

FOURTH MONITORING REPORT

Project title: Bulgarian Small Hydro Power Plant (SHPP) Portfolio

JI reference: BG1000158

Monitoring period: 1 January 2012 – 31 October 2012

Crediting period: 2008-2012

Version: 1.0

Date of completion: 22/11/2012

Section 1. General Description of Project Activity

1.1 Project Objective

To construct, own, and operate small scale hydropower plants that provide economic clean renewable power to the Bulgarian electrical grid.

1.2 Brief Description of Project

The project consists of a portfolio of three small scale run-of-the-river hydropower plants (SHPPs) with a total installed capacity of 6.46 MW. All three projects in the portfolio are located in the Rodopi and Rila Mountain ranges in the Southwest part of Bulgaria. According to the PDD of the project, the aggregated annual electrical output was estimated to be about 42 GWh.

Information on the portfolio of SHPPs can be found in Table 1 below.

Table 1: Information about the small hydro power plant portfolio

Power plant	Location	Nominal capacity [kW]	Electricity generation [MWh/yr]	Equipment
Loziata SHPP	Plovdiv region	5,156	34,040	2 horizontal Francis turbines
Byala Mesta SHPP	Blagoevgrad region	650	3,849	Pelton turbine
Cherna Mesta SHPP	Blagoevgrad region	650	4,019	Pelton turbine
Total	-	6,456	41,908	-

Source: PDD

1.3 Project participants

Entity name	Contact details
Brestiom Plc.	30-32 General Tottleben Blvd.; Sofia 1606, Bulgaria - Host Country
Carbon Asset Management, International GmbH (Contractual party: CAMCO International Ltd.)	Burggasse 116, 1070 Vienna, Austria (Channel House, Green Street, St. Helier, Jersey, JE2 4UH, registered number 92432)

Section 2. Monitoring Methodology and Data

2.1 Introduction

This is the fourth JI monitoring report for the Brestiom JI portfolio of project activities. The monitoring covers the period from January 1, 2012 to October 31, 2012.

2.2 Monitoring methodology

In accordance with the JI supervisory committee's 'Guidance on criteria for baseline setting and monitoring' (ver.03), JI project participants can use a monitoring methodology approved by the EB of the CDM, including methodologies for small-scale project activities.

Therefore, this monitoring plan utilizes the approved monitoring methodology AMS-I.D “Grid connected renewable electricity generation” (ver. 10) for the emission reductions calculation. The AMS-I.D methodology is applicable to grid-connected renewable power generation project activities and therefore pertains to all SHPPs included in the portfolio.

2.3 Monitoring plan

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

The electricity output from **SHPP Loziata** is measured by the electricity purchaser EVN using their own electric meter which is installed at the site in a room within the main building of the SHPP, next to the control room. The electricity output is measured and monitored by a 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. on a monthly basis – the participant in the JI project.

The electricity generation from **SHPP Byala Mesta** and **Cherna Mesta** is measured by the electricity purchaser CEZ which uses their own meter installed outside the main building of the SHPPs. 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. In addition, CEZ takes a reading on a monthly basis per distance.

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. In addition, each month the project owner receives separate invoices for the own consumption of SHPPs and pays them separately.

Net electricity output is calculated as the difference between electricity generation and consumption of electricity taken from the grid for the own needs of the SHPPs. The data is included in a workbook which automatically multiplies the electricity generated with the baseline carbon Emission Factor for the Bulgarian electricity system resulting in the emission reductions.

2.4 Emission Reduction Calculation Formula

In accordance with AMS-I.D (ver.10), the baseline is calculated as the MWh produced by the renewable generating unit multiplied by an emission coefficient (measured in tCO₂/kWh), therefore:

$$BE = EG \times EF_{Bulgaria}$$

Where:

BE - Baseline Emissions (tCO₂)

EG - Quantity of net electricity supplied to the grid as a result of the implementation of the project activity (MWh)

EF - CO₂ emission factor (tCO₂/MWh)

The emission reductions for a given period are generated by the project activity are calculated as follows:

$$ER = BE - PE - L$$

Where:

ER - Emission Reductions

BE - Baseline Emissions (tCO₂)

PE - Project emissions (tCO₂)

L - Leakage emissions (tCO₂)

The project consists of the installation of new renewable energy project activities (i.e., run-off river hydro plants where no reservoirs are installed), therefore the GHG emissions from the project activity are taken as zero (*PE* = 0). Since the technology used is neither transferred to nor transferred from another activity, the leakage is considered to be zero (*L* = 0). Therefore, the Emission Reductions generated by the project activity are calculated as follows:

$$ER = BE = \sum_{i=1}^3 (EG_i \times EF)$$

For the baseline emission factor the 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 it 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 (refer to Table 2 below). Thus, for 2012 and the fourth monitoring period, the adopted value is 0.791 tCO₂e/MWh

Table 2: Carbon Emission Factor of Bulgaria

	Unit	2010	2011	2012
Scenario Prosperity Maximum Demand	tCO ₂ /MWh	0.850	0.834	0.791

Source: “Baseline study of Joint Implementation projects in the Bulgarian energy sector. Carbon emission factor “

Section 3. Monitoring Data and Tables

3.1 Electricity generation data sheet

An Excel file with the monthly electricity output, self-consumption, and net electricity output is attached to this monitoring report. The power generated and supplied is monitored continuously, recorded on a daily basis and aggregated into monthly protocols that are then invoiced.

For SHPP Byala Mesta and Cherna Mesta, for the first 3 months of the monitoring period (i.e., January, February, March 2012) there are differences between the values recorded in the protocols and the invoiced produced electricity. For both plants, the invoices for January and February include amounts lower than the meter recorded ones. The invoices for March are therefore higher than the protocols. i.e., they make up for the previously incurred differences. Invoices are accepted as main cross-check of information, and therefore the values included in them are used across the Excel file.

The meters are owned by EVN (SHPP Loziata) and CEZ (SHPPs Byala Mesta and Cherna Mesta).

For SHPP Loziata, a new electricity meter was installed onsite on 03/05/2011 (ID 00440218). This meter was initially checked in 2009 by the authorized laboratory Eldis by an application from the producer and importer of the meter ELSTER GmbH. On 07/04/2011, following a request by the owner EVN, the meter was checked again and successfully received a seal numbered 045/01 and M11 (as it is stated in protocol 30422 by EVN Bulgaria). The last check of the meter was in 29/09/2012 (protocol 52454 by EVN Bulgaria).

During the Fourth monitoring period, the meters were not calibrated. The meters have been last calibrated at the following dates:

Loziata – 03-05 May 2011
Byala Mesta - 02 May 2011
Cherna Mesta - 02 May 2011

The next periodical checks of the meters will happen at the discretion of the meter owner, but not more rarely than every 4 years for meters used to measure under 10 MVA, according to "Order

determining the follow-up checks of the instruments for measurement, which are subject to metrological control" (newest order from 13/10/2011, posted on the site of the National Agency for Metrological and Technical Supervision of Bulgaria).

3.2 Emission reduction calculation

Period	Total net generated electricity, MWh	Grid emission factor, tCO ₂ e/MWh	Emission reductions, tCO ₂ e
1 January 2012 - 31 October 2012	15,544.3	0.791	12,296

Section 4. Contact Information

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