Verification Report

BTG Central Europe s.r.o.

Biomass Energy Portfolio for Czech Republic
Period 01/01/2007 – 31/12/2007

Report No. 1179264, Version 02

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Industrie Service

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Subject:	Periodic Verification of a Climate Change Project
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Client:	BTG Central Europe S.R.O. Korunni 79 130 00 Praha 3 - CZECH REPUBLIC
Contract approved by:	Werner Betzenbichler
Report Title:	Verification of the project Biomass Energy Portfolio for Czech Republic Period 01/01/2007 – 31/12/2007
Number of pages	16 (without cover page and annexes)

Summary:

TÜV SÜD Industrie Service GmbH has performed a periodic verification of the prospective JI project: “Biomass Energy Portfolio for Czech Republic”. The verification is based on requirements of ER-UPT 1 set as part of the MVP for this specific project. Additionally this verification is based on the currently valid documentation of the UN Framework Convention on Climate Change (UNFCCC). In this context, the relevant documents are the "Marrakech Accords".

This verification engagement was carried out during the period of 02. May and 02. August 2008.

The management BTG Central Europe s.r.o. (BTG) is responsible for the preparation of the GHG emissions data and the reported GHG emissions reductions of the project “Biomass Energy Portfolio for Czech Republic” on the basis set out within the project Monitoring and Verification Plan. 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 the project.

The verifier confirms that the project is implemented as planned and described in validated and registered project design documents. Installed equipment being essential for generating emission reduction runs reliably and is calibrated appropriately.

The monitoring system is in place and the project is ready to generate GHG emission reductions. Further quality assurance procedures summarized in a appropriate manual shall be elaborated and implemented, further details are addressed in the report and its annexes.

The verifier can confirm that the GHG emission reduction is calculated without material misstatements.

Our opinion relates to the project’s GHG emissions and resulting GHG emissions reductions reported for the period of 01-01-2007 to 31-12-2007 and its associated documents. Based on the information we have seen and evaluated we confirm the submitted amount of 99.372 ton CO2 –equivalents for the period of 2007.

Work carried out by:	Internal Quality Control by:
Klaus Nürnberger (ATL), Steffen Klein (A), Zsolt Matra (T)	Certification Body of Climate and Energy

Abbreviations

AE	Applicant Operational Entity
BTG	BTG Central Europe s.r.o.
CAR	Corrective Action Request
FAR	Forward Action Request
CDM	Clean Development Mechanism
CER	Certified Emission Reduction
CR	Clarification Request
JI	Joint Implementation
DNA	Designated National Authority
DOE	Designated Operational Entity
EB	Executive Board
EIA / EA	Environmental Impact Assessment / Environmental Assessment
ER	Emission reduction
GHG	Greenhouse gas(es)
KP	Kyoto Protocol
MP	Monitoring Plan
NGO	Non Governmental Organization
PDD	Project Design Document
TÜV SÜD	TÜV SÜD Industrie Service GmbH
UNFCCC	United Nations Framework Convention on Climate Change
VVM	Validation and Verification Manual

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1 INTRODUCTION

1.1 Objective

The client (BTG Central Europe s.r.o.) has commissioned an independent verification by TÜV SÜD Industrie Service GmbH of its project Biomass Energy Portfolio for Czech. Verification is the periodic independent review and ex post determination by the Designated Operational Entity / Independent Entity of the monitored reductions in GHG emissions during the defined verification period.

The objective of verification can be divided in Initial Verification and Periodic Verification:

Initial Verification: The objective of an initial verification is to verify that the project is implemented as planned, to confirm that the monitoring system is in place and fully functional, and to assure that the project will generate verifiable emission reductions. A separate initial verification prior to the project entering into regular operations is not a mandatory requirement.

Periodic Verification: The objective of the periodic verification is to verify that actual monitoring systems and procedures are in compliance with the monitoring systems and procedures de-scribed in the monitoring plan; further more the periodic verification evaluates the GHG emission reduction data and express a conclusion with a high, but not absolute, level of assurance about whether the reported GHG emission reduction data is “free” of material misstatements; and verifies the reported GHG emission data is sufficiently supported by evidence, i.e. monitoring records. If no prior initial verification has been carried out, the objective of the first periodic verification also includes the objectives of the initial verification.

The verification shall consider both quantitative and qualitative information on emission reductions. Quantitative data comprises the monitoring reports submitted to the verifier by the project entity. Qualitative data comprises information on internal management controls, calculation procedures, and procedures for transfer, frequency of emissions reports, review and internal audit of calculations/data transfers.

The verification follows UNFCCC criteria refer to the Kyoto Protocol criteria and the CDM rules and modalities as agreed in the Bonn Agreement and the Marrakech Accords.

The portfolio project is characterized by an increasing number of participating sub-projects. Sub-projects that are the first time in the verification process have to pass above mentioned Initial Verification. For all involved sub-project the initial verification was performed at least in the last verification or even in the verification before; hence this verification is a standard periodic verification. This time there was no new subproject which entered to the portfolio.

1.2 Scope

Verification scope is defined as an independent and objective review and ex post determination by the Designated Operational Entity / Independent Entity of the monitored reductions in GHG emissions. The verification is based on validated project design document including baseline. These documents are reviewed against Kyoto Protocol requirements, UNFCCC rules and associated interpretations. TÜV SÜD has, based on the recommendations in the Validation and Verification Manual employed a risk-based approach in the verification, focusing on the identification of significant risks and reliability of project monitoring and generation of CERs/ERUs.

The verification is not meant to provide any consulting towards the client. However, stated requests for clarifications and/or corrective actions may provide input for improvement of the project design.

The audit team has been provided with a Monitoring Report issued in March 2008, covering the period 1.1.2007 – 31.12.2007. Based on this documentation a document review and a fact finding mission in form of an on-site audit has taken place. Afterwards the client decided to revise the Monitoring Report according to the identified findings in the audit process. The final Monitoring Report version was submitted in June 2008 serves as the basis for the final assessment presented herewith.

Studying the existing documentation belonging to this project, it was obvious that the competence and capability of the validation team has to cover at least the following aspects; according to these requirements TÜV SÜD has composed a project team in accordance with the appointment rules of the TÜV certification body “climate and energy”:

- Knowledge of Kyoto Protocol and the Marrakech Accords
- Environmental and Social Impact Assessment
- Skills in environmental auditing
- Quality assurance
- Technical aspects of biomass utilization for energy production and district heating
- Monitoring concepts
- Political, economical and technical random conditions in host country

In order to have an internal quality control of the project, a team of the following persons has been composed by the certification body “climate and energy”:

Goyal Abishek (former deputy head of certification body “climate and energy”)

Rachel Zhang (reviewer of certification body “climate and energy”)

1.3 GHG Project Description

The project Biomass Energy Portfolio for Czech Republic is a early Joint Implementation project sponsored by Senter International, the Netherlands. The project is owned by BioHeat International B.V., the Netherlands, and administered by its daughter company BTG Central Europe s.r.o., the Czech Republic. After winning a contract (#ERU 0011) in the ERUPT 2000 tender, and two years of administrative delays, the project has received an approval from the Czech Ministry of Environment, satisfied the contractual requirements of the Dutch government, and started receiving prepayments from Senter International.

The project is a flexible portfolio of 14 subprojects in the Czech Republic where fossil fuels are replaced by biomass. The prepared and submitted monitoring report is linked to the original Project Description (BTG, February 2001), including the Validation Reports (SGS, January 2001 and May 2004). Furthermore conclusions from last verifications are considered also in this monitoring report.

It covers emission reductions from 1st January 2007 and 31st December 2007 for the 14 subprojects of the portfolio. The subprojects included are:

Bouzov,	Nova Cerekev,	Velký Karlov,
Bystrice nad Pernstejnem,	Rostin,	Zlate Hory,
Driten,	Slavicín,	Zruc nad Sazavou,
Horni Plana,	Stitna nad Vlari,	Zlutice.
Iromez s.r.o., Pelhrimov,	TTS CZ s.r.o., Trebic,	

The crediting start date is January 1, 2003.

2 METHODOLOGY

The project assessment aims at being a risk based approach and is based on the methodology developed in the Validation and Verification Manual, an initiative of Applicant Entities, which aims to harmonize the approach and quality of all such assessments.

In order to ensure transparency, a verification protocol was customized for the project, according to the Validation and Verification Manual. The protocol shows, in a transparent manner, criteria (requirements), means of verification and the results. The verification protocol serves the following purposes:

- It organizes, details and clarifies the requirements a CDM/JI project is expected to meet;
- It ensures a transparent validation process where the verifier will document how a particular requirement has been proved and the result of the verification.

The verification protocol consists of four tables. The different columns in these tables are described in

Periodic Verification Checklist Table 3: Detailed audit testing of residual risk areas and random testing		
Areas of residual risks	Additional verification testing performed	Conclusions and Areas Requiring Improvement (including FARs)
List of residual areas of risks of Periodic Verification Checklist Table 2 where detailed audit testing is necessary. In addition, other material areas may be selected for detailed audit testing.	The additional verification testing performed is described. Testing may include: Sample cross checking of manual transfers of data Recalculation Spreadsheet 'walk throughs' to check links and equations Inspection of calibration and maintenance records for key equipment Check sampling analysis results Discussions with process engineers who have detailed knowledge of process uncertainty/error bands.	Having investigated the residual risks, the conclusions are noted here. Errors and uncertainties are highlighted.

Periodic Verification Checklist Table 4: Compilation of open issues		
Corrective and Forward Action Requests by audit team	Summary of project owner response	Audit team conclusion

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Corrective and Forward Action Requests by audit team	Summary of project owner response	Audit team conclusion
List of open clarifications and correction that needs to be solved before concluding the verification positively.	Project owner's responses, clarifications or corrections.	Evaluation of given responses.

Figure 1. The checklist for initial Verification has been used as well for increasing transparency. The completed protocol is enclosed in Annex 1 to this report.

Periodic Verification Checklist Table 1: Data Management System/Controls		
Expectations for GHG data management system/controls	**Score**	**Verifiers Comments (including Forward Action Requests)**
Critical issues needs to be checked.	score is assigned as follows: • Full - all best-practice expectations are implemented. • Partial - a proportion of the best practice expectations is implemented • o Limited - this should be given if little or none of the system component is in place	Explanation of defined score.

Periodic Verification Checklist Table 2: GHG calculation procedures and management control testing		
Identification of potential reporting risk	**Identification, assessment and testing of management controls**	**Areas of residual risks**
Based on onsite visit potential risks are listed.	If potential risks have been identified, the evaluation and testing procedure should clarify if identified risks are not real or if there are residual risks.	List of residual risks

Periodic Verification Checklist Table 3: Detailed audit testing of residual risk areas and random testing

Areas of residual risks	Additional verification testing performed	Conclusions and Areas Requiring Improvement (including FARs)
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Figure 1 Verification Protocol Tables

2.1 Review of Documents

The project design document submitted by the client and additional background documents related to the project design and baseline were reviewed. A complete list of all documents reviewed is attached as annex 2 to this report.

2.2 Follow-up Interviews

In the period of 13 – 15 May 2008 TÜV SÜD performed interviews with project stakeholders to confirm selected information and to resolve issues identified in the document review. Representatives of subproject owners and BTG were interviewed. The main topics of the interviews are summarised in Table 1.

Table 1 Interview topics

Interviewed organization	Interview topics

BTG at 13th May 2008	Project design Technical equipment and operation Crediting period Monitoring plan Monitored data Implementation of management system Environmental impacts Communication process between project manager and portfolio manager Compliance with national laws and regulations
Between 13. and 15. May 2008: Zruc nad Sazavou Velky Karlov Rostin Slavicin Stitna nad Vlari	Technical equipment and operation Monitored data Sustainable development issues Environmental impacts Compliance with national laws and regulations Communication process between project manager and portfolio manager

2.3 Resolution of Clarification and Corrective Action Requests

The objective of this phase of the validation was to resolve the requests for corrective actions and clarification and any other outstanding issues which needed to be clarified for TÜV SÜD`s positive conclusion on the project design. The Corrective Action Requests, Clarification Requests and raised by TÜV SÜD were resolved during communication between the client and TÜV SÜD. Forward Action Requests are indicated issues which do not effect the generation of emission reduction in the verified period, but shall be improved in order to ensure the reliability of future data. To guarantee the transparency of the verification process, the concerns raised and responses that have been given are summarized in chapter 3 below and documented in more detail in the verification protocol in annex 1.

Verification Findings

In the following sections the findings of the verification are stated. The verification findings for each verification subject are presented as follows:

- The findings from the desk review of the final project design document and the findings from interviews during the follow up visit are summarized. A more detailed record of these findings can be found in the Verification Protocol in annex 1.
- Where TÜV SÜD had identified issues that needed clarification or that represented a risk to the fulfillment of the project objectives, a Clarification or Corrective Action Request, respectively, have been issued. The Clarification and Corrective Action Requests are stated, where applicable, in the following sections and are further documented in the Verification Protocol in annex 1. The verification of the project resulted in Corrective Action Request (CAR) a/o Clarification Requests (CR).
- Where Clarification or Corrective Action Requests have been issued, the exchanges between the Client and TÜV SÜD to resolve these Clarification or Corrective Action Requests are summarized.

In the context of Forward Action Requests (FAR), risks have been identified, which may endanger the delivery of high quality CERs 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 verification. A FAR may originate from lack of data sustaining claimed emission reductions. Forward Action Requests are understood as recommendation for future project monitoring; they are stated, where applicable, in the following sections and are further documented in the Verification Protocol in annex 1. The verification of the project resulted in five Forward Action Requests.

The final conclusions for verification subject are presented.

The verification findings relate to the project design as documented and described in the final project design documentation.

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3 INITIAL VERIFICATION FINDINGS

This verification does not include aspects from the initial verification. Aspects that occurred during the assessment and that fit to the table 1 in the annex 1 are considered in the following chapter “Periodic Verification Findings”.

4 PERIODIC VERIFICATION FINDINGS

4.1 Remaining Issues / FARs from Previous Verification

4.1.1 Discussion

The previous verification the verification team addressed Forward Action Requests (FAR), which might endanger the delivery of high quality 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 this periodic verification. A FAR may originate from lack of data sustaining claimed emission reductions. Forward Action Requests are understood as recommendation for future project monitoring; they are stated, where applicable.

In the last Verification Report for BTG Central Europe s.r.o. declared as “Biomass Energy Portfolio for Czech Republic” Period 01/01/2006 – 31/12/2006, Report No. 988482, Version 01 two open FARs were addressed. These FARs are listed below:

Forward Action Request#1:

The overall management of BTG Central Europe is asked to develop and to implement procedures how existing procedures can be improved. That includes asking the local municipalities as well as owning staff experiences for improvements regarding reporting procedures.

Forward Action Request#2:

The project management at BTG Central Europe has to implement a system that ensures that sub-project owners store and archive all relevant original data that has been considered so far.

4.1.2 Findings

Re: previous Forward Action Request#1:

There are procedures at the level of the portfolio manager to improve monitoring procedures.

There are no direct improvement procedures at the level of local municipalities and owning staff but the current data management practice seems to be efficient.

Re: previous Forward Action Request#2:

Project operators archive data for the period of project lifetime plus two years.

The data is collected properly, onsite hard copies and electronically available too. However in some cases no backups have been made (Velky Karlov) or the backups are stored in the boiler house (Rostin).

Response: As a result of the audit on site the deficiencies will be corrected.

4.1.3 Conclusion

Previous FAR#1 is considered as solved.CR 1 is considered as solved.

Previous FAR#2: As a result of the audit on site the deficiencies will be corrected. - This issue is considered as mainly solved; See below new FAR#4.

4.2 Project Implementation / changes

4.2.1 Discussion

Besides emission factor for electrictiy fed into the national grid (power emission factor) there were no changes in the project or baseline since the last periodic verification.

4.2.2 Findings

The determined power emisson factor of the original assessment of PDD was changed with providing the Monitoring Report for the 5.th verification period for the calendar year 2007 due to the fact that this estimated factor according to Dutch ERUPT-Program does not follow the real electricity production and even not the applicable CDM-Methodologies.

The Czech Ministry of Environment resp. Director of Climate Change department provided to the audit team the confirmation that for the project in question and for the year 2007 the value of the emission factor is defined as 1,12 CO2/MWh generated electricity. Also the values of power emission factor for the Kyoto-period are defined.

The above defined power emission factor was a bit different to the one used in the Monitoring Report version 1, 2 and 3. Thus the Monitoring report was once more adjusted with providing the version 4 to the audit team.

4.2.3 Conclusion

Since the last periodic verification the power emission factor was changed according to the definition of Czech DFP the Ministry of Environment. The used power emission factor in the final Monitoring Report corresponds with the one officially backed.

4.3 Completeness of Monitoring

4.3.1 Discussion

Monitoring of data covers all aspects of data measuring, processing and collecting. The focus is on completeness, accuracy and consistency. The accuracy and calibration has been checked onsite at the meters. According to check law the calibration is valid for 4 years. A calibration stamp on each meter addressing the year of calibration serves as an evidence of calibration.

Furthermore the Czech law requires the use of metering equipment with an accuracy class of 2 meaning an accuracy of +- 2%.

4.3.2 Findings

The amount of avoided GHG is expressed by the delivered heat. However in some cases the sold heat is produced by bought of biomass (project) and other (non-project) boilers. The amount of heat is measured directly with calibrated heat and flow meters or is calculated from the difference of total production and production of individual boilers.

This results that the heat production calculation can become unclear at the first view and a lengthy explanation of the project owner is necessary to get an overview about the metering and calculation system.

Forward Action Request#3:

Please include a flow-chart diagram to the project descriptions visualising all the boilers and metering equipments at one site and describing how the sold heat is calculated.

4.3.3 Conclusion

The monitoring has been complete although some inaccuracy was identified as mentioned in the next chapter.

4.4 Accuracy of Emission Reduction Calculations

4.4.1 Discussion

The calculation is defined in an Excel sheet. Its functionality was tested. As mentioned the Czech law requires the use of metering equipment with an accuracy class of 2 meaning an accuracy of +- 2%. The calculation sheet considers a safety deduction of 5% minimum. In other words the calculated emission reduction per sub-project considers already the common and inherent uncertainty of the equipment. This is valid as far as relevant parameters are metered directly and according to their purpose.

4.4.2 Findings

Due to better quality of biomass fuel the boiler efficiency calculation yields results over 100% (e.g. Slavicin, Stitna nad Vlari). This is because default values are used for calculation but the real values are fluctuating because of the varying moisture content.

Forward Action Request #1

It should be proven that the caloric value of the biomass feedstock is quite higher than the validated value. In that case the caloric value should be tested from laboratory every quarter. The samples should be representative as far as possible.

The real/correct calorific value can be estimated due to the moisture content of the used biomass too. A more expensive direct test of calorific value in a laboratory can be avoided this way. At least a monthly determination of moisture content should be used for the calculation of caloric boiler input.

4.4.3 Conclusion

According to submitted and verified data the verification team confirms that the accuracy of calculated and reported emission reductions do not lead to a significant and material misstatement.

4.5 Quality of Evidence to Determine Emission Reductions

4.5.1 Discussion

Determining emission reductions is based on invoices in the case of biomass. Those are usually the most reliable evidences. In case of produced or consumed heat the most reliable evidence is also the invoice for sold heat in respective manual monitored heat production.

4.5.2 Findings

The data is collected properly, onsite hard copies and electronically available too. However in some cases no backups have been made (Velky Karlov) or the backups are stored in the boiler house (Rostin).

Forward Action Request#4:

The monthly production data should be stored for backup e.g. on CDs and deposed safely off from the boiler house (e.g. municipality office).

4.5.3 Conclusion

The project management elaborated procedures ensuring stable quality. Procedures are described in the monitoring report as well.

4.6 Management System and Quality Assurance

4.6.1 Discussion

A proper established and implemented Quality Management System is not crucial for monitoring and reporting of emission reduction units (ERU), but it reduce the inherent risk and raise the reliability of monitored data.

As recommended the conduction of internal validation and checks have been performed. Additional documented procedures have been introduced

The communication between the portfolio manager and the project owners happen by the means of email, phone or fax.

4.6.2 Findings

The communication process between project participants is described in the Monitoring Report but there is no information flow diagram available. The step in the reporting procedure between project manager and portfolio manager is not completely clear.

Forward Action Request#2

Additional to the description a flow diagram should be provided.

4.6.3 Conclusion

Beyond that no significant risk can be identified. The Quality Management and checks are well established and described in the monitoring manual.

A flow diagram and additional description of the communication procedure was provided in the version 2 of the Monitoring Report 2007. Therewith this issue is considered as resolved.

5 PROJECT SCORECARD

Risk Areas		Conclusions			Summary of findings and comments
		Baseline Emissions	Project Emissions	Emission Reductions	
Completeness	Source coverage/ boundary definition	☑	☑	☑	Can be confirmed
Accuracy	Physical Measurement and Analysis	☑	☑	☑	Can be confirmed
	Data calculations	☑	☑	☑	Can be confirmed
	Data management & reporting	☑	☑	☑	Can be confirmed
Consistency	Changes in the project	☑	☑	☑	Can be confirmed

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6 VERIFICATION OPINION

TÜV SÜD Industrie Service GmbH has performed a verification of the prospective JI project: "Biomass Energy Portfolio for Czech Republic". The verification is based on requirements of ER-UPT 1 set as part of the MVP for this specific project. Additionally this verification is based on the currently valid documentation of the UN Framework Convention on Climate Change (UNFCCC). In this context, the relevant documents are the "Marrakech Accords".

This verification engagement was carried out during the period of 02. May and 02. August 2008.

The management BTG Central Europe s.r.o. (BTG) is responsible for the preparation of the GHG emissions data and the reported GHG emissions reductions of the project "Biomass Energy Portfolio for Czech Republic" on the basis set out within the project Monitoring and Verification Plan. 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 the project.

The verifier confirms that the project is implemented as planned and described in validated and registered project design documents. Installed equipment being essential for generating emission reduction runs reliably and is calibrated appropriately.

The monitoring system is in place and the project is ready to generate GHG emission reductions. Further quality assurance procedures summarized in a appropriate manual shall be elaborated and implemented, further details are addressed in the report and its annexes.

Possible negative as well as positive environmental and social impacts are addressed detailed in the report, however significant negative impacts are not identifiable.

The verifier can confirm that the GHG emission reduction is calculated without material misstatements.

Our opinion relates to the project's GHG emissions and resulting GHG emissions reductions reported for the period of 01-01-2007 to 31-12-2007 and its associated documents. Based on the information we have seen and evaluated we confirm the submitted amount of 99.372 ton CO2 –equivalents for the period of 2007.

Munich, 05 March 2009

Certification body "climate and energy"

Munich, 05 March 2009

Klaus Nürnberger
Assessment Team Leader

Industrie Service

Annex 1: Verification Protocol

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. A score 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.

Expectations for GHG data management system/controls	Score	Verifiers Comments (including Forward Action Requests)
1. Defined organisational structure, responsibilities and competencies		
1.1. Position and roles	Full	Regarding roles and positions there is no change against previous verification. The positions and roles are defined in the contracts.
1.2. Responsibilities Specific monitoring and reporting tasks and responsibilities are included in job descriptions or special instructions for employees.	Full	The responsibilities of involved person are clear and documented in the contracts.

Expectations for GHG data management system/controls	Score	Verifiers Comments (including Forward Action Requests)
1.3. *Competencies needed* Competencies needed for each aspect of the GHG determination process are analysed. Personnel competencies are assessed and training programme implemented as required.	Full	Involved persons have the appropriate competence to fulfill all required tasks with GHG reporting. The involved persons demonstrated sense of reasonability and accuracy for operating the projects as well as for reporting.
2. Conformance with monitoring plan		
2.1. Reporting procedures 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.	Full	The reporting follows established procedures. They are part of the monitoring report itself. The meters are read off daily and recorded in prepared paper forms. These values are transmitted to the computer. In some cases the metering results are automatically exported to MS Excel sheets. On this basis the monthly production is calculated. Reporting happens in the form defined by the monitoring plan. Spreadsheets are provided by the portfolio manager.

Expectations for GHG data management system/controls	Score	Verifiers Comments (including Forward Action Requests)
2.2. Necessary Changes Necessary changes to the monitoring plan are identified and changes are integrated in local procedures as necessary.	Partial	There are existing procedures for identifying the possible need for necessary changes and to establish these. The project operators and local municipalities take only marginal initiative to identify possible improvement opportunities in their reporting procedures or increase possible project extension possibilities. – However the current procedures are well established and extension opportunities are possibly/nearly exhausted.
3. Application of GHG determination methods		

Expectations for GHG data management system/controls	Score	Verifiers Comments (including Forward Action Requests)
3.1. Methods used 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.	Partial	No changes since previous verification. The used method follows the validated method considering the real heat production or heat demand. Due to better quality of biomass fuel the boiler efficiency calculation yields results over 100% (e.g. Slavicin, Stitna nad Vlari). This is because default values are used for calculation but the real values are fluctuating because of the varying moisture content. **Forward Action Request #1** It should be proven that the caloric value of the biomass feedstock is quite higher than the validated value. In that case the caloric value should be tested from laboratory every quarter. The samples should be representative as far as possible. The real/correct calorific value can be estimated due to the moisture content of the used biomass too. A more expensive direct test of calorific value in a laboratory can be avoided this way. At least a monthly determination of moisture content should be used for the calculation of caloric boiler input.

Expectations for GHG data management system/controls	Score	Verifiers Comments (including Forward Action Requests)
3.2. Information/process flow An information/process flow diagram, describing the entire process from raw data to reported totals is developed.	Partial	There is no information flow diagram available. However the communication process between project participants is described. The step between project manager and portfolio manager is not clear. **Forward Action Request#2** Additional to the description a flow diagram should be provided.
3.3. Data transfer 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.	Full	The project owners report by using data registration form to the portfolio manager. The data transfer channels are e-mail, fax and phone. Transfer processes are secured against data losses and distortions.
3.4. Data trails Requirements for documented data trails are defined and implemented and all documentation are physically available.	Full	The process is implemented and clear to the project participants. All documents are physical available.
4. Identification and maintenance of key process parameters		

Expectations for GHG data management system/controls	Score	Verifiers Comments (including Forward Action Requests)
4.1. Identification of key parameters The key physical process parameters that are critical for the determination of GHG emissions (e.g. meters, sampling methods) are identified.	Full	The determination of the GHG emissions is based on two aspects: First the fuels switches from fossil to biomass fuels and second the avoidance of rotting biomass. Rotting biomass emits methane. Regarding fuel switch the key process parameters is the produced energy respectively consumption. That key parameters are verifiable. Regarding avoiding methane one key parameter is the biomass utilization factor. Those values have not been determined on objective evidences but just on statements. As that approach was developed for the baseline study and was not rejected by validator or involved parties, the verification team assumes that this approach commonly accepted. A similar approach has been used for estimating the distribution of substituting individual stoves. The households that are connected to the district heating system for the first time are estimated by the major regarding their previous used fuels. As that approach was developed for the baseline study and was not rejected by validator or involved parties, the verification team assumes that this approach commonly accepted.

Expectations for GHG data management system/controls	Score	Verifiers Comments (including Forward Action Requests)
4.2. Calibration/maintenance Appropriate calibration/maintenance requirements are determined.	Full	The metering equipments are installed, maintained and calibrated appropriately. The documents of calibration, installation or maintenance are available. The calibration of the heat meter in Stitna is scheduled for Nov 08.
5. GHG Calculations		
5.1. Use of estimates and default data 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.	Partial	As mentioned above the proportional distribution of individual stove types have been adjusted according to updated circumstances. Those proportions are based on the assumptions from the majors in the municipality. That is the same approach had been used for validation. As that approach was developed for the baseline study and was not rejected by validator or involved parties, the verification team assumes that this approach commonly accepted. Estimates and default values addressed in the baseline and monitoring study have been applied correctly. In cases when calculated boiler efficiencies are near to or over 100% the real caloric values of the biomass fuel should be used instead of default values. – This can be calculated based on the moisture content of the fuel too. See **FAR#1**

Expectations for GHG data management system/controls	Score	Verifiers Comments (including Forward Action Requests)
5.2. Guidance on checks and reviews 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.	Full	There are established data processing & quality management procedures described in the Monitoring Protocol. Data is checked on calculation errors as well as two consistency checks (combusted fuel crosschecked by produced heat amount, produced heat crosschecked by sold heat) are carried out.
5.3. Internal verification Internal verifications include the GHG data management systems, to ensure consistent application of calculation methods.	Partial	The amount of avoided GHG is expressed by the delivered heat. However in some cases the sold heat is produced by bought of biomass (project) and other (non-project) boilers. The amount of heat is measured directly with calibrated heat and flow meters or is calculated from the difference of total production and production of individual boilers. This results that the heat production calculation can become unclear at the first view and a lengthy explanation of the project owner is necessary to get an overview about the metering and calculation system. *continuation see next page*

Expectations for GHG data management system/controls	Score	Verifiers Comments (including Forward Action Requests)
		Forward Action Request#3: Please include a flow-chart diagram to the project descriptions visualising all the boilers and metering equipments at one site and describing how the sold heat is calculated. Troubleshooting procedures are established appropriately: If the auxiliary HFO or natural gas boilers are used in the case of biomass boiler failure the consumed HFO or gas is the basis of the calculation of produced heat which is subtracted from the total amount. In the case of malfunction of heat meters the sold heat is calculated on basis of the heat meters from individual consumers, or estimated based on the average of former years, or on the used amount of biomass. However, the Czech Metric Institute can replace the meters within 24-48 hours.
5.4. Internal validation 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.	Full	See sections 5.2. – 5.3

Expectations for GHG data management system/controls	Score	Verifiers Comments (including Forward Action Requests)
5.5. Data protection measures Data protection measures for databases/spreadsheets should be in place (access restrictions and editor rights).	Partial	The relevant documents are archived in hardcopy and electronically by the project owner. The portfolio manager stores at the office of BTG CE. A backup at BTG Bioheat office is stored too. The data is collected properly, onsite hard copies and electronically available too. However in some cases no backups have been made (Velky Karlov) or the backups are stored in the boiler house (Rostin). **Forward Action Request#4:** The monthly production data should be stored for backup e.g. on CDs and deposed safely off from the boiler house (e.g. municipality office).

Expectations for GHG data management system/controls	Score	Verifiers Comments (including Forward Action Requests)
5.6. IT systems IT systems used for GHG monitoring and reporting should be tested and documented.	Full	The central IT system for reporting is MS-Excel at BTG. Appropriate IT systems are used for the boiler control at the sub-project sites. The function of these systems is essential for heat production process. At some sites process data are directly exported to MS-Excel sheets. Monthly reporting is based on this sheets edited on common PC-Systems or server based systems. Backups of the monthly reported values at sub-project sites and at BTG avoid from total data losses that are related to calculation of emission reductions.

Table 2: GHG calculation procedures and management control testing

Identification of potential reporting risk	Identification, assessment and testing of management controls	Areas of residual risks
As described in the Periodic Verification Checklist in 2007 a potential reporting risk is that monitoring protocols can be misunderstood by the operators.	The internal review of BTG Central Europe s.r.o identified that issue already.	This specific issue has been identified in time. However, it cannot be excluded that there might be further possible misunderstandings of the monitoring protocols.
Due to better quality of biomass fuel the boiler efficiency calculation yields results over 100% (e.g. Slavicin, Stitna nad Vlari). This is because default values are used for calculation but the real values are fluctuating because of the varying moisture content.	The internal review of BTG Central Europe s.r.o identified that issue already.	This specific issue has been identified earlier. However, there are no changes in the current calculation practice, the default value is still in use. The calculation are cross-checked, but the use of default values might decrease the reliability of reported ERUs.
The communication process between project participants is described. However there is no information flow diagram available. The step between project manager and portfolio manager is not clear.	This issue was identified during the desk review of the monitoring report.	Possibly incomplete information flow between project manager and portfolio manager.

Identification of potential reporting risk	Identification, assessment and testing of management controls	Areas of residual risks
The amount of avoided GHG is expressed by the delivered heat. However in some cases the sold heat is produced by bought of biomass (project) and other (non-project) boilers. The amount of heat is measured directly with calibrated heat and flow meters or is calculated from the difference of total production and production of individual boilers.	This issue was identified during the onsite audit.	An indistinct measuring/calculation system can bear methodological/procedural mistakes and distort the reported amount of ERUs.
The data is collected properly, onsite hard copies and electronically available too. However in some cases no backups have been made (Velky Karlov) or the backups are stored in the boiler house (Rostin).	This issue was identified during the onsite audit.	In the case if the original data get lost only backups can make good the loss. The archive can provide a basis for recalculating the ERUs. But if the backups are stored onsite in the boilerhouse too they can get lost together with the original (e.g. in the case of a house fire).

Table 3: Detailed audit testing of residual risk areas and random testing

Areas of residual risks	Additional verification testing performed	Conclusions and Areas Requiring Improvement (including Forward Action Requests)
Misunderstandings of the monitoring protocols.	All reported and for the ERU calculation relevant information reported by the sub-projects had been asked regarding correctness. Further misunderstood issues were not identified during onsite visits and interviews.	There are procedures at the level of the portfolio manager to improve monitoring procedures. The current data management practice seems to be efficient to avoid further misunderstandings.
Reliability of reported ERUs due to calculated unrealistic boiler efficiencies.	Besides the approved default values for energy content of biomass it was concluded that the real caloric values can be estimated based on the moisture content of the fired feedstock.	See FAR#1
Possibly incomplete information flow between project manager and portfolio manager.	This issue was discussed with the Portfolio Manager and the Project Owners during the onsite audits.	This issue was addressed in FAR#2 however the interviews revealed no human errors or high risks in the communication procedures. The Portfolio Manager added a flow chart in version 2 of the Monitoring Report 2007. Hence this issue is considered to be resolved.

Areas of residual risks	Additional verification testing performed	Conclusions and Areas Requiring Improvement (including Forward Action Requests)
An indistinct measuring/calculation system can bear methodological/procedural mistakes and distort the reported amount of ERUs.	During the onsite audit the amount of produced heat and the metering/calculation was unclear at the first view and a lengthy explanation of the project owner was necessary to get an overview about the metering and calculation system.	A clear description of the metering practice/calculation is necessary separately for each single production site. This should include flow-chart of the production and metering equipment. See FAR#3
Common loss of original data and back-ups.	The archiving procedures and storage places of the archives were checked at each visited site.	See above FAR#4

Table 4: Compilation of open issues

Corrective and Forward Action Requests by audit team	Summary of project owner response	Audit team conclusion
Forward Action Request#1 (2007): The overall management of BTG Central Europe is asked to develop and to implement procedures how existing procedures can be improved. That includes asking the local municipalities as well as owning staff experiences for improvements regarding reporting procedures.		There are procedures at the level of the portfolio manager to improve monitoring procedures. There are no direct improvement procedures at the level of local municipalities and owning staff but the current data management practice seems to be efficient. Issue is considered as solved.
Forward Action Request#2 (2007): The project management at BTG Central Europe has to implement a system that ensures that sub-project owners store and archive all relevant original data that has been considered so far.		Project operators archive data for the period of project lifetime plus two years. The data is collected properly, onsite hard copies and electronically available too. However in some cases no

Corrective and Forward Action Requests by audit team	Summary of project owner response	Audit team conclusion
		backups have been made (Velky Karlov) or the back-ups are stored in the boiler house (Rostin). As a result of the audit on site the deficiencies will be corrected. Issue is considered as mainly solved. See FAR#4 (2008)
Forward Action Request#1 It should be proven that the caloric value of the biomass feedstock is quite higher than the validated value. In that case the caloric value should be tested from laboratory every quarter. The samples should be representative as far as possible. The real/correct calorific value can be estimated due to the moisture content of the used biomass too. A more expensive direct test of calorific value in a laboratory can be avoided this way. At least a monthly determination of moisture content should be used for the calculation of caloric boiler input.		The implementation of analyzing the moisture content of biomass will be checked next verification.
Forward Action Request#2	A flow diagram and additional description of the	This issue is considered as resolved.

Corrective and Forward Action Requests by audit team	Summary of project owner response	Audit team conclusion
Additional to the description a flow diagram should be provided.	communication procedure was provided in the version 2 of the Monitoring Report 2007.	
Forward Action Request#3: Please include a flow-chart diagram to the project descriptions visualising all the boilers and metering equipments at one site and describing how the sold heat is calculated.		This issue will be assessed by next periodic verification.
Forward Action Request#4: The monthly production data should be stored for backup e.g. on CDs and deposed safely off from the boiler house (e.g. municipality office).		This issue will be assessed by next periodic verification.

Annex 2: Information Reference List

Ref. No.	Issuance and/or submission date (dd/mm/yyyy)	Title/Type of Document	Author/Editor/ Issuer
1	02/05/2008	Biomass Energy Portfolio for Czech Republic, Monitoring Report 2007, Version 2, June 2008 Finally submitted on: 26/06/2008	BTG Central Europe s.r.o.: Michaela Remrová Martijn Vis Kateřina Vališová Patrick Reumerman
2	26/02/2001	Biomass Energy Portfolio for Czech Republic, Baseline Study, Feb. 2001	BTG Biomass Technology Group B.V.
3	24/05/2004	Validation of 'Biomass Energy Portfolio for Czech Republic Extension #1'	BTG Central Europe s.r.o. Irma Lubrecht
4	18/06/2007	Verification Report, BTG Central Europe s.r.o., Biomass Energy Portfolio for Czech Republic, Period 01/01/2006 – 31/12/2006, Report No. 988482, Version 01	TÜV SÜD Industrie Service GmbH Carbon Management Service Markus Knödlseder
5	13-15/05/2008	List of Participant of on-site interviews	TÜV SÜD
6	13/05/2008	On-site interviews conducted by TÜV SÜD: **Verification Team:** Steffen Klein TÜV SÜD Industrie Service GmbH Zsolt Matra TÜV SÜD Industrie Service GmbH **Interviewed Persions:** Michaela Remrová (Managing Director) BTG Central Europe s.r.o. Prusa Jivt (Chief Operator) TENDOM s.r.o. Zruc nad Sazavou	TÜV SÜD
7	14/05/2008	On-site interviews conducted by TÜV SÜD: **Verification Team:** Steffen Klein TÜV SÜD Industrie Service GmbH Zsolt Matra TÜV SÜD Industrie Service GmbH **Interviewed Persions:** Pavelka Frantisek (operating staff) Velky Karlov	TÜV SÜD

Ref. No.	Issuance and/or submission date (dd/mm/yyyy)	Title/Type of Document	Author/Editor/ Issuer
		Praohy Beonisac (mayor) Velky Karlov Stanislav Kraml (consultant) Velky Karlov Cyril Spalek (deputy mayor) Velky Karlov Ranovaw Jaw (mayor) Rostin Iabel Tejotman (project responsible) Rostin Mahara Frantisek (technician) Rostin	
8	15/05/2008	On-site interviews conducted by TÜV SÜD: **Verification Team:** Steffen Klein TÜV SÜD Industrie Service GmbH Zsolt Matra TÜV SÜD Industrie Service GmbH **Interviewed Persions:** Kocicky Jaroslav (major) Slavicin Kozacek Oldrich (managing director) BTH Slavicin, spol.s.r.o. Miklas Jaroslav (technician) BTH Slavicin, spol.s.r.o. Itnico Jindoich (technician) Stitna nad Vlari	TÜV SÜD
9	12/2006	Validation and Verification Manual,	IETA/PCF http://www.vvmanual.info
10	13-15/05/2008	Onsite records about produced heat and electricity, Onsite records about sold heat, Onsite records of fired biomass, Completed and reported monitoring protocols from sub-projects to BTG Central Europe s.r.o Verification of existing and valid seals from calibrations of measuring equipments Photographs of metering equipment	
11	Accessed:	International Association for the Properties of Water and Steam, "Steam Tables" books based on the IAPWS-IF97	http://www.iapws.org/

Ref. No.	Issuance and/or submission date (dd/mm/yyyy)	Title/Type of Document	Author/Editor/ Issuer
12	Issued 18/12/2008 submitted 07/01/2009	Letter on definition of power emission factor from Czech Ministry of Environment	Czech Ministry of Environment Ing. Pavel Záyslcký