JOINT IMPLEMENTATION PROJECT DESIGN DOCUMENT FORM FOR SMALL-SCALE PROJECTS
Version 01.1 - in effect as of: 27 October 2006

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Annexes

SECTION A. General description of the small-scale project

A.1. Title of the small-scale project:

Biomass Steam Boiler at Vinprom Peshtera

Version 03
03.10.2011
Sectoral scope (1) Energy Industries (Renewable/Non-renewable sources)

A.2. Description of the small-scale project:

Existing situation before project starting date
The project is a contribution to the development of the Renewable Energy Sources (RES) in Bulgaria. It is a step to achievement of the Bulgarian Government strategies and programs, expressed in the "Renewable and Alternative Energy Sources and Biofuels Act " Chapter Four - SG 49/19.06.2007, replaced of "Renewable Sources Energy Act" issued on 2 May 2011 – chapter [(A.2-1)].
The project category is Renewable Energy Sources.
The Energy Strategy for Bulgarian energetics development to 2020 is the founding document of the national energy politic.
The Energy Strategy's objective is to overcome the main challenges that Bulgarian energetics facing up to moment:

1) The high energy intensity of GDP.

Despite the positive trend to improving, now the energy intensity of the national GDP is with 89 % more than average of EU.

2) The high dependency of energy resources import

Bulgaria ensures more than 70% of the total energy consumption from import. The dependence from import of natural gas, crude oil and nuclear fuel is practically 100 % and traditionally is connected with Russia.

3) Industry's ecological development necessity.

The renewable energy sources (RES), like local important inexhaustible sources, will be priority of the National energy politic. The development of the RES sector will play more and more fundamental role for EU political purposes reaching. The RES utilization can be seen like one of the main factors to go to low carbon economics, for new high technology productions and "green" growth – "green" jobs ensuring. [(A. 2-2)]
The National Long-Term Program to Encourage the Use of RES for 2005-2015 (NLTPRES) was developed in compliance with the requirements of Art. 4, Para. 2, point 9 of the Energy Act and its implementing legislation. It is in line with the overall concept for the development of RES in the country, with the indicative targets for electric energy generation from RES and the means to achieve them.
The program was continued with new National Long-Term Program to Encourage the Use of RES 2008-2020-issued 20.06.08. It establishes the general framework of the opportunities to utilize biomass for energy purposes. On these base short-term programmes will be developed promotion of the biomass usage in Bulgaria. The program formulates measures and policies to encourage the use of RES in the national energy balance, by taking into account:

- the condition of RES use in the country,
- the need for the accelerated use of RES in the next ten-year period,

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[(A.2-1)] http://dv.parliament.bg/DVWeb/showMaterialDV.jsp?idMat=48899
[(A.2-2)] http://www.mee.government.bg/doc_vop/ENERGY.STRATEGY.-FINISH-FINISH-14.01.2011.pdf

- the mutual influence of the reduced energy efficiency and the expanded use of RES in the country from the point of view of achieving sustainable energy development.(A.2-3)

The increasing of the RES share for the country is constituted to reach 16 % from the gross electricity consumption in year 2020. In comparison the RES share for the base year 2005 is estimated to 9.4 % and that value is considered as a result in the operation of the bigger HPP plants.

Straw is a solid agricultural by-product that is used in the country primarily in horticulture and live-stock breeding. More than 20 % of straw can be utilized for energy purposes.

One of the possible methods for transformation of biomass into energy is the direct combustion and utilization of heat.

Baseline scenario

Vinprom Peshtera SA is a Bulgarian leader in the production of wines and high-alcoholic products, which has stable share on the market in Bulgaria and abroad. The company has its own facilities, capacity and technologies for production of wines, rakia, vodka, whisky, mentha, mastic brandy, etc. Increase of the production capacities is foreseen in the near future.

Up to the moment, the steam used for technological purposes in Katunitsa Distillery is produced from 2 steam boilers burning fossil fuel (natural gas). The type of the boilers is KM-12 with capacity 12 t/h of steam each. The boilers normally produce about 125,000 t steam annually and they spend about 10,000, 000 Nm^3 natural gas as fuel.

Project scenario

In order to achieve higher productivity of spirit and to reduce energy costs in the final product, Vinprom Peshtera has decided to implement project for construction of biomass waste burning steam boiler. The ash, as a result of the burning process, due to its properties – high content of potassium against low content of heavy metals, will be used for soil fertilizing. The existing natural gas boilers will be used for backup power source in cases when biomass boiler is out of order or steam consumption exceeds its power capabilities. The steam produced by NG boilers will be measured from their own flowmeters.

The Project comprises implementation and operation of steam boiler for biomass burning /mainly straw/. The boiler will be located in the reconstructed for this purpose building that is a part of existing workshop for CO2 liquefaction. The inlet fuel power of the boiler is 11.2 MWt or 2.7 t/h of straw. The boiler can operate also with different biomass fuels as wood chips and other biomass residues. In this case the quantity of the inlet fuel can be calculated on the basis of its lower heating value (LHV) and needed input thermal power /11.2 MWt/. The boiler produces 15 t/h of steam with following properties – pressure 13 barg and temperature 195°C. The produced steam will be used entirely for the plant technological purposes.

The project construction has started in 2010 when all needed permissions are obtained.

Main project data are shown in the table A.2.1 below:

INITIAL PROJECT DATA			
Total installed input power		[MWt]	**11.2**
Estimated starting date of the project operation			**01.06.2011**
Average annual availability of the biomass boiler on rated power		[h]	**7,900**
Average annual steam production		[MWth]	**77,420**
Total investment costs		[EUR.10^3]	**2,971**
Total volume of emissions reduced /ERUs / for the period	to 2012	[tCO2]	**25,643**
	2013 - 2020	[tCO2]	**136,830**

Table No A.2.1 Initial Project Data

(A.2-3) http://www.mee.government.bg/energy/energy_doc/Biomass_Programme_EN.pdf

A.3. Project participants:

Party involved	**Legal entity project participant (as applicable)**	**Please indicate if the Party involved wishes to be considered as project participant (Yes/No)**
Bulgaria – Host Country	Vinprom Peshtera JSC	No
Bulgaria – Host Country	CoGen Engineering LTD	No

Role of the above mentioned legal entities:

- Vinprom Peshtera JSC is a private company, established in 1939 in region with long viticulture and wine-producing traditions. Current Joint Stock Company is registered in the trade register during 2001. Today Vinprom Peshtera JSC is the Bulgarian leader in the production of wines and high-alcoholic products. Vinprom Peshtera invests in the JI project implementation and is the owner of the generated ERUs.
- CoGen Engineering LTD is Bulgarian consulting company, developer of projects under the Kyoto Protocol. The company focuses on Joint Implementation (JI) projects development in Bulgaria. CoGen Engineering LTD is responsible for the preparation of this JI project including PDD preparation, obtaining Party approvals, monitoring and transfer of ERUs.

A.4. Technical description of the small-scale project:

A.4.1. Location of the small-scale project:

Bulgaria

A.4.1.1. Host Party(ies):

Bulgaria

A.4.1.2. Region/State/Province etc.:

Area Plovdiv – the South part of Bulgaria

A.4.1.3. City/Town/Community etc.:

Village Katunitsa, close to town Plovdiv

A.4.1.4. Detail of physical location, including information allowing the unique identification of the small-scale project:

The Vinprom Peshtera Distillery, where the biomass steam boiler will be implemented, is located in Katunitsa village, Plovdiv district at 15 km south-east from Plovdiv.

Its location is shown on the map below:

Fig. A4.1.4-1 Distillery plant Katunitsa location

There are some historical evidences that on the same place the first distillery had been established 120 years ago.
In 2004, a serious investment program has been started on the territory of the factory. In the next years almost all production capacities have been renovated, a new technology for spirit production has been implemented as far as the main raw material is substituted from treacle to grain.
In the next 18 months, an implementation of new core projects shall take place in the factory such as "waste treatment plant", "biomass boiler", "retrofitting of power substation".

A.4.2. Small-scale project type(s) and category(ies):

The proposed project activity falls under the following type and category:
Sectoral Scope: (1) Energy Industries (Renewable/Non-renewable sources)
Project Type : TYPE I - Renewable energy project,
Category C: Thermal energy for the user
Reference: AMS-I.C./Version 19 CDM SSC EB61 [(A.4.2-1)]
Applicability under paragraph 7 and 8 of the "Provision for Joint Implementation Small-Scale Projects":
The project activity satisfies the threshold of JI SSC project:
According to the type-I JI SSC project, the project activity displaces the use of natural gas with straw in order to produce thermal energy. The installed capacity is smaller than 45 MWt. [(A.4.2-2)]

[(A.4.2-1)] http://cdm.unfccc.int/methodologies/index.html
[(A.4.2-2)] http://ji.unfccc.int/Ref/Documents/Provisions_for_JI_SSC_projects.pdf

A.4.3. Technology(ies) to be employed, or measures, operations or actions to be implemented by the small-scale project:

The new straw boiler, subject of this JI project, will be implemented to cover the factory needs of steam with parameters 13 barg – 195 °C for 60000 l/day ethyl spirit production.
The biomass boiler producer and supplier is the Danish company "Weiss A/S". Weiss's specialists will ensure supervising of the assembling process and will be responsible for starting of the boiler normal operation. The boiler will be installed in separate building. The existing facility for CO2 liquefying and bottling will be reconstructed for the purpose.
The main straw quantity, in pack like bales, will be stored in open area at around 2.5 km to the factory. Also, reserve storage for one day boiler operation will be organized on open place in the factory frames. The bales will be covered with waterproof material and will be placed on special grates.
Schematic view of the straw boiler is shown on the figure below and more details can be seen in Annex 5-Doc.No.3-Biomass boiler disposition.

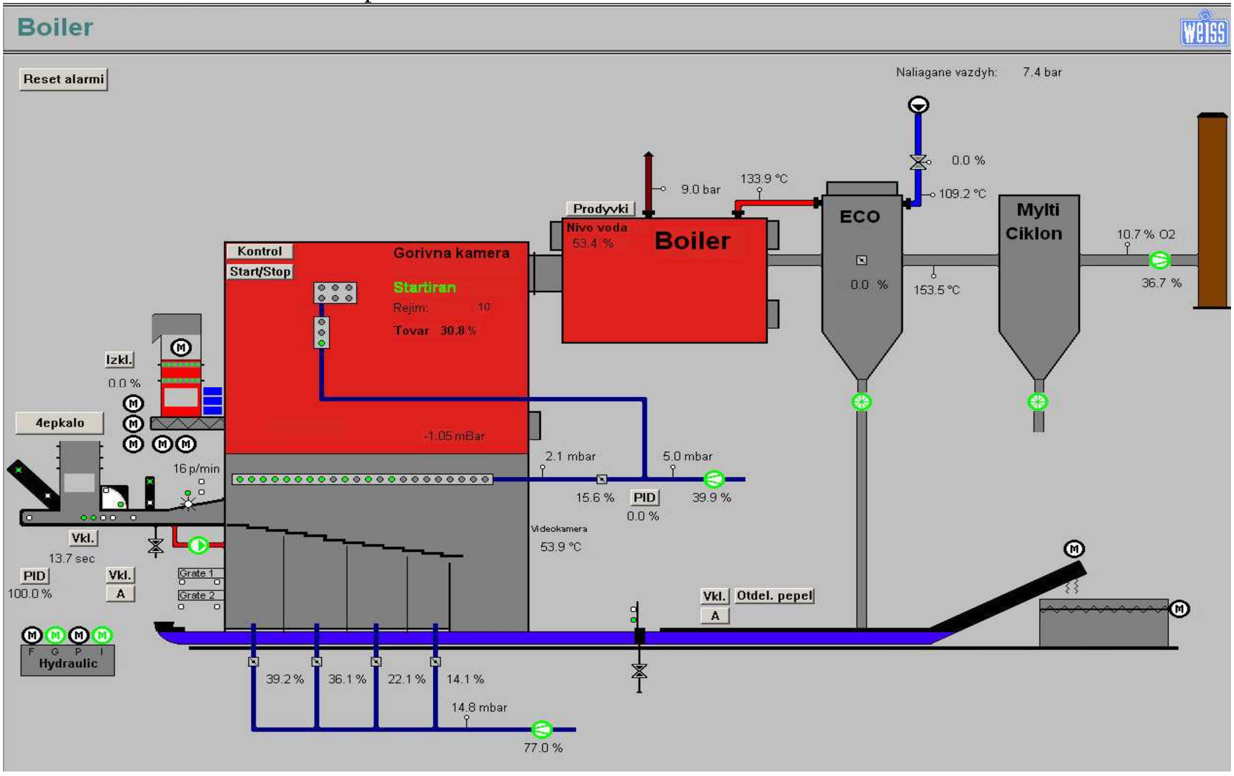


Fig. A.4.3-1 Schematic view of the straw boiler

The main parts of the boiler are:
1. Straw transport system

- Feeding condense reservoir with volume V = 20 m3, ф 3,600 мм, with inside warm-pipe for heating, armature, isolation;
- Overhead fuel crane, one beam bridge type with weight capacity 5 tones, equipped with 2 m^3 grab, modifying of two bales, one on the top of the other, lifting. The crane is with PLC control;
- Installation for automatic straw bakes dosing to the straw divider device with max. dimensions 2,500мм x 1,400 мм x 1,400 мм.;
- Hydraulic system of bales loosening, straw dividing and dosing to the boiler. The system ensures uniformly and safely loading of the boiler;
- Push feeder with capacity 850-2,800 kg/h. The push feeder transports the loose straw from the straw divider to the combustion grate. The device is equipped with hydraulic operated fire damper;
- Water cooled fuel feeding duct with 2,000 mm length, that ensure fuel equal distribution in the full width of the combustion grate;

- Hydraulic station for operation of the push feeder, combustion grate and fire damper. The oil pressure is 175 barg and the rated electrical power is 18.5 kWe;

- Moving combustion grate for fuel feeding and burning. Grate size - 12 m². Dimensions – length 5,750mm, width – 2,100mm. Grate capacity - 940 kW/m². Grate speed – adjustable. Combustion zones – 4 pcs. Grate material – high-alloyed cast steel with 23 % Chromium. Grate weight – 16,000 kg. The grate is equipped with system for mechanical ash removing.

2. Fire-tube boiler for steam production.

- The radiation chamber , designed for steam generation, is adjusted to the combustion grate. The designed pressure is 16 barg and the temperature – 204ºC. The chamber walls are insulated with 150 mm insulation. The dimensions of the radiation chamber are – length 5,700mm, width -2,400 mm, and height – 4,200 mm. The camera's weight is 32,000 kg. The water capacity is 12.5 m³;

- Convection steam boiler(3-pass evaporator). It consists of a furnace and cylindrical two horizontal passes fire tube boiler part. Its dimensions are 7,800/3,610/3,960 mm and weight 46,000 kg. The designed pressure and temperature are 16 barg /204ºC;

- Feed water preheater (Economizer). Vertical boiler shell with end plates and tube plate. Dimensions -2,360/2,460/5,550 mm and weight 12,500 kg. Designed as two-pass cooler of exhaust gases;

- Systems for measurements and control , fittings, valves etc. Support construction for convection steam boiler.

3. Combustion air system

- The primary and secondary combustion air is supplied from single fan placed directly to the combustion grate. The primary combustion air is supplied to four independent air zones and the air volume in these zones can be regulated individually by motor dampers. The secondary air is blown inside through a row nozzles placed in the boiler side with high velocity. The secondary air is controlled through O2 measurement in flue gases. The maximum airflow is 11,500 m³/h. The rated power of the motor is 22 kW at 1470 r/min. Temperature on the air is 20ºC. The differential pressure is 3,000 Pa. The fan is controlled by a Frequency Inverter.

4. Flue gases system:

- Flue gas retraction system consists of single fan which supplies cooled flue gas to the combustion chamber when burning dry fuels. The maximum airflow is 8,200 m³/h. The rated power of the motor is -15 kW by 1,470 r/min. Maximal operating temperature - 200ºC. The differential pressure is 1,500 Pa The fan is controlled by Frequency Inverter. The fan is placed at the combustion grate and air intake to the fan is taken just after the Multicyclone;

- Flue gases fan. The fan is installed after the boiler. Its function is to force the flue gases and to obtain the necessary negative pressure in the fire box. The maximum flue gases flow is 36,000 m³/h. The rated power of the motor is 75 kW at 1,470 r/min. Maximal operating temperature - 300ºC. The differential pressure is 4,000 Pa. The fan is controlled by a Frequency Inverter.

5. Ash separation and exhaust gases cleaning devices

- Flue gases cyclones for rough and fine cleaning with rotation sluice and ash screw for ash moving to the ash conveyor;

- Conveyor for ash removing to the container

6. Computer Control System for manual and automatic boiler control includes all necessary measurement devices and acting devices

7. Auxiliary devices:

- Deaerator;
- Pumps (feeding, booster and circulation);
- Valves

The straw boiler works in the following order:

- The bales are moved to the conveyor for their transportation to the straw loosening and dividing devices;

- The cutter cuts the packing strap and the unpacked bale is moving to the rotational dividing device;
- The straw has cut into the small peaces inside the dividing device and then it goes to the blades-belt transporter. The transporter moves the straw to the crosswise placed fuel transport screw;
- The fuel screw conveyor feeds a rotational dosing sluice, placed on its back end;
- The rotational dosing sluice feeds the fuel feeding screw with the necessary quantity of straw in accordance to the furnace loading regime;
- The fuel feeding screw feeds the straw to the front part of the movable combustion grate in the furnace;
- The process of the combustion is kept at the specified power level through the ventilators operation (smoke, primary and secondary air) controlled with frequency inverters in line with the current readings of the instrumentation and sensors (lambda sensor etc.).
- The uniform move of the fuel on the top of the grate is achieved by the hydraulic device, intended to drive the movable grate.
- Purifying of the flue gases is done through cyclones for rough and fine cleaning. The ash from the cyclones is collected into a waste container using ash transport mechanism. The ash then is dispersed at the agriculture fields for ground properties improving.

The overall technical characteristics of the biomass-burning boiler are shown in the table below:

No	Parameter		Unit	Value
1	Boiler type			fire-tube boiler
2	Fuel		-	Straw
3	Manufacturer of the boiler		-	Weiss, Danish
4	Number of boilers		[pcs.]	1
5	Steam produced		[t/h]/ [MWt/h]	15.0 / 11.65
6	Steam parameters	Operating pressure	[barg]	13.0
		Temperature	[° C]	195
7	Feeding water temperature		[° C]	105
8	Thermal energy of the feeding water		[MWt/h]	1.85
9	Maximum permissible pressure		[barg]	16.0
10	Combustion chamber /the data is for 100% steam producing/	Max. combustion power	[kW]	11,200
		Power range	[%]	40 ÷ 100
		Fuel consumption (max)	[kg/h]	2,800
		Fuel consumption (min)	[kg/h]	1,100
		Efficiency at 100% load	[%]	87 – 88
11	Straw parameters Design calculation data	LHV	(MJ/kg)	15.2
		Nitrogen contents	[%]	max. 1
		Water contents	[%]	15
		Ash contents	[%]	3 ÷ 5
		Ash melt temperature	[° C]	more than 1,000
		Bales dimensions LxWxH	[m]	2.5 x 1.2 x 1.2
		Bales weight	[kg]	250
12	Primary and secondary combustion air fan		[m^3/h]	11,500
13	Flue gases fans	Flue gases retraction fan	[m^3/h]	8,200
		Flue gases fan	[m^3/h]	36,000
14	Control system			OMRON PLC
15	Electricity auxiliary consumption /average/		[%]	0.58 (from the thermal power of the boiler, p5)

Table A.4.3.1 - Technical characteristics of the biomass boiler

The distribution of the planned activities with the terms of their realization is shown in the Implementation plan table below:

№	Name of activity	Terms of execution	
		Start	End
1	Official Notification on Investment Intention	01.04.2010	
2	Project Detailed Design development	01.04.2010	15.12.2010
3	EIA decision - № OBOC-201/23.08.2010.	01.06.2010	30.07.2010
4	Main equipment delivery contracts signing	01.08.2010	10.08.2010
5	Construction Permit -№ 55/23.06.2010	20.05.2010	23.06.2010
6	Executing of the construction activities	20.01.2011	01.05.2011
6.1	Buildings and infrastructure	20.01.2011	30.03.2011
6.2	Construction of the foundations	20.01.2011	05.02.2011
7	Equipment production and delivery	01.09.2010	20.02.2011
8	Equipment installation and tests	20.01.2011	15.05.2011
9	Commissioning, incl. /72 – hours testing/	15.05.2011	30.05.2011
Start of operation		**01.06.2011**	

A.4.4. Brief explanation of how the anthropogenic emissions of greenhouse gases by sources are to be reduced by the proposed small-scale project, including why the emission reductions would not occur in the absence of the proposed small-scale project, taking into account national and/or sectoral policies and circumstances:

The reduction in anthropogenic emissions of GHG will occur through the replacement of production of steam by the existing natural gas boilers with one new straw boiler. The fossil fuel natural gas will be replaced with carbon-neutral fuel straw. The process of steam producing is direct combustion of the straw.

The project is a contribution to the development of the Renewable Energy Sources (RES) in Bulgaria. It is a step to achievement of the Bulgarian Government strategies and programs like:

- "Renewable Sources Energy Act" issued on 2 May 2011; (A.4.4-1)
- National Long-Term Programme to Encourage the Use of RES 2008-2020 issued 20.06.08; (A.4.4-2)
- Energy Strategy for Bulgarian energetics development to 2020. (A.4.4-3)

In the baseline scenario, without implementation of this project will continue the existing situation with fossil fuel consumption and GHG emissions generation in the atmosphere.

A.4.4.1. Estimated amount of emission reductions over the crediting period:

The project does not generate AAUs. Regarding the crediting period 2008-2012, it is expected that the total emission reduction will be about **25,406 tonnes CO2eqv.**

(A.4.4-1) http://dv.parliament.bg/DVWeb/showMaterialDV.jsp?idMat=48899

(A.4.4-2) http://www.mee.government.bg/doc_vop/ENERGY.STRATEGY.-FINISH-FINISH-14.01.2011.pdf

(A.4.4-3) http://www.mee.government.bg/energy/energy_doc/Biomass_Programme_EN.pdf

	Years
Length of the crediting period	1 year and 7 months
Year	Estimate of annual emission reductions in tonnes of CO_2 equivalent
2008	-
2009	-
2010	-
2011	**8,539**
2012	**17,104**
Total estimated emission reductions over the crediting period (tonnes of CO_2 equivalent)	**25,643**
Annual average of estimated emission reductions over the crediting period/period within which ERUs are to be earned (tonnes of CO_2 equivalent)	**16,196**

Table A.4.4.1.1 Estimated amount of emissions reductions over the crediting period

In case of positive decision of UNFCCC and Host country approval for second crediting period 2013 - 2020, it is expected that the project will realize a total emission reduction about **136 830 tonnes CO2eqv** for the period.

	Years
Length of the crediting period	8
Year	Estimate of annual emission reductions in tonnes of CO_2 equivalent
2013	**17,104**
2014	**17,104**
2015	**17,104**
2016	**17,104**
2017	**17,104**
2018	**17,104**
2019	**17,104**
2020	**17,104**
Total estimated emission reductions over the crediting period (tonnes of CO_2 equivalent)	**136,830**
Annual average of estimated emission reductions over the crediting period/period within which ERUs are to be earned (tonnes of CO_2 equivalent)	**17,104**

Table A.4.4.1.2 Estimated amount of emissions reductions over the next crediting period up to 2020

Regarding the first and second crediting periods, it is expected that the total emission reduction will be about **162,473 tonnes CO2eqv.** More details project's results can be seen in Section E in the PDD and in the attachment to Annex 5.1 - Project emissions reduction calculations PDD-Biomass Boiler Vinprom Peshtera.xls.

A.4.5. Confirmation that the proposed small-scale project is not a debundled component of a larger project:

On behalf of the project participant, Vinprom Peshtera JSC confirms that the project is not a debundled component of a large project that already exist like JI (SSC) project with available determination, because none of the next conditions are fulfilled:

(a) It has the same project participants;

(b) It applies the same technology/measure and pertains to the same project categories;

(c) Whose determination has been made publicly available in accordance with paragraph 34 of the JI guidelines within the previous 2 years; and

(d) Whose project boundary is within 1 km of the project boundary of the proposed JI SSC project at the closest point.

A.5. Project approval by the Parties involved:

The Letter of Support (LoS) of the project activity was issued by the Ministry of Environment and Water on 24 February 2011. Copy of the LoS can be seen in Annex No.4 to the PDD.
The Letter of Approval (LoA) of the project will be issued by MoEW at later stage after a positive determination.

SECTION B. Baseline

B.1. Description and justification of the baseline chosen:

The baseline for an Article 6 project is the scenario that reasonably represents the anthropogenic emissions by sources or anthropogenic removals by sinks of greenhouse gases that would occur in the absence of the proposed project.
A baseline shall be established:

(a) On a project-specific basis and/or using a multi-project emission factor;

(b) In a transparent manner with regard to the choice of approaches, assumptions, methodologies, parameters, data sources and key factors;

(c) Taking into account relevant national and/or sectoral policies and circumstances, such as sectoral reform initiatives, local fuel availability, power sector expansion plans, and the economic situation in the project sector;

(d) In such a way that emission reduction units (ERUs) cannot be earned for decreases in activity levels outside the project activity or due to force majeure;

(e) Taking account of uncertainties and using conservative assumptions.

Methodologies for baselines and monitoring, including methodologies for small-scale project activities, approved by the Executive Board of the Clean Development Mechanism, may be applied by project participants under joint implementation, as appropriate. [B.1-1]
Description and justification of the baseline chosen is provided below in accordance with the "Guidelines for users of the Joint Implementation Project Design Document Form for Small Scale Projects", version 04 [B1-2], using the following step-wise approach:

Step 1: Indication and description of the approach chosen regarding baseline setting
The baseline of this project shall be established in accordance with appendix B of the JI guidelines. The project developers have chosen the following approach regarding baseline setting, defined in the Guidance (Paragraph 9):

(b) A, methodology for baseline setting and monitoring approved by the Executive Board of the clean development mechanism (CDM), including methodologies for small-scale project activities, as appropriate, in accordance with paragraph 4(a) of decision 10/CMP.1

If an approved CDM baseline and monitoring methodology is used, the most recent valid version of the CDM methodology shall be applied when the project design document (JI SSC PDD) is submitted for publication on the UNFCCC JI website in, allowing for a grace period of two months.
The approved CDM methodology shall be used in its totality, including all explanations, descriptions and analyses.[B.1-3]
An approved CDM baseline methodology, AMS-***I.C.*** – **"Thermal energy production with or without electricity" –Version 19 EB61**[B.1-4] is chosen for the project**.** This methodology comprises renewable energy technologies that supply industrial facilities with thermal energy that displaces fossil fuel use. These units include energy derived from renewable biomass that displaces fossil fuel. The methodology fully comprises the technology of the project.
Applicability
The proposed project comprises renewable energy biomass technology that will supply Vinprom Peshtera industrial facility with thermal energy that displaces fossil fuel use (in accordance with p.1[B.1-4]).

[B.1-1] http://unfccc.int/resource/docs/2005/cmp1/eng/08a02.pdf
[B1-2] http://ji.unfccc.int/Ref/Documents/Guidlines_users_JISC_PDD_Form.pdf
[B.1-3] http://ji.unfccc.int/Ref/Documents/Baseline_setting_and_monitoring.pdf
[B.1-4] http://cdm.unfccc.int/methodologies/DB/6EL4AG49US2S1DNH55Y4S7GDQFA2JF

Emission reductions from this biomass system will accrue from a thermal energy (steam) production for on-site consumption (in accordance with p.3/b/[(B.1-4)]). Electricity is not produced in the project boundary. The total installed/rated thermal energy generation capacity of the project equipment is less than 45 MW thermal power (in accordance with p.4 and p.6/b/[(B.1-4)]).

Step 2: Application of the approach chosen

The chosen approach is based on the approved CDM baseline methodology, AMS-***I.C.*** **Version 19 EB61.**

Baseline scenario

For renewable energy technologies that displace technologies using fossil fuels, the simplified baseline is the fuel consumption of the technologies that would have been used in the absence of the project activity, times an emission factor for the fossil fuel displaced.
The main parameter for baseline estimation is the value of efficiency of the existing facility. Baseline calculations shall be based on historical data on the energy use (natural gas) and the output (steam) in the baseline plant for at least three years prior to project implementation. In our case for the existing facility no historical data/information on baseline parameters such as efficiency, energy consumption and output due to calibrated measuring equipment missing. In the case the baseline parameters will be determined using a performance test carried out prior to the implementation of the project activity.
The conclusion of the Boilers Efficiency estimation is shown in Annex 2 to PDD.
Baseline scenario for the project heat production is accordance to the methodology [(B.1-4)] point.19 (a):-
”Electricity is imported from a grid and thermal energy (steam/heat) is produced using fossil fuel” i.e. continue of the existing situation.
In absence of the project Vinprom Peshtera will continues to use the existing steam boilers with fuel natural gas to produce the necessary plant technological steam.
Here the heat of baseline fuel natural gas at the boilers inlet will be calculated with the value of the measured steam output of the new straw boiler, corrected with the thermal energy of the boiler water input (condensate + fresh water) and divided by the boiler efficiency estimated like it is explain above, once for the crediting period.
The baseline emissions are equal of baseline fuel heat multiplied by the emission factor of natural gas. The source of default EF value is 2006 IPCC vol.2 Table 2.2.
For ex-ante calculations will be used the value of net steam production like difference between row 5 and row 8 of straw boiler factory technical data table. See Table A.4.3.1 of PDD.

Project scenario

The project scenario here wholly is connected with the electricity consumption for auxiliary needs of the new straw boiler. The value of electricity will be measured continuously throughout the operation of the new boiler. For ex-ante calculation will be used value from the straw boiler factory technical data see Table A.4.3.1 row 15 of PDD.
The project emissions are equal of electricity consumption increased with the relative grid looses and multiplied by the emission factor of the grid.
The emission factors $EF_{grid,CM\ y}$ used in PDD on ex-ante project emissions reduction calculation are taken from the survey “Baseline Study of Joint Implementation projects in the Bulgarian energy sector”[(B.1.5)] developed by NEK – EAD and officially published by MoEW. The survey has applied the ACM0002 Methodology and was executed at a request of Bulgarian Ministry of Environment and Waters(MoEW). The $EF_{grid,CM\ y}$ values are reported for the historical period 2000 – 2004 and for the future period 2005 – 2012. The table with the estimated emission factors is shown in Annex 2 to PDD.

[(B.1.5)] http://www.moew.government.bg/recent_doc/climate/Baseline%20CEF%20Summary.pdf

The value of EF for 2012 is used for the ex-ante calculations in the period 2012 – 2020.
The relative grid looses are taken from Eurostat 2011 edition Energy Balance Sheets 2008-2009 [(B.1-6)]. Extract from the Balance Sheet is shown in Annex 2 to PDD.

Leakage

Where the collection/processing/transportation of biomass residues is outside the project boundary CO_2 emissions from the collection/processing/transportation of biomass residues to the project site shall be taken into account as leakage in case that biomass residues are transported over a distance of more than 200 kilometres. In other case, like the due to the implementation of the project activity then the leakage source attributed to transportation can be neglected. In our case the distance of biomass collecting is about 100 km, and leakages will be neglected. The area for straw biomass collecting is shown in Annex 2.

The key information and data used to establish the baseline are provided in the following tables:

Data/Parameter	EG_{ty}
Data unit	TJ
Description	The net quantity of steam/heat supplied by the project activity during the year *y*
Time of determination/monitoring	At the beginning of next year based on ex-post annual recordings, by months. Ex-post daily measurements and monthly recording
Source of data (to be) used	Boiler outlet steam flowmeter and boiler inlet heat flowmeter.
Value of data applied	Ex-ante:2011-139.4, 2012- 278.6. Ex-post: From Measurement Journal
Justification of the choice of data or description of measurement methods and procedures (to be) applied	Steam flowmeter at the boiler outlet and heat flowmeter at the boiler feeding water inlet. Both flowmeters are measuring flow, temperature and pressure parameters and calculating thermal energy. The data will be read in MWt and will be converted to TJ in the Monitoring plan. The difference of the readings of outlet steam flowmeter and inlet heat flowmeter will constitute the boiler's net thermal energy supply.
QA/QC procedures (to be) applied	The QA/QC procedures for those measurement devices will be described in details separately for each measurement device in special "Journal of Measurement Device" taking in mind manufacture instructions. The journal will contents the main measurement device data, like technical description and documentation, position, QA/QC procedures, calibrations, training, temporally replacing procedures etc.
Any comment	The estimation of EG_{ty} will be performance automatically in the Monitoring plan like difference between the two input measurement data.

Data/Parameter	η_{ty}
Data unit	-
Description	The efficiency of the plant using fossil fuel (natural gas) that would have been used in the absence of the project activity
Time of determination/monitoring	Once before the start of regular operation of the project.
Source of data (to be) used	Protocol of authorized laboratory.
Value of data applied	The value preliminary estimated and valid for the whole project operational life.
Justification of the choice of data or description of measurement methods and procedures (to be) applied	Measurements (by direct or indirect method) in different working load regimes (50%-100%) of each boiler. Estimation of average value for whole thermal , Plant.
QA/QC procedures (to be) applied	The QA/QC procedures for the measurements and estimations are in accordance with authorized laboratory rules.
Any comment	The efficiency estimation shall be conservative.

[(B.1-6)] http://epp.eurostat.ec.europa.eu/portal/page/portal/product_details/publication?p_product_code=KS-EN-11-001

Data/Parameter	EF_{NG}
Data unit	tCO2/TJ
Description	The CO_2 emission factor of the fossil fuel (natural gas) that would have been used in the baseline plant obtained from reliable local or national data if available, alternatively, IPCC default emission factors can be used (tCO_2/TJ)
Time of determination/monitoring	At the end of each year based on the last IPCC estimated value
Source of data (to be) used	2006 IPCC vol.2 Table 2.2.
Value of data applied	56.1
Justification of the choice of data or description of measurement methods and procedures (to be) applied	-
QA/QC procedures (to be) applied	IPCC QA/QC procedures.
Any comment	-

B.2. Description of how the anthropogenic emissions of greenhouse gases by sources are reduced below those that would have occurred in the absence of the small-scale project:

Additionality of the project is proven using the CDM "Tool for the demonstration and assessment of additionality" Ver.05.2 [B.2.1] as approved by the CDM Executive Board.
A proof that the JI has seriously been considered as an option is the PIN that was sent to the Bulgarian Ministry of Environment (MOEW) to apply for a Letter of Endorsement in January 2011. In this PIN, the project owner states its interest obtaining the JI incentive for their envisaged project activity. During the preliminary project development phase, it became clear that the Project would not be feasible unless emissions reductions could be generated and sold by the project activity.

Step 1: Identification of alternatives to the project activity consistent with current laws and regulations
Sub-step 1a: Define alternatives to the project activity:

Below are shown all possible realistic alternatives to the project activity that can supply the Katunitsa spirit factory with needed thermal energy:
Alternative A: The proposed project activity not undertaken as a JI project activity
Alternative B: Continuation of the current situation (working with existing natural gas boilers)
Alternative C: Heat energy consumption supplied from an external thermal plant
Alternative D: Reconstruction and extension of the existing boiler house, working on natural gas
Alternative E: Construction of new boiler house working on fuel oil

Alternative A: The proposed project activity not undertaken as a JI project activity.
This alternative is the project scenario but without the revenues of JI incentive. It requires reconstruction of the boiler house, purchase of new expensive equipment and considerable capital investments correspondingly. In order to reduce the influence of these investment costs to the project viability an additional source of financing is required as can be seen later.
Alternative B: Continuation of the current situation (working with existing natural gas boilers).
This alternative is selected as baseline scenario because it corresponds to the "business as usual" case, where continuing the operation of the existing natural gas boilers is not connected with any additional investments.

[B.2.1] http://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-01-v5.2.pdf

Alternative C: Heat energy consumption supplied from an external thermal plant.
Currently there is no existing thermal plant inside and around Katunitsa village. In addition, there are no other big industrial consumers of thermal energy in the nearby area. The thermal needs of the inhabitants are covered by small in-house installations, based on wood logs as fuel. The Katunitsa spirit factory is located inside the village and there are no possibilities for other industrial facility to be built in the neighboring area. All these facts lead to the conclusion that in the near future the construction of such external thermal plant is not feasible. Thus the Alternative C is excluded from further analyze.
Alternative D: Reconstruction and extension of the existing boiler house, working on natural gas
This alternative is a variation of the Alternative B but incurring an additional investment costs. At the other hand, the existing natural gas boilers are not so old (6-7 years of operation), they are not obsolete and their efficiency is not reduced dramatically in comparison to new ones (as can be seen after in the present document). In general, their replacement and reconstruction in the near future is not needed and the supply of new natural gas boilers will become feasible only in case of considerable expansion of the spirit production capacity. This means that in any case, Alternative B will be more feasible than the present alternative and that is why we will not review it further.
Alternative E: Construction of new own boiler house working on fuel oil
At present, fuel oil cost in Bulgaria is about 520.00 Eur/t or 13.00 Eur/GJ (for comparison the current natural gas price is about 9.00 Eur/GJ). It is the most expensive power-plant fuel. It is evident that fuel oil consumption is not reasonable from the economic point of view. Therefore, this alternative also was excluded from review.

Even all alternative scenarios are in line with the mandatory legislation, only Alternative A and Alternative B are realistic and credible alternative scenarios to the project activity and they will be used in the following analyze.

Sub-step 1b: Consistency with mandatory laws and regulations:

The realization of the project is not required by the Bulgarian legislation and it is not subject of special Bulgarian Government decision.
The above-defined alternatives are fully in consistency with the mandatory Bulgarian laws and regulations.

As per *Alternative "A"* can be underlined that in the last years the Bulgarian Government exerts special cares and efforts of RES implementation legislation development. In April 201 was adopted "Renewable Energy Act" - SG 35/03.05.2011, into force since 03.05.2011[B.2.2]. This document primarily concerns the encouragement of the energy production based on renewable energy sources and combined energy production, but without any requirements for obligatory projects implementation. Unfortunately, the supporting scheme through feed-in tariffs is available only to biomass plants that produce electricity. Because the project activity is connected only with thermal production, these incentives are not available for it.
In terms of project development procedures, the proposed project is in full compliance with the laws and regulations in Bulgaria. For further information about the assessment of the environmental impact of the project, please refer to section F in PDD.
All existing equipment for steam production, using natural gas as per *Alternative "B"* is in compliance with the present legislation norms (Laws, Regulations, Rules, Orders, and Licenses). There are no legislation norms under development, which can prevent or stop the operation of the boilers. The current thermal demand in the Katunitsa spirit factory could be covered entirely by the existing natural gas boilers.

B.2.2. http://dv.parliament.bg/DVWeb/showMaterialDV.jsp?idMat=48899

Step 2: Investment analysis

In this section will be proved that the proposed project activity, without the additional revenues from the sale of the ERUs is unlikely to be economically and financially attractive to investors.

Sub-step 2a: Determining the appropriate analysis method

Benchmark analysis (option III) will be used for this project since the baseline scenario is continuation of the current situation, where no investment is required by default.
Because there is no specific investment benchmarks for the Bulgarian power sector that currently exists the needed discount rate for that analysis will be derived from the financial and economic indicators that is standard for the country and are public available.

Sub-step 2b: Option III. Applying of the benchmark comparison analysis

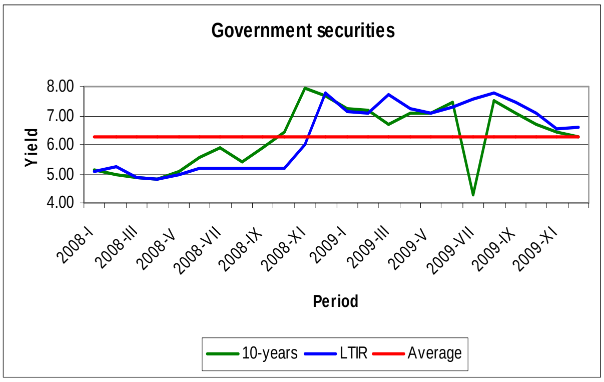
The discount rate that will be used as a minimum benchmark value for comparison with the Project IRR in line with the requirements as per paragraphs (6a) and (6b) of the CDM Tool [B.2.1] is derived from 10-years maturity Bulgarian Government Securities with fixed yield as far as from commercial lending rates that are standard for the country. The exact value is estimated as the cost of the capital needed for the successful implementation of a RES project of such scale while applying Bulgarian market conditions.
For the equity part of the capital structure is applied Government Bonds yield (as a risk-free component) plus specific risk premium. In general, such risk premium must be determined considering both the country risk and the technology risk.
The country-risk premium is based on an independent research carried out by Aswath Damodaran [B.2.3] from Stern School of Business (New York University). This research is dedicated for annually assessment of various countries according to their credit ratings assigned by Moody's (for example Bulgarian credit rating is Baa3 for the years 2008 and 2009 and stable prospects).
To the equity beta factor is assigned a value that is typical for investments in power plants. It reflects the deviation of the risk in such investment from the average country risk. The source of this data is also the same research.
The debt part of the capital structure is calculated using average interest rate on loans for non-financial corporations as per the period relevant to the decision-making context.

The final value equals to weighted average on the equity and debt parts of the capital structure.

The actual benchmark calculation is made on the basis of public available data for the period January-2008 up to the December-2009, derived from the statistics of the Bulgarian National Bank [B.2.4]. This timeframe corresponds to the 2-year period of historical data up to the moment of project decision-making – the beginning of year 2010. Comparison of the dates in the Table "Project implementation plan" in Section A.4.3 and Annex 5.6 "Construction Permit" will confirm the correctness of the above-mentioned finding.

[B.2.3] The equity risk premium(ERP):Determinants, Estimation and Implications
http://pages.stern.nyu.edu/~adamodar/New_Home_Page/data.html
[B.2.4] STATISTICS, Bulgarian National Bank
http://www.bnb.bg/Statistics/StMonetaryInterestRate/StInterestRate/StIRInterestRate/index.htm

The average yield on 10-years maturity Government Securities as far as average loan interest rates, used for calculation of the benchmark value are shown in the graphs below:



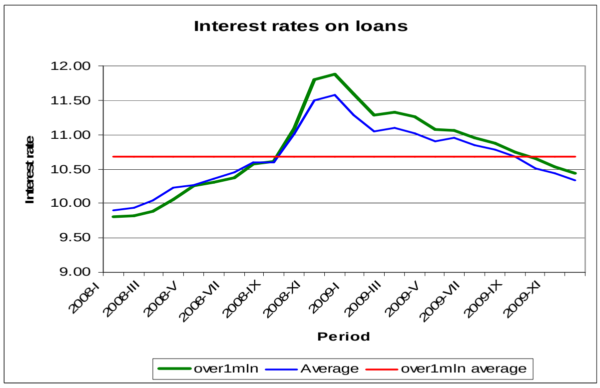


Fig.B.2.1 – Bulgarian loans interest rate and government securities yield

Sub-step 2c: Calculation and comparison of financial indicators:

For the proposed JI project activity without ERU sales, the following remarks shall apply:
In the calculations, as the costs are included initial investment cost as far as all expenses for operation and maintenance, management and labor costs, insurances and internal electricity consumption on the annual basis. Expenses for investment loan or other financing expenditures such as lending installments are excluded.
The revenues are defined on the basis of the produced steam price cost. The calculations are based on the fact that thermal demand of the Katunitsa spirit factory otherwise must be supplied from the existing boilers.
Following instructions in the Annex to the Tool for the demonstration and assessment of additionality Ver.5.02, the calculation period is extended to the end of the expected project lifetime - 15 years i.e. this direct implies that all capital expenditures will be consumed at the end of the period. The reason of such extension is based on the fact that it is very hard to determine the future residual fair value of the assets in case of shorter term due to the irregular wearing of the equipment as a result of the varying quality of the supplied straw. All expectations are that the current equipment will be totally obsolete and outdated after about 15 years.
All these clarification remarks are intended the present analysis to obtain transparent and conservative approach of the calculations. All related spreadsheets with the exact formulas and values are included in Annex 5.4 – "Project Investment Analisys.xls" and will be submitted to the validation independent entity.

The basic parameters of the project without ERU incomes are as folows:

Parameter	Value	Dimension
Total installed power	11.65	[MWt]
Total investment costs	2,971,000	[EUR]
Annual fuel, operation and maintenance costs	1,482,000	[EUR]
Annual thermal energy production	77,420	[MWh/year]
Project lifetime	15	[years]
ERU Crediting period	1.5 (01.06.2011 – 31.12.2012)	[years]

Table B.2.1 – Project initial data

A detail plan of the financial structure of the project is provided in the Annex 5.5 "Financial plan of the project". This document is available on request.

After applying of the cash flow analysis main financial indicators of the project are:

Parameter	**Value**
Project payback period	16 years
Net Present Value (NPV)	-110.4 ths EUR
Project Internal Rate of Return (IRR)	9.34 %
Benchmark value	**12.70 %**

Table B.2.2 – Benchmark analysis results

As it could be seen in comparison of the Project IRR and the corresponding benchmark value, the project does not look financially attractive without considering some additional potential benefits like carbon revenues.
Nevertheless, the ERU's crediting period is very short comparable to the project lifetime its positive impact to the Project viability especially in the first years after commissioning can be noticed in the table below:

Parameter	Value
Project payback period with ERU's	14 years
Net Present Value (NPV) with ERU's	149.4 ths EUR
Project Internal Rate of Return (IRR) with ERU's	**10.93 %**

Table B.2.3 – Positive impact of ERU support to the Project

In case of positive decision of COP/CP for prolonging of JI mechanism also in the Second Commitment Period as per the Kioto Protocol (ERU's crediting period up to 2017/2020 year) and further, it could be seen in the table below that the project would become very attractive when all possible benefits of the emission reduction also is included:

Parameter	Value
Project payback period with ERU's	8 years
Net Present Value (NPV) with ERU's	1,044.3 ths EUR
Project Internal Rate of Return (IRR) with ERU's	**16.14%**

Table B.2.4 – Positive impact of ERU support to the Project (Second commitment period included)

Sub-step 2d: Sensitivity analysis:

The following assumptions about sensitivity analysis are established during examine whether the conclusion regarding the financial attractiveness of the project is robust:

The overall increasing/decreasing of the costs directly corresponds to possible fluctuation of the fuel prices (the cost of straw), and operation and maintenance expenditures. Practically there are no real revenues of the project activity, the incomes are indirect in function of investment and operational costs and that is why they are not foreseen in the sensitivity analysis.

The overall increasing/decreasing of the investment directly corresponds to possible fluctuation of the equipment costs, and labor and maintenance expenses during implementation period.

The results of the sensitivity analysis are shown below:

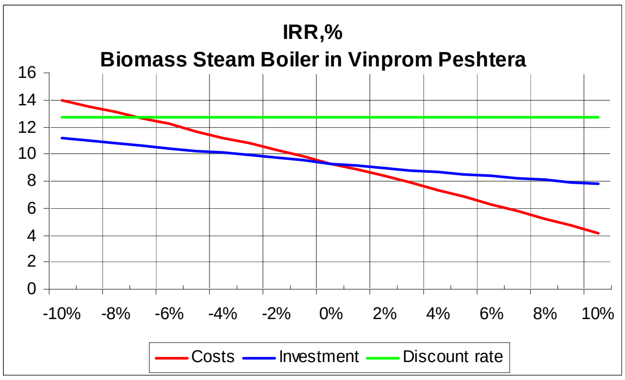
Costs	-10%		-5%		0%		5%		10%	
	IRR	PBP	IRR	PBP	IRR	PBP	IRR	PBP	IRR	PBP
	%	Years	%	Years	%	Years	%	Years	%	Years
	14.0	11	11.7	13	9.3	16	6.8	20	4.1	No

Investment	-10%		-5%		0%		5%		10%	
	IRR	PBP	IRR	PBP	IRR	PBP	IRR	PBP	IRR	PBP
	%	Years	%	Years	%	Years	%	Years	%	Years
	11.2	14	10.2	15	9.3	16	8.5	18	7.8	19

Table B.2.5 – Project sensitivity analysis

The comparison of the benchmark with different Project IRR's in conjunction to the fluctuation in the investment and revenues can be obtained from the following graph:

Fig.B.2.4 – Project IRR sensitivity



In the most probable scenarios where the investment increase (overall increase of the equipment price) or operational costs increase (that corresponds to the positive trend of the straw fuel price) the project IRR is far below the benchmark.
The scenario where project IRR passes benchmark is marginal (reducing of the operational expenditures) and in fact, it cannot modify the assumption that the project is additional.
Reducing of the operational costs (constituted mainly from the costs for straw procurement) with 10% is not a feasible scenario because all expectations are that the price of the straw will rise in the future. Currently the straw is mainly a waste product in the agriculture but in the next years, its characteristics as a fuel will lead to increased demand and respectively its price will have a positive trend.
The above data confirms the conclusion that in the most cases of fluctuation of the main parameters the Project remains in its state - unlikely to be financially/economically attractive.

Step 3: Barrier analysis

Despite of the existing policies and regulations designed to promote development of energy production from renewable sources, the proposed project activity is not attractive for lenders/investors due to perceived risks/barriers associated to energy production from straw biomass in Bulgaria. All government incentives are focused on biomass electricity production and cogeneration. The pure heat production for industrial purposes cannot access such financing.
Therefore, additional financing the project is not possible and project developer aims the financial benefit of the revenues obtained by selling ERU's to reduce the risks perceived by lenders/investors.

Sub-step 3a: Identify barriers that would prevent the implementation of the proposed JI project activity:
The main barrier that we can identify is the Technological barrier.

Technological barrier:
There are no local producers of straw-based boilers and also the technology is new for Bulgaria. Combustion of straw bales is a very specific process and is subject to big investments in research and development. The present know-how is carried by the North-European countries such as Sweden, Denmark, and Netherlands – countries that have traditional experience in the biomass energy production. The proposed project is based on Dutch boiler with patented combustion chamber based inclined shaking grate. Such grate provides high efficiency of the combustion process, combined with low NOx pollutions.
At the near past in Bulgaria, the straw traditionally was burnt at agriculture fields. Since 2009, such processing is forbidden and currently the straw is left to decay on the land and thus is used to fertilize the soil. The traditional combustion of straw in the furnaces results in very low thermal efficiency and increased levels noxious NOx emissions. That is why such use is very rare. There is no experience with the operation and maintenance of straw combustion technology. There is a lack of experienced and trained personnel to operate and maintain such boilers. While the operation and maintenance experience is very limited, the technology and equipment suppliers will have the main role for maintenance of the equipment and training of the operation personal.
The second main problem against using straw as a fuel for thermal production is serious influence of the logistics. The experience of the North-European countries shows that in order to maintain low transport costs is needed the collection of the straw to be done in the 50-100km perimeter around the thermal plant. This fact additionally decreases the usage of the proposed technology.

Sub-step 3 b: Show that the identified barriers would not prevent the implementation of at least one of the alternatives (except the proposed project activity):

Alternative A represents the proposed project without the JI incentive and it is therefore not considered in this sub-step.
Alternative B is a continuation of the existing situation:
The technology for thermal production, based on fossil fuels (including natural gas) is very well acknowledged and experienced in Bulgaria. There is a local producer (Kotlostroene AD – Sofia) of steam and hot water boilers, burning fuel oil and natural gas. There are hundreds of such installations across the country. It is clear that the technological barriers will not prevent the implementation of this alternative.
The identified barrier would not prevent the Alternative B- continuation of the current situation.

Step 4. Common practice analysis

Sub-step 4a. Analyze other activities similar to the proposed project activity:
As already mentioned above there are strong technological barriers that prevents wide usage of straw as a fuel in production of energy. Known difficulties in operation of such plants as advanced technology to keep parameters of the straw combustion process in foreseen limits in combination with hard logistics, force the investors to search for other technological solutions to supply their thermal needs.

Currently there are few investment projects, based on straw combustion, under way in various stages of development like for example:
- Enemona - Nikopol - cogeneration for electricity and hot water for district heating - 47MWt;
- Euroethyl - Alfatar - steam boilers for bioethanol factory - 8 MWt;

- Almagest - Ihtiman - steam boilers for ethanol factory - 10 MW;

None of these projects is completed and operational yet. The only exceptions are very small and/or demonstration installations.

Sub-step 4b. Discuss any similar options that are occurring:

Since there is no straw based installations, comparable in size with proposed project activity, commissioned in the recent years, then it cannot be identified any existing similar options. The mentioned above projects are:

- in process of implementation;
- developed as JI projects.

Therefore, these projects are not examples of such similar options.

In conclusion, it can be said that the straw biomass boiler projects are not a common practice.

The above mentioned passed additionality test and the positive impact of possible JI revenues leads to the conclusion that the project activity is additional.

B.3. Description of how the definition of the project boundary is applied to the project:

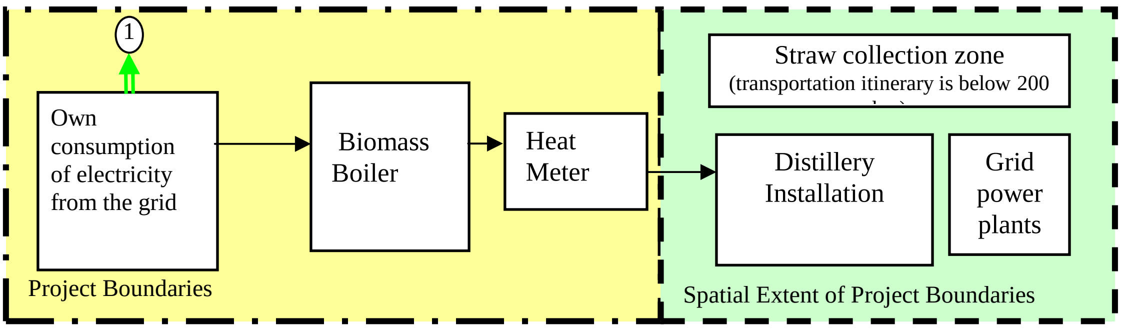
In accordance with JISC "Guidance on criteria for Baseline Setting and Monitoring" Ver.02 p.14 (a), the project boundary shall encompass all anthropogenic emissions by sources of GHGs which are significant, reasonably attributable to the project and under the control of the project participants. As per p.15 of the indicative simplified CDM baseline and monitoring methodology AMS-I.C. Version 19, the spatial extend of the project boundaries shall include the heat generating plant at the project site, grid electricity system, heat consuming industrial facility.

The baseline scenario is defined as continuing of the existing situation or the thermal energy generated by the project activity would have otherwise been generated by the operation of existing fossil fuel boilers.

After the project implementation, emissions from the burning process will be omitted, due to the renewable energy source (straw) used for heat production for the Katunitsa spirit factory. Emissions from the electricity grid for auxiliary needs in the Boiler House have to be taken into account in the Project boundary – this is a conservative estimation.

The project boundary is defined like physical and geographical site of the project activities, and the spatial extent of the project boundary includes the project boiler house, straw collecting zone (the transportation roundtrip is below 200 km), distillery installation that consumes the produced heat and electricity energy system of Bulgaria, from where the boiler auxiliary needs are supplied.

The project boundaries are shown on Figure B.3.1 below:



1 – CO_2 emissions (own consumption electricity from the grid)

Figure B.3.1 - System and Project Boundaries

The project boundary includes all emissions related with the fossil fuels combusted in the existing natural gas boilers in the Katunitsa spirit factory. The emissions related with the production, transportation and distribution of the reduced quantities of natural gas as a result of project activities are not included in the project boundary. The leakages, connected with straw bales processing and transportation is not included as emissions source since the average transportation roundtrip is below

200 km. CH_4 emissions from biomass residues that would be dumped or left decay are also excluded from the project boundary.

The greenhouse gases and emission sources included in or excluded from the project boundary in accordance with AMS-I.C. are shown in the Table below:

Source		**Gas**	**Included?**	**Justification/Explanation**
Baseline	CO2 emissions from combustion of fossil fuel in the existing boilers that are displaced due to the project activity	CO2	Yes	Main emissions source
		CH4	No	Considered negligible
		N2O	No	Considered negligible
Project activity	Fossil fuel combustion in the grid power plants for electricity supply to boiler house (auxiliary needs)	CO2	Yes	Main emissions source
		CH4	No	Considered negligible
		N2O	No	Considered negligible
Leakage	Collection, processing, transportation of biomass residues (straw bales)	CO2	No	Considered minor source of emissions.
		CH4	No	Considered negligible
		N2O	No	Considered negligible

Table B.3.1 Emissions sources included in or excluded from the project boundary

B.4. Further baseline information, including the date of baseline setting and the name(s) of the person(s)/entity(ies) setting the baseline:

The date of baseline setting is 15.04.2011.
The baseline study in this Joint Implementation Project was elaborated from,

Mr. Stefan Manev
Tel/Fax. +359 2 9263445
Email. cogen@cogeneng-bg.com
The person is not project participant.

Mr. Pavel Sotirov
CoGen Engineering LTD
Tel/Fax +359 2 9632223
Mobile. +359 884 221 435
Email. cogen@cogeneng-bg.com
The person is not project participant.

SECTION C. Duration of the small-scale project / crediting period

C.1. Starting date of the small-scale project:

The starting date of the small-scale project is 01.04.2010 with official Notification No.OBOC-201/01.04.2010 of the investment intention.

C.2. Expected operational lifetime of the small-scale project:

The expected operation lifetime of the small-scale project is 15 years and 0 months or 180 months.

C.3. Length of the crediting period:

Start of the first crediting period: 01.06.2011.
Length of the first crediting period: 1.58 years or 19 months.
Emission reductions generated after the first crediting period may be used in accordance with an appropriate positive decision of UNFCCC and Host country approval for second crediting period 2013 – 2020. In this case the length of the second crediting period would be 8 years or 96 months.

SECTION D. Monitoring plan

D.1. Description of monitoring plan chosen:

Description and justification of the monitoring plan chosen is provided below in accordance with the "Guidelines for users of the Joint Implementation Project Design Document Form for Small_Scale Projects ", version 04 [(D1-1)], using the following step-wise approach:

Step 1: Indication and description of the approach chosen regarding monitoring

The monitoring for this project shall be established in accordance with paragraphs 4-6 of appendix B of the JI guidelines.
The project developers have chosen the following approach regarding monitoring setting, defined in the Guidance (Paragraph 9):
b) A methodology for baseline setting and monitoring approved by the Executive Board of the clean development mechanism (CDM), including methodologies for small-scale project activities, as appropriate, in accordance with paragraph 4(a) of decision 10/CMP.1
The approved CDM methodology shall be used in its totality, including all explanations, descriptions and analyses.[(D1-2)]
The approved CDM baseline and monitoring methodology ***AMS-I.C.*** – **"Thermal energy production with or without electricity" –Version 19**[(D1-3)] will be chosen for the project **.** The chosen methodology comprises renewable energy technologies that supply industrial facilities with thermal energy that displaces fossil fuel use. These units include energy derived from renewable biomass that displaces fossil fuel. The methodology fully comprises the technology of the project.
Applicability
Emission reductions from a biomass cogeneration system can accrue from the following activity:
(b) Electricity and/***or thermal energy (steam or heat) production for on-site consumption***

Step 2: Application of the approach chosen

In accordance with Step 1 and Guidance on criteria for baseline setting and monitoring.[(D1-2)] a Monitoring Plan was developed by the project developers. The Monitoring Plan provides:
(a) The collection and archiving of all relevant data necessary for estimating greenhouse gases emissions by sources occurring within the project boundary during the crediting period;
(b) The collection and archiving of all relevant data necessary for determining the baseline of greenhouse gases emissions by sources within the project boundary during the crediting period;
(c) The identification of the potential sources of greenhouse gases emissions outside the project boundary showed that they are not significant and in accordance with the applied methodology ***AMS-I.C*** they reasonably are not applicable to the project during the crediting period.
(d) The collection and archiving of information on environmental impacts, in accordance with procedures as required by the host Party, also is not applicable to the project;
(e) Quality assurance and control procedures for the monitoring process are developed in section D3. QA/QC procedures for every single measurement device will be developed after the start of project operation in special Journal of Measurement Device additional integral part to the developed Monitoring plan;

[(D1-1)] http://ji.unfccc.int/Ref/Documents/Guidlines_users_JISC_PDD_Form.pdf
[(D1-2)] http://ji.unfccc.int/Ref/Documents/Baseline_setting_and_monitoring.pdf
[(D.1-3)] http://cdm.unfccc.int/methodologies/DB/6EL4AG49US2S1DNH55Y4S7GDQFA2JF

(f) Procedures for the automatic periodic calculation of the reductions of anthropogenic emissions greenhouse gases by sources in the project boundaries ;
(g) Documentation of all steps involved in the calculations (from all data collecting, throughout the calculations of baseline and project emissions to emissions reduction calculation).
(h) Clearly identify the responsibilities and the authority regarding the monitoring activities in the plant.
The developed Monitoring plan form and its integral part Journal of Measurement Device forms are shown in Annex No.5 to PDD –Doc. No. 5.2 and 5.3.
Data monitored and required for determination are to be kept in electronically and written form for two years after the last transfer of ERUs for the project.
The project participants are encouraged to improve the monitoring process and its results.
Revisions, if any, to the monitoring plan to improve the accuracy and/or applicability of information collected shall be justified by project participants and shall be submitted for the determination referred to in paragraph 37 of the JI guidelines by the AIE. In this case the AIE shall determine whether the proposed revisions improve the accuracy and/or applicability of information collected, compared to the original monitoring plan without changing conformity with the relevant rules and regulations for the establishment of monitoring plans and, in case of a positive determination, shall proceed with the determination referred to in paragraph 37 of the JI guidelines .[(D1-2)]
The implementation of the monitoring plan and its revisions, as applicable, shall be a condition for verification of project results in the crediting period.

D.2. Data to be monitored:

The Monitoring plan is developed on the base Guidance on criteria for baseline setting and monitoring.[(D1-2)]
The Monitoring plan separately to project emissions, baseline emissions and leakages describes all relevant parameters and their key characteristics that will be monitored in the crediting period.
The Monitoring plan provides a complete compilation of the data that needs to be collected for its correct application. This includes the data that are measured and data that are collected from other sources (e.g. official statistics, MOEW published data, IPCC 2006 data,). Data that is calculated with equations are not included in this compilation.

The project environmental impact is insignificant. The demonstration of this is the decision of Regional Environmental Inspectorate - Plovdiv / Decision № ПВ-51-ПР/23.08.2010 that for this project Environmental Impact Assessment is not necessary. See Annex No 5 Doc. No. 5.7. By this reason the collection and archiving of information on environmental impacts, in accordance with procedures as required by the host Party, is not applicable to the project;

The information in the Monitoring plan is provided in Excel tabular forms.
The data to be monitored, with the formulas for project emissions, baseline emissions, leakages and emission reduction calculations are shown below:

[(D.1-4)] http://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-05-v1.pdf

The parameters that shall be monitored in the crediting period for project emissions calculations are shown in tabular form below:

Data/Parameter	$EC_{PJ,y}$
Data unit	MWh
Description	Electricity consumption for straw boiler auxiliary needs
Time of determination/monitoring	At the beginning of next year based on ex-post annual recordings, by months. Ex-post daily measurement and monthly recording
Source of data (to be) used	Approved type electrometer with laboratory control at side 0.4 kV.
Value of data applied	Ex-ante:2011-271.0, 2012- 542.0 Ex-post: From Measurement Journal
Justification of the choice of data or description of measurement methods and procedures (to be) applied	Daily electricity readings with calibrated measurement unit, which is connected online to electricity substation of Katunitsa plant. The measurements are recorded electronically and in the Journal of Measurement Device.
QA/QC procedures (to be) applied	The QA/QC procedures for those measurement devices will be described in details separately for each measurement device in special "Journal of Measurement Device" taking in mind manufacture instructions. The journal will contents the main measurement device data, like technical description and documentation, position, QA/QC procedures, calibrations, training, temporally replacing procedures etc.
Any comment	Electricity supplied form the grid to the project site.

Data/Parameter	$EF_{grid,CM}$ y
Data unit	tCO2/MWh
Description	Bulgarian Electrical System combined margin CO_2 Emission factor of the grid.
Time of determination/monitoring	At the end of each year based on ex-post annual data or from the survey "Baseline Study of Joint Implementation projects in the Bulgarian energy sector" officially published on MOEW site.
Source of data (to be) used	Official MOEW and ESO publications
Value of data applied	Every year, for reference see Table An.2 -1, value- Minimum Demand – HPP Included - Dispatch Data Adjusted _OM_EF -2011 – 0.849, 2012 – 0.838 and for period 2013 -2020 -0.838 or officially calculated and verificated on the base of ex-post Electrical System data. The choice is conservative.
Justification of the choice of data or description of measurement methods and procedures (to be) applied	Take-over of officially MOEW publication calculated and certificated ex-post for each year in the crediting period. If no going mechanism, than will be used the survey "Baseline Study of Joint Implementation projects in the Bulgarian energy sector".
QA/QC procedures (to be) applied	The sources of the data shall be "official". The result of the calculations and its correctness is predetermine from the correctness of the inside parameters and the rightness of the power plants choice, sorting and grouping (low-costs, must-runs, BM sample group). DOE will check the correctness of the data and the grouping of the plants.
Any comment	The data shall be received officially from the Bulgarian authorities ex-post each year in the monitoring period. In case of MOEW's new publications missing, all calculations of ***EFgrid,CM y*** are from "Baseline Study of Joint Implementation projects in the Bulgarian energy sector"

Data/Parameter	TDLgrid,y
Data unit	%
Description	Average technical transmission and distribution relative grid loses
Time of determination/monitoring	At the end of each year based on ex-post annual data, or if data missing in the moment, then the data from the last year.
Source of data (to be) used	Eurostat 2011 edition, Energy Balance Sheets[D.2.1.2-1].
Value of data applied	Ex-post, the average value of the loses is 10.79 % for 2009. The value is used for emissions reduction ex-ante calculation. The values for ex-post calculations are always for the year before the last.
Justification of the choice of data or description of measurement methods and procedures (to be) applied	The data in Eurostat are from the Bulgarian National Statistical Institute that is the original source of information for transmission and distribution grid loses.
QA/QC procedures (to be) applied	The QA/QC procedures of Eurostat (Bulgarian National Statistical Institute)
Any comment	Normally in the period of Monitoring Report preparing the data of TDL for the year before the last are available. The officially Eurostat /NSI/ data of the grid distribution loses are not divided by separate voltage levels.

The parameters that shall be monitored in the crediting period for baseline emissions calculations are shown in tabular form below:

Data/Parameter	$EG_{t,y}$
Data unit	TJ
Description	The net quantity of steam/heat supplied by the project activity during the year *y*
Time of determination/monitoring	At the beginning of next year based on ex-post annual recordings, by months. Ex-post daily measurements and monthly recording
Source of data (to be) used	Boiler outlet steam flowmeter and boiler inlet heat flowmeter.
Value of data applied	Ex-ante:2011-139.4, 2012- 278.6. Ex-post: From Measurement Journal
Justification of the choice of data or description of measurement methods and procedures (to be) applied	Steam flowmeter at the boiler outlet and heat flowmeter at the boiler feeding water inlet. Both flowmeters are measuring flow, temperature and pressure parameters and calculating thermal energy. The data will be read in MWt and will be converted to TJ in the Monitoring plan. The difference of the readings of outlet steam flowmeter and inlet heat flowmeter will constitute the boiler's net thermal energy supply.
QA/QC procedures (to be) applied	The QA/QC procedures for those measurement devices will be described in details separately for each measurement device in special "Journal of Measurement Device" taking in mind manufacture instructions. The journal will contents the main measurement device data, like technical description and documentation, position, QA/QC procedures, calibrations, training, temporally replacing procedures etc.
Any comment	The estimation of $EG_{t,y}$ will be performance automatically in the Monitoring plan like difference between the two input measurement data: - $EG_{tgo,y}$ - the gross quantity of steam produced by the straw boiler - $EG_{tFw,y}$ – the thermal energy of the feeding water at the inlet of the boiler.

Data/Parameter	$\eta_{t,y}$
Data unit	-
Description	The efficiency of the plant using fossil fuel (natural gas) that would have been used in the absence of the project activity
Time of determination/monitoring	Once before the start of regular operation of the project.
Source of data (to be) used	The operation manuals of the boilers producer are the source of the data.
Value of data applied	The value preliminary estimated and valid for the whole project operational life.
Justification of the choice of data or description of measurement methods and procedures (to be) applied	The estimation of the efficiency is performance for the whole station in difference periods of working on the base of the consumed natural gas and the produced steam, but for the fact, that this value is smaller than the values shown in the boilers producer documentations, it will be used the higher value from these documentations of baseline emissions calculation. The calculation of boilers efficiency is shown in Annex 2 to PDD.
QA/QC procedures (to be) applied	The QA/QC procedures for the measurements and estimations are in accordance with the boilers producer rules.
Any comment	The efficiency estimation shall be conservative.

Data/Parameter	EF_{NG}
Data unit	tCO2/TJ
Description	The CO_2 emission factor of the fossil fuel (natural gas) that would have been used in the baseline plant obtained from reliable local or national data if available, alternatively, IPCC default emission factors can be used (tCO_2/TJ)
Time of determination/monitoring	At the end of each year based on the last IPCC estimated value
Source of data (to be) used	2006 IPCC vol.2 Table 2.2.
Value of data applied	0.0561
Justification of the choice of data or description of measurement methods and procedures (to be) applied	-
QA/QC procedures (to be) applied	IPCC QA/QC procedures.
Any comment	-

The Project emissions in the crediting period will be calculated:

Project emissions include CO_2 emissions from electricity consumption by the project activity using the latest version of the “Tool to calculate baseline, project and/or leakage emissions from electricity consumption” Ver.01[D.1-4]

The project emissions will be calculated by the next formulae:

$$PEy = EC_{PJy} * (1+TDL_{grid,y}/100) * EF_{grid,CM,y}; \quad [tCO2/y] \qquad \text{(D-1)}$$

Where:

$EC_{PJ,y}$ – boiler electricity own consumption [MWh/y];

$EF_{grid,CM,y}$ – grid electricity emission factor [tCO2/MWh];

$TDL_{grid,y}$ - relative grid loses, [%]

The information for relative grid looses estimation will be extracted from Eurostat 2011 edition Energy Balance Sheets [D.2.1-1] for the year before the last year. The transformation from absolute value to percentages will be performed by the next formulae:

$TDL_{grid,y}$ [%] = Row 34 (Distribution looses) * 100 /{Row 3 (Import) + Row 19 (Transformation output) + Row 29 (Exchanges and transfers, Returns /RES-Wind and Hydro/) }

The Baseline emissions in the crediting period will be calculated:

For renewable energy technologies that displace technologies using fossil fuels, the simplified baseline is the fuel consumption of the technologies that would have been used in the absence of the project activity, times an emission factor for the fossil fuel displaced.

For steam/heat produced using fossil fuels the baseline emissions will be calculated as follows:

$$BE_{t,y} = (EG_{t,y} / \eta_{ty}) * EF_{NG} \quad [tCO_2/y] \qquad \text{(D-2)}$$

Where:

$BE_{t,y}$	The baseline emissions from steam/heat displaced by the project activity during the year *y* (tCO_2)
$EG_{t,y}$	The net quantity of steam/heat supplied by the project activity during the year *y* (TJ)
EF_{NG}	The CO_2 emission factor of the fossil fuel (natural) gas that would have been used in the baseline plant obtained from reliable local or national data if available, alternatively IPCC default emission factors can be used (tCO_2/TJ)
$\eta_{t,y}$	The efficiency of the plant using fossil fuel (natural gas) that would have been used in the absence of the project activity. Estimated once before project operation starting

$$EG_{t,y} = (EG_{tgo,y} - EG_{tFw,y})/1000 \ [TJ]; \qquad \text{(D–3)}$$

Where:

$EG_{tgo,y}$ - the gross quantity of steam produced by the straw boiler [TJ];
$EG_{tFw,y}$ – the thermal energy of the feeding water at the inlet of the boiler [GJ].

Where the collection/processing/transportation of biomass residues is outside the project boundary CO_2 emissions from the collection/processing/transportation of biomass residues to the project site shall be taken into account as leakage in case those biomass residues are transported over a distance of more than 200 kilometres.

In our case the area for biomass collecting is less than 100 km distance, and for this reason the leakages will be neglected and data connected with leakages sources will not be monitored in the crediting period. The area for straw biomass collecting is shown in Annex 2 to PDD.

The Emissions reductions in the crediting period will be calculated:

Emission reductions are calculated as follows:

$$ER_y = BE_{t,y} - PE_y - LE_y \ [tCO_2/y] \qquad \text{(D - 4)}$$

Where:

ER_y	Emission reductions in year *y* (tCO_2e)
$BE_{t,y}$	Baseline emissions in year *y* (tCO_2e)
PE_y	Project emissions in year *y* (tCO_2)
LE_y	Leakage emissions in year *y* (tCO_2)

[D2-1] http://epp.eurostat.ec.europa.eu/portal/page/portal/product_details/publication?p_product_code=KS-EN-11-001

D.3. Quality control (QC) and quality assurance (QA) procedures undertaken for data monitored:

Data *(Indicate table and ID number)*	Uncertainty level of data (high/medium/low)	Explain QA/QC procedures planned for these data, or why such procedures are not necessary.
D.2–First Table variable parameter $EC_{PJ,y}$ [MWhe]	Low	The data will be used directly for emission reduction calculation. The auxiliary electricity grid consumption of the straw boiler will be measured continuously with electrical meter type LZQJ –XC production of the German company "EMH metering". The LZQJ-XC as a multifunctional meter according to VDEW-specifications 2.1 fulfills the requirements for quality monitoring by implementing additional functions. Additionally the device can analyze the instantaneous P, Q, S (per phase and sum), U, I, power factor, line frequency, values phase failure. The meter device is certified and calibrated according the national standards outlined in Annex 3 to PDD. The QA/QC procedures for the measurement device will be described in details in special "Journal of Measurement Device" taking in mind manufacture instructions. The journal will contents the main measurement device data, like technical description and documentation, position, QA/QC procedures, calibrations, training, temporally replacing procedures etc.
D.2 –Second Table variable parameter $EF_{grid,CM}$ y [tCO2/MWh]	Medium	This data will be used directly for emission reduction calculation. These variables are result of calculations and their correctness are predetermine from the correctness of the inside parameters and the rightness of the power plants choice, sorting and grouping (low-costs, must-runs, BM sample group). The calculations of EF s are ex-post annually. The sources of the data shall be "official" and DOE will check the correctness of the data and the grouping of the plants. The source of data is MOEW. In case of MOEW's new publications missing, all calculations of of ***EFgrid,$_{CM}$ y*** are from "Baseline Study of Joint Implementation projects in the Bulgarian energy sector" 2005. In this case we can talk for medium uncertainty of data. The implemented QA/QC procedures are subject of state authority MOEW.
D.2 –Third Table variable parameter TDLgrid,y [%]	Low	The data will be used directly for emission reduction calculation. The source of data is Eurostat respectively Bulgarian National Institute The QA/QC procedures are of Eurostat (Bulgarian National Statistical Institute)
D.2 –Fourth Table variable parameter $EG_{t,y}$ [TJ]	Low	The data will be used directly for emission reduction calculation. The data will be calculated in Monitoring plan on the base of difference between the gross steam output and feeding water heat input. The parameter $EG_{tgo,y}$ - gross quantity of steam produced by the straw boiler will be used indirectly for emission reduction calculation and will be measured with steam flow meter Vortex Flowmeter VTFV4000-VT4 and Universal Heat Meter CF300 companies ABB and Unisyst production. The value of parameter EG_{tFwiy} – the thermal energy of the feeding water at the inlet of the boiler will be used indirectly for emission reduction calculation and will be measured with heat flow meter -

		Process Master FEP311 Electromagnetic Flowmeter system, integral mount and Universal Heat Meter CF300 companies ABB and Unisyst production. The meter devices are certified and calibrated according the national standards outlined in Annex 3 to PDD. The QA/QC procedures for each measurement device will be described in details in special "Journal of Measurement Device" taking in mind manufacture instructions. The journal will contents the main measurement device data, like technical description and documentation, position, QA/QC procedures, calibrations, training, temporally replacing procedures etc.
D.2 –Fifth Table parameter η_{ty}	Low	The data will be used directly for emission reduction calculation. The efficiency value of the plant using fossil fuel (natural gas) that would have been used in the absence of the project activity will be estimated once before the start of operation and remain valid for the whole project operational life. The estimation of the efficiency is performance for the whole station in difference periods of working on the base of the consumed natural gas and the produced steam, but for the fact, that this value is smaller than the values shown in the boilers producer documentations, it will be used the higher value from these documentations of baseline emissions calculation. The calculation of boilers efficiency is shown in Annex 2 to PDD. The QA/QC procedures for the measurements and estimations are in accordance with boilers producer rules.
D.2 –Sixth Table parameter EF_{NG} [tCO_2/TJ]	Low	The data will be used directly for emission reduction calculation. The CO_2 emission factor of the fossil fuel (natural gas) that can be used like fuel in case of project missing. The source of data is 2006 IPCC vol.2 Table 2.2. The QA/QC procedures are these of IPCC.

D.4. Brief description of the operational and management structure that will be applied in implementing the monitoring plan:

In the context of the JI Projects, the Monitoring Plan outlines the systematic observation of the Project status, through measurement and recording of related indicators. The Monitoring Plan (MP) refers to the baseline and project scenario. MP provides the basis for GHG reductions assessment. MP provides also data collecting and their processing. It is foreseen like monitoring operator to be CoGen Engineering LTD. MP should be used by the operator during project implementation and operation. The operator shall follow the MP instructions for data measuring and recording and shall prepare the monitoring reports for the process of project results verification. MP is the basis of ERU's generation and delivery to the Buyer.
MP is presented in Excel format. The model requires entering of the observed parameters as input data and automatically computes the design and basic emissions for every year after commissioning of the plant.
The structure and the procedures which will be performance in the period of project implementation and operation are:

Staff at project site

- Collecting and recording /electronically and in journal/ hourly and monthly the data from electro meter in measurement position MP-1, the steam flowmeter in measurement position MP-2 and the heat flowmeter in measurement position MP-3;

- Monthly to send to the Operator the data collected;
- To develop, complete with the Operator help "Journal of the measurement device" (in electronically and hard format) for every one measurement device. To fill the Journals regularly throughout the years in the crediting period;
- To organize the training process and participate regularly;
- To check the measurement devices calibration intervals and ensure their calibration in term.

Staff at Operator

- To control the realization of all monitoring requirements in the process of the detail design and construction on site;
- In the process of the of the subprojects to control for realizing of the monitoring requirements;
- To collect data of officially MOEW publicized grid **($EF_{grid,CM`y}$)**;
- To calculate using the existing monitoring model the emission reduction annually;
- To prepare annually Monitoring report and to send to the independent verification entity;
- To help of the project staff to organize the training process regularly.

The structure of monitoring process organization is shown in Annex 3 to PDD on Fig.An.3-2.

Remark:

1. The monitoring process of the project will be supported from the implementation of one especially developed document "Journal of the measurement device". In this journal will be collected all necessary data for every one measurement device position from the measurement scheme of the biomass plant in paper and electronic variants. The journal comprise the next sections with data: - Measurement device QA/QC ensure, Technical description, Measurement device calibration, Training of the measurement device service, The procedures description in case of damages and temporary replacing of the measurement device, Measurement results (daily in the period 2011-2012 and to 2020). The filling of the journal is obligation of the factory staff. The final processing with the journals is obligation of the operator. The form of the "Journal of the measurement device" is available on request and the filled journals will be presented to Verification Company in the process of verification.
2. The spreadsheets with the input data, calculations and results for the baseline and projects emissions are presented in file "To Ann3-Monitoring Plan Tables PDD – Vinprom Peshtera Biomass Boiler.xls" to PDD- Annex 5 Doc.5.2 – "List of documents presented to the validator", and are available on request.

D.5. Name of person(s)/entity(ies) establishing the monitoring plan:

Mr. Stefan Manev
CoGen Engineering LTD
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Email. cogen@cogeneng-bg.com
The person is not project participant.

SECTION E. Estimation of greenhouse gas emission reductions

E.1. Estimated project emissions and formulae used in the estimation:

Project emissions include CO_2 emissions from electricity consumption by the project activity using the latest version of the "Tool to calculate baseline, project and/or leakage emissions from electricity consumption"Ver.01(E.1-1)

$$PE_y = EC_{PJy} * (1+TDLgrid,y/100) * EF_{grid,CM,y};\ [tCO2/y] \qquad (E\text{-}1)$$

Where:
$EC_{PJ,y}$ – boiler electricity own consumption [MWh/y]
$EF_{grid,CM,y}$ – grid electricity emission factor [tCO2/MWh];
TDLgrid,2009 - relative grid loses for 2009, [%]

The emission factors $EF_{grid,CM\ y}$ used in the PDD on ex-ante project emissions reduction calculation are taken from the survey "Baseline Study of Joint Implementation projects in the Bulgarian energy sector" (E.1-2) developed by NEK – EAD and officially published by MoEW. The survey was applied the ACM0002 Methodology and was executed at a request of Bulgarian Ministry of Environment and Waters(MoEW). The $EF_{grid,CM\ y}$ values are reported for the historical period 2000 – 2004 and for the future period 2005 – 2012. The table with the estimated emission factors is shown in Annex 2 to PDD.
The value of EF for 2012 is used for the ex-ante calculations in the period 2012 – 2020.

The information for relative grid loses estimation will be extracted from Eurostat 2011 edition Energy Balance Sheets (E..1-3) for the year before the last year. The transformation from absolute value to percentages will be performed by the next formulae:
$TDL_{grid,2009}$ [%] = Row 34 (Distribution looses) * 100 /{Row 3 (Import) + Row 19 (Transformation output) + Row 29 (Exchanges and transfers, Returns /RES-Wind and Hydro/) } = 4,512 * 100 / (2,662 + 38,671 + 3,710) = 10.02 %.
Extract from the journal is shown in Annex 2 to PDD.
The results from calculation of the project emissions are presented in Table below. Detailed calculation is available in Ann.5 Doc.5.1 -To.Ann.2- Project Emissions Reduction Calculations PDD V.P.B.B..xls.

No	Description	Measure	2011	2012	Total 2011-2012
14	Project Emissions	[tCO_2]	244.9	464.5	709.4

No	Description	Measure	2013	2014	2015	2016	2017	2018	2019	2020	Total 2013-2020
14	Project Emissions	[tCO_2]	464.5	464.5	464.5	464.5	464.5	464.5	464.5	464.5	3,716.37

Table E.1 – Project Emissions

E.2. Estimated leakage and formulae used in the estimation, if applicable:

Leakage estimations are not applicable to the project.
In accordance to the accepted methodology ***AMS-I.C.*** – **"Thermal energy production with or without electricity" –Version 19:**

(E.1-1) http://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-05-v1.pdf
(E.1-2) http://www.moew.government.bg/recent_doc/climate/Baseline%20CEF%20Summary.pdf
(E.1-3) http://epp.eurostat.ec.europa.eu/portal/page/portal/product_details/publication?p_product_code=KS-EN-11-001

"Where the collection/processing/transportation of biomass residues is outside the project boundary CO_2 emissions from the collection/processing/transportation of biomass residues to the project site shall be taken into account as leakage in case those biomass residues are transported over a distance of more than 200 kilometres. In other case, like the due to the implementation of the project activity then the leakage source attributed to transportation can be neglected".

$$LEy = 0; \ [tCO2/y] \qquad (E\text{-}2)$$

The area for straw biomass collecting is shown in Annex 2 to PDD.

E.3. Sum of E.1. and E.2.:

The sum of (E-1) and (E-2) is equal to ***PEy.***

E.4. Estimated baseline emissions and formulae used in the estimation:

Baseline emissions for heat production

For steam/heat produced using fossil fuels the baseline emissions are calculated as follows:

$$BE_{t,y} = (EG_{t,y} / \eta_{t,y}) * EF_{NG} \quad [tCO_2/y] \qquad (E\text{-}3)$$

Where:

$BE_{t,y}$	The baseline emissions from steam/heat displaced by the project activity during the year *y* (tCO_2)
$EG_{t,y}$	The net quantity of steam/heat supplied by the project activity during the year *y* (TJ)
EF_{NG}	The CO_2 emission factor of the fossil fuel (natural) gas that would have been used in the baseline plant obtained from reliable local or national data if available, alternatively, IPCC default emission factors can be used (tCO_2/TJ)
$\eta_{t,y}$	The efficiency of the plant using fossil fuel (natural gas) that would have been used in the absence of the project activity

$$EG_{t,y} = EG_{tgo,y} - EG_{tFw,y} \quad [TJ] \qquad (E\text{-}4)$$

Where:

$EG_{tgo,y}$ - the gross quantity of steam produced by the straw boiler [TJ];

$EG_{tFw,y}$ – the thermal energy of the feeding water at the inlet of the boiler [TJ].

The results from calculation of the baseline emissions are presented in Table below. Detailed calculation is available in Ann.5 Doc.5.1 -To.Ann.2- Project Emissions Reduction Calculations PDD V.P.B.B..xls.

No	Description	Measure	2011	2012	Total 2011-2012
13	Baseline Emissions	[tCO_2]	**8,784.1**	**17,568.3**	**26,352.4**

No	Description	Measure	2013	2014	2015	2016	2017	2018	2019	2020	Total 2013-2020
13	Baseline Emissions	[tCO_2]	**17,568.3**	**17,568.3**	**17,568.3**	**17,568.3**	**17,568.3**	**17,568.3**	**17,568.3**	**17,568.3**	**140,546.0**

Table E.2 – Baseline Emissions

E.5. Difference between E.4. and E.3. representing the emission reductions of the project:

Emission reductions are calculated as follows:

$$ER_y = BE_{t,y} - PE_y - LE_y \ [tCO_{2e}/y] \qquad (E\text{-}5)$$

Where:

ER_y	Emission reductions in year *y* (tCO_2e)
$BE_{t,y}$	Baseline emissions in year *y* (tCO_2e)
PE_y	Project emissions in year *y* (tCO_{2e})
LE_y	Leakage emissions in year *y* (tCO_{2e})

E.6. Table providing values obtained when applying formulae above:

Year	Estimated project emissions (tonnes of CO2 equivalent)	Estimated leakage (tonnes of CO2 equivalent)	Estimated baseline emissions (tonnes of CO2 equivalent)	Estimated emission reductions (tonnes of CO2 equivalent)
For the first commitment period				
2011	**245**	**0**	**8,784**	**8,539**
2012	**465**	**0**	**17,568**	**17,104**
Total (tonnes of CO2 equivalent)	**709**	**0**	**26,352**	**25,643**
For the second commitment period				
2013	**465**	**0**	**17,568**	**17,104**
2014	**465**	**0**	**17,568**	**17,104**
2015	**465**	**0**	**17,568**	**17,104**
2016	**465**	**0**	**17,568**	**17,104**
2017	**465**	**0**	**17,568**	**17,104**
2018	**465**	**0**	**17,568**	**17,104**
2019	**465**	**0**	**17,568**	**17,104**
2020	**465**	**0**	**17,568**	**17,104**
Total (tonnes of CO2 equivalent)	**3,716**	**0**	**35,137**	**136,830**

The estimations for the Second Commitment Period 2013-2017/2020 and following periods up to the end of the project operational lifetime are provisional and would be updated if necessary in accordance to the relevant decisions of UNFCCC, COP/CMP and Host country approval.

SECTION F. Environmental impacts

The Project has received a positive resolution concerning the absence of the environmental impacts. It is not expected considerable contamination and discomfort of the environment in the process of realization and operation of the project, and by this reason, EIA is not needed.
The EIA Decision is issued from the Regional Environmental Inspectorate - Plovdiv / Decision № ПВ-51-ПР/24.08.2010. The EIA Decision can be seen in Annex 5, Doc.5.7 to PDD.

F.1. Documentation on the analysis of the environmental impacts of the project, including transboundary impacts, in accordance with procedures as determined by the host Party:

There are a lot of arguments confirming the minor impact on the environment due to the biomass boiler implementation and operation at Spirit factory Katunitsa, as follows:

Implementation phase of the project
During Implementation phase the following main aspects have to be taken into account:
Land use
Project will be built over urbanized land for industrial use. The Project equipment will be placed in the existing retrofitted building.
Noise
Main construction activities as building of foundations, channels, etc, will be carried indoor in the existing workshop. That will reduce significantly noise impact on the environment. Workers are obliged to wear their personal safety devices during construction activities.
Dust and exhaust gases
Releasing of big dust quantities is not expected during the construction process. In order to keep the volume of noxious exhaust gases below limits, proper ventilation will be provided in the premises.
Solid Wastes
The main quantities of solid wastes will be generated as a result of configuration change of the existing building and also due to the earthwork activities connected to construction of foundations and channels. These solid wastes will be dumped according to the Waste Management Act (State Gazette 86/2003).
The project will be built in respect to the approved detail design documentation, the rules and norms, required by the current legislation, Bulgarian standards and other technical specifications for executing, control and accepting of the construction and erection works, following conditions of Article 169 of the Spatial Planning Act.

Operation Phase
Noise
The noise will be genrated mainly from the incorporated in the equipment hydraulic pumps and air fans. Their noise characteristics, according to the technical data are in the range of 60 – 70 dB. These values are in the permissible limits. The air fans also are placed on rubber dampers.
The overall noise background will fit the requirements of the Law on Protection against Environmental Noise (State Gazette 74/13.09.2005) and Regulation №6/26.06.2006 for limit values of the noise indicators for the different hours of the day in the residential areas.

Dust and Exhaust Gases

The emissions of the straw-fired boiler depend directly on the combustion process parameters. There are several factors that control the full utilization of organic matter and its transformation into thermal energy. The combustion process is conditioned mainly by the following parameters: combustion (oxidation) temperature, combustion time (a parameter that controls the complete intermixing of the fuel components with air oxygen and their oxidation), turbulence (an index of flows irregularity and mixing intensity). The exhaust gases that cause harmful emissions during the operation of the boiler contain water vapor, CO_2, CO, NOx, SO_2 /very small quantity/, unburned hydrocarbons and dust.

The maximum furnace temperature should not exceed 800 to 900 °C. Another possible solution to prevent ash fusion and slugging over the grate is by the means of additional water-cooling of the grate bars. In the project boiler, both means are applied (lowered combustion chamber temperature and water-cooling of the grate) to avoid the ash melting effect that due to its high Si content endangers the boiler operation.

The lowered combustion temperature causes lowered NOx values in the exhaust gases.

The building and operation of all fixed sources of harmful air pollutions, as in the case of the present combustion facility, are subject to several regulation limitations. They shall follow strictly the rules of:

- Environmental Protection Act, St. Gazette No. 91/25.09.2002
- Clean Air Act, St. Gazette No. 45/28.05.1996
- Regulation №1/27.06.2005 for permissible limits of harmfull substances, emitted in the air from immovable sources of emissions, issued by MOEW.

For the sources with fuel input in the range of 0.5 MWth up to 50 MWth the limits for emmision of harmful substances are:

Limits for permitted emissions of harmful substances from fuel sources with thermal power from 0,5 to 50 MW at 7 % oxygen volume presence.- [mg/Nm3]								
	Expected values - boiler operation				Limits - Regulation №1/2005			
Fuel type	Dust	SOx	NOx	CO	Dust	SOx	NOx	CO
Solid - straw	**<100**	**-**	**<650**	**<250**	**150**	**2,000**	**650**	**250**

Table F.1-1 Limits of permitted emissions harmful substances in the air

It is an established fact that projects of this kind are not a source of hazardous air and soil pollution. The boiler emissions are significantly lower compared to fossil fuel-fired boilers, which is due mainly to the following reasons:

- fuel type;
- special combustion chamber design to achieve lowered temperature and uniformity of combustion;
- continuous combustion process optimization, computer control based on information from a Lambda-sensor in the chimney and frequency-regulated primary and secondary air ventilators;
- efficient cyclone system for ash separation and collection from the exhaust gases.

The expected emissions in the air results of straw boiler operation are shown in the left part of Table F.1-1.

Wastes

<u>Sediment wastes</u>

These wastes, as a result of the boiler operation such as blow down, clearing, lubricating, etc., are subject to collection in the drain pit. From this drain pit the wastes will be moved periodically to the main waste treatment plant of the factory.

Solid wastes - Ashes

The ashes, generated as a result of biomass burning, are collected from the burning grate and the cyclones into a special purpose container. Then the collected ash is foreseen for use in agriculture soil improvement due to the following reasons:

- The content of potassium in the ash is comparatively high. Such ash can partially replace the usage of expensive potassium fertilizers. In the table below are shown the fertilizing capabilities based on the expected ash generation from the boiler:

Annual straw consumption	[t/y]	22,000
Ash rate from straw	[%]	4.55
Calculated annual ash quantity	[t/y]	1,000
Minimal K content in ash according to manufacturer Weiss	[%]	10
K2O/K conversion ratio		1.2046
Annual K2O gain from the ash	[t/y]	120.46
Max. recommended K2O norm for wheat	[kg/ha]	90
Max. recommended K2O norm for maize without watering	[kg/ha]	110
Max. area fertilized with K2O as by the norms above with ash separately for wheat	[ha]	1,338.44
Max. area fertilized with K2O as by the norms above with ash separately for maize	[ha]	1,095.09
Depth of cultivation	[m]	0.3
Cultivated soil density	[t/m3]	1.5
Quantity of cultivated soil	[t/ha]	4,500
Dispersed ash per ha with wheat	[kg/ha]	747.14
Dispersed ash per ha with maize	[kg/ha]	913.17

Table F.1-2 Fertilizing capabilities of ash generated from the boiler

- The ash dispersing over agriculture land does not lead to any risk of heavy metals pollution because their content in the biomass ash is times less that the limits. In the following table are given the real values of soil pollution with heavy metals due to the ash fertilizing as far as their limits according to the Bulgarian legislation:

Max. heavy metal content in ash according to manufacturer Weiss			***Max. heavy metal pollution due to the dispersed ash in [mg/ha] cultivated soils***		
Heavy metal	*Unit*	*Value*	*Unit*	*Value wheat*	*Value maize*
Cd	mg/kg	4.9	mg/ha	3,660.966	4,474.514
Cr	mg/kg	25	mg/ha	18,678.399	22,829.155
Cu	mg/kg	36	mg/ha	26,896.895	32,873.983
Hg	mg/kg	0.16	mg/ha	119.542	146.107
Ni	mg/kg	24	mg/ha	17,931.263	21,915.989
Pb	mg/kg	22	mg/ha	16,436.992	20,089.656
Zn	mg/kg	82	mg/ha	61,265.150	74,879.628

Table F.1-3 Max. heavy metals content in ash and heavy metal pollution of cultivated soils due to the dispersed ash like fertilizer

Norms as by Regulation No.3/08.05.1979 for sandy-clayey soils			*Max. heavy metal pollution due to the dispersed ash in [mg/kg] cultivated soils*		
Heavy metal	*Unit*	*Value*	*Unit*	*Value wheat*	*Value maize*
Cd	mg/kg	0.8	mg/kg	0.000814	0.000994
Cr	mg/kg	110	mg/kg	0.004151	0.005073
Cu	mg/kg	60	mg/kg	0.005977	0.007305
Hg	mg/kg	0.07	mg/kg	0.000027	0.000032
Ni	mg/kg	80	mg/kg	0.003985	0.004870
Pb	mg/kg	45	mg/kg	0.003653	0.004464
Zn	mg/kg	160	mg/kg	0.013614	0.016640

Table F.1-4 Comparison between the Bulgarian norms and the really pollution of heavy metals in the soils from straw boiler ash dispersion

It is clearly indicated that the lowest difference between the values and their limits is above 800 times. The rest of the ashes that is not used for fertilization will be dumped according to the Waste Management Act (State Gazette 86/2003).

Detail information for heavy metals pollution in the soils can be seen in Annex 5 Doc. 5.8.

F.2. If environmental impacts are considered significant by the project participants or the host Party, provision of conclusions and all references to supporting documentation of an environmental impact assessment undertaken in accordance with the procedures as required by the host Party:

The environmental impact of the project is not considered as significant by the host country that is confirmed by the EIA Decision issued from the Regional Environmental Inspectorate - Plovdiv in 2010. The project realization and operation shall not cause any transboundary impacts.

SECTION G. Stakeholders' comments

G.1. Information on stakeholders' comments on the project, as appropriate:

The first official notification of the investment intention is to the Regional Environmental Inspectorate Plovdiv on 01.04.2010. Really this is the date of the project starting. On 11.06.2010 in front of Municipality Katunitsa and higher Municipality Sadovo was publicised the investment intention for public discussion of local population. After the legal term of 14 days, the municipalities with official letters inform Vinprom Peshtera that no received objections or opinions or proposals concerning the investment intention from population side.
The letters are No.204/30.06.2010 of Municipality Katunitsa and No. 09-00-388/29.06.2010 of Municipality Sadovo.
The investment intention is also publicised in local news paper "Maritsa" from 26.07.2010.
With letter No. EUBA 12/10.06.2011 Bulgarian Energy Utilization Biomass Association express their positive attitude towards the implementation of the project in Spirit factory Katunitsa. The utilization of RES is an opportunity to a partially decreasing of our country's energy dependency on mineral fuels import.
The documents listed and their certified translations in English are shown in Annex 5 Doc.5.9 of the documents sent to the validator.

Annex 1

CONTACT INFORMATION ON PROJECT PARTICIPANTS

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Annex 2

Baseline Information

1. Emission Factor $EF_{grid,CM}$ y [tCO2/MWh] Determination

The grid electricity baseline emission factor $EF_{grid,CM,y}$, values in the PDD are taken of the survey "Baseline Study of Joint Implementation projects in the Bulgarian energy sector developed by NEK – EAD and officially published by MoEW in 2005. The survey applies the ACM0002 Methodology and was work out at the request of Bulgarian Ministry of Environment and Waters (MoEW). The EFy values are reported for the historical period 2000 – 2004 and for the future period 2006 – 2012.

The final results for BEF are given in the following Table An.2-1. For further determination of Project Scenario will be use the most conservative BEF which is received of Baseline Maximum Scenario when Simple Adjusted Method is implemented.

		Unit	2000	2001	2002	2003	2004		
1.	Total system power generation	GWh	41 805	44 785	41 943	41 990	43 621		
2.	Total system heat generation	$MW_{th}h$	14 398 244	17 092 947	17 104 183	18 945 487	15 622 107		
3.	Total CO2 emissions of power generation	kt/a	20 686,07	24 186,09	21 130,37	23 502,96	26 141,93		
4.	Total CO2 emissions of energy transformation	kt/a	25 364,83	29 868,93	27 206,40	29 968,99	31 566,24		
	Baseline Emission Factor - BEF								
	Fossil Fuels								
1.	Dispatch Data_OM_EF	tonne/MWh	1,215	1,287	1,214	1,226	1,199		
2.	Dispatch Data Adjusted_OM_EF	tonne/MWh	1,159	1,222	1,150	1,160	1,138		
3.	Average Dispatch Data_OM_EF	tonne/MWh	1,269	1,307	1,231	1,237	1,239		
	HPP included								
1.	Dispatch Data_OM_EF	tonne/MWh	1,144	1,184	1,106	1,160	1,165		
2.	Dispatch Data Adjusted_OM_EF	tonne/MWh	1,065	1,106	1,032	1,067	1,078		
3.	Average Dispatch Data_OM_EF	tonne/MWh	1,101	1,149	1,040	1,073	1,108		
	Fossil Fuels								
1.	Dispatch Data_OM_EF	kg/GJ	106,38	109,57	110,86	111,24	110,03		
2.	Dispatch Data Adjusted_OM_EF	kg/GJ	106,93	109,05	110,68	111,09	109,91		
3.	Average Dispatch Data_OM_EF	kg/GJ	109,43	108,79	109,00	109,47	110,63		
	Forecast								
	Minimum demand	Unit	2006	2007	2008	2009	2010	2011	2012
1.	Total system power generation	GWh	45 051	43 115	44 156	47 490	48 212	51 139	52 291
2.	Total system heat generation	$MW_{th}h$	17 875 519	18 057 503	18 320 175	18 746 936	19 028 565	19 744 974	19 358 651
3.	Total CO2 emissions of power generation	kt/a	28 035,37	31 810,38	31 245,76	33 538,31	33 547,47	33 863,20	31 248,73
4.	Total CO2 emissions of energy transformation	kt/a	34 447,38	38 304,71	37 832,72	40 154,36	40 358,39	40 560,20	37 758,36
	Baseline Emission Factor - BEF								
	Fossil Fuels								
1.	Dispatch Data_OM_EF	tonne/MWh	1,215	1,158	1,144	1,022	0,984	0,963	0,953
2.	Dispatch Data Adjusted_OM_EF	tonne/MWh	1,154	1,100	1,078	0,956	0,917	0,902	0,899
3.	Average Dispatch Data_OM_EF	tonne/MWh	1,243	1,190	1,146	1,026	0,986	0,974	0,983
	HPP included								
1.	Dispatch Data_OM_EF	tonne/MWh	1,176	1,175	1,110	0,995	0,959	0,940	0,918
2.	Dispatch Data Adjusted_OM_EF	tonne/MWh	1,111	1,102	1,017	0,894	0,858	0,849	0,838
3.	Average Dispatch Data_OM_EF	tonne/MWh	1,138	1,153	1,057	0,947	0,909	0,898	0,889
	Fossil Fuels								
1.	Dispatch Data_OM_EF	kg/GJ	111,997	106,693	106,484	100,340	97,288	95,088	96,152
2.	Dispatch Data Adjusted_OM_EF	kg/GJ	111,976	106,621	106,402	100,566	97,871	95,946	96,570
3.	Average Dispatch Data_OM_EF	kg/GJ	111,622	106,175	106,640	100,646	98,217	96,578	97,026
	Forecast								
	Maximum demand	Unit	2006	2007	2008	2009	2010	2011	2012
1.	Total system power generation	GWh	46 739	43 572	46 588	48 351	49 455	51 368	53 194
2.	Total system heat generation	$MW_{th}h$	20 360 486	19 909 333	20 240 498	21 206 857	22 170 354	23 026 991	23 407 576
3.	Total CO2 emissions of power generation	kt/a	27 152,04	31 508,75	32 821,32	33 044,62	33 387,00	32 807,31	30 531,04
4.	Total CO2 emissions of energy transformation	kt/a	34 405,23	38 713,17	40 181,87	40 770,13	41 342,14	40 706,37	38 615,88
	Baseline Emission Factor - BEF								
	Fossil Fuels								
1.	Dispatch Data_OM_EF	tCO2/MWh	1,204	1,215	1,124	1,014	0,973	0,947	0,884
2.	Dispatch Data Adjusted_OM_EF	tCO2/MWh	1,143	1,156	1,059	0,947	0,908	0,884	0,833
3.	Average Dispatch Data_OM_EF	tCO2/MWh	1,233	1,252	1,127	1,018	0,977	0,953	0,917
	HPP included								
1.	Dispatch Data_OM_EF	tCO2/MWh	1,158	1,168	1,101	0,990	0,947	0,928	0,865
2.	Dispatch Data Adjusted_OM_EF	tCO2/MWh	1,091	1,095	1,006	0,888	0,850	0,834	0,791
3.	Average Dispatch Data_OM_EF	tCO2/MWh	1,118	1,144	1,052	0,940	0,899	0,879	0,840
	Fossil Fuels								
1.	Dispatch Data_OM_EF	kg/GJ	109,651	111,991	105,315	100,011	95,929	94,604	93,043
2.	Dispatch Data Adjusted_OM_EF	kg/GJ	109,571	111,876	105,263	100,226	96,498	95,130	93,524
3.	Average Dispatch Data_OM_EF	kg/GJ	109,126	111,908	105,550	100,273	96,821	95,676	94,056

Table An.2-1: Baseline Emission Factor

The BEF of the Electrical System in the Monitoring period to 2012 will be taken from this table or in case of ex-post calculations every year and official publication on MOEW page the new EF for category HPP Included point 2 – Dispatch Data Adjusted_OM_EF. For the period 2012 - 2020 will be used the value of 2012 if no ex-post calculated and published.

2. Area of straw biomass collecting

The area for straw biomass collection is shown on Fig.Ann.2-1 below:

Fig. Ann.2-1- Straw collecting area

The collecting area comprises the lands mainly of two municipalities Plovdiv and Pazardjik. On the figure above is shown the collecting area. By data from Regional Offices of "Agriculture and Forests" in Plovdiv and Pazardjik the lands planted with wheat, barley, rye and the expected crop yields are given in the table below (the data are for 2010). Normally the weight proportion between crops and straw is 50:50 %. For conservatively we accept proportion crop/straw 60: 40 %.

Area	Cereal kind	Lands planted	Average yield	Crops yield	Straw yield
Dimension	-	[decares]	[t/dca]	[t]	[t]
Plovdiv	Wheat	468,698	0.324	151,858	60,740
	Barley	62,421	0.290	18,682	7,470
	Rye	17,217	0.194	3,340	1,330
Total		**548,336**	**-**	**173,880**	**69,540**
Pazardjik	Wheat	115,000	0.280	32,200	12,880
	Barley	22,000	0.270	5,940	2,376
	Rye	9,600	0.190	1,824	730
Total		**146,600**	**-**	**39,964**	**15,986**

Table Ann.2 -2 Biomass collecting area straw capacity

It becomes clear from the table above, that the capacity of straw in the collecting area (85,526 t/y) is in many times bigger than the needs of the biomass boiler plant.

It is foreseen that the main points for straw collecting and purchasing are the towns and villages in the area like:

- Plovdiv area- Parvomai, Rakovski, Saedinenie, Hisaria etc.
- Pazardjik area- Bratanitsa, Rosen, Tsar Asen, Vetren, Septemvri, Varvara, Zlokuchene, Belovo etc.

The main straw quantity, in pack like bales, will be stored in open area 65 dka at around 1.5 km to the factory. The storage place is shown on the figure below. Also, reserve storage for one day boiler operation will be organized on open place in the factory frames. The bales will be covered with waterproof material and will be placed on special grates.

Fig.Ann 2-2 - Straw Storage Place

3. Relative grid loses estimation

The relative grid loses will be taken from Eurostat 2011 edition, Energy Balance Sheets.
http://epp.eurostat.ec.europa.eu/portal/page/portal/product_details/publication?p_product_code=KS-EN-11-001
The data in Eurostat are from the Bulgarian National Statistical Institute that is the original source of information for transmission and distribution grid loses. Normally in the period of Monitoring Report preparing the data of TDL for the year before the last are available. The officially Eurostat /NSI/ data of the grid distribution loses are not divided by separate voltage levels.

BULGARIA Year : **2009**

	Residual fuel oil	Other pet. products	Natural gas	Coke-oven gas	Blast-furn. gas	Gasworks gas
	1000 t		TJ(GCV)			
Primary production	-	-	609	-	-	-
Recovered products	-	-	-	-	-	-
Imports	64	327	99 130	-	-	-
Stock change	24	-9	778	-	-	-
Exports	1 154	32	-	-	-	-
Bunkers	57	-	-	-	-	-
Direct use	-	-	-	-	-	-
Gross inland consumption	-1 123	286	100 517	-	-	-
Transformation input	176	41	43 290	-	-	-
Main act. thermal power stations	143	41	30 634	-	-	-
Autoprod. thermal power stations	-	-	1 077	-	-	-
Nuclear power stations	-	-	-	-	-	-
Briquetting plants	-	-	-	-	-	-
Coke-oven plants	-	-	-	-	-	-
Blast-furnace plants	-	-	-	-	-	-
Gas works	-	-	-	-	-	-
Refineries	-	-	-	-	-	-
District heating plants	33	-	10 658	-	-	-
Transformation output	1 536	308	-	-	-	-
Main act. thermal power stations	-	-	-	-	-	-
Autoprod. thermal power stations	-	-	-	-	-	-
Nuclear power stations	-	-	-	-	-	-
Briquetting plants	-	-	-	-	-	-
Coke-oven plants	-	-	-	-	-	-
Blast-furnace plants	-	-	-	-	-	-
Gas works	-	-	-	-	-	-
Refineries	1 536	308	-	-	-	-
District heating plants	-	-	-	-	-	-
Exchanges and transfers, returns	-88	-21	-	-	-	-
Interproduct transfers	-65	6	-	-	-	-
Products transferred	-23	-27	-	-	-	-
Returns from petrochem. industry	-	-	-	-	-	-
Consumption of the energy branch	-	124	1 823	-	-	-
Distribution losses	-	-	772	-	-	-
Available for final consumption	149	408	54 632	-	-	-
Final non-energy consumption	-	199	9 965	-	-	-
Industry	-	199	9 965	-	-	-
of which: chemical/petrochemical	-	43	9 965	-	-	-
Final energy consumption	117	208	43 443	-	-	-
Industry	105	208	28 020	-	-	-
Iron & steel industry	-	1	4 511	-	-	-
Non-ferrous metal industry	27	-	769	-	-	-
Chemical industry	4	-	4 763	-	-	-
Glass, pottery & building mat. industry	11	207	8 991	-	-	-
Ore-extraction industry	3	-	13	-	-	-
Food, drink & tobacco industry	30	-	4 269	-	-	-
Textile, leather & clothing industry	7	-	1 084	-	-	-
Paper and printing	-	-	1 244	-	-	-
Transport equipment	-	-	129	-	-	-
Machinery	4	-	1 113	-	-	-
Wood and wood products	8	-	393	-	-	-
Construction	8	-	408	-	-	-
Non specified (Other)	-	-	-	-	-	-
Transport	-	-	8 780	-	-	-
Railways	-	-	-	-	-	-
Road transport	-	-	2 285	-	-	-
International aviation	-	-	-	-	-	-
Domestic aviation	-	-	-	-	-	-
Domestic navigation	-	-		-	-	-
Other sectors	12	-	6 643	-	-	-
Households	-	-	2 363	-	-	-
Services	11	-	3 072	-	-	-
Agriculture/Forestry	1	-	1 208	-	-	-
Fishing	-	-	-	-	-	-
Statistical difference	32	1	1 224	-	-	-

Year : **2009** **BULGARIA**

Nuclear heat	Solar heat	Geothermal heat	Biomass	Wind energy	Hydro energy	Other fuels	Derived heat	Electrical energy
TJ(GCV)				GWh		TJ(GCV)		GWh
165 732	-	1 368	32 117	237	3 470	611	-	-
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	2 662
-	-	-	-443	-	-	-	-	-
-	-	-	777	-	-	-	-	7 735
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
165 732	-	1 368	30 898	237	3 470	611	-	-5 073
165 732	-	-	100	-	-	-	213	-
-	-	-	-	-	-	-	-	-
-	-	-	34	-	-	-	-	-
165 732	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
-	-	-	66	-	-	-	-	-
-	-	-	17	-	-	-	61 458	38 671
-	-	-	-	-	-	-	48 220	23 211
-	-	-	-	-	-	-	84	204
-	-	-	-	-	-	-	967	15 256
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	12 187	-
-	-	-	-	-237	-3 470	-	-	3 710
-	-	-	-	-237	-3 470	-	-	3 710
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	16 838	5 885
-	-	-	-	-	-	-	5 519	4 512
-	-	1 368	30 815	-	-	611	38 888	26 911
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
-	-	1 368	30 809	-	-	611	39 054	26 847
-	-	-	2 845	-	-	611	19 095	8 393
-	-	-	3	-	-	-	-	1 113
-	-	-	-	-	-	-	610	880
-	-	-	1	-	-	-	12 980	1 220
-	-	-	4	-	-	611	4	728
-	-	-	2	-	-	-	6	878
-	-	-	404	-	-	-	699	1 120
-	-	-	8	-	-	-	293	492
-	-	-	774	-	-	-	96	239
-	-	-	2	-	-	-	2	95
-	-	-	18	-	-	-	26	685
-	-	-	1 454	-	-	-	-	144
-	-	-	15	-	-	-	35	368
-	-	-	-	-	-	-	-	-
-	-	-	6	-	-	-	-	467
-	-	-	-	-	-	-	-	361
-	-	-	6	-	-	-	-	-
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
-	-	1 368	27 958	-	-	-	19 959	17 987
-	-	-	27 345	-	-	-	15 115	10 302
-	-	1 368	460	-	-	-	4 834	7 433
-	-	-	153	-	-	-	10	250
-	-	-	-	-	-	-	-	2
-	-	-	5	-	-	-	-166	64

Table. Ann.2-3 -Eurostat Energy Balances

The transformation from absolute value to percentages will be performed by the next formulae:
$TDL_{grid,y}$ [%] = Row 34 (Distribution looses) * 100 /{Row 3 (Import) + Row 19 (Transformation output) + Row 29 (Exchanges and transfers, Returns /RES-Wind and Hydro/) }

4. The existing steam boilers plant efficiency estimation

Now and to this moment the Spirit Factory Katunitsa technological steam is produced by Steam Boiler Plant comprises two boilers with fuel natural gas. The boilers are Bulgarian production and the type is:

- PKGH 12 – 12 t/h saturated steam, with pressure13 barg, feeding water – 60-104ºC, exhaust gases temperature-220ºC produced 2003;
- PKG 12 – 12 t/h steam with temperature - 194ºC and pressure- 13 barg, feeding water – 102ºC, exhaust gases temperature-220ºC produced 2007;

The measurement of the steam produced from the existing boilers plant is common for the whole plant. The measurement device measures only the moment values i.e. the device is without totalize system. For this reason we will use its measurements only for a limited cross-check of accepted efficiency values. The staff of the plant was performed measurements for some different periods in 2010, 2011 and on the base of the gas consumed in these periods was calculated the total efficiency of the plant. The table with calculations is shown below:

Period	Plant Steam produced after Steam Regulator P=9 bara, T=180ºC		Natural Gas consumed LHV = 9.3 kWh/Nm³		Plant Efficiency
	[t]	[MWht]	[Nm³]	[MWht]	
13.10-30.10.2010	2123	1642,1	204121	1898,3	0,865
01.11-10.11.2010	1820	1407,9	176848	1644,7	0,856
11.11-13.11.2010	149	115,6	14322	133,2	0,868
21.11-11.12.2010	1941	1501,7	189300	1760,5	0,853
9.12-15.01.2011	4561	3528,8	435635	4051,4	0,871
Average Plant Efficiency					**0,8626**

Table.Ann.2 -4 – Plant Efficiency Roughly Estimation

The efficiency of the existing boilers in accordance with factory documentations for PKGH 12 and PKG 12 are:

- PKGH 12 – Chapter Technical characteristics (drawing K 181.00.00.00) p. 8 – η = 88 %;
- PKG 12 – “ОИЕ” – Table No.2 p.14 - η = 89 %.

It is expected that the efficiency of the new boilers is more than the actual one.

In this case we make the choice, that the future baseline emissions calculations (ex-ante or ex-post) for the whole life-time of the project, will be performance with plant efficiency ***89 %*** *, conservatively accepted like the bigger value of new boilers.*

Annex 3

Monitoring plan

The monitoring methodology and organization consist of:

- Continuous observation of measurement data in order to estimate emissions.
- The readings of generated net quantity steam and auxiliary needs consumed electricity from the grid of Vinprom Peshtera straw boiler will be taken every month from the heat and electric meters and entered in the form of report in Excel format;
- All measurements have a internal character and will be executed with calibrated measurement devices. The leading of cross-check conformity measurements is impossible in the plant.
- Every one measurement device will be completed with special "Journal of the measurement device" (in electronically and hard format) which will consist of all documentation for the device (Calibration certificates, Quality Certificates, Ex Certificates as well as Certificates of Moisture Protection and Electromagnetic Compatibility etc.)

The Operation Manager of the BBP is responsible for the organization and performance of these activities.

1. Monitoring Technology
1.1 Methodology assumptions

The monitoring methodology and its implementation for the project are in conformity with CDM small scale methodology *AMS-I.C.* – "Thermal energy production with or without electricity" –Version 19, JI board – "Guidance on criteria for baseline setting and monitoring" Ver.02, CDM – "Tool to calculate baseline, project and/or leakage emissions from electricity consumption" Ver.01.

1.2 Methodology outline

The following parameters are subject to monitoring:

- $EC_{PJ}y$ *[MWhe] - Electricity consumption for straw boiler auxiliary needs.*
- $EF_{grid,CM}y$ *[tCO2/MWh] - Bulgarian electrical system combined margin CO_2 emission factor of the grid.*
- *TDLgrid,y [%] - Average technical transmission and distribution relative grid loses.*
- EG_{ty} *[TJ] - The net quantity of steam/heat/ supplied by the project activity during the year y.*
  Remark:
  EG_{ty} is parameter that is not direct measured. It is estimated in the Monitoring plan on the base of directly measured parameters:
    - EG_{tgoy} *- the gross quantity of steam produced by the straw boiler [TJ];*
    - EG_{tFwiy} *– the thermal energy of the feeding water at the inlet of the boiler [TJ].*
- η_{ty} *- The efficiency of the plant using fossil fuel (natural gas) that would have been used in the absence of the project activity.*
- EF_{NG} *[tCO2/TJ] - The CO_2 emission factor of the fossil fuel (natural gas) that would have been used in the baseline plant obtained from reliable local or national data if available, alternatively, IPCC default emission factors can be used.*

The monitoring methodology and organization consist of:

- Continuous observation of measurement data in order to estimate emissions.
- The readings of generated net quantity steam and auxiliary needs consumed electricity from the grid of Vinprom Peshtera straw boiler will be taken every month from the heat and electric meters and entered in the form of report in Excel format;
- All measurements have a internal character and will be executed with calibrated measurement devices. The leading of cross-check conformity measurements is impossible in the plant.

- Every one measurement device will be completed with special "Journal of the measurement device" (in electronically and hard format) which will consist of all documentation for the device (Calibration certificates, Quality Certificates, Ex Certificates as well as Certificates of Moisture Protection and Electromagnetic Compatibility etc.)

The Operation Manager of the BBP is responsible for the organization and performance of these activities.

1.3 Monitoring plan model

A monitoring model reflecting the specific features of the site was developed. The model is presented in Excel format. The model requires entering of the monitored parameters as input data, and automatically computes the project and baseline emissions for each year since commissioning of the plant.
The staff in charge of the monitoring shall fill in the Spreadsheets every month. The model automatically computes the annual sums, respectively the reduction of greenhouse gas emissions resulting from implementation of the Project.
The model contains a series of spreadsheets with different functions:

Input Data Spreadsheets:

- Introduction
- Baseline Emission Calculation Input Data;
- Project Site Input Data.

Calculations Spreadsheets:

- Baseline Emission Calculations
- Project Emissions Calculations;

Result Spreadsheet:

- Emissions Reduction Calculation

The above Spreadsheets are presented in the file: <Monitoring Plan Tables PDD-Vinprom Peshtera Biomass Boiler .xls> to Annex 5 Doc.5.2 .

2. Measurement Devices and Accuracy

2.1 Scheme of biomass boiler plant measurements

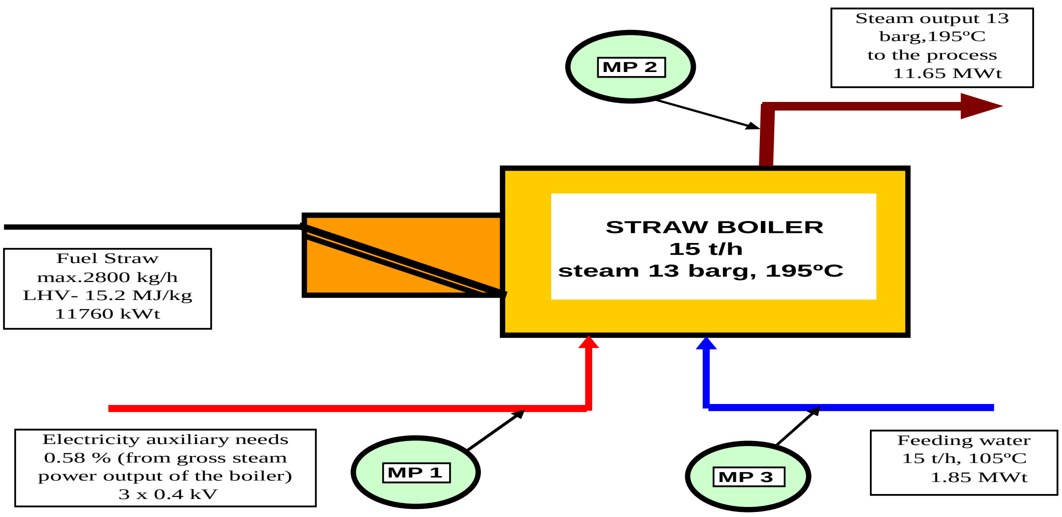

Fig. An.3 – 1 Biomass Boiler Plant Measurement Scheme

2.2 Measurement position MP-1

The measured variable parameter on this position is $\boldsymbol{EC_{PJ,}y}$ *[MWhe] - Electricity consumption for straw boiler auxiliary needs.*

The measurement device is electrical meter from the type LZQJ –XC (LZQJ S1A6-00-6MB-DC-030000-N50/Q). The producer of the device is the German company "EMH metering" . The LZQJ-XC as a multifunctional meter according to VDEW-specifications 2.1 fulfills the requirements for quality monitoring by implementing additional functions.
The main characteristics of LZQJ –XC are given in the table below:

Parameter	Characteristics
Voltage	3 x 240/415 V
Connection version	**Transformer connection version - 3 voltage and current transformers**
Current	1(6) A
Measurement system	Compensated current transformer
Measuring type	Active energy +A
Accuracy	Active energy-Cl. B (Cl. 1)
Frequency	50 Hz
Energy registers	Max. 32 tariff registers each with 15 historical values
Display	VDEW-display, 84 mm x 24 mm
Operation	Mechanical buttons for operation of display and reset
Data interfaces Data protocols	RS485, RS232 or CL0 IEC 62056-21 or DLMS
Outputs	Max. 8 –relays /250VAC/DC-100mA/ or optical-MOSFET
EMC-characteristics	Isolation resistance 4 kV AC, 50 Hz, 1 min
Temperature range	-25 °C...+55 °C
Relative humidity	max. 95 %, non-condensing acc. to IEC 62052-11, EN 50470-1 and IEC 60068-2-30
Additional features of the LZQJ-XC	Measuring of instantaneous P, Q, S (per phase and sum), U, I, power factor, line frequency, values phase failures Installation check via instantaneous values (service data) possible Optical fibre interface for connection of up to 4 optical fibre separation boxes Buffer battery exchangeable buffer battery for reading out the meter via the optical interface and reading the display without power Tamper detection opening of meter and terminal cover and magnetic fields Network analysis monitoring of U, I, THD, f, flicker, harmonics acc. to DIN EN 50160

Table An.3 – 1 Technical characteristics Measurement position MP-1 – variable parameter $EC_{PJ,y}$

2.3 Measurement position MP-2

The measured variable parameter on this position is $EG_{tgo,y}$ *[TJ] - the gross quantity of steam produced by the straw boiler.* The parameter is necessary for $EG_{t,y}$ estimation.
The measurement device consists of three separate parts:

- Computing block for steam and water measuring –Universal Heat Meter CF300 production of the Bulgarian company Unisyst;
- Vortex Flowmeter VT4 - FV4000-VT4, compact design, welded flange / wafer type – production of the German company ABB;
- Temperature Sensor SensyTemp TSP121, with tubular thermowell, for light and medium duty applications Pt 100.

The main characteristics of the measurement device are given in the tables below:

Universal Heat Meter CF300	
Parameter	**Characteristics**
Input channels	4 pcs. - galvanic divided analog inputs 4-20 mA
Output channels	Transitory volume of consumption, one galvanic divided analog output 0(4) – 20 mA at load resistance Rt < 500 oms.
Power supply	Single phase 220 V (187 – 242 V)/50Hz, Consumption 10 VA.
Dimensions	96 x 96 x 180 mm
Protection degree	IP 54
Operation conditions	Ambient temperature 5 – 40 º C

Table An.3 -2 Technical specification position MP-2 device CF300 – variable parameter EG_{tgoy}

Vortex Flowmeter VT4 - FV4000-VT4

Product Code **VT4.0.1.3.1.1 F.D.A.1.1 .A.2.E.X.O.A. A. A.1**		
VT4 - FV4000-VT4 Vortex Flowmeter, compact design, welded flange / wafer type		
Ex Approval	0	Without
Process Connection	1	Flange
Fluid	3	Steam
Material Housing / Bluff Body (Shedder) / Sensor	1	Stainless steel
Meter Size	1F	DN 150 (6 in.)
Pressure Rating	D	PN 40
Gasket Surface Roughness	A	Standard
Sensor Design	1	Standard single sensor (Tmax = 280 °C [536 °F])
Sensor Seals / Fluid Temperature Range	1	Graphite / -55 ... 280 °C (-67 ... 536 °F)
Certificates	A	Standard
Communication	2	With display with HART
Name Plate	E	English
Design Level / Software Level	X	(Specified by ABB)
Accessories	0	Without
Operating Mode	A	Continuous flowrate metering
Cable Gland	A	M20 x 1.5
Calibration	A	Test certificate
Ambient Temperature Range	1	-20... 70 °C

Table An.3 -3 Technical specification position MP-2 device VT4 - FV4000-VT4 – variable parameter EG_{tgoy}

Temperature Sensor Pt100 – TSP 121

Product Code **TSP121 .Y0.S2.A3.S01 .A4.U1 .N1 .S2.P3.B2.B2.Y1 -> NOTSOPT.N**		
TSP121 - SensyTemp TSP121 Temperature Sensor, with tubular thermowell, for light and medium duty applications		
Explosion Protection / Approvals	**YO**	Without
Wetted Thermowell Material	**S2**	ASTM 316Ti SST (1.4571)
Thermowell Type	**A3**	Screwed tubular thermowell with straight shaft (Form 2G)
Process Connection	**S01**	Parallel thread G 1/2 A
Thermowell Diameter	**A4**	14 mm (0.56 in.)
Immersion Length	**U1**	U = 100 mm (4 in.)
Nominal Length	**N1**	N = 230 mm (9.1 in.)
Measuring Inset Type	**S2**	Extended vibration resistance, thin film RTD, measuring range -50 ... 400 °C (-58 ... 752 °F), vibration proof up to 30 g
Sensor Type and Wiring	**P3**	1 x Pt100, 4-wire
Sensor Accuracy	**B2**	Accuracy Class B IEC 60751
Connection Head Type / Material	**B2**	BUZH / Aluminum, high cover, hinged
Transmitter	**Y1**	Without transmitter, sensor with ceramic terminal block - spring loaded

Table An.3 -4 Technical specification position MP-2 device TSP 121 – variable parameter EG_{tgoy}

2.4 Measurement position MP-3

The measured variable parameter on this position is EG_{tFwiy} *[TJ] – the thermal energy of the feeding water at the inlet of the straw boiler.* The parameter is necessary for EG_{ty} estimation.
The measurement device consists of three separate parts:

- Computing block for steam and water measuring – Universal Heat Meter CF300 – production of the Bulgarian company Unisyst.;
- Process Master FEP311 Electromagnetic Flowmeter system, integral mount production of the German company ABB;
- Temperature Sensor SensyTemp TSP121, with tubular thermowell, for light and medium duty applications Pt 100.

The main technical specifications of the measurement device are:

- Universal Heat Meter CF300 - the technical specifications are given in Table An.3-2 above.
- Temperature sensor TSP 121 - the technical specifications are given in Table An.3-4 above.
- Electromagnetic Flowmeter system FEP311 –the technical specifications are given in the table below:

Electromagnetic Flowmeter system FEP311

Product Code **FEP311.040.A.1 .S.1 .D4.B.0.A.1 .A.0.A.1 .A.1 .C.1 .AY............ME**		
FEP311 - ProcessMaster FEP311 Electromagnetic Flowmeter system, integral mount		
Bore Diameter	**040**	DN 40 (1-1/2 in.)
Liner Material	**A**	PTFE
Electrode Design	**1**	Standard
Measuring Electrodes Material	**S**	Stainless steel 316Ti (1.4571)
Grounding Accessories	**1**	Standard
Process Connection Type	**D4**	Flanges DIN PN 40
Process Connection Material	**B**	Carbon steel flanges
Usage Certifications	**0**	Meter tube with PED certificate (Pressure Equipment Directive)
Calibration Type	**A**	Standard factory calibration - Without ScanMaster
Temperature Range of Installation / Ambient Temperature Range	**1**	Standard design / -20 ... 60 °C (-4 ... 140 °F)
Name Plate	**A**	Adhesive label
Signal Cable Length and Type	**0**	Without signal cable
Explosion Protection Certification	**A**	Without
Protection Class Transmitter / Protection Class Sensor	**1**	IP 67 (NEMA 4X) / IP 67 (NEMA 4X)
Cable Conduits	**A**	M20 x 1.5
Power Supply	**1**	100... 230 VAC, 50 Hz
Input and Output Signal Type	**C**	HART + 20 mA active + Pulse + Contact I/O
Configuration Type / Diagnostics Type	**1**	Parameters set to factory defaults / Standard diagnostic functions activated
Accessories	**AY**	Without
Documentation Language	**ME**	Language package Eastern Europe

Table An.3 -5 Technical specification position MP-3 device FEP311– variable parameter EG_{tFwiy}

All detail information connected with the measurements devices can be seen in document “Journal of the measurement device” completed to each measurement device. The form of the “Journal of the measurement device Vinprom Peshtera Biomass Boiler” is shown in Annex 5 Doc 5.3 and it is available on request.

3. Quality Assurance and Quality Control – (QA/QC)

The procedures for the Quality Control and Quality Assurance of data monitored are given in Section D - Table D2 of PDD.

The procedures for installation and maintenance of the measuring devices are outlined in details ain the “Journal of the measurement device” and the Operation Manuals supplied with each device. The producers are also obliged in accordance with the international practice and the Bulgarian legislation to perform supervision control in the process of installation, so and to commissioning in operation of the measurement devices.

Principally all procedures for the Quality Control and Quality Assurance of the measurements are presented in the legislation documents (norms and standards) as follow:

- Measurement Law – S.G., issue No 99 /09.12.2005 year;
- Order for measurement devices, which must have metrological control – S.G., issue No 98 /07.11.2003 year;
- Regulation for ordering of the competent persons how to verify measurement devices, which are under metrological control – GD N31 /12.03.2003 year;

- SAMTS (State Agency for Metrology and Technical Surveillance) order No A-102/05.03.2010 for the periodical testing of measurement devices, which are subject of metrological control.

The calibration intervals for the separate measurement devices are shown in the table below.

	MP- 1 type LZQJ –XC (LZQJ S1A6-00-6MB-DC-030000-N50/Q).	**MP-2 -** Universal Heat Meter CF300 Vortex Flowmeter VT4 - FV4000-VT4 Temperature Sensor SensyTemp TSP121	**MP-3 -** Universal Heat Meter CF300 Electromagnetic Flowmeter system FEP311 Temperature sensor TSP 121
Calibration Interval in accordance with SAMTS (State Agency for Metrology and Technical Surveillance) order N A-102/05.03.2010 for the periodical testing of measurement devices, which are subject of metrological control	**4 years**	**2 years**	**2 years**

The procedures in case of measurement device damage or data incorrectness in principle are outlined in the “Journal of the measurement device” for every one device.

The verification of the emission reduction will be performed by independent authorised entity every year from 2008 to 2012 and in case of positive decision from UNFCCC and host country to 2020. In the process of verification, all procedures will be checked concerning the monitoring procedures (measurement data reliability and calculations correctness).

4. Monitoring process organization

The structure of monitoring process organization is shown in the Figure below:

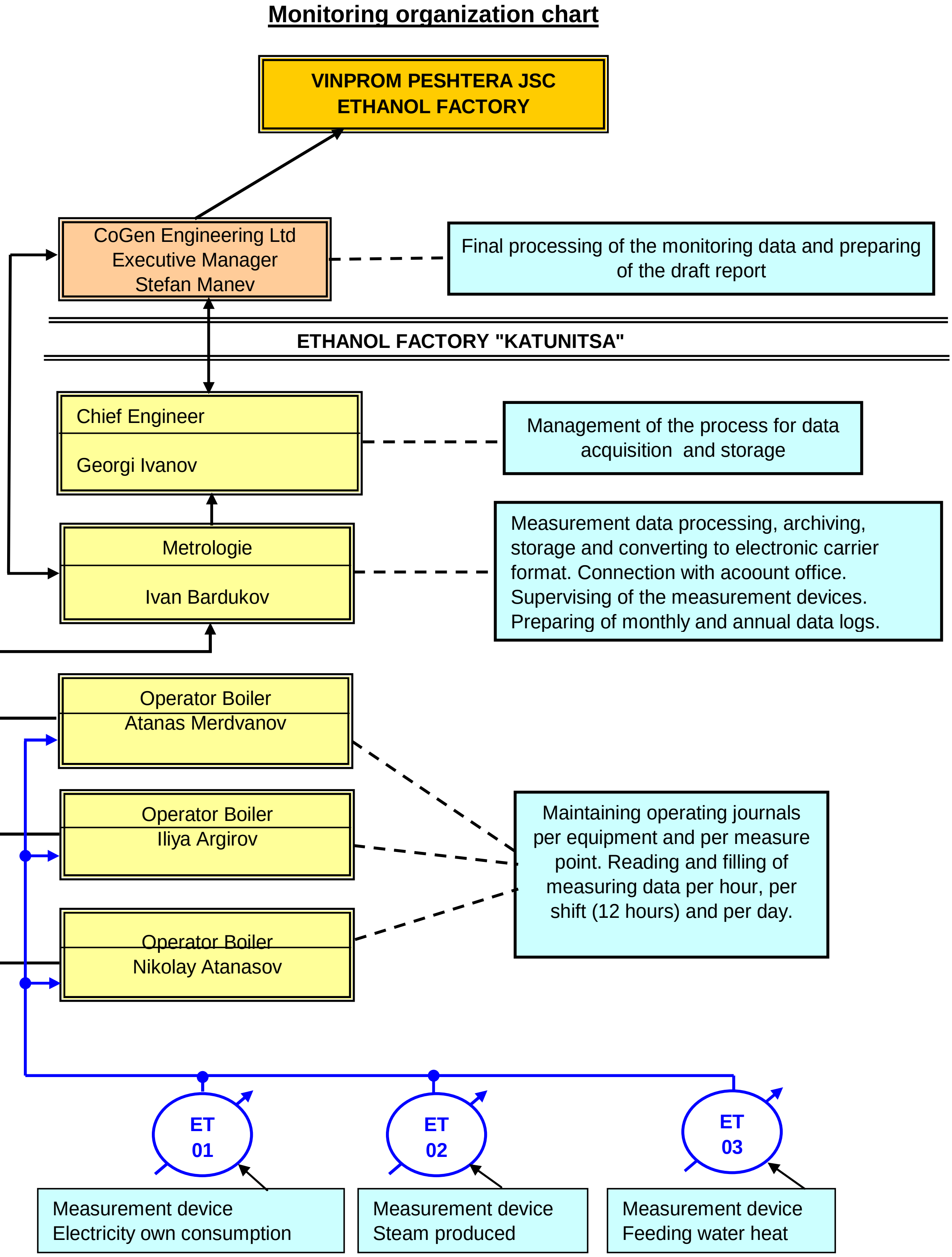

Fig.An.3 – 2 Monitoring process organization chart

<u>Annex 4</u>

Letter of support from the Bulgarian Ministry of Environment and Water

REPUBLIC OF BULGARIA

MINISTRY OF ENVIRONMENT AND WATER

24 February, 2011

Sofia, Bulgaria

To
Vinprom Peshtera AD
5 Dunav Blvd.
North Zone
4003 Plovdiv
Bulgaria

LETTER OF SUPPORT

The Ministry of Environment and Water supports in principle the proposed project idea

Proposal number/date	26-00-334/26.01.2011
Title	Biomass steam boiler in Vinprom Peshtera
Location	Katunitsa village, Plovdiv district
Supplier	Vinprom Peshtera AD

and confirms that it falls within the scope of the Joint Implementation projects under Article 6 of the Kyoto Protocol to the United Nations Framework Convention on Climate Change.

The Ministry of Environment and Water acknowledges hereby that no set-aside in the National Allocation Plan for the period 2008 – 2012 is required for the implementation of the project, based on the fact that the project framework does not envisage activities that will lead to direct or indirect double counting of emission reductions under the European Union Emission Trading Scheme.

The Ministry of Environment and Water will consider granting formal approval of the above mentioned Joint Implementation project according to the Bulgarian guidelines for approval of projects under Track 1/Track 2 of the Joint Implementation mechanism and after positive assessment of the project by the Bulgarian Joint Implementation Steering Committee.

Evdokia Maneva

Deputy Minister of Environment and Water

София 1000, бул. "Мария Луиза" 22
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Annex 5

List of documents presented to the validator

Doc. 5.1 - Additional Information to Annex 2 - To Ann.2 - Project emissions reduction calculations PDD-Vinprom Peshtera Biomass Boiler.xls.

Doc. 5.2 - Additional Information to Annex 3 - To Ann.3 - Monitoring Plan Tables PDD- Vinprom Peshtera Biomass Boiler .xls.

Doc. 5.3 - Model of "Journal of the measurement device Vinprom Peshtera Biomass Boiler".xls.

Doc. 5.4 - Project Investments Analysis .xls .

Doc. 5.5 - Financial Statement of the Project.

Doc. 5.6 - Construction Permit.

Doc. 5.7 - EIA Decision.

Doc. 5.8 - Heavy Metals Soil Pollution.

Doc. 5.9 - Stakeholders Information

Remark:

1. The documents in Annex 5 are and will be presented to all official authorities that have an attitude to the present PDD (Validation and Verification Companies, Host Country Authorities /MOEW etc./, UNFCCC and etc.).
2. The documents will be available on request of any stakeholder , with exception of the documents No. 5.3, 5.4, 5.5, 5.9 that have a confidential character. Decision on presenting of these documents will be taken from Vinprom Peshtera.