

“S V I L O S A” CO

SVISHTOV, BULGARIA

ANNUAL REPORT

**FOR GENERATED CARBON
EMISSIONS**

PROJECT “BIOMASS BOILER”

PREPARED FOR THE WORLD BANK
CUSTODIAN OF THE PROTOTYPE CARBON FUND (PCF)

APPROVED BY: Dipl. Eng. M. Kolchev – Chief Executive Director

January 2008
The town of Svishtov, Bulgaria



Responsible Care

ISO 14001:2004



Certificate of approval № 23020-A

ISO 9001:2000

Certificate of approval № 170240

I. Introduction

Svilosa AD through its main daughter company Svilocell EAD is the only producer in Bulgaria of bleached kraft pulp and products thereof. As a raw material is used wood from hardwood types: beech, oak, poplar and acacia. After debarking of the logs and cutting into chips the wood is cooked. The obtained cellulose is washed, sorted and bleached, after that is dried and baled in sheet and blocks. During cooking is used the conventional sulphate (kraft) process, and the bleaching included oxygen delignification, oxygen-alkaline treatment and treating with chlorine dioxide. The processed cooking solution is congested in the Evaporation Plant (EP) and is burnt in the Sodium Recovery Boiler (SRB) in order to regenerate chemicals.

In the raw material preparation process for pulp production are discarded around 50 000 t/year wood barks with moisture of about 65%, which are stock piled on the dumping-ground. The storage depot for wood waste does not respond to the contemporary normative requirements. Intensive decomposition processes of the organic mass take place. The deposited barks decay and self-ignite. The products, which originate from these processes, give negative impact on the groundwaters and the atmospheric air.

The development of the market for reduced carbon emissions gave opportunity to *Svilosa Co* to choose the approach “Combined implementation” and to invest in a project for energy production from renewable source and utilization of the waste barks. The major goals are:

- Avoids the disposal of the fresh waste;
- Utilization of the energy potential of the barks;
- Evasion of the methane emissions from the bark decay;
- Reduction of the methane emissions from the already disposed wood waste;
- Reduction of the amount of burned coals;
- Reduction of the CO₂ emissions as a result of substitution of the coals with biomass.

The project has positive impact on the environment concerning the emission reduction of green house gasses and the air purity in the region, as well as for avoidance of the disposal of waste biomass in future.

Our main aim is to strengthen the leadership in the Balkans and Europe’ pulp industry and to reach it the company is following a competitive investment strategy. The company is planning an investment strategy for increasing of pulp production by improvement of its energy efficiency and accomplishment of the necessary investments for carrying in accordance to the ecological requirements of EU (IPPC BAT).

On September 16th 2007 the planned Reconstruction for the increasing of the working capacity of the main subsidiary Svilocell EAD has started. The main production lines were stopped - Fibre Line and Soda Recovery Boiler. As the necessity of thermal energy drop out, the Biomass boiler also was stopped for a certain period of time. This will be also pointed out in the filled-in electronic workbook in Excel format. The workbook consists of data for the years 2004, 2005 2006 and 2007, which is used for calculation of the generated carbon emissions. The installation works of the new equipment have been completed, a commissioning of the reconstructed production line is performed and the activities for the fine tuning of the technological process are undergoing in the moment.

II. Structural changes

With our letter № 845/9.V.2006 we have informed you about the carried out structural changes in the company – the Pulp mill is divested as a separate joint stock company Svilocell EAD, which is 100% owned subsidiary of Svilosa AD.

The production structure includes:

- Production Installation for bleached kraft pulp;
- Installation for production of CMC;
- Water supply, sewerage and communications

In accordance with section 10.11 Assignment (a) of the signed on 24.09.2003 Emission Reductions Purchase Agreement between Svilosa AD, Svishtov and the World Bank, as a trustee of PCF, Svilosa AD assigns all rights and obligations regarding the Agreement to the company Svilocell EAD.

In this relation, considered from 01.01.2006 the operator of the installation Biomass Boiler and Biomass Depot is Svilocell EAD, but Svilosa AD participates 100% in the company's capital via an installment in kind and is a sole-owner of the shares

The required actions for changes in the project management organization and the Management and Monitoring of the System have been carried out.

The performed restructuring as well as the accounts made on the basis of the results envisaged in the Monitoring Plan single tests, idle time of the boiler for maintenance, the achieved quantities reduced carbon emissions in 2004 and 2005 and the present biomass will not have influence over the quality and the fulfillment of the total quality of contracted carbon emissions according to the first amendment of the Emission Reductions Purchase Agreement (TF.No.052196). (First Amendment to the Emission Reductions Purchase Agreement (ERPA) for the Bulgaria Svilosa Biomass Project)

No suggestions for amendments in the Emissions reduction purchase agreement (ERPA) have been made and we thus consider that they are not necessary.

The corresponding authorities are informer for all conducted activities

From the Ministry of Environment and Waters in Bulgaria raised the question for signing of a new Approval Letter, in which Svilocell EAD shall be noted as a supplier of the reduced emission units.

As the owner of the JI project remains Svilosa AD, we consider that it is not necessary to issue a new approval letter. Our statement was sent to the Ministry on November 31st 2007 and up until now we have not received any comments. We have notified with an e-mail, dated January 10th 2008, the World Bank.

III. Biomass Boiler

1. Technical properties

In 2003 in Svilosa is erected and launched Boiler for Biomass and production of heat power for the production process in the Pulp Mill. As a primary fuel is used the fresh barks from the logs that are waste from the preparation of the wood for cooking and deferred bark. The produced heat power reduces the necessity of heat, produced in the Electric Power Station, as well as the quantity of used coal.

. The basic installation properties are as follows:

- Fuel: wood barks (fresh and deposited)
- Quantity of fed fuel; 12 500 kg/h barks with moisture 65% and calorific value 1000 ccal/kg
- Capacity: 14t/h concentrated steam with pressure 13 bars
- Power: 11 MW

The basic processes are fuel preparation, fuel feeding, bark burning and production of technological steam. The ashes from the under-grate space and the captured by the multi-cyclone are collected in a closed container for deposit.

The installation is designed and erected by “Polytechnicks” Ltd. company – Pleven, Bulgaria.

At the beginning of 2004 in the period of introduction of the Boiler in exploitation and reaching of the design properties (capacity and power) occurred considerable problems, which solving ended in the end of April. From May 2004 the Boiler is under normal exploitation

2. Changes and maintenance

In order to avoid entering of long wood pieces in the furnace and to provide filtering out of the water from the barks at the exit of the raw material preparation department was assembled a wood-chipping machine.

For providing of normal processing of the installation at the inlet of the burning chamber, additionally is assembled device for capturing of metal particles/pieces.

Concerning the arisen accidents, a journal is filled in, where are stated the type, date and hour of the failure. Measures for their timely removal are being taken.

For the burning process optimization, close to the installation is defined site for temporary storage of the fresh waste and reduction of its moisture content.

In 2005 have been performed the following upgrades of the installation:

On 22.05.2005 is assembled and launched a third feed pump. The pump is produced by a Bulgarian manufacturer. It is assembled in order to increase the safety of the installation.

On 23.05.2005 is assembled and launched second ventilator for smoke fan. Its assembly is motivated by the necessity to guarantee the efficiency of the installation, the safe and effective operation of the multi cyclone.

In April 2006 was purchased and installed a new flow meter for measuring the generated heat energy.

IV. Generated carbon emissions

The amount of generated reduced emissions (t CO_{2e}) and their correspondence with the preliminary contractually agreed are shown in table 1:

Table 1

year	<i>First amendment of the Emissions Reductions Purchase Agreement (7.05.2004)</i>	<i>Reduced carbon emissions according to the report of Svilosa</i>	<i>Verified Carbon Emissions</i>
	ERs, t CO _{2e}	ERs, t CO _{2e}	ERs, t CO _{2e}
2004	17 000	18 938	18 935
2005	37 000	43 324	45 449
2006	33 000	48 445	48 445
2007	48 000	33 053	

In execution of the Emissions Reductions Purchase Agreement (ERPA) the first annual verification of carbon emissions related to the project was performed during the period 31.01 – 3.02. 2005 by JCI /Japan Consulting Institute/ Japan. The results from the verification are summarized in report № JCI-CDM-VER-003-1, Revision No.00, certifying reduction of 18,935 tons of carbon emissions for the period May 2004– December 2004 inclusive.

In the period 27.02. – 2.03.2006 was carried out the second annual verification for certifying the quantity of reduced emissions for 2005. The results from the verification are summarized in report № JCI-CDM-VER-003-1-2P, Revision No.00, certifying the reduction of 45 449 tons of carbon emissions in 2005.

In the period 26.02. – 01.03.2007 was carried out the tertiary annual verification for certifying the quantity of reduced emissions for 2006. The results from the verification are summarized in report № JCI-CDM-VER-003-1-3P, Revision No.00, certifying the reduction of 48 445 tons of carbon emissions in 2006..

The reports are stored in the office of the project manager.

V. Project Management

1. System for management and monitoring

System for management and monitoring is formed for determination of the responsibilities concerning collection, registering and documenting of the data, necessary for the emissions' calculation and facilitation of the verification processes and certification of the achieved reduced emissions. The personnel, responsible for the process data management is familiar with the procedures from the System for management and monitoring. The responsibilities are clearly defined. A project manager is appointed, who controls the task implementations. The quality manager controls the procedure fulfillment and the data quality for constant improvement of the Management and Monitoring System.

During the tertiary annual verification are prescribed the following forward action requests for implementation:

3P-FAR-1 Improvement to the technological computer system by introducing monthly backup of the data base of the stored in the system production, monitoring and control data and a hard copy printout of the monthly produced heat chart for better tractability of the actual production.

In execution of 3P-FAR-1 are carried out the following activities:

3P-FAR-1-1 To the procedure P_03 Gathering and storage of the data of the System for Management and Monitoring, item 5 implementation of the procedure, an item 5.2.2.2 Technological computer system for a monthly hard copy printout of the data base of the stored in the system parameters of production, monitoring and controlling of the biomass boiler.

3P-FAR-1-2 To the procedure P_03 Gathering and storage the data of the System for Management and Monitoring, item 5 implementation of the procedure, an item 5.2.2.2 is added – Technological computer system of the hard copy printout of the monthly heat production chart of the displayed in the technological computer system.

3P-FAR-1-3 To the item 3.4 Storage of the data of the system for management and monitoring of the biomass boiler the technological computer system is included. The main item is the better tractability of the actual production and preservation of the risk of lost (non-stored) data. The procedure P_03 Gathering and storage of the data is revised

All carried out changes are reflected in the System for Management

The maintenance and the improvement of the implemented system is ensured by the internal audits that are carried out

In the period 01.11.. – 02.11.2007г. was carried out internal audit of the *Management and Monitoring System* of the Biomass Boiler project.

The implementation of the following was done:

- Procedure P_04 from the Management and Monitoring System “Reliability of the data when problems with the measurement instruments occur”

- The training of the personnel, which is defined with the Instruction И-13 of the Quality Control System ISO 9001 – 2000.

2. Data management

All necessary data for the calculation the amount of reduced emissions is collected and filled in the electronic workbook in Excel format. The requirements and principles for data collection in the database of the company are observed.

A contract between *Svilosa Co* and CHPP *Svilosa AD* is concluded for providing of the necessary information during the project operation.

The Project Manager stores all references, signed and sealed

2.1. Single inputs

Prior to the project beginning *Svilosa* carried out 24 horary experiments with the different species of wood. The results are provided in table 2.

Table 2

№	Indicators	Units	Species of the used wood			
			Beech	Turkey oak	Acacia	Poplar
1	Date of the test implementation		17.11.2003	19.11.2003	21.11.2003	11.12.2003
2	Pulp output 1	t	167	159	161	157
3	Quantity of the used wood 2	t	668	636	644	707
4	Wood moisture 3	%	39,55	42,49	39,06	55,59
5	Quantity of the used absolutely dry wood 4	t	403,8	365,8	392,5	313,8
6	Quantity of the obtained waste – barks 5	t	131,20	147,76	143,37	87,96
7	Barks moisture 3	%	68,58	68,61	67,37	78,09
8	Quantity of the absolutely dry barks 6	t	41,18	46,43	46,78	19,27
9	Barks caloricity 8	Gcal/t	0,72	0,67	0,82	0,78
10	Quantity of the obtained waste – shavings 5	t	20,57	20,44	20,44	11,22
11	Shavings moisture 3	%	39,55	42,49	39,06	55,59
12	Quantity of the absolutely dry shavings 7	t	12,43	11,76	12,46	4,98
13	Shavings caloricity 8	Gcal/t	2,26	2,19	2,31	1,51
Notes:						
1 – the quantities are specified by produced pulp bales weighing during the tests implementation						
2 – the quantities are specified in calculative way using the specific costs of wood from the respective species per production unit						
3 – the moisture content is specified in laboratory by analysis of 3 pieces of average tests						
4 –the quantities are found in calculative way as a product of the input wood quantity and the content of dry substance in it (row 3 of the table * (100 – row 4 of the table))/100						
5 – the quantities are specified by weighing of the trucks with barks (shavings, respectively) that are obtained during the tests implementation						
6 – the quantities are found in calculative way as a product of the weighed barks quantity and the content of dry substance in them (row 6 of the table * (100 – row 7 of the table))/100						
7 – the quantities are found in calculative way as a product of the weighed shavings quantity and the content of dry substance in them (row 10 of the table * (100 – row 11 of the table))/100						
8 – the caloricity is specified by a laboratory analysis of 3 pieces of average tests						

From the data in *Table 2* are defined the following properties:

- Determination of the subordination between produced pulp (at standard moisture) and used wood (on the basis of dry material);
- Determination of the subordination between the used wood and the generated technological waste (barks and shavings);
- Calculation of moisture and calorificity of fresh barks and shavings by wood species (poplar, oak, acacia, beech);
- Proportion of used wood / produced pulp per species;

The heat efficiency of the Biomass Boiler is defined during the 72 – horary test.

The determined factors for one time entries and admissions remain unaltered. In table 3 are stated all data, which are subject to single input in the electronic workbook

Table 3

<u>Fixed conversion factors</u>	Units		
Density of CH ₄	kg/m ³	0,654	
Conversion from CH ₄ to CO ₂ e		21	
Biomass boiler efficiency	%	77,73	
Wood Consumption (dry) to Pulp Production (process mc)	Units		
Acacia	%	244	
Beech	%	242	
Oak	%	230	
Poplar	%	200	
Process waste to input wood ratio (dry basis)	Units		
Acacia	%	15	
Beech	%	13	
Oak	%	16	
Poplar	%	8	
Ratio of wood waste (dry basis)	Units	Bark	Shavings/ Saw dust
Acacia	%	79	21
Beech	%	77	23
Oak	%	80	20
Poplar	%	80	20
Moisture Content of wood waste	%	70	44
Calorific Value of waste	Units	Bark	Shavings/ Saw dust
Acacia	MWh/tonne	0,96	2,69
Beech	MWh/tonne	0,84	2,62

Oak	MWh/tonne	0,77	2,54
Poplar	MWh/tonne	0,9	1,75
Stock piled waste	Units		
Moisture Content	%	46	
Calorific value (ambient moisture content)	MWh/tonne	1,6	

2.2. Monthly inputs

Each month data is entered in the electronic workbook concerning:

- Biomass boiler heat output, MWh/month (table 4);
- Pulp output per species, t/month (table 5)

The data for these indicators for the 2007 are shown in tables 4 and 5.

Table 4

year	2007	2007	2007	2007	2007	2007
month	January	February	March	April	May	June
Heat output	3293,000	4056,000	3024,000	2841,000	4213,000	1696,000

Table 4 – extension

2007	2007	2007	2007	2007	2007
July	August	September	October	November	December
3861,000	4195,000	1734,000	0,000	625,000	1750,000

Table 5

year	2007	2007	2007	2007	2007	2007
month	January	February	March	April	May	June
Poplar	0,000	376,320	0,000	0,000	228,502	54,391
Mixed	5523,602	4421,348	5226,316	5747,362	5681,999	5625,710

Table 5 - extension

2007	2007	2007	2007	2007	2007
July	August	September	October	November	December
0,000	0,000	0,000	0,000	0,000	0,000
6125,039	5647,267	2680,673	0,000	0,000	1491,033

2.3. Annual inputs

Annually in the electronic workbook is entered data for:

- CO2 emission factor of coal;
- Calorific value of coal;
- Thermal efficiency of CHPP;

Because of change in the wood delivery order the electronic model is being modified, as a new Sheet 8 *Blended wood consumption* is added for monthly data input and determination of the percentage ratio of received wood species.

The responsible person for the electronic workbook filling monthly enters data from the reference for delivered wood per species. The results from this Sheet are utilized as inlet data for page 4, cells D15, D16, D17 till L15, L16, L17.

The indicators' data for the 2006 are shown in table 6.

Table 6

Annual Conversion Factors	Units	2007
CO2 emission factor of coal	kgCO2/t	
Calorific value of coal	MWh/tonne	
CHPP thermal Efficiency	%	
Blended wood consumption ratios	Units	2007
-Acacia	%	5,4
- Beech	%	17,1
- Oak	%	77,5

2.4. Others

For the performance of the operative and monitoring responsibilities of the Monitoring Plan, the Project Operator collects regularly data and information for:

- Production of process heat from CHPP – MWh/month (table 7);
- Total generated electricity from CHPP, MWh/month (table 8);
- Delivery of wood, tons/month (table 9);
- Modifications in CHPP and ancillary plant;

The records for these indicators for the 2007 are shown in tables 7, 8 and 9.

Table 7

year	2007	2007	2007	2007	2007	2007
month	January	February	March	April	May	June
Heat energy						

Table 7 – extension

2007	2007	2007	2007	2007	2007
July	August	September	October	November	December

Table 8

year	2007	2007	2007	2007	2007	2007
month	January	February	March	April	May	June
Electric energy						

Table 8 - extension

2007	2007	2007	2007	2007	2007
July	August	September	October	November	December

Table 9

year	2007	2007	2007	2007	2007	2007
month	January	February	March	April	May	June
Acacia	1002,198	2506,989	3267,903	2488,103	1002,183	464,720
Beech	1495,664	3146,413	4025,752	5240,771	4243,825	3682,604
Oak	25967,679	24493,366	12657,023	14589,330	15821,528	18993,439

Table 9 - extension

2007	2007	2007	2007	2007	2007	
July	August	September	October	November	December	Total
289,840	133,420	302,040	187,000	342,420	304,140	12290,956
3262,062	3555,987	3422,420	2448,400	2149,940	2382,860	39056,698
16836,164	13540,885	10815,580	10210,760	7997,720	5190,993	177114,467

2.5. Implementation of the EU Directive for the waste depots

Svilosa Co is committed to constant quality improvement of the environment and cooperates to the Ministry of Environment and Waters (MEO) for the implementation and adaptation of the European Legislation in Bulgaria.

According to the Monitoring Plan of the project *Svilosa* has made an official inquiry to the Ministry of environment and waters regarding the progress in the legislation in the area of depots and the put into compliance of their sites in correspondence with the execution and coming into force of Directive 99/31/EU regarding dung hills. In order to collect the necessary information was used *Questionnaire for waste management*, that is inseparable part of the Monitoring Plan of project Biomass Boiler.

Up to now there is no erected system on the site, which purpose is to capture and burn out the dumping gas.

Project Manager: Dipl. Eng. Y. Gaydarov