



VERIFICATION / CERTIFICATION REPORT

SAWDUST 2000 JOINT IMPLEMENTATION PROJECT IN ROMANIA

Verification Period:
1 January 2008 to 31 December 2008

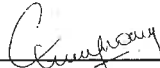

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DET NORSKE VERITAS



VERIFICATION / CERTIFICATION REPORT

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Client: Danish Environmental Protection Agency	Client ref.: Inge Gerhardt-Pedersen

DET NORSKE VERITAS
CERTIFICATION AS


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Summary:
The Danish Environmental Protection Agency (DEPA) has commissioned Det Norske Veritas Certification AS (DNV) to perform the verification of the emission reductions reported for the SAWDUST 2000 Joint Implementation Project (ITL number RO 100020) in five towns of Romania for the period 1 January 2008 to 31 December 2008. This report summarises the findings of this verification.

The verification was carried out in accordance with the Determination and Verification Manual and Romanian JI Track I procedure. During the verification DNV reviewed the project's monitoring reports, baseline study, determination report, monitoring plan and the project's previous verification report (fourth voluntary verification performed by DNV). This report covers the first verification period according to JI Track I procedures of Romania.

In our opinion, the GHG emission reductions reported for the project in the monitoring reports are fairly stated.

Det Norske Veritas Certification AS was able to verify that the emission reductions from the SAWDUST 2000 Joint Implementation Project during the period 01 January 2008 to 31 December 2008 amount to **72 198** tonnes of CO₂ equivalent.

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Report title: SAWDUST 2000 Joint Implementation Project in Romania	
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Work verified by: Astakala Vidyacharan	
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**Abbreviations**

CAR	Corrective Action Request
CEF	Carbon Emission Factor
CER	Certified Emission Reduction(s)
CH ₄	Methane
CO ₂	Carbon dioxide
CO _{2e}	Carbon dioxide equivalent
DNV	Det Norske Veritas
DNA	Designated National Authority
ERU	Emission Reduction Units(s)
FAR	Forward Action Request
GHG	Greenhouse gas(es)
IPCC	Intergovernmental Panel on Climate Change
MP	Monitoring Plan
MVP	Monitoring and Verification Plan
N ₂ O	Nitrous oxide
NGO	Non-governmental Organisation
ODA	Official Development Assistance
PDD	Project Design Document
UNFCCC	United Nations Framework Convention for Climate Change
GWP	Global Warming Potential



1 INTRODUCTION

The Danish Environmental Protection Agency (DEPA) has commissioned Det Norske Veritas Certification AS (DNV) to perform a verification of the emission reductions reported for the SAWDUST 2000 Joint Implementation Project for the period 1 January 2008 to 31 December 2008.

The SAWDUST 2000 Joint Implementation Project comprises the conversion of district heating systems by substitution of fossil fuels (natural gas and liquid gas oil) with wood residues (sawdust) in five towns of Romania (namely Huedin, Vlahita, Gheorgheni, Vatra Dornei and Intorsura Buzaului).

During the fourth periodical verification in April of 2008 /4/, three sites of the project (Vatra Dornei, Gheorgheni and Vlahita) were visited to verify that the project was implemented in accordance with the project design document (PDD) and furthermore to assess that the monitoring systems were in place and fully functional.

The site visits were performed at the Vatra Dornei and Huedin locations for this verification (it is the fifth periodical and simultaneously first JI verification) in Romania on 19-20 May 2009. For the other three locations the project's reported emission reduction calculations and supporting data were assessed.

1.1 Objective

Verification is the periodic independent review and *ex post* determinations by an Independent Entity of the monitored reductions in GHG emissions that have occurred as a result of a registered JI project activity during a defined verification period.

1.2 Scope

The scope of the verification is:

- To verify that actual monitoring systems and procedures are in compliance with the monitoring systems and procedures described in the monitoring plan.
- To evaluate the GHG emission reduction data and express a conclusion with a reasonable level of assurance about whether the reported GHG emission reduction data is free from material misstatement.
- To verify that the reported GHG emission data is sufficiently supported by evidence.

The verification also followed up the findings of the fourth verification report issued by DNV /4/.

The verification shall ensure that reported emission reductions are complete and accurate.

The verification team has, based on the recommendations in the Determination and Verification Manual /13/, employed a risk-based approach, focusing on the identification of significant reporting risks and verifying the mitigation measures for these.



1.3 Description of the Project Activity

Project Parties:	Danish Environmental Protection Agency Romanian Ministry of Environment and Water Management
Title of project activity:	SAWDUST 2000 Joint Implementation Project
Project Entity:	Danish Environmental Protection Agency, Amaliegade 44 DK - 1256 Copenhagen K Inge Gerhardt-Pedersen, Tel. +45 33 92 67 29 igp@ens.dk
Location of the project activity:	Huedin Gheorgheni Intorsura Buzaului Vatra Dornei Vlahita

The SAWDUST 2000 Joint Implementation Project upgraded and developed the district heating system of five towns (listed above) in Romania. The project substituted previously used fossil fuel (natural gas and liquid oil) with biomass, primarily with sawdust. The project is based on the experiences from a previous pilot project in another Romanian town, Tasca in the Neamt County. The key components of the present project are listed below:

- Use of renewable energy resources
- Reduction of the environmental impacts caused by the illegal dumping of wood waste from the sawmill and the wood processing industry
- Improvement of the social standard in Romania
- Stable heat energy price for consumers that are not being affected by the changes to the fuel prices on the world market

The project generates reductions of green house gas emissions, mainly carbon dioxide through replacement of fossil fuel usage and methane from decomposition of dumped wood waste.

The calculations are based on the fact that 78% of the greenhouse gas emission reductions relate to reductions from anaerobic digestion of wood waste dumped.

The crediting period of the project is from 2004 to 2017, established according to an agreement between the Romanian Ministry of Environment and Water Management and the Danish Environmental Protection Agency.



2 METHODOLOGY

The verification of the emission reductions has assessed all factors and issues that constitute the basis for emission reductions from the project. These include:

- i) Records related to measuring quantity of heat;
- ii) Emission factors issued PDD /1/ and Baseline methodology /3/;
- iii) Records on validation and/or calibration of the used measuring equipment, etalons and calculation software.
- iv) Requirements included in national procedure for using Joint Implementation (JI) under Track I (National JI Track procedure for Romania) /14/

Verification team

Type of involvement

<i>Role/Qualification</i>	<i>Last Name</i>	<i>First Name</i>	<i>Country</i>	<i>Desk review</i>	<i>Site visit</i>	<i>Reporting</i>	<i>Supervision of work</i>	<i>Technical review</i>	<i>Expert input</i>
JI verifier / Technical team leader with sectoral knowledge GHG auditor	Vöröš	Mario	Slovak Republic			✓	✓		✓
Technical reviewers	Andrtová	Zuzana	Czech Republic	✓	✓	✓			
	Astakala	Vidyacharan	India					✓	

Duration of verification

Preparations: 11-05-2009

On-site verification: From 19-05-2009 to 20-05-2009

Reporting: From 22-05-2009 to 15-03-2010

2.1 Review of Documentation

During verification DNV has assessed Project design document /1/, Guidelines for Monitoring Plan /2/, Baseline study /3/, Determination report /12/ and Monitoring reports for individual cities /5/ including documents of calibration report and operational records reviewed the during site visit in May 2009.



2.2 Site Visits

The Sawdust 2000 project is a fully implemented project, which includes heating system in the 5 towns, Huedin, Vatra Dornei, Gheorgheni, Intorsura Buzaului and Vlahita in Romania. DNV carried out a site visit at two towns Vatra Dornei and Huedin on a sampling basis in May 2009. Vatra Dornei is main of the site with major emission reduction and it is planned that the rest 3 sites will be visited during next verification. The operations and stocking places were visited in these two towns. The operational records were reviewed and compared with records in individual monitoring reports /5/. Documentation records from calibration of metering devices and trainings were assessed. The operation in these two towns was without any long unplanned malfunctions. The assessment of the three other monitoring reports /5/ for other sites are described below in follows chapters.

Requirements from Monitoring plan /2/ were compared with operational practices on both sites. Additionally inspection records /9/ /11/ were assessed from local EPAs (branch offices under the Ministry of Agriculture, Forest, Waters and Environment).

Persons interviewed during site visit are listed in chapter 6 - 'References' of this report. The main topics of interview were: information related operation as capacity of plant, number of consumers, information related to sawdust, its availability and its quality, calculation of emission reduction in monitoring reports /5/, malfunctions of boilers in verified periods, comments from EPAs visits, maintenance records and needs, training requirements and data management.

2.3 Assessment

The data presented in the monitoring reports /5/ were assessed. Project documentation and production records were verified, as well as established monitoring and reporting practices and collection of measurements and the reliability of the installed monitoring equipment. Interviews with personnel of the Huedin and Vatra Dornei plants and project manager have been performed to assess awareness of personnel. This has enabled the verification team to assess the accuracy and completeness of the reported monitoring results, and to verify that actual monitoring systems and procedures are in compliance with the monitoring systems and procedures described in the monitoring plan and the determination of the reductions in CO₂ emissions.

Further the assessment was carried out by means of:

- Checking and recalculation of quantity of delivered heat and calculation of the baseline emissions;
- Checking the value of emission factor used for baseline calculation;
- Verifying the implementation of the monitoring plan including procedures for quality assurance of the monitoring/measuring equipment and software.

2.4 Reporting of Findings

Findings established during the verification may as follows:

A corrective action request (CAR) is issued, where:

- i. Non-conformities with the monitoring plan or methodology are found in monitoring and reporting, or if the evidence provided to prove conformity is insufficient;



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- ii. Mistakes have been made in applying assumptions, data or calculations of emission reductions which will impair the estimate of emission reductions;
- iii. Issues identified in a FAR during validation to be verified during verification have not been resolved by the project participants.

A clarification request (CL) shall be raised if information is insufficient or not clear enough to determine whether the applicable CDM requirements have been met.

A forward action request (FAR) is issued for actions if the monitoring and reporting require attention and/or adjustment for the next verification period.

3 VERIFICATION FINDINGS

This section summarises the findings from the verification of the emission reductions reported for the project for the period 1 January 2008 to 31 December 2008. The findings of the verification are documented in more detail in the verification checklist given in Appendix A.

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

One FAR from previous verification was assessed:

FAR 1: Periodic recalibration of the measurement devices from Vlahita boiler plant should be done in June 2008. The FAR is closed, the calibration record /6/ was submitted to verifier.

3.2 CARs, FARs or CLs from this Verification period

FAR, CL #	Description of the FAR, CL	Observed actions taken to resolve	Conclusions
FAR1	Tables for NCV of spruces and other type of the sawdust is not a controlled document currently. It shall be included into a controlled documentation as PDD, Monitoring plan etc.	<p>The NCV tables are hard copy versions of an excel calculation spreadsheet (provide in the attachment), thus a results of a calculation.</p> <p>The NCV is calculated by means of the following formula:</p> $CV_{MC, \%} = 18.92 \text{ GJ/t} * (100\% - MC) - MC * 2,45 \text{ MJ/kg water}$ <p>Where: 18.92 GJ/t is Calorific Value of sawdust in a dry state MC is Moisture content of available sawdust 2,45 GJ/t is Amount of heat required for vaporizing water in sawdust</p> <p>The NCV at certain moisture content is included in the determined and valid Monitoring Report as well as in the annex of the Guidelines for the Monitoring Plan Version 4.</p>	<p>The provided explanation is sufficient.</p> <p>The FAR is closed.</p>
FAR2	The requirements for archiving period are not clear. It shall be reviewed	There are no specific requirements for data archiving from the Romanian Government or the Danish Energy Agency (DEA, former DEPA) in this aspect.	The archiving period is



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	as to what period is required from Romanian government or DEPA and establish this period and include an appropriate way of electronic data back-up.	Nevertheless it is envisaged that all Monitoring data will be archived at least throughout the crediting period, which is 14 years (2004-2017).	clearly set for crediting period. The FAR is closed
FAR3	It is important to review the recording primary daily reporting data, which is performed by operational employees. Some records found missing out from official records and it was needed to use back up data or average data (Huedin – 25-27 January 2008 or several days in February). Additional instructions/trainings to increase awareness of relevant employees are needed.	<p>Issues related to missing data etc. has been solved during the site visit carried out by Mrs. Zuzana Andrtova.</p> <p>In relation to additional instructions/trainings please note the following:</p> <p>a) Periodical site inspections including instructions and trainings at all boiler sites incorporated in the project activity are carried out by Mr Cristi Dragan, Boiler House Manager from Vatra Dornei. Mr Dragan is visiting each boiler house at a minimum 4 times a year</p> <p>b) In addition Mr Mihai Brasoveanu, Local Country Coordinator from the Danish Energy Agency (former DEPA) is periodically visiting the sites</p> <p>Grue + Hornstrup is holding a contract with the Danish Energy Agency since 2006 for providing annual monitoring and operational oversight to all boiler houses incorporated in the project activity. In this context an annual site visit is performed at each boiler house including inspections, instructions and trainings</p>	The new procedures are established and provides often control for persons involved in daily records. The FAR is closed.
FAR4	The requirements in monitoring plan shall be in accordance with legal requirements. Thus the requirements for local EPAs visits shall be updated accordingly.	Initially a quarterly quality assurance check was envisaged and performed by the local EPAs, however in accordance with the “National Procedure for Track 1” in force in Romania a semi-annual check is sufficient. The respective procedure/form for quality assurance carried out by the local EPAs has been revised in accordance.	The FAR will be closed during the next verification .
FAR5	Please identify the resource of the table, where NCV of spruces (or other type of sawdust) are identified, and review it, if the data for the humidity over 60% are available. Some cases with higher humidity have been observed.	<p>The NCV tables are hard copy versions of an excel calculation spreadsheet (provide in the attachment), thus a results of a calculation.</p> <p>The NCV is calculated by means of the following formula:</p> $CV_{MC} = 18.92 \text{ GJ/t} * (100\% - MC) - MC * 2,45 \text{ MJ/kg water}$ <p>Where: 18.92 GJ/t is Calorific Value of sawdust in a dry state MC is Moisture content of available sawdust</p>	The FAR will be closed during next verification.



		<p>2,45 GJ/t is Amount of heat required for vaporizing water in sawdust</p> <p>A new table will be issued at all sites including NCV for moisture contents beyond 60% in the week 10 / 2010.</p>	
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3.3 Project Implementation

This is the fifth verification period of the project (first JI-verification period) and the project is fully implemented and established according to description in PDD /1/. Situation was confirmed at visited locations in Vatra Dornei and Huedin city. Both locations have suitable place for sawdust stocking and processes correspond with information/directions described in PDD /1/, Baseline study /3/ and Monitoring plan /2/ except quantity of local EPAs visits (see chapter 3.7 and FAR4). The next question is archiving period of documents and records. The procedure did not determine this period in a clear way. But when this situation was discussed, some requirements for documents keeping were mentioned. Nevertheless the archiving period has not been clearly appointed, thus it shall be reviewed and the period shall be determined to include an appropriate way of back-up for electronic data (FAR2). Currently all data are properly archived; only procedures describing it should be more explicit.

3.4 Completeness of Monitoring

The monitoring plan includes two methodologies for monitoring and estimation of the GHG emission reductions of the project, i.e. reduction of carbon dioxide CO₂ emissions and avoidance of methane CH₄ emission.

Methodology one, comprises the calculation of the annual CO₂ emission reduction originating from the substitution of fossil fuels with wood residues. The CO₂ emission reductions are equal to the annual quantity of CO₂ emission estimated in the BAU scenario. The specific type of the fossil fuel, the calorific value of the oil and natural gas has been determined or monitored by the project operator contacting the relevant supplier of oil and natural gas to obtain precise and reliable data. The CO₂ emission factors for the oil or the natural gas are available. Hence, taking into consideration the heat supply to each town the corresponding CO₂ emissions can be calculated.

Methodology two, comprises the calculation of the CH₄ emission avoidance resulting from reducing the quantities of stockpiles of wood residues that are left for decay. Information/type about the wood residues loaded into the new boiler system and the water content of the wood residues combusted and the heat produced by the biomass boiler system are recorded with daily frequency. The identification of the calorific value of the wood residue entering the boilers according to the wood specie and water content is calculated by use of the table with this information. But the table is not included in the Monitoring plan and used tables are not controlled documents thus it could be a problem if they will be lost (see FAR1 and FAR5). Similarly should the water content in sawdust be more than 60% the system does not address what actions would be taken. These FAR's have been responded-to by the project proponent as indicated in the table above and shall be verified during the next verification.

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The heat production efficiency of the boiler system is considered to be 85% ex-ante /2/ /3/. By using this estimated efficiency value the gross total heat energy amount and biomass quantity loaded into the boiler system may be calculated. The methane emission reductions are calculated on the amount of the sawdust by using the PCF plus model given in the Monitoring Plan /2/.

The basic data for the calculation of the emission reductions are the weight and water content of the wood residue combusted, and the gross heat energy produced in the boiler system. This information is collected with daily frequency and recorded in monitoring report forms in accordance with the requirements of the Monitoring Plan /2/ on each site.

3.5 Accuracy of Emission Reduction Calculations

In accordance with the requirements of the Monitoring Plan /2/, the produced gross heat energy is measured on each site with calibrated ultrasonic heat meter. The calibration records are part of the project installation documentation. The frequency of the re-calibration is now every four years according to Romanian legislation. The correctness of calibration process was confirmed at both sites visited /6/. The calibration of Vlahita heat meter was confirmed with calibration certificate provided /7/. Other meters were not verified because the same have been verified during the previous verification conducted and that the validity of the calibration period is 6 years.

Data handling and recording into the Excel sheet calculation template for calculation purposes has been done without any materiality mistakes. Minor differences owing to overwriting were corrected as it was not influencing the end result. There was an instance of missing data about water content which has now been considered as 50% content of water with a corresponding NCV and is deemed acceptable given that it is conservative. A FAR has been raised on the issue of handling records and transfer of data (FAR3).

3.6 Quality of Evidence to Determine Emission Reductions

The basic data for the calculation of the emission reductions are the weight and water content of the wood residue combusted, and the gross heat energy produced in the boiler system. This information is collected with daily frequency and recorded in the monitoring report forms in accordance with the requirements of the monitoring plan of each site.

The input data are verified by plant manager and performed by staff of the individual plants. These data are verified monthly by technical consultant of the project, who is plant manager of Vatra Dornei. Nevertheless some daily data was missing in reviewed samples (the months of January, February and December for the sites visited were reviewed and recalculated in detail and also for March in Huedin). As the data was corrected on site and based on records which are not listed in "obligatory" record list for this project and since the corrections did not influence the final outcome of the verification, this was deemed as acceptable. A FAR with regard to additional instructions/trainings to increase awareness of relevant employees and more consistent controls has also been raised and responded to by the client (see FAR3).

Operations are checked twice in year by local EPAs. This is different as opposed to the stipulations in the Monitoring plan /2/ (see FAR4) but it is in accordance with newly issued legal requirements. The EPAs employees are trained together with plant employees, as required in the Monitoring plan.



3.7 Management System and Quality Assurance

The SAWDUST 2000 Joint Implementation Project reflects legal requirements for national JI track 1 procedure /13/, and plant managers are appointed in all 5 plants. The operators of the boiler plants are responsible for the necessary daily raw data collection. The approval of the measured data and the evaluation of these are the task of the plant managers in co-operation with the local EPA. The calculated emission reductions are approved by the local EPAs.

The monitoring tasks are included into the Monitoring Plan as a special instruction.

The personnel were trained on the operation of the new biomass boiler system as well as in relation of the importance of the calculation of emission reductions and the way to achieve these. Records from mentioned trainings are available at the audited sites /8/, /10/.

The quality assurance system comprises inspection of the monitoring procedure by an independent third party, the local EPAs were recommended for this activity. The tasks of the quality assurance to be performed by the utility/project operator and the relevant local EPA are listed in detail in the Monitoring Plan. The change of periodicity according new legal requirements for this procedure is required (FAR4).

Management system and data collecting approach is periodically checked and reviewed first by Mr. Cristian Dragan, plant manager in Vatra Dornei and Supervisor of Sawdust 2000 in one person, and also by periodical inspections of EPA's staff. The improvement of recording discipline is required (FAR3).



4 PROJECT SCORECARD

Risk Areas	Conclusions			Summary of findings and comments	Error/Discounted Uncertainty Tonnes
	Baseline Emissions	Project Emissions	Calculated Emission Reductions		
Completeness	<ul style="list-style-type: none"> Source coverage/ boundary definition 	OK	OK	The project boundary is clearly described in PDD/1/ and Baseline study /3/ as heat production, heat distribution and supply include anaerobic digestion of biomasses.	OK
Accuracy	<ul style="list-style-type: none"> Physical Measurement and Analysis 	OK	OK	The measurement devices are in accordance with Romanian national law.	OK
	<ul style="list-style-type: none"> Data calculations 	OK	OK	Data calculation is based on heating measurement and emission factor, which is determined in the PDD.	OK
	<ul style="list-style-type: none"> Data management & reporting 	OK	OK	The data management and reporting is on sufficient level.	OK
Consistency	<ul style="list-style-type: none"> Changes in the project 	OK	OK	No changes observed.	OK



5 VERIFICATION STATEMENT

Det Norske Veritas Certification AS (DNV) has performed a verification of the emission reductions reported for the *SAWDUST 2000 Joint Implementation Project* in Romania for the period 1 January 2008 to 31 December 2008.

The Danish Environmental Protection Agency (DEPA) is responsible for the collection of data in accordance with the validated monitoring plan and the reporting of GHG emissions reductions from the project.

It is DNV's responsibility to express an independent verification statement on the reported GHG emission reductions from the project and the compliance with the monitoring plan.

The verification was carried out in accordance with the Determination and Verification Manual and Romanian JI Track I procedure. DNV conducted the verification on the basis of the monitoring plan included in the PDD /1/ of the project and the project's monitoring plans for individual sites (Guidelines for Monitoring Plan – Version 3 – issued 2005-01-05) for the year 2008 /2/. The verification included i) checking whether the provisions of the monitoring plan in the PDD were consistently and appropriately applied and ii) the collection of evidence supporting the reported data.

DNV's verification approach draws on an understanding of the risks associated with reporting of GHG emission data and the controls in place to mitigate these. DNV planned and performed the verification by obtaining evidence and other information and explanations that DNV considers necessary to give reasonable assurance that reported GHG emission reductions are fairly stated.

In DNV's opinion, the GHG emissions reduction for the project as reported in the project's monitoring reports for individual sites for 2008 /5/ is fairly stated.

The GHG emission reductions were correctly calculated on the basis of the validated monitoring plan and formulae given in the Project Design Document of 5 January 2005 /1/.

Det Norske Veritas Certification AS is able to certify that the emission reductions from the SAWDUST 2000 Joint Implementation Project in Romania during the period 1 January 2008 to 31 December 2008 amount to **72 198** tonnes of CO₂ equivalent.

For the individual sites, this translates to:

Huedin	5 853 tonnes of CO ₂ equivalent
Gheorgheni	11 801 tonnes of CO ₂ equivalent
Intorsura Buzaului	10 189 tonnes of CO ₂ equivalent
Vatra Dornei	37 091 tonnes of CO ₂ equivalent
Vlahita	7 264 tonnes of CO ₂ equivalent

DNV does not assume any responsibility towards the issuance and utilization of the emission reductions hereby verified and certified. The verification of reported emission reductions is based on the information made available to DNV and the engagement conditions detailed in



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this report. DNV cannot be held liable by any party for decisions made or not made based on this report.

Prague and Bangalore, 25 March 2010

Mario Vöröš
JI Verifier
DNV Prague, Czech Republic

Kumaraswamy Chandrashekara
Regional Manager (South Asia & Oceania),
Det Norske Veritas Certification AS



6 REFERENCES

Documents provided by the Project Participants that relate directly to the GHG components of the project. These have been used as direct sources of evidence for the periodic verification conclusions, and are usually further checked through interviews with key personnel.

- /1/ SAWDUST 2000 Project Design Document - Version 3 – issued 2005-01-05
<http://ji.unfccc.int/JIITLProject/DB/YVNY1K95HNNREFBNUYC8MGJD04HCCT/details>
- /2/ SAWDUST 2000 Guidelines for Monitoring Plan – Version 3 – issued 2005-01-05 and previous SAWDUST 2000 Project Implementation Monitoring Plan – Version 1- issued 2002-09-16
<http://ji.unfccc.int/JIITLProject/DB/YVNY1K95HNNREFBNUYC8MGJD04HCCT/details>
- /3/ SAWDUST 2000 Baseline Study – Version 3 – issued 2005-01-05
<http://ji.unfccc.int/JIITLProject/DB/YVNY1K95HNNREFBNUYC8MGJD04HCCT/details>
- /4/ DNV: Periodic verification report for 1 January 2007 to 31 December 2007 - Report number 2008-0968 – version 01 – issued 22-06-2008
- /5/ Monitoring reports for individual sites as excel files:
Monitoring Plan gheorghieni - 2008 - 2.xls dated 22 June 2009
monitoring plan huedin 2008 - 3.xls dated 28 May 2009
Monitoring plan Intorsura Buzaului 2008 - 1.xls dated 4 May 2009
monitoring plan vatra dornei 2008 -2.xls dated 28 May 2009
monitoring plan vlahita 2008-1.xls dated 4 May 2009
- /6/ Calibration certificate for Vlahita heat meters dated 23 August 2007
- /7/ Calibration certificate for Vatra Dornei heat meters dated 20 September 2006
- /8/ Training records from 24 January 2008 and 8 February 2009 (operators, EPA employee in Vatra Dornei)
- /9/ EPA's inspection records (checklist) for Vatra Dornei from 7 February and 23 October 2008
- /10/ Training records from 25 January 2008 and 5 February 2009 (operators, EPA employee in Huedin)
- /11/ EPA's inspection records (checklist) for Huedin
- /12/ SGS Determination report: DETERMINATION OF THE SAWDUST 2000 PROJECT dated 16 February 2005

Background documents related to the design and/or methodologies employed in the design or other reference documents.

- /13/ JI Supervisory Committee, Determination and verification manual, version 01 adopted at JISC 19



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- /14/ National procedure for using Joint Implementation (JI) mechanism under Track I (National JI Track I Procedure) issued 21 March 2008

<http://ji.unfccc.int/UserManagement/FileStorage/AWBVICCKC5KW215L28BETVJZ1YHUN6>

Persons interviewed during the initial verification, or persons who contributed with other information that are not included in the documents listed above.

- /15/ Mr. Mihai Brasoveanu, LPC – contact person DEPA
/16/ Mr. Cristian Dragan, plant manager in Vatra Dornei, Supervisor of Sawdust 2000
/17/ Mr. Shinco Zoltan, plant manager in Huedin

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APPENDIX A

VERIFICATION CHECKLIST

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 <i>Forward Action Requests</i>)
A. Defined organisational structure, responsibilities and competencies		
A.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>	F	<p>The boiler plants in the five towns involved in the project SAWDUST 2000 are the property of the local government, and plant managers are appointed by them. The operators of the boiler plants are responsible for the necessary daily raw data collection; the evaluation is a task for the plant managers with the cooperation of local EPA responsible to audits of the plants according to check list.</p> <p>Local EPA has attended on enhancement training and made active inspections according to project methodology requirements.</p> <p>Refresh training (monitoring procedures) for responsible personnel and EPA personnel is made annually and properly documented.</p>
A.2. Responsibilities <i>Specific monitoring and reporting tasks and responsibilities are included in job descriptions or special instructions for employees.</i>	F	<p>The monitoring tasks are included into the monitoring plan as special instruction.</p> <p>Awareness of relevant personnel is at good level. Refresh training (monitoring procedures) for responsible personnel and EPA personnel is made annually and properly documented.</p>

Expectations for GHG data management system/controls	Score	Verifiers Comments (including <i>Forward Action Requests</i>)
<p>A.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></p>	F	The personnel were trained in relation of the importance of the emission reductions and the way to achieve this. Records from the trainings are stored on site.
<p>B. Conformance with monitoring plan</p>		
<p>B.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></p>	F	The collection of raw data for the calculation of the emission reduction is continuous in each of the five places of the project in accordance of the monitoring plan.
<p>B.2. Necessary Changes <i>Necessary changes to the monitoring plan are identified and changes are integrated in local procedures as necessary.</i></p>	F	Not necessary

Expectations for GHG data management system/controls	Score	Verifiers Comments (including Forward Action Requests)
<p>C. Application of GHG determination methods</p> <p>C.1. Methods used</p> <p><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></p>	<p>F</p>	<p>The emission reduction caused by the project consists of two areas:</p> <ul style="list-style-type: none"> • Carbon dioxide emission reduction from substituting fossil fuels (oil and natural gas) with wood residues • Methane emission reduction (anaerobic digestion of wood residues) from reducing the quantity of wood residues dumped in stockpiles in the nature <p>Carbon dioxide emission reductions are calculated on the base of the heat supply of each cities considering the emission factors and calorific value of the necessary existing fossil fuels substituted by wood residues (first of all by sawdust).</p> <p>The methane emission reduction is calculated using the model of PCF plus Research Study. (Methane and Nitrous Oxide Emission from Biomass Waste Stockpiles) The study is a first-order multiphase model and includes three key aspects when estimating methane emission.</p> <ol style="list-style-type: none"> 1. to predict the methane emission as a function of time for wood stockpiles 2. requires easily obtainable input parameters 3. is able to incorporate wood waste of various ages and types <p>The quantity of the avoided methane emission in carbon dioxide equivalent is calculated by a computer program. The calculations may be followed on the monitoring record forms.</p> <p>The monitoring plan contains instruction for the operation of the standby boiler system during the break down of the biomass boilers. In this case the amount of the used fossil fuel and its net calorific value should be determined and considered at the calculation of the emission reduction.</p>

Expectations for GHG data management system/controls	Score	Verifiers Comments (including <i>Forward Action Requests</i>)
<p>C.2. Information/process flow <i>An information/process flow diagram, describing the entire process from raw data to reported totals is developed.</i></p>	P	<p>The raw data are collected in individual boiler houses by operators in daily recorded logbooks. Plant managers fulfilled monitoring reports excel sheets, which are Monitoring report. The control of this individual excel files is performed by Plant manager from Vatra Dornei, who is responsible for general review of Monitoring report. The whole process is cross checked by local EPAs.</p> <p>Very small indiscipline in primary recording and overwriting in monitoring plans were observed during verification review. All mistakes were corrected. (FAR 3)</p>
<p>C.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></p>	F	<p>Each input, and the assumptions used during the calculation of emission reduction are documented clearly on the monitoring record forms.</p>
<p>C.4. Data trails <i>Requirements for documented data trails are defined and implemented and all documentation are physically available.</i></p>	F	<p>The forms included in the monitoring plan are used as a protocol of data handling. Data and information obtained by third party concerning are documented and confirmed by signature.</p>
D. Identification and maintenance of key process parameters		
<p>D.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></p>	P	<p>The moisture of the wood residue used for the boilers is measured daily. Methodology of sawdust drying process is properly kept. Laboratory scales are calibrated properly.</p> <p>The produced heat energy also is reported once every day and it is measured by ultrasonic heat meter continuously.</p>

Expectations for GHG data management system/controls	Score	Verifiers Comments (including Forward Action Requests)
<p>D.2. Calibration/maintenance <i>Appropriate calibration/maintenance requirements are determined.</i></p>	<p>P</p>	<p>The ultrasonic heat meter in each site was calibrated during the installation of the new boiler system. Recalibration is performed every four years according to the national legislation.</p> <p>All measurements devices are correctly maintained and calibrated. Recalibration of measurement devices in boiler plant in Vlahita, where the recalibration was scheduled for June 2008, what was confirmed by provided calibration report /6/</p> <p>The moisture of the wood residue supplied into the boiler is calculated by the weight loss on drying using the balance and drying oven.</p> <p>The boiler system has instructions for maintenance. The performance of the maintenance and every change in the operation of the biomass boilers are documented also on the monitoring record forms.</p>
<p>E. GHG Calculations</p>		
<p>E.1. 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></p>	<p>P</p>	<p>The calculated emission reduction are reviewed and approved by the local EPAs.</p> <p>Quarterly inspections have been required by local EPA's but new legal requirements has set these inspections interval for twice in year. Thus the update of the Monitoring plan, to be in compliance with legal requirements, is required (FAR4).</p>
<p>E.2. 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></p>	<p>F</p>	<p>Each monitoring record form is reviewed and approved by the plant manager and finally is reviewed by Plant manager from Vatra Dornei.</p> <p>Independent inspection of project is performed by local EPA.</p>

Expectations for GHG data management system/controls	Score	Verifiers Comments (including <i>Forward Action Requests</i>)
<p>E.3. Data protection measures <i>Data protection measures for databases/spreadsheets should be in place (access restrictions and editor rights).</i></p>	P	<p>The input data necessary for the calculation and the calculation of the emission reduction of the project are stored in computer, but all information is also available in printed form and copied on CDs.</p> <p>The archiving period should be clearly set in compliance with all requirements of involved parties (DEPA, Romanian government, JI track 1 requirements, companies needs) (FAR2)</p>
<p>E.4. IT systems <i>IT systems used for GHG monitoring and reporting should be tested and documented.</i></p>	P	<p>Individual boiler houses have independent computers for reporting daily logbooks to excel file of Monitoring report for their boiler house. These files are finally collected in Vatra Dornei for final review.</p> <p>The monitoring reports are archived on CDs annually. The requirements for archiving period are not clear. It shall be reviewed what period is required from Romanian government or DEPA and establish this period and include the appropriate way of the electronic data back-up. (FAR2).</p>

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
Shut down of heat meters.	The heat meters are regularly calibrated and maintained. The eventual malfunction would be reported in operational records. Recalculation from invoicing of heat delivery would be possible.	Wrong data usage
Wrong data transfer	The data is controlled by individual plant manager and by supervisor of the project (he checks the data randomly).	Wrong formulas application
Incorrect calculation	The formulas used in excel files was checked in several steps and review by supervisor of the project annually.	

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 <i>Forward Action Requests</i>)
Wrong data usage	The Monitoring plans was compared with sample of primary data and small incorrectness was corrected on site	
Wrong formulas application	All formulas was verified with Monitoring Plan /2/	

