**MONITORING REPORT**

**rev. 4**

**for the period January 1st – August 31st, 2012**

**Svilosa Biomass Project**

**Project proponent: Svilosa AD, Svishtov, Bulgaria**

**Monitoring period: January 1st, 2012 – August 31st, 2012**

**Emission reductions achieved: 111 586** **t CO2e**

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**Svishtov, Bulgaria**

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# **List of abbreviations used**

UNFCCC – United Nations Frameworks Convention on Climate Changes

MOEW – Ministry of Environment and Waters

PDD – Project Design Document

JI – Joint Implementation

IBRD – International Bank for Reconstruction and Development

ERPA – Emission Reductions Purchase Agreement

ERs – Emission Reductions

ERU – Emission Reduction Unit

CHPP – Combined Heat and Power Plant

PCF – Prototype Carbon Fund

SRB – Soda Recovery Boiler

EP – Evaporation Plant

CO2 – Carbon Dioxide

CO2e – Carbon Dioxide Equivalent

MMS – Management and Monitoring System

# **General information**

# **Project background**

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

The development of the carbon finance market gave opportunity to Svilosa AD to use Joint implementation (JI) mechanism under Kyoto Protocol to invest in the project aimed at energy production from a renewable source and utilization of the wood waste. The major goals of the project are:

* Avoidance of the disposal of the fresh wood waste;
* Utilization of the energy potential of the wood waste;
* Avoidance of the methane emissions from the wood waste decay;
* Reduction of the methane emissions from the already disposed wood waste;
* Reduction of the amount of burned coal;
* Reduction of the СО2 emissions as a result of substitution of the coal with biomass.

The Svilosa Biomass Project was approved by the Republic of Bulgaria as a Joint Implementation project in accordance to the Article 6 of the Kyoto Protocol. The Project design document (PDD) was determinate by TÜV Süddeutschland Bau und Betrieb Carbon Management Service and the Determination report No 67 962 was issued on October 4th, 2002. On February 25th, 2003 the Ministry of Environment and Water of Bulgaria issued a Letter of Approval for this JI project.

On September 24th, 2003 Svilosa AD and the International Bank for Reconstruction and Development (IBRD) as Trustee of the Prototype Carbon Fund (PCF) concluded an Emission Reductions Purchase Agreement (ERPA).

The project was registered as JI project under Track 1 on the UNFCCC website with the following ITL Project ID: BG1000163.

The crediting period of the project is from January 1st, 2004 to December 31st, 2012.

The project generates emission reductions as consequence of:

* Wood waste utilization;
* Reduction of heat energy consumption from Combined Heat and Power Plant.

# **History of project implementation**

Svilosa has verification reports for the reporting period of 2004 – 2008 years issued by JCI (Japan Consulting Institute). Totally emission reductions in amount of 191 841 t CO2e were verified during this reporting period.

For the reporting period of 2009-2011 years Bureau Veritas verified emission reductions in amount of 135,492 t CO2e.

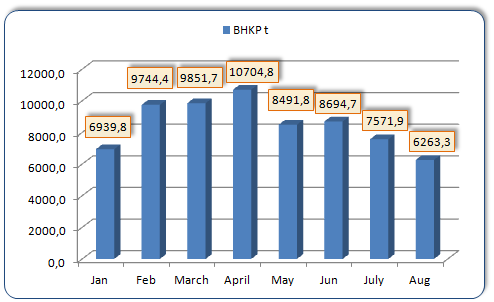
The reports are stored by the Project Manager.

# **Project operation status during this monitoring period**

Below there is a short explanation concerning the operation of the pulp mill in 2012.

Once the annual overhaul in the end of 2011 – beginning of 2012 was completed, Svilocell EAD restarted its production on January 7th, 2012. In the Graph 1 below the data for the pulp produced in 2012 during this monitoring period are presented.

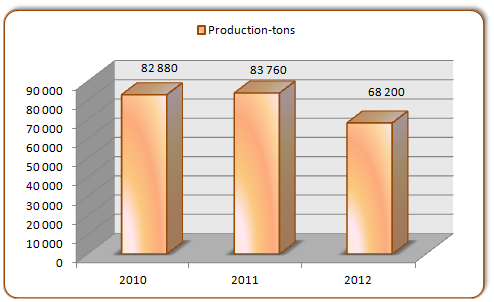
Graph 1. Pulp production during the monitoring period of January 1 – August 31, 2012.



Within the period January – April the mill has stable operation and increased gradually the production volumes. The pick of production was in April 2012 when 10 705 t of pulp were produced.

Since May 2012 up to the present moment in the wood logging sector and on the wood market as a whole, serious disturbances have occurred. The neighbor countries started to import Bulgarian wood that led to an increase in the wood price per ton and lack of wood as well. Due to that reason the stoppages of Svilocell EAD increased, i.e. due to the lack of the main raw material – hardwood. This could be clearly seen on the pulp produced in the next months. In comparison to the relevant periods in 2010 and 2011 the pulp production was lower on approximately 15 000 t (see Graph 2 below).

Graph 2. Comparison of pulp production during the first eight months of 2010-2012 years.



Additionally the situation is deteriorated by the period when the people in Bulgaria (and the north part of Greece also) buy firewood for the winter period. In this regard Svilocell EAD stopped its production within the period September 1st- 15th until the needed wood volumes are accumulated.

Within the period January 1– August 31, 2012 emissions in amount of 111 586 t CO2e were reduced. For the calculation data from the Combined Heat and Power Plant (CHPP) Svilosa AD were used, i.e. coal calorific value, coal emission factor, and thermal efficiency for the period January – September 2012.

# Operation of Biomass Boiler

# Changes and maintenance

In Annex 1 to the Monitoring report the overhaul of biomass boiler as well the improvements made to the equipment are described in details.

The PDD envisaged construction of boiler and auxiliary parts for wood barks incineration with thermal capacity of 14 MW and heat generation of 18 t/h saturated steam. However, the PDD permits the maximum size of the boiler to be with capacity of up to 24 MW.

Due to wearing out of some of the main parts of the boiler at the end of 2011 a scheduled overhaul of it was performed. The old boiler was replaced with the new more efficient boiler (type Boiler – КПТ 28 000 /13, manufacturer number 19, registration number ВТПК – 0543/30.01.2012). The new boiler was produced in 2011 by Promishlena Energetika AD, based in Varna, Bulgaria. It has a Certificate of initial technical inspection issued on March 15th, 2012. The increase of the nominal thermal capacity of the boiler (up to 19.7 MW) is reached through an extension of the heating surface of the boiler, which leads to its more efficient usage.

All auxiliary equipment of the boiler and its characteristics were not changed, including the fuel feeding and the dozing unit, the amount of the fuel fed, the grate and the dust separation.

These modifications do not have any impact on the methodology used by the project given that:

1. This overhaul do not impact project boundaries.
2. The monitoring points are not modified.

Further, these modifications do not have any impact on the additionality of the project since:

1. The generated steam will be used only for meeting the pulp mill demands as per PDD. As it is demonstrated on Graph 2, the pulp production level remains stable and is not expected to increase in 2012. The heat production by the biomass boiler will respond to the needs of pulp production.
2. PDD projects that the biomass boiler will generate 117 GWh of heat annually. This annual amount has been used in the establishment of additionality. This limit will not be exceeded with the new boiler (during 8 months of 2012 the new boiler generated about 68 GWh of heat).

Finally, the actual total ERs from the project and annual ERs for 2012 year will not exceed the total ERs from the project (826,001 tCO2e) and annual ERs for 2012 year (124,172 tCO2e) as it is described in the PDD, Baseline Study part.

* 1. **Operation of the boiler in 2012**

In 2012 the biomass boiler operation was related to the pulp mill production. As a result of the increased boiler capacity, the increased calorific value of the wood barks and increased heat energy demand during the first half of the year there was a steady increase of the heat energy generated. This lead to an increased amount of emission reductions. Since May 2012 up to the present moment due to the lack of wood Svilocell was forced to stop its production numerous times that influenced the biomass boiler operation as well.

# 3.3. Monitoring equipment

In accordance to the Monitoring plan the following data are monitored:

* Heat energy produced by the biomass boiler (MWh) - it is reported as per the indications of the flow meter.
* Weight of the pulp produced in tons (t) – it is defined from weighting on an electronic scale, produced by METLER TOLEDO.
* Weight of the wood volumes supplied in tons (t) – it is defined from weighting on a motor scale, produced by Mary Betz.

All measurement devices correspond to the operational requirements.

The main parameters of the monitoring equipment are presented in Table 1.

Table 1. Main parameters of the monitoring equipment.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Measuring instrument | **Measuring units and parameters** | Manufacturer | Serial number | Installation date | Date of last calibration | Calibration period | Mistake/ Uncertainty level | Comment |
| EDZ 420 | m³/h steam | Bopp&Routher Messtechnik GmbH Germany – Metra Energie | 94036288 | 20.01.2012 | 03.2012 | 2 years | ±1 % | Swirl flow meter was installed on January 20th, 2012. It transferred the information to the RMC621 meter for defining the amount of heat energy generated in MW/h. It was dismantled on May 22nd, 2012 due to damage. |
| PROWIRL 72F | m³/h steam | ENDRES+  HAUSER | F406B402000 | 22.05.2012 | 20.04.2012 | 2 years | ±0.75 | Swirl flow meter – it replaced the damaged flow meter EDZ 420. Protocol for installment is dated May 22nd, 2012. It transfers the information to the RMC621 meter for defining the amount of heat energy generated in MW/h. |
| RMC621 | t/h, MW/h,– heat output from boiler, (HBB) | ENDRES+  HAUSER | D9003A0422E | 16.11.2010 | 03.2012 | 2 years | ±0.2 % | Calibration is approved with stickers. |
| Motor scale | t, wood volume supplied | “Mary Betz” | 021206 | 12.12.2006 | 04.06.2012 | 1 year | 3 | - |
| Automatic scale | t, pulp produced | Metler Toledo | 4280193 | 20.05.2004 | 22.05.2012 | 1 year | 3 | - |

The company has adopted and certified an Integrated Management System (IMS) on the Quality and Environment in accordance to the international approved standards ISO 9001:2008 and ISO 14001:2004. A Quality Certificate № SOF0170240 dated December 27th, 2011 as well Environment Certificate № SOF0170240/А dated August 3rd, 2012 were issued by Lloyds Register Quality Assurance Ltd. In November 2012 a recertification audit of the IMS will be performed.

A certification audit concerning the standard OHSAS 18001: 2007 is pending.

The company has adopted Procedure P10 - Securing and control of equipment for observation and measuring. It defined the order, the authorities and responsibilities for management of the equipment for measurement and monitoring, calibration, records kept as well as their storage. Procedure P10 of the IMS is an integral part of the Management and monitoring system of the Biomass boiler project.

# Calculation of carbon emission reductions

# Overview of achieved emission reductions

The table below consist information concerning the baseline emissions, project emissions and emission reductions generated per year.

Тable 2. Baseline emissions, project emissions and ERs during 2004-2012 years.

|  |  |  |  |
| --- | --- | --- | --- |
| Year | Baseline emissions, tCO2e | Project emissions, tCO2e | Emission reductions, tCO2e |
| 2004 | 18 935 | 0 | 18 935 |
| 2005 | 45 449 | 0 | 45 449 |
| 2006 | 48 445 | 0 | 48 445 |
| 2007 | 33 053 | 0 | 33 053 |
| 2008 | 45 959 | 0 | 45 959 |
| 2009 | 23 766 | 0 | 23 766 |
| 2010 | 49 373 | 0 | 49 373 |
| 2011 | 62 353 | 0 | 62 353 |
| 2012[[1]](#footnote-1) | 111 586 | 0 | 111 586 |

The Excel workbook (file “SVI\_Workbook\_2012\_rev4.xls”) is a part of the MR and was approved by the validation company. The Excel workbook calculates directly the achieved emission reductions. The data, subject to monitoring and entered into the workbook are presented in the MR.

The data from Tables 11 and 12 of the MR are entered into Sheet 5 “Monthly Inputs” of the workbook for the relevant year.

The data from Tables 13 of the MR are entered into Sheet 4 “Annual Inputs” of the workbook.

The data from Table 14 of the MR is entered into Sheet 8 “Blended Wood Consumption Ratio” of the workbook for the relevant year.

Emission reductions are achieved by:

* CO2 emission reductions due to coal replacement (ERCO2,coal);
* CH4 emission reductions due to wood burning (process and stockpile) (ERCH4).

The decrease of CH4 emissions leads to emission reductions generated by the project and is equal to 1 metric ton equivalent of CO2 calculated on the basis of the potential for the global warming.

# CO2 emission reductions due to coal replacement

ERCO2,coal = (HBB / EfTPP ) / HVCcoal x EFcoal/1000 (1)

where,

**ERCO2,coal – Tons** emission reductions due to coal replacement, t

**HBB –** heat generated by the Biomass Boiler, MWh

**EfTPP –** TPP efficiency, %

**HVCcoal –** caloricity of the consumed coal, MWh/tons **coal**

**EFcoal –** coal emission factor, kgCO2/tons coal

The following emission reductions have been achieved due to coal replacement within the monitoring period:

Table 3. Emission reductions due to coal replacement.

|  |  |  |  |
| --- | --- | --- | --- |
| **Monitoring period** | **Base line emissions, tons CO2** | **Project emissions, tons CO2** | **Emission reductions, tons CO2** |
| January 1st - August 31st, 2012 | **81 286** | **0** | **81 286** |

For reference see the additional file “BB\_Calculation\_29112012.xlsx”, Sheet “Coal\_01-082012” and the attached unprotected workbook.

# CH4 Emission reductions due to wood burning (process and stockpile)

The calculated volume of process and stockpile wood burning is multiplied by the relevant CH4 emissions factors. The emissions factors of the consumed wood depend on the species and the year of consumption.

ERCH4 = ERCH4,stockpile + ERCH4,process (2)

Where,

**ERCH4**–Tons emissions reductions of CH4 (t CH4) due to wood burning (process and stockpile), t

**ERCH4,stockpile**– Tons emission reductions of CH4 (t CH4) due to stockpile wood burning, t

**ERCH4,process**–Tons emission reductions of CH4 (t CH4) due to process wood burning, t

# CH4 Emission reductions due to stockpile wood burning

ERCH4,stockpile = Wy х ЕF, (3)

Where

**ERCH4,stockpile**- Tons emissions reductions of CH4 (t CH4) due to stockpile wood burning, t

**Wy** - stockpile wood volume, kg absolutely dry for the relevant year *y*;

**ЕF** - emission factor (kgCH4/kg Wood)

Table 4. Emission Factors for stockpile wood depending on piling period.

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Age of wood waste (years)** | **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** |
| Annual Emissions Factor for Stockpile Wood Waste, (**EF**) kgCH4/  kgWood | 0.0060822 | 0.0058206 | 0.005559 | 0.0052974 | 0.0051012 | 0.0048396 | 0.0046434 | 0.0044472 | 0.004251 |
|  |  |  |  |  |  |  |  |  |

For reference see Sheet 7 “Methane emission factors” in Excel workbook.

**For the monitoring period of January 1 - August 31, 2012** :

**ERCH4,stockpile**= W 2012 х 0,0060822 + W 2011 х 0,0058206 + W 2010 х 0,005559+ W 2009 х 0,0052974 + W 2008 х 0,0051012 + W 2007 х 0,0048396 + W 2006 х 0,0046434+ W 2005 х 0,0044472 +W 2004 x 0,004251 (**3)**

**ERCH4, stockpile:** 82484 kg CH4,

82484 kg CH4/1000 х 21 = 1732 tons СО2е, (4)

( Conversion factor from CH4 to CO2e = 21)

**ERCО2е, stockpile**: 1732 tons СО2е

During the monitoring period from the stockpile wastes burning were reduced 82 484 kg CH4 which leads to the reduction of 1 732 t СО2е.

For reference see an additional file “BB\_Calculation\_29112012.xlsx”, Sheet “Bark 01-082012”, Tables 1, 2 and 3; and the Excel workbook.

# CH4 Emissions reductions due to process wood burning

# 

ERCH4,process = Wy х ЕF, (5)

Where

**ERCH4,process**-Tons emission reductions of CH4 (t CH4) due to process wood burning, t

**Wy** - wood volume, kg absolutely dry for the relevant year *y*

**ЕF** - emission factor (kgCH4/kg Wood)

Table 5. Emission Factors for process wood depending on piling period.

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Age of waste (years)** | **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** |
| Annual Emissions Factor for Process Wood Waste, (**EF)**  kgCH4/  kgWood | 0.008175 | 0.007848 | 0.0074556 | 0.0071286 | 0.0068016 | 0.00654 | 0.006213 | 0.0059514 | 0.0056898 |
|  |  |  |  |  |  |  |  |  |

For reference see Sheet 7 “Methane emission factors” in Excel workbook.

**For the monitoring period of January 1 - August 31, 2012:**

**ERCH4,process**= W 2012 х 0,008175 + W 2011 х 0,007848 + W 2010 х 0,0074556+ W 2009 х 0,0071286 + W 2008 х 0,0068016 + W 2007 х 0,00654 + W 2006 х 0,006213+ W 2005 х 0,0059514 + W 2004 х 0,00569; **(5)**

**ERCH4,process:** 1 360 363 kg CH4, or28 568 t СО2е

1 360 363 kg CH4/1000 х 21 = 28 568 t СО2е (6)

( Conversion factor from CH4 to CO2e = 21)

During the monitoring period from the process wastes burning were reduced 1 360 363 kg CH4 which leads to the reduction of 28 568 t СО2е.

For reference see an additional file “BB\_Calculation\_29112012.xlsx”, Sheet “Bark 01-082012”, Tables 4, 5 and 6; and the Excel workbook.

The following emissions reductions (ERCO2e) have been achieved due to wood burning replacement within the monitoring period:

Table 6. Emission reductions due to wood burning.

|  |  |  |  |
| --- | --- | --- | --- |
| Monitoring period | **Baseline emissions, tons CO2e** | **Project emissions, tons CO2e** | **Emission reductions, tons CO2e** |
| January 1 - August 31, 2012 | **30300** | **0** | **30300** |

For reference see an additional file “BB\_Calculation\_29112012.xlsx”, Sheet “Bark 01-082012”, Tables 7 and 8.

* 1. **Project emission reductions**

ER= ERCO2,coal + ERCО2е (7)

Where

**ER**– Tons emission reductions achieved by the project during the monitoring period, t

**ERCO2,coal –** Tons emission reductions due to coal replacement, t

**ERCО2е** -Tons emissions reductions due to wood burning (process and stockpile), t

In the Table 7 below the total emission reductions achieved within the monitoring period January 1 - August 31, 2012 are shown.

Table 7. Project emission reductions during the period January 1st – August 31st, 2012.

|  |  |  |  |
| --- | --- | --- | --- |
| Monitoring period | Baseline emissions, tons CO2e | Project emissions, tons CO2e | Emission reductions, tons CO2e |
| January 1 - August 31, 2012 | 111 586 | 0 | 111 586 |

For reference see an additional file “BB\_Calculation\_29112012.xlsx”, Sheet “Summary 01-082012”, Tables 1 and 2; and Workbook rev.3, Sheet “2 MP Summary”.

All formulas in the workbook could be transparently and clearly checked (Sheet “2 MP Summary”, Sheet “4 Annual Inputs”; Sheet “6 Biomass Calculations” and Sheet “7 Methane Emission Factors”) for each single value and for all monitoring periods.

For reference see the attached unprotected workbook and the additional calculation file.

The amount of verified emission reductions (t CO2e) and their correspondence with the preliminary agreed in the PDD (Baseline Study part) are shown in Table 8:

Тable 8. Planned and actual emission reductions.

|  |  |  |
| --- | --- | --- |
| Year | ERs in accordance to PDD | Verified Emission Reductions |
| ERs,  t CO2e | ERs,  t CO2e |
| 2004 | 55 560 | 18 935 |
| 2005 | 65 807 | 45 449 |
| 2006 | 75328 | 48 445 |
| 2007 | 84 400 | 33 053 |
| 2008 | 93097 | 45 959 |
| 2009 | 101388 | 23 766 |
| 2010 | 109333 | 49 373 |
| 2011 | 116918 | 62 353 |

In accordance to the PDD (Baseline Study part) within the period 2004 – 2011 years the project planned to generate emission reductions in amount of 701 831 tCO2e.

The actual verified emission reductions within the same period are equal to 327 333 tCO2e.

The difference in the reduced amounts is as a result of the several factors.

First, at the end of 2003 huge amount of the wood barks accumulated at the landfill (and supposed to be used at the biomass boiler) was burnt due to self ignition.

Second, in the beginning of 2004 significant problems occurred with the start of boiler’s operation. The problems were eliminated by the end of April 2004. Third, in September 2007 the planned reconstruction of the pulp mill capacity was started. The two main production units were stopped, i.e. Fibre line and Recovery boiler. Due to that reason there was no need for heat energy and within the period September – December 2007 the biomass boiler was stopped as well.

Fourth, in February 2009 due to the world economic crisis Svilosa AD management decided to stop temporarily the production at Svilocell EAD. The pulp mill production was restarted in December 2009.

Within the monitoring period of January 1 – August 31, 2012 emission reductions in amount of 111 586 tCO2e were achieved.

# Project Management

# Management and monitoring system

# 

Project management and monitoring system determines the data collection responsibilities, data registering and reporting, required for the emission reductions calculation and verification processes.

The Management and Monitoring System (MMS) is agreed with the Project Manager and approved by the Executive Director. Training of the personnel for acknowledgement with the MMS (rev.4 dated February 4th, 2011) was performed. It is described in a protocol prepared in 2011. A hard copy of the signed MMS together with the procedures was presented to and stored by the head of Regeneration department.

In compliance to **Procedure P\_03\_Collection and storage of data, para. 2.2.4 Information loss prevention,** a part of the **MMS,** the term for document storage after the final transfer of emission reductions from the project is stated to 5 years.

The data management system represent technological computer system based on the programmable logical controller (PLC) managed through NT touch panel and SCADA system. The system is developed by Jarnforsen (Sweden). Changes related to requirements are performed by ECOSIM based in Pleven, Bulgaria. In case problems related to the SCADA system functioning occur, Svilosa is in contact with ECOSIM, despite the fact there is no contract for regular maintenance.

The Management system could control the boiler operation in different modes which are chosen and displayed in SCADA.

The System has three access stages of adjustment and boiler operations. The operator could change the set values and could manipulate with all the motors and regulators. The engineering stage could do everything that the operator does, including change of the limits. The supervisor’ stage could change the regulating parameters.

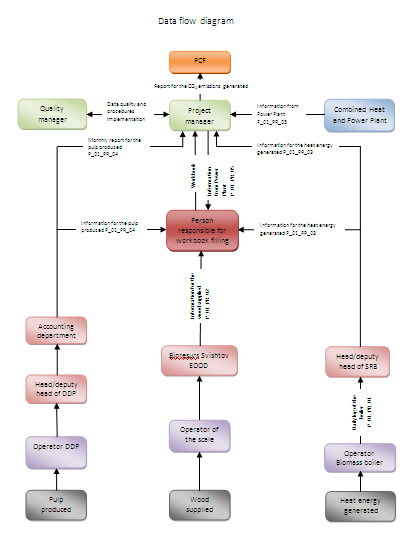
The persons in charge of the data management are familiar with the procedures from the project management and monitoring system. The responsibilities are clearly defined. All tasks concerning the data collection and monitoring report preparation are delegated to the responsible persons.

In the attached data flow diagram the personnel responsible for the data collection and transfer, the way for reporting of the data as well as processing, reporting and storage of the data, used for calculation of emission reductions, could be seen. The diagram is part of the Project Management and Monitoring System. The responsibilities and the chain of command and authority regarding the monitoring activities are presented on the Data flow diagram 1 (Annex 3 to the MMS).

A Project Manager is appointed to supervise the Project Management and Monitoring System implementation.

Quality manager controls the procedure performance and the data quality for constant improvement of the Project Management and Monitoring System.

Data flow diagram 1.



# Data management

The data required by emission reductions calculation is collected and filled up in electronic workbook in Excel format. The requirements and principles for data collection in the database of the company are observed.

There is a contract № 26-00-661/НТ/080304 between Svilosa AD and the nearby Combined Heat and Power Plant for providing data required on the Project. The Project Manager stores all references, signed and sealed.

# Data and parameters used for monitoring of ERs

# Measured and calculated monitoring parameters

Prior to the project beginning Svilosa carried out 24 hour experiments within the period of November 17th – December 11th, 2003, with different wood species, for which a protocol had been issued. The results are provided in table 9.

Table 9. Results of experiments with different wood species.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| № | 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 9 the following parameters are defined:

* 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 caloricity 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 hour test.

The determined factors for one time entries and admissions remain unaltered. In Table 10 all data, subject to single input in the electronic workbook, are presented.

Table 10. Defined parameters used for monitoring.

|  |  |  |  |
| --- | --- | --- | --- |
| **Fixed conversion factors** | **Units** |  | |
| Density of CH4 | kg/m3 | 0,654 | |
| Conversion from CH4 to CO2e |  | 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 | |

# Monthly inputs

The heat energy is measured through flow meter and reported as per heat energy meter. The data is entered into logbooks. Each month a monthly report is prepared by the deputy head of department.

Below is a Biomass boiler heat output within the monitoring period January 1 – August 31, 2012, MWh/month (Table 11);

Table 11. Biomass boiler heat output.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Year** | 2012 | 2012 | 2012 | 2012 | 2012 | 2012 |
| **Month** | January | February | March | April | May | June |
| **Heat output, (HBB) (MWh)** | 2405 | 9686 | 9939 | 10728 | 9546 | 9225 |

Table 11 – extension.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 2012 | 2012 | 2012 | 2012 | 2012 | 2012 | Total |
| July | August | September | October | November | December |
| 8776 | 7948 |  |  |  |  | 68253 |

The pulp produced is measured with a scale. The data is entered into logbooks. Each month a report is prepared by the Accounting department.

Below is the Pulp output per species within the monitoring period January 1 – August 31, 2012, t/month (Table 12).

Table 12. Pulp output per species.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Year** | 2012 | 2012 | 2012 | 2012 | 2012 | 2012 |
| **Month** | January | February | March | April | May | June |
| **Poplar (t)** | 0 | 0 | 0 | 0 | 0 | 0 |
| **Mixed (t)** | 6939.81 | 9744.387 | 9851.661 | 10722.709 | 8552.06 | 8726.975 |

Table 12 – extension.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 2012 | 2012 | 2012 | 2012 | 2012 | 2012 | Total |
| July | August | September | October | November | December |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 7648.225 | 6286.24 |  |  |  |  | 68472.067 |

# Annual inputs

Annually in the electronic workbook is entered data for:

* CO2 emission factor of coal – the data is entered into a protocol submitted by the CHPP;
* Calorific value of coal– the data is entered into a protocol submitted by the CHPP;
* Thermal efficiency of TPP – the data is entered into a protocol submitted by the CHPP.

The data from CHPP is included in the Reports for the period January – September 2012 as shown in the Table 13 below:

Table 13. CHPP production data.

|  |  |  |
| --- | --- | --- |
| Annual Conversion Factors | Units | January – September 2012 |
| CO2 emission factor of coal (**EFcoal)** | kgCO2/t | 2 429 |
| Calorific value of coal,( **HVCcoal)** | MWh/tonne | 6.785 |
| CHPP thermal Efficiency,( **EfTPP)** | % | 30,06 |

The Person in charge for filling-up the monthly electronic register in Workbook, Sheet “8 Blended wood consumption ratios” inputs the data from the information sheets for the received wood by species and defines the received wood species’ percent proportion.

The results from this Sheet are summarized as inlet data for Sheet “4 Annual Inputs”, cells D15, D16, D17 till L15, L16, L17. The data from the ratio (in %) according to the used wood species for the period January 1 – August 31, 2012 are presented in Table 14.

Table 14. Proportion of received wood species.

|  |  |  |
| --- | --- | --- |
| Blended wood consumption ratios | Units | **2012** |
| -Acacia | % | 2.2 |
| - Beech | % | 25.3 |
| - Oak | % | 72.5 |

# Other production data

As part of the operational and monitoring responsibilities in accordance with the Monitoring Plan, the Project Operator collects regularly the following data and information:

* Production of process heat by CHPP – MWh/annually;
* Total generated electricity by CHPP, MWh/annually.

The data for these indicators for the monitoring period are presented in Table 15.

Table 15. Heat energy and electricity generated by CHPP Svilosa AD.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Year** | 2012 | 2012 | 2012 | 2012 | 2012 | 2012 |
| **Month** | January | February | March | April | May | June |
| **Heat energy, MWh** | 14907.00 | 11333.00 | 1843.000 | 0.00 | 1386.00 | 823.00 |
| **Electricity, MWh** | 25880.640 | 22918.176 | 19135.392 | 10603.296 | 14595.648 | 19115.328 |

Table 15 – extension.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 2012 | 2012 | 2012 | 2012 | 2012 | 2012 | Total |
| July | August | September | October | November | December |
| 928.00 | 613.00 |  |  |  |  | 31833.00 |
| 29085.120 | 8414.880 |  |  |  |  | 149748.480 |

The wood supplied is measured with a scale. The data is entered into logbooks. Each month a report is prepared by Bioresurs Svishtov EOOD.

Below is Delivery of wood within the monitoring period January 1 – August 31, 2012, tons/month (Table 16).

Table 16. Delivery of wood.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Year** | 2012 | 2012 | 2012 | 2012 | 2012 | 2012 |
| **Month** | January | February | March | April | May | June |
| **Acacia, t** | 1213.682 | 152.58 | 1285.135 | 1278.6 | 75.796 | 0 |
| **Beech, t** | 742.56 | 86.2 | 3875.04 | 8297.36 | 6972.127 | 10322.124 |
| **Oak, t** | 7801.732 | 1671.36 | 27023.109 | 31026.151 | 15316,184 | 18719.850 |

Table 16 - extension.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 2012 | 2012 | 2012 | 2012 | 2012 | 2012 | Total |
| July | August | September | October | November | December |
| 106.3 | 21.26 |  |  |  |  | 4133.353 |
| 10470.893 | 5688.004 |  |  |  |  | 46454.308 |
| 14540.279 | 17057.376 |  |  |  |  | 133156.041 |

# **Execution of European Union Directive on landfills**

Svilosa submitted an official request to the Ministry of Environment and Water regarding the legislation development for landfills and landfills sites and compliance with the EU Directive 99/31/EC of the landfills. In Bulgaria there are no landfills for wood wastes with equipment for methane emissions elimination.

The EC requirements regarding the waste management are transposed to the Bulgarian Legislation. Svilosa operates in compliance with the acting legislation for waste management.

The landfill for industrial wastes (sections for barks, lime mud and industrial wastes) was closed and recultivated according to the “Plan for compliance with the requirements of the Regulation 8” from August 23, 2004 about the conditions and the requirements for commissioning and exploitation of landfills and Installation for waste utilization and making it harmless.

The plan has been accepted by Decision №00-04-02-01/2006 from the Minister of the Environment and Water.

The landfill is closed and recultivated.

The landfill and Biomass Boiler are parts of the facilities operating under the Complex Permit №175–H1/2007 and they are regularly monitored in compliance with the Complex Permit’s requirements.

The monitoring as well as the way for data reporting are defined with a Regulation 6 dated March 26th, 1999 for the order and way for measurement of emissions of harmful substances emitted in the atmosphere from the objects with fixed sources.

Archiving of the monitoring data is implemented in accordance to Procedure P4-И1-О Monitoring of the treatment equipment and containers for the wastes and Procedure P12 Monitoring and measurement of the processes of the Environmental Management System in accordance to the ISO 14001:2004.

According to the legislation requirements a new landfill for non-hazardous wastes, where the wood barks disposal is not allowed, is commissioned for exploitation by Complex Permit №363-H0/2008.

1. The values stated refer to the period of January 1st – August 31st, 2012 only and to the reported amount of ERs (not yet verified). [↑](#footnote-ref-1)