

# **Monitoring Report**

## **Bulgarian Small Hydro Power Plant (SHPP) portfolio**

**MONITORING PERIOD: 1 May 2010 – 31 May 2011**

**Version 1.4**

**Date of completion: 21 July 2011**

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## Section 1. General Description of Project Activity

### 1.1 Project Objective

To construct, own, and operate a small scale Hydropower project and provide economic, clean renewable power to the Bulgarian electrical grid.

### 1.2 Brief Description of Project

The project consists of a portfolio of three run of river SHPPs with a total installed capacity of 6.46 MW. All three of the projects in the portfolio are located in the Rodopi and Rila Mountain range, in the south-west of Bulgaria.

According the PDD, the aggregated annual electrical output of the project was planned to be about 42 GWh per year. The portfolio of the three small hydro power projects comprises:

**Table 1: Small hydro power plant portfolio**

Power plant	Nominal capacity	Electricity generation
Loziata SHPP	5,156 kW	34,040 MWh/yr
Byala Mesta SHPP	650 kW	3,849 MWh/yr
Cherna Mesta SHPP	650 kW	4,019 MWh/yr
<b>Total</b>	<b>6,456 kW</b>	<b>41,908 MWh/yr</b>

### 1.3 Project participants

**Brestiom Plc.**, 30-32 General Tottleben Blvd.;Sofia 1606, Bulgaria- Host Country

**Carbon Asset Management**, International GmbH, Burggasse 116, 1070 Vienna, Austria  
(Contractual party: **CAMCO International Limited**, Channel House, Green Street, St. Helier, Jersey, JE2 4UH, registered number 92432)

## Section 2. Monitoring methodology and data

### 2.1 Monitoring methodology

This is the second JI monitoring report for the Brestiom JI bundle. It covers the period from 1 May 2010 to 31 May 2011.

The monitoring plan uses the approved monitoring methodology AMS-I.D “Renewable electricity generation for a grid” (version 10) for the emission reductions calculation. The methodology ASM-I.D is designed for grid-connected renewable power generation project activities and applies to all proposed HP Projects.

Monitoring consists of continuous metering the electricity generated by the SHPPs.

The electricity output from Loziata is measured by EVN (the electricity purchaser) using their own electric meter which is installed at the site. The electricity output is measured and monitored by this single meter working in two directions. In case the plant works the meter shows generated electricity given to the grid and when the plant stops it measures electricity taken from the grid for the own consumption. The operators in SHPP Loziata make the daily readings of the produced electricity and put the data in a table sent per E-mail to the manager of “Brestiom” Plc – the participant of JI project.

The electricity generation from Byala Mesta and Cherna Mesta is measured by CEZ (the electricity purchaser) which uses their own meter as well. The operators in SHPPs Byala Mesta and Cherna Mesta make the daily readings of the produced electricity and transfer it by mobile phone to the manager of “Brestiom” Plc. Also CEZ takes a reading on a monthly basis per distance. Since 01 November 2010 new contracts were signed for consumption of electricity between CEZ and Cherna Mesta and Bjala Mesta.

The monthly readings are confirmed with the project owner and on this basis the invoices for generated electricity are prepared for EVN and CEZ. The confirmation is made by comparison of invoice against daily readings of electric meters made by the operators of the SHPPs.

Also each month the project owner receives separate invoices for the own consumption of SHPPs (for Bjala Mesta and Cherna Mesta since 01.11.2010) and pays them separately.

Net electricity output is calculated as a difference between electricity generation and consumption of electricity taken from the grid for own SHPP needs. The data are included by the project owner in a workbook which automatically multiplies the electricity generated with the baseline Carbon Emission Factor of Bulgaria resulting in the actual Emission Reduction.

## **2.2 Emission Reduction Calculation Formula**

Emission Reductions generated by the Project are calculated as follows. The net generation from project during the monitoring period times the baseline emission factor.

$$(\text{MWh}) \times (\text{tCO}_2\text{e} / \text{MWh}) = \text{Net CO}_2 \text{ emissions avoided at grid (tCO}_2\text{e)}$$

For the baseline emission factor the new emission factors of the Bulgarian Ministry of Environment and Water had been taken, as all project developer of JI projects in Bulgaria are obliged to use the new factors for their calculation of emission reductions. The emission factors had been determined ex-ante in the “BASELINE STUDY OF JOINT IMPLEMENTATION PROJECTS IN THE BULGARIAN ENERGY SECTOR. CARBON EMISSION FACTOR”. In order to apply conservative emission factors the lower emission factors of the “Maximum Demand Forecast” with “included HPP” have been applied.

**Table 2: Carbon Emission Factor of Bulgaria**

	UoM	2010	2011	2012
Scenario Prosperity Maximum Demand	tCO <sub>2</sub> /MWh	<b>0.850</b>	<b>0.834</b>	0.791

Project Emissions = 0 as it is not applicable.

Leakage = 0 as it is not applicable.

## Section 3. Monitoring Tables and Data

### 3.1 Electricity generation data sheet (monthly and annual)

An Excel file with the monthly and annual generation and electricity output is attached to this monitoring report. The power generated and supplied is monitored continuously and is recorded on a daily basis and aggregated into monthly totals. The meters are owned by EVN and CEZ respectively. The meters were calibrated at the following dates during the monitoring period:

- Loziata – 04 Oct 2010, 03-05 May 2011
- Byala Mesta - 02 May 2011
- Cherna Mesta - 02 May 2011

**Table 3: Electricity output to CEZ/EVN by the Bulgarian Small Hydro Power Plant (SHPP) Portfolio from May 2010 to May 2011, kWh**

YEAR	MONTH	Loziata SHPP			Byala Mesta SHPP			Cherna Mesta SHPP			Total
		Electricity generation	Selfconsumption	Electricity output	Electricity generation	Selfconsumption	Electricity output	Electricity generation	Selfconsumption	Electricity output	
2010	May	2 072 984	576	2 072 408	330 384	184	330 200	357 590	310	357 280	2 759 888
	June	1 205 632	968	1 204 664	235 155	758	234 397	345 054	169	344 885	1 783 946
	July	1 806 000	304	1 805 696	426 871	88	426 783	373 727	310	373 417	2 605 896
	August	1 832 472	352	1 832 120	367 903	47	367 856	305 300	161	305 139	2 505 115
	September	1 699 816	656	1 699 160	257 842	36	257 806	151 709	145	151 564	2 108 530
	October	104 040	3 824	100 216	320 442	124	320 318	233 189	200	232 989	653 523
	November	655 656	3 360	652 296	317 151	125	317 026	261 227	177	261 050	1 230 372
	December	1 154 152	4 096	1 150 056	309 970	218	309 752	373 520	347	373 173	1 832 981
<b>Total in 2010</b>		<b>10 530 752</b>	<b>14 136</b>	<b>10 516 616</b>	<b>2 565 718</b>	<b>1 580</b>	<b>2 564 138</b>	<b>2 401 316</b>	<b>1 819</b>	<b>2 399 497</b>	<b>15 480 251</b>
2011	January	2 389 712	1 856	2 387 856	256 092	11	256 081	289 011	323	288 688	2 932 625
	February	2 234 328	1 352	2 232 976	191 185	15	191 170	174 484	106	174 378	2 598 524
	March	1 334 808	3 056	1 331 752	240 822	90	240 732	255 561	56	255 505	1 827 989
	April	1 031 304	2 696	1 028 608	336 126	16	336 110	372 085	52	372 033	1 736 751
	May	1 302 192	1 704	1 300 488	426 970	29	426 941	382 838	120	382 718	2 110 147
<b>Total in 2011</b>		<b>8 292 344</b>	<b>10 664</b>	<b>8 281 680</b>	<b>1 451 195</b>	<b>161</b>	<b>1 451 034</b>	<b>1 473 979</b>	<b>657</b>	<b>1 473 322</b>	<b>11 206 036</b>

### 3.2 Emission Reduction calculation

Period	Electricity output, MWh	Grid emission factor, tCO <sub>2</sub> e/MWh	Emission reductions, tCO <sub>2</sub> e
1 May 2010 - 31 Dec 2010	15 480.25	0.850	13 158.21
1 Jan 2011 – 31 May 2011	11 206.04	0.834	9 345.83
<b>Total 1 May 2010 – 31 May 2011</b>	<b>26 686.29</b>		<b>22 504</b>

### **3.3 Contact Information**

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