductions cannot be verified.

A Clarification (CLARs) should be issued, where:

- additional information is required to clarify an issue sufficiently.

3 DETERMINATION ON MONITORING FINDINGS

3.1 Remaining Issues, CARs, FARs from Previous Validation or Verification

It was confirmed that there are no remaining CARs and CLARs, which had been addressed in the “1st ~ 4th Periodic Determination on Monitoring Report” for TS, however one CAR for Letter of Approval by PCF as ANNEX 1 country is remaining, but it is a government issue.

3.2 Project Implementation

The following subjects were discussed.

- 1) Project implementation – execution of works, new heat pipes, conversion of heat source of HOB from heavy fuel oil to natural gas, and replacement of and new installation of substations.
- 2) Operating and Maintenance conditions
- 3) Equipment conditions
- 4) Calibration of measuring equipment procedures and execution

No findings were addressed for the project implementation and equipment conditions and no CARs or FARs were addressed.

3.3 Completeness of Monitoring

The following subjects were discussed.

- 1) Changes of heavy fuel oil supply to natural gas and its implication on monitoring data
- 2) Role and performance of Quality Manager

All requirements are fulfilled and no CARs, FARs or CLARs were addressed.

3.4 Accuracy of Emission Reduction Calculations

The following subjects were discussed.

- 1) Data input and data transfer procedures and input data errors
- 2) Tracking Database Worksheets and monthly and annual data calculations

No CARs or FARs were addressed.

3.5 Quality of Evidence to Determine Emission Reductions

The following subjects were discussed.

- 1) Check of the input data, the operation data and the source data
- 2) Check of the daily log sheets and monthly records and digital data logs.

All requirements fulfilled and no CARs, FARs and CLARs were addressed.

3.6 Management System and Quality Assurance

The following subjects were discussed.

- 1) Organization chart, responsibilities and roles, changes of responsible persons
- 2) Data flow diagrams
- 3) External audits

No CARs or FARs were addressed

4 PROJECT SCORE CARD

Project Scorecard shows the conclusion of risk analysis for the Periodic Determination on Monitoring in the following Table 4.1.

Table 4.1 Project Score card

Objectives	Key aspects for Determination on Monitoring	Scope of Sampling	Results of data review	Conclusion
Emission Sources	Completeness	All sources	Monthly Protocols for all Emission sources during 2008 1) Heat Sold (Hot water) 2) Steam Sold 3) Generated Electricity 4) Gas Consumption 5) Oil Consumption 6) Makeup Water	OK Risk Level: LOW
Calculation Equation	Conformity	All Equations	All Equations are defined and protected in the excel sheet of Tracking database and therefore, the calculations are executed by the excel sheet of Tracking database.	OK Risk Level: LOW
Default Values, Emission Coefficients	Conformity	All values	All default values and Emission Coefficients are checked and confirmed the conformity with official published data.	OK Risk Level: LOW
	Accuracy	All values	Ditto	OK Risk Level: LOW
Monitored data	Accuracy	Sampling from all data	Monthly Protocols for all Monitored data during 2008 are checked. Those data are the sum of hourly/daily data and are managed as commercial dealing purpose with cross checked. 1) Heat Sold 2) Steam Sold 3) Generated Electricity 4) Gas Consumption 5) Oil Consumption 6) Makeup Water	OK Risk Level: LOW
	Substantiality	Sampling from all	Monthly Protocols for all Emission sources during 2008	OK

Objectives	Key aspects for Determination on Monitoring	Scope of Sampling	Results of data review	Conclusion
		data	are checked. Hourly/Daily records are checked with sampling and obtained the copies of those. 1) Heat Sold 2) Steam Sold 3) Generated Electricity 4) Gas Consumption 5) Oil Consumption 6) Makeup Water	Risk Level: LOW
	Completeness	All data	Ditto	OK Risk Level: LOW
Calculation in the Monitoring Report	Accuracy	All calculation	No were found in the input data to the Tracking Database	OK Risk Level: LOW
Numerical values in the Monitoring Report	Accuracy	All values	No errors were found in the input data to Tracking data base	OK Risk Level: LOW

5 DETERMINATION ON MONITORING STATEMENT

Introduction

JCI has been engaged by the CFU to examine the greenhouse gas (GHG) emission reductions reported from Toplofikacia Sofia for the period January 1, 2008 to December 31, 2008, equating to 278,471 tonnes of CO₂ equivalents.

Our opinion relates to the project's GHG emissions and resulting GHG emissions reductions reported for the stated period ended December, 2008.

Responsibilities of Toplofikacia Sofia and JCI

The management of the Toplofikacia Sofia JSC is responsible for the preparation of the GHG emissions data and the reported GHG emissions reductions on the basis set out within the project Monitoring and Determination on monitoring Plan dated October, 2007 and its subsequent revision. The development and maintenance of records and reporting procedures in accordance with that plan, including the calculation and determination of GHG emission reductions from the project is the responsibility of the management of Toplofikacia Sofia JSC.

It is JCI's responsibility to express an independent GHG verification opinion on the GHG emissions from the project for the period January 2008 ~ December 2008, which ended December, 2008 and on the calculation of GHG emission reductions from the project for the above period ended December, 2008 based on the verified emissions for the above period from January 1, 2008 until December 31, 2008.

Basis of GHG determination on monitoring opinion

JCI's determination on monitoring approach was based on the requirements as defined under the Kyoto Protocol, Marrakech accord, as well as those defined by the CDM Executive Board/JI Supervisory Committee, COP/MOP.

JCI's approach is risk-based, drawing on an understanding of the risks associated with reporting GHG emissions data and the controls in place to mitigate these. JCI's examination includes assessment, on a test basis, of evidence relevant to the amounts and disclosures in relation to the project's GHG emission reductions for the period from January 1, 2008 until December 31, 2008.

We planned and performed our work to obtain the information and explanations that we considered necessary to provide sufficient evidence for us to give reasonable assurance that the amount of GHG emission reductions for the above period, prepared on the basis of the MP dated October 22, 2007, are fairly stated.

We conducted our determination on monitoring having regard to the Project Design Document Version 3 including Sofia District Heating Project's MP dated October 22, 2007. This assessment includes:

- collection of evidence supporting the reported data
- checking whether the provisions of the MP dated October 22, 2007, were consistently and appropriately applied

We have verified whether the information from Toplofikacia Sofia is current and has been correctly extracted from the Project Design Document. And we have verified whether the emissions reduction achieved has been determined correctly.

Opinion

Based on the information we have seen and evaluated.

It is our opinion that the amount of **278,471 tonnes of CO2 equivalents** indicated in the monitoring report during the period of January 1, 2008 to December 31, 2008 can be justified appropriately as the result of the Periodic Determination on Monitoring.

6 REFERENCES

List of the Main Documents / Data provided by Toplofikacia Sofia during the on-site Assessment is as follows.

1.	Monitoring Report (25 February, 2009) with Annex-Tracking database for 2008
2.	Organization Chart of TS
3.	Project Dataflow chart
4.	Layout Drawings three(3) sets for the three HOB reconstruction to gas fuel
5.	Order No. 388/13.11.2008 for changes in the Working Group for the Project
6.	Order No. 57/07.03.2008 for assignment of Quality Manager for the Project
7.	The record of external Audit by Grand Thornton for the Loan from EBRD for the Sofia District Heating Rehabilitation Project.
8.	The record of external Audit by Grand Thornton for the Loan from IBRD for the Sofia District Heating Rehabilitation Project.
9.	Copy of Tracking database sheet for December 2008, signed by Quality Manger
10.	Monthly records for fuel purchase January – December 2008
11.	Monthly records for heat production January – December 2008
12.	Monthly record for electric energy consumption January – December 2008
13.	Monthly record for electric energy production by TS January – December 2008
14.	Order for calibration and annual check of measuring equipment by National Agency for Metrology and Measurements
15.	Certification of the electric meter of gross electricity for Sofia CHP and Sofia East CHP, for gas flow meters in HOB Hadji Dimitar and Sofia CHP, heat meters in Sofia CHP, water consumption in Sofia CHP

- o0o -

Annex 1 Checklist for “5th Periodic Determination on Monitoring of Sofia District Heating Project in Bulgaria”**PERIODIC DETERMINATION ON MONITORING CHECKLIST****Introduction**

This document contains a generic Periodic Verification Checklist for **“5th Periodic Determination on Monitoring of Sofia District Heating Project in Bulgaria”**, which is in relation to the Initial Verification Report.

This periodic Determination on Monitoring checklist ensures a transparent periodic Determination on Monitoring process to document how emission reductions have been verified and the conclusion that have been reached.

This checklist is used and viewed to make sure that the emissions/performance reporting system is in compliance with the project’s monitoring plan, and to identify all issues that may cause risk for material misstatement of emission reductions.

This checklist is prepared in accordance with the, “Validation and Verification Manual (VVM)”, given by IETA, but the list is customized specifically for the project by the verifier.

Table 1 Data Management System/Controls

The project operator’s data management system/controls are assessed to identify reporting risks and to assess the data management system’s/control’s ability to mitigate reporting risks. The GHG data management system/controls are assessed against the expectations detailed in the table. The score in the Table 1 is assigned as follows:

- Full - all best-practice expectations are implemented.
- Partial - a proportion of the best practice expectations is implemented
- Limited - this should be given if little or none of the system component is in place.

Annex 1 Check for Basic Information of monitored data

Annex 1 Checklist for “5th Periodic Determination on Monitoring of Sofia District Heating Project in Bulgaria”

Table 1 Data Management System/Controls			Draft Con- clusion	Final Con- clusion
Expectations for GHG data management system/controls	Score	Verifiers Comments		
1. Defined organisational structure, responsibilities and competencies				
1.1. Position and roles <i>Position and role of each person in the GHG data management process is clearly defined and implemented, from raw data generation to submission of the final data. Accountability of senior management must also be demonstrated.</i>	Full	1) Position and role is indicated in Operational Instruction. English version of Operational Instruction, which is requested as Quality Management Manual to WB/CFU is provided. Management and responsibilities, including quality control manager defined with an order of the Executive Director. Changes in the personnel in 2008 again executed with an order of the Executive Director and copies obtained.	OK	OK
		2) Discussions for transfer of the Municipality shares in the Company to the state and making the company fully stated owned started in September 2008. The actual transfer and transformation has been concluded in 23 January 2009. There are no changes in the management even after that.		
		3) Data Flow/ Organization chart including role and responsibilities of heat, electricity, fuel gas and oil for the Project is clearly documented. Changes from heavy fuel oil to gas supply in HOB documented and copies obtained.	OK	OK
1.2. Responsibilities <i>Specific monitoring and reporting tasks and responsibilities are included in job descriptions or special instructions for employees.</i>	Full	Same as 1.1 – 1 and 2)	OK	OK
		Same as 1.1 – 3)	OK	OK

Annex 1 Checklist for “5th Periodic Determination on Monitoring of Sofia District Heating Project in Bulgaria”

Table 1 Data Management System/Controls			Draft Con- clusion	Final Con- clusion
Expectations for GHG data management system/controls	Score	Verifiers Comments		
1.3. Competencies needed <i>Competencies needed for each aspect of the GHG determination process are analysed. Personnel competencies are assessed and training programme implemented as required.</i>	Full	<p>The training program was executed in accordance with the Regulation No.9.</p> <p>The records of training of staff were confirmed. Training for newly installed electric meters at installation and new substations was confirmed.</p>	OK	OK
2. Conformance with monitoring plan				
2.1. Reporting procedures <i>Reporting procedures should reflect the monitoring plan content. Where deviations from the monitoring plan occur, the impact of this on the data is estimated and the reasons justified.</i>	Full	Reporting procedures are in compliance with the Monitoring plan and Control Manager has checked all reporting documents. There are no deviations from the monitoring plan. Fuel change from heavy fuel oil to gas for the HOB does not change the monitoring procedure and plan. should reflect the monitoring plan content, where deviations from the monitoring plan occur.	OK	OK
2.2. Necessary Changes <i>Necessary changes to the monitoring plan are identified and changes are integrated in local procedures as necessary.</i>	Full	It is confirmed that the current changes in Monitoring Plan are integrated in actual Monitoring System and the Tracking Database.	OK	OK
3. Application of GHG determination methods				
3.1. Methods used <i>There are documented description of the methods used to determine GHG emissions and justification for the chosen methods. If applicable, procedures for capturing emissions from non-routine or exceptional events are in place and implemented.</i>	Full	The Tracking Database which is provided and revised by PöYRY is used to determine GHG emissions in appropriate manner.	OK	OK

Annex 1 Checklist for “5th Periodic Determination on Monitoring of Sofia District Heating Project in Bulgaria”

Table 1 Data Management System/Controls			Draft Con- clusion	Final Con- clusion
Expectations for GHG data management system/controls	Score	Verifiers Comments		
3.2. Information/process flow <i>An information/process flow diagram, describing the entire process from raw data to reported totals is developed.</i>	Full	(Same as 1.1 – 3))	OK	OK
3.3. Data transfer <i>Where data is transferred between or within systems/spreadsheets, the method of transfer (automatic/manual) is highlighted - automatic links/updates are implemented where possible. All assumptions and the references to original data sources are documented.</i>	Full	Input data to the Tracking Database was checked and traced based on the monthly Protocol records, compared with the introduced monthly data gathering and calculation sheets, for all data of electric power, Heat sold, and gas/oil consumption, and data of makeup water. There were no errors found. The invoiced quantities for gas for January and February differ from the monthly consumption protocols, however the difference from January is compensated with the February invoice. The tracking database and input data correspond to the actual consumption.	OK	OK
3.4. Data trails <i>Requirements for documented data trails are defined and implemented and all documentation are physically available.</i>	Full	Same as 3.3	OK	OK
4. Identification and maintenance of key process parameters				
4.1. Identification of key parameters <i>The key physical process parameters that are critical for the determination of GHG emissions (e.g. meters, sampling methods) are identified.</i>	Full	It is confirmed that the key physical process parameters are identified because the Tracking Database sheet is used in appropriate manner.	OK	OK

Annex 1 Checklist for “5th Periodic Determination on Monitoring of Sofia District Heating Project in Bulgaria”

Table 1 Data Management System/Controls			Draft Con- clusion	Final Con- clusion
Expectations for GHG data management system/controls	Score	Verifiers Comments		
4.2. Calibration/maintenance <i>Appropriate calibration/maintenance requirements are determined.</i>	Full	It is confirmed that the calibration/maintenance requirements are determined in appropriate manner by the Certification records and calibration plan. Physical check on calibration marks on measuring equipment was performed and documented with photos.	OK	OK
5. GHG Calculations				
5.1. Use of estimates and default data <i>Where estimates or default data are used, these are validated and periodically evaluated to ensure their ongoing appropriateness and accuracy, particularly following changes to circumstances, equipment etc. The validation and periodic evaluation of this is documented.</i>	Full	It is confirmed that the default data are used and determined in appropriate manner by the official records.	OK	OK
5.2. Guidance on checks and reviews <i>Guidance is provided on when, where and how checks and reviews are to be carried out, and what evidence needs to be documented. This includes spot checks by a second person not performing the calculations over manual data transfers, changes in assumptions and the overall reliability of the calculation processes.</i>	Full	Systematical checking procedure for input data is well established. Quality Control Manager is assigned for the Project.	OK	OK
5.3. Internal verification <i>Internal verifications include the GHG data management systems, to ensure consistent application of calculation methods.</i>	Full	Data read out and transfer is cross checked by the accounting department and used later for the tracking database data. Conversion from heavy fuel oil to gas in the HOBs has been pointed out by the Project manager and how it has influenced the Project, and that it is in conformity with the Monitoring plan.	OK	OK

Annex 1 Checklist for “5th Periodic Determination on Monitoring of Sofia District Heating Project in Bulgaria”

Table 1 Data Management System/Controls			Draft Con- clusion	Final Con- clusion
Expectations for GHG data management system/controls	Score	Verifiers Comments		
5.4. Internal validation <i>Data reported from internal departments should be validated visibly (by signature or electronically) by an employee who is able to assess the accuracy and completeness of the data. Supporting information on the data limitations, problems should also be included in the data trail.</i>	Full	It is confirmed that the data reported from internal departments was validated by signature by an employee with the evidential documents.	OK	OK
5.5. Data protection measures <i>Data protection measures for databases/spreadsheets should be in place (access restrictions and editor rights).</i>	Full	It is confirmed that the protection measures for the Tracking Databases is in place in appropriate manner. Access restrictions are managed by password.	OK	OK
5.6. IT systems <i>IT systems used for GHG monitoring and reporting should be tested and documented.</i>	Full	It is confirmed that the GHG monitoring data is managed by the computer logging system in appropriate manner.	OK	OK
6. Management and Operational System <i>In order to ensure a successful operation of a Client project and the credibility and verifiability of the ERs achieved, the project must have a well defined management and operational system.</i>				
6.1. Emergency Procedure <i>The system should contain procedures which provide emergency concepts in case of unexpected problems with data access and/or data quality.</i>	Full	It is confirmed that the emergency procedure is established based on the request of the Initial Verification Report.	OK	OK
6.2. Data Archiving <i>The system should provide routines for the archiving of all data which is required for verifying the project's performance in the context of consecutive verifications.</i>	Full	It is confirmed that the data archiving procedure including CD Disk backup system is established at onsite assessment and based on the request of the Initial Verification Report.	OK	OK

Annex 1 Checklist for “5th Periodic Determination on Monitoring of Sofia District Heating Project in Bulgaria”

Table 1 Data Management System/Controls			Draft Con- clusion	Final Con- clusion
Expectations for GHG data management system/controls	Score	Verifiers Comments		
6.3. Monitoring Report <i>The system includes procedures for the calculation of emission reductions and the preparation of the monitoring report.</i>	Full	<p>It is confirmed that the system fully satisfies the requirements and the needs for the proper calculation of the emission reductions and the preparation of the monitoring report.</p> <p>There are no mistakes in the monitoring report.</p>	OK	OK
6.4. External Audit	Full	<p>There are two external financial audits for the Project for “Toplofikacia Sofia District Heating Rehabilitation Project” for the financing institutions – the IBRD and the EBRD for the period January – August 2008. The copies obtained confirm that data handling work and monthly protocol records are processed in reliable manner, since these data form part of the accounting statements, checked by the audit.</p> <p>It is confirmed that the TS have the external audits from the State Energy and Water Regulation Commission (SEWRC) and for finance audit including technical operational data. In addition, all monthly data submitted as protocol/statement are cross checked. Therefore data handling work and the monthly protocol records of TS is basically evaluated as processed in reliable manner.</p>	OK	OK
7. Environmental and Social Effects <i>A Monitoring Plan may comprise environmental and/or social indicators which could be necessary to monitor for the success of the project activity.</i>				

Annex 1 Checklist for “5th Periodic Determination on Monitoring of Sofia District Heating Project in Bulgaria”

Table 1 Data Management System/Controls			Draft Con- clusion	Final Con- clusion
Expectations for GHG data management system/controls	Score	Verifiers Comments		
7.1. Implementation measures <i>A project activity may demand for the installation of measures (e.g. filtering systems or compensation areas), which are exceeding the local legal requirements. A check of the implementation or realization of such measures should be part of the initial verification.</i>	Full	<p>Environmental improvement effect is achieved through the substitution of the heavy fuel oil with gas in the Heat only boilers, which is an additional effect to the implementation of the Project.</p> <p>The Joint Implementation Project does not address environmental issues or concerns, however being part of the Toplofikacia Sofia District Heating Rehabilitation Project, the environmental goals and public opinion have been checked and verified as adequate.</p>	OK	OK


Annex 1 Checklist for “5th Periodic Determination on Monitoring of Sofia District Heating Project in Bulgaria”

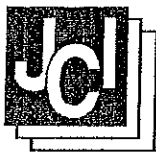
Annex 1 Check for Basic Information of monitored data

Objectives	Key aspects for Determination on Monitoring	Scope of Sampling	Results of data review	Conclusion
Emission Sources	Completeness	All sources	Monthly Protocols for all Emission sources during 2008 are checked. 1) Heat Sold (Hot water) 2) Steam Sold 3) Generated Electricity 4) Gas Consumption 5) Oil Consumption 6) Makeup Water	OK Risk Level: LOW
Calculation Equation	Conformity	All Equations	All Equations are defined and protected in the excel sheet of Tracking database and therefore, the calculations are executed by the excel sheet of Tracking database.	OK Risk Level: LOW
Default Values, Emission Coefficients	Conformity	All values	All default values and Emission Coefficients are checked and confirmed the conformity with official published data.	OK Risk Level: LOW
	Accuracy	All values		OK Risk Level: LOW
Monitored data	Accuracy	Sampling from all data	Monthly Protocols for all Monitored data during 2008 are checked. Those data are the sum of hourly/daily data and are managed as commercial dealing purpose with cross checked. 1) Heat Sold 2) Steam Sold 3) Generated Electricity 4) Gas Consumption 5) Oil Consumption 6) Makeup Water	OK Risk Level: LOW

Annex 1 Checklist for “5th Periodic Determination on Monitoring of Sofia District Heating Project in Bulgaria”

Objectives	Key aspects for Determination on Monitoring	Scope of Sampling	Results of data review	Conclusion
	Substantiality	Sampling from all data	Monthly Protocols for all Emission sources during 2008 are checked. Hourly/Daily records are checked with sampling and obtained the copies of those. 1) Heat Sold 2) Steam Sold 3) Generated Electricity 4) Gas Consumption 5) Oil Consumption 6) Makeup Water	OK Risk Level: LOW
	Completeness	All data	Ditto	OK Risk Level: LOW
Calculation in the Monitoring Report	Accuracy	All calculation	No errors found	OK Risk Level: LOW
Numerical values in the Monitoring Report	Accuracy	All values	No errors found	OK Risk Level: LOW

	5th Periodic Determination on Monitoring under the JI Summary of On-Site Assessment	
	Project Name	Bulgaria Sofia District Heating Project
	Duration for the On-site Survey	March 23 – March 24, 2009
	Place	1. Meeting Room of Toplofikacia Sofia Office 2. On-site Survey in Sofia CHP Station Site, Sofia East CHP and Local Heat Only Boiler Hadji Dimitar Site
	Verification Team	JCI CDM Center / Vladimir Kanev /Team Member Todor Georgiev Donchev/ Bulgarian Expert
Project Participant	Toplofikacia Sofia JSCo/ Anastasiya Markova / PIU Manager, Director Electric and Heat Production Stefan Dochev/ PCF Project Manager, Director Marina Popova/ Head of Department Toplofikacia Sofia JSCo/ Sofia CHP Lyubomir Lyubomirov/Production Department Manager of CHP Vasil Alexsandrov/Electricity Production Manager of CHP Toplofikacia Sofia JSCo/ Sofia East CHP Petar Dimitrov/Director Sofia East District Heating and Director Sofia East CHP Vladimir Vodenicharski/ Deputy Director SE DH and Deputy Director Sofia East CHP Nikola Goranov/Production Department Manager of CHP Toplofikacia Sofia JSCo/ Local Heat Only Boiler (LHOB) Hadji Dimitar Site Tzvetan Popov/Director of LHOB – the 3 sites -- Hadji Dimitar, Suha Reka and Levski G Rumen Milenov/Manager LHOB Hadji Dimitar	
Stake holders	Toplofikacia Sofia JSCo	
Findings by Verification Team		
<p>Verification(Monitoring Determination) Team has done the On-site Assessment of the 5th (2008) Periodical Verification at Toplofikacia Sofia (TS) Site, Bulgaria during March 23 and 24, 2009 for the Bulgaria Sofia and Pernik District Heating Project.</p> <p>The summary of the findings by the Verification Team through the On-site Assessment are shown below.</p> <p>1. It was confirmed that there are no remaining CARs and CLARs which have been addressed in the 1st-4th Verification Report for TS, however one CAR for Letter of Approval by PCF as ANNEX I country is still remaining, being government policy issue.</p>		

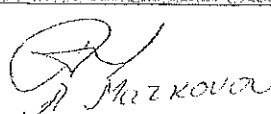



5th Periodic Determination on Monitoring under the JI Summary of On-Site Assessment

2. At the time of assessment the TS is 100% Government owned, and municipality shares have been transferred to the Government on 23 January 2009, however the discussions started in September 2008. There are no changes in the management and operation in TS in 2008.
3. The Project support and monitoring team has undergone changes of two members, properly endorsed by the TS Management.
4. TS have changed the fuel of the three Local Heat Only Boilers, according to plan, from heavy fuel oil to natural gas. The changes are reflected in the design documentation. TS have replaced 1 149 substations to new ones under the Project and additional new ones are installed in the newly constructed buildings. Under the Project 2000 m of heat supply pipes have been replaced and another 4 600 m for the account of TS.
5. Total Project Emissions reductions (tonnes CO_{2e});
Project Emissions reductions requested in the monitoring report, amount 278,471 ton CO_{2e} is verified as 278,471 ton CO_{2e} for the period of January 2008 to December 2008 which is indicated in the summary sheet of the Tracking Database for 2008.
6. Total Project Emission reductions (tonnes CO_{2e}) for the whole project monitored period 01.01. 2004 to 31.12.2008 amount to 1,203,933 ton CO_{2e}, which amount exceeds the ERPA agreed amount of 1,084,000 tonnes CO_{2e}.

Year	ER tonnes CO _{2e}
2004	148,953
2005	238,978
2006	275,321
2007	262,210
2008	278,471
Total	1,203,933

7. There are no other findings.

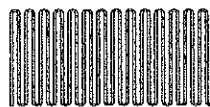
Signature of Project representative	Date	Signature Leader of Verification Team	Date
 A. MIZKOVA	7 April 2009		10 April 2009

Main Documents/Data List obtained during the On-site Assessment

No.	Documents	Obtained from
1.	Organization Chart of TS	TS
2.	Project Dataflow chart	TS
3.	Layout Drawings three(3) sets for the three HOB reconstruction to gas fuel	TS
4.	Order No. 388/13.11.2008 for changes in the Working Group for the Project	TS
5.	Order No. 57/07.03.2008 for assignment of Quality Manager for the Project	TS
6.	The record of external Audit by GrandThornton for the Loan from EBRD for the Sofia District Heating Rehabilitation Project.	TS
7.	The record of external Audit by GrandThornton for the Loan from IBRD for the Sofia District Heating Rehabilitation Project.	TS
8.	Copy of Tracking database sheet for December 2008, signed by Quality Manger	TS
9.	Monthly records for fuel purchase January – December 2008	TS
10.	Monthly records for heat production January – December 2008	TS
11.	Monthly record for electric energy consumption January – December 2008	TS
12.	Monthly record for electric energy production by TS January – December 2008	TS
13.	Order for callibration and annual check of measuring equipment by National Agency for Metrology and Measurments	
14.	Certification of the electric meter of gross electricity for Sofia CHP and Sofia East CHP, for gas flow meters in HOB Hadji Dimitar and Sofia CHP, heat meters in Sofia CHP, water consumption in Sofia CHP	TS



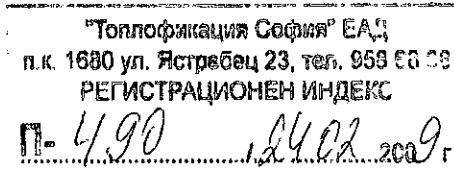
**TOPLOFIKACIA
SOFIA**



23, Jastrebetz str.
1680 Sofia
tel.: 958 68 08
fax: 859 70 15

To
MR. KARI HÄMEKOSKI
Sr. Technical Specialist,
Carbon Finance Unit (ENVCF), MSN MC 3-309
The World Bank Group
1818 H Street, NW, Washington, DC, 20433,

USA



Re: PCF – JI Monitoring Report for year 2008

**Joint Implementation Monitoring Report, Prototype Carbon Fund
SOFIA DISTRICT HEATING PROJECT**

Date: 23.02.2009
Sofia

Monitoring period

01.01.2008-31.12.2008

Project

The aim of the project is to rehabilitate the DH system in the city of Sofia by (i) replacing 60 km of pipelines and (ii) 10000 substations in order to reduce energy generation and GHG emissions at two combined heat and power plants and heat only boilers in Sofia, Bulgaria. Further background on this project can be found in the Project Design Document available at: www.carbonfinace.org.

Monitoring

The basis for the calculation of emission reductions is the monitoring section of PDD. It is based on the JI specific approach using relevant JI Guidelines. The project has been positively determined by TÜV SÜD Industrie Service GmbH

Calculation methodology

Emission reductions were calculated using Tracking Database based on the following formula:

$$ER_y = BE_y - PE_y$$

Where:

BE_y is the total baseline emissions in year y (tCO₂e) based consumption of heavy fuel oil and natural gas in year y for gross heat and power generation based on the historical correlation of energy generated and fuels used.

PE_y is the total project emissions in year y (tCO₂e) based on project emissions in year y resulting from the heavy fuel oil and natural gas combustion for gross heat and power generation by the DH system.

Results are adjusted by the expected infrastructure improvements in the baseline case and electricity savings due to more efficient pumps.

Monitoring results

The calculated emission reductions from 01.01.2008 to 31.12.2008 inclusively are t CO₂e.

Monitoring Period	ERs, t CO ₂ e.
01.01.2008-31.12.2008	278 471
Total	278 471

ANNEX – TRACKING DATABASE FOR 2008

Best regards,

PETKO MILEVSKY
Executive Director



TRACKING DATABASE FOR 2008

Toplofikacia Sofia

Month	Year	Nat. Gas million m3	Hvy. Fuel Oil (Tons)	Elec. Prod MWh	Heat Sold MWh	Base Fuel GJ	Baseline kg-CO2e	Project kg-CO2e	Reduction kg-CO2e	Notes
1	2008	131,384	4264	168395	819478	5423273	307 511 604	255 500 946	52 010 658	
2	2008	105,988	3208	141280	642524	4294815	243 324 387	204 838 984	38 485 403	
3	2008	81,105	2294	116923	479409	3292179	186 295 432	155 570 788	30 724 644	
4	2008	44,329	611	71540	218513	1789270	100 860 299	81 734 995	19 125 304	
5	2008	36,331	86	54269	134459	1265960	71 120 095	65 189 277	5 930 818	
6	2008	30,934	54	50937	129332	1220564	68 550 294	55 013 528	13 536 766	
7	2008	29,57	20	49857	108263	1091389	61 191 591	52 362 242	8 829 349	
8	2008	27,038	0	43853	101628	1021285	57 227 811	47 572 986	9 654 826	
9	2008	24,52	0	27337	110504	994615	55 798 287	42 871 261	12 927 026	
10	2008	29,235	0	28956	139827	1172011	65 903 220	51 675 325	14 227 895	
11	2008	65,968	0	60 513	401 612	2 622 194	148 408 438	120 264 862	28 143 576	
12	2008	109,439	0	123727	666904	4345510	246 311 391	201 435 901	44 875 491	
Tot		715,841	10 537	937 588	3 952 453	28 533 065	1 612 502 850	1 334 031 094	278 471 756	

Petko Milevsky:
/Executive Director/

