

# First Monitoring Report

Version 1.0

Date: 20.07.2009

Monitoring Period: 27/07/2008 – 31/03/2009

CERs: 17,702

## 12 MW Hydropower Plant in Bhandardara in Maharashtra, India

Dodson –Lindblom Hydro Power Private  
Limited, INDIA

**UNFCCC Ref. No. 0430**

**Project Advisor**

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**Verifier**

**Bureau Veritas Certification Holding SAS**



## **Monitoring Report of 12 MW Hydropower plant in Bhandardara in Maharashtra, India**

### **1.Introduction**

Dodson-Lindblom Hydro Power Private Limited (Project Proponent) has **registered** a small scale project activity of 12 MW hydropower plant as a Clean Development Mechanism (CDM) project, hereinafter referred to as the small scale project activity, with CDM Executive Board of United Nations Framework Convention on Climate Change (UNFCCC). This monitoring report is prepared for verification of the emission reductions generated by the project activity. The project has already been issued CERs from its first crediting period. The monitoring report is the first monitoring report for the second crediting period and fourth since the registration of the project

### **2. Project Reference**

Title of the small scale project activity	:	12 MW hydropower plant in Bhandardara in Maharashtra, India.
UNFCCC reference no. of the project	:	0430
Date of registration	:	30/09/2006
Version of the monitoring report	:	01
Date of the report	:	04/09/2009
Crediting Period	:	27 Jul 08 - 26 Jul 15

### **3. Location of the project activity**

The small scale project activity is located in Bhandardara in Akola Taluk in Ahmed Nagar District in Maharashtra state in India.

### **4. Brief Process description**

The project activity is construction and commissioning of a 12 MW hydro electric project at the foot of a hill adjacent to the Bhandardara dam. The project utilises water released from Bhandardara reservoir for irrigation purposes and generates electricity. The net electricity after auxiliary consumption is connected to state electricity grid owned and operated by Maharashtra State Transmission Company Ltd (MSTCL).

## **5. Type of Project**

Type : I. Renewable energy projects

Category : I.D. Grid connected renewable electricity generation

The small scale project activity has applied Version 13 of the Approved small scale methodology I.D. (AMS I.D) - Grid connected renewable electricity generation dated 14/12/2007.

## **6. Period of verification**

Period of verification of emission reductions : **27/07/2008 - 31/03/2009**

## **7. Unique identification details of turbine & generator.**

The unique identification details of turbine & generator are as follows

Turbine: i) Make: Sulzer Hydro AG  
ii) Reference No: V-0037/1

Generator: i) Make: CG Elin Power System Ltd  
ii) Generator Type: Ssv 350/14-107  
iii) Serial No: C21/001

## **8. Energy meter identification, accuracy check and calibration details**

The unique identification details of energy meters are as follows

Gross Meter: i) Make: M/s L&G Siemens  
ii) Serial. No: 73932341

Main Meter: i) Make: A.B.B.  
ii) Serial. No: 02173601

Check Meter: i) Make: A.B.B.  
ii) Serial No: 02173600

**There have been no changes in the project equipment / instrument**

The accuracy check / calibration details of the energy meters are as follows

Gross Meter (Siemens Landis & Gyr No 73932341)

Date of testing	Minimum Error	Maximum Error	Frequency
24.12.2008	0 % at <ul style="list-style-type: none"> <li>10% load and unity power factor</li> <li>100% Load &amp; 0.5 Lag Power Factor</li> </ul>	(-) 0.20% at 10% Load & 0.5 Lag Power Factor	Six monthly

Main Meter (ABB No: 02173601)

Date	Minimum Error	Maximum Error	Frequency
23.12.2008	(-) 0.04% at 100% Load & 0.5 Lag Power Factor (PF)	(-) 0.20% at 10% Load & Unity power factor	Six monthly

Check Meter (ABB No: 02173600)

Date	Minimum Error	Maximum Error	Frequency
23.12.2008	-0.040 % at <ul style="list-style-type: none"> <li>100% load and unity power factor</li> <li>100% Load &amp; 0.5 Lag Power Factor</li> </ul>	(-) 0.17% at 10% Load & Unity power factor	Six monthly

## 9. Monitoring plan

As per monitoring report in the PDD, the data to be monitored for estimation of the emission reductions are the following:

- i. Electricity exported to the grid by the project activity in kWh ( $EG_y$ )
- ii. Electricity imported from the grid by the project activity in kWh ( $E_{import}$ )
- iii. Gross electricity generated by the project activity ( $E_{Gen}$ )
- iv. Auxiliary Units consumed by the project activity
- v. Diesel consumed by the stand by DG Set (DC)
- vi. Hourly electricity exported to the grid by the project activity as recorded at the main meter ( $HEE_{main\_meter}$ )

**i. Electricity exported to the grid by the project activity in kWh (EG<sub>y</sub>)**

The electricity exported to the grid is measured monthly and a Joint meter reading statement is made which gives the electricity exported to the grid by the project activity in kWh. The Joint Meter reading is taken on the last day of every month. The electricity exported figures for the monitoring period are tabulated below

Month	From	To	Export to grid (kWh)
August 2008	31.07.2008	31.08.2008	4338000
September 2008	31.08.2008	30.09.2008	5648400
October 2008	30.09.2008	31.10.2008	1342800
November 2008	31.10.2008	30.11.2008	1861200
December 2008	30.11.2008	31.12.2008	1309200
January 2009	31.12.2008	31.01.2009	5834400
February 2009	31.01.2009	28.02.2009	2596800
March 2009	28.02.2009	31.03.2009	2787600
<b>Total</b>			<b>25718400</b>

**ii. Electricity imported from the grid by the project activity in kWh (E<sub>import</sub>)**

Monthly records for electricity imports (recorded by MSEDCL) pertaining to the project activity are maintained by the project proponents. These are tabulated below

Further, there is a mismatch between the verification period dates and the date of Monthly records for electricity imports. The periods are

- a) From 27.07.2008 to 31.07.2008
- b) From 31.07.2008 to 24.08.2008
- c) From 16.03.2009 to 31.03.2009

As stipulated in the PDD , the following procedure is adopted for these periods

*“The maximum monthly electricity imports during the previous 12 month period (prior to the date of mismatch) is arrived at. For the mismatch period, the maximum monthly electricity import as identified above is taken and the daily import is worked out based on the number of days during the concerned month. This daily import as worked out is applied for those specific days of mismatch to estimate the total import for the mismatch period.”*

*Monitoring Report of Emission Reductions*

<b>Month</b>	<b>From</b>	<b>To</b>	<b>Import from Grid (kWh)</b>
July 2008	27.07.2008	31.07.2008	1242
August 2008	31.07.2008	24.08.2008	7450
September 2008	24.08.2008	18.09.2008	5766
October 2008	18.09.2008	23.10.2008	8199
November 2008	23.10.2008	17.11.2008	8091
December 2008	17.11.2008	19.12.2008	8256
January 2009	19.12.2008	17.01.2009	6417
February 2009	17.01.2009	20.02.2009	9255
March 2009	20.02.2009	16.03.2009	2478
March 2009	16.03.2009	31.03.2009	4656
March Total	<b>20.02.2009</b>	<b>31.03.2009</b>	7134
<b>Total</b>			<b>61810</b>

Workings for the mismatch periods

<b>From</b>	<b>To</b>	<b>Maximum monthly import in the previous 12 months (kWh) and month</b>	<b>No. of days in the period</b>	<b>Import from Grid corresponding to this period (kWh)</b>
27.07.2008	31.07.2008	9312 (from 19 <sup>th</sup> June to 17 <sup>th</sup> July, 2008)	4	1242
31.07.2008	24.08.2008	9312 (from 19 <sup>th</sup> June to 17 <sup>th</sup> July, 2008)	24	7450
16.03.2009	31.03.2009	9312 (from 19 <sup>th</sup> June to 17 <sup>th</sup> July, 2008)	15	4656

### iii. Gross electricity generated by the project activity ( $E_{\text{Gen}}$ )

The gross electricity generated by the project activity is monitored in kWh and are recorded regularly by the project proponents. The gross generation of the project activity is tabulated below

Month	From	To	Gross Generation (kWh)
July 2008	27.07.2008	31.07.2008	0
August 2008	31.07.2008	31.08.2008	4424380
September 2008	31.08.2008	30.09.2008	5761550
October 2008	30.09.2008	31.10.2008	1369640
November 2008	31.10.2008	30.11.2008	1896920
December 2008	30.11.2008	31.12.2008	1336560
January 2009	31.12.2008	31.01.2009	5948740
February 2009	31.01.2009	28.02.2009	2651270
March 2009	28.02.2009	31.03.2009	2842560
<b>Total</b>			<b>26231620</b>

### iv. Auxiliary Units consumed by the project activity

The difference between the gross electricity generation ( $E_{\text{Gen}}$ ) and electricity exported to the grid ( $E_{\text{G}}$ ) as per the JMR gives the total Auxiliary Consumption

Month	From	To	Auxiliary Consumption (kWh)
July 2008	27.07.2008	31.07.2008	0
August 2008	31.07.2008	31.08.2008	86380
September 2008	31.08.2008	30.09.2008	113150
October 2008	30.09.2008	31.10.2008	26840
November 2008	31.10.2008	30.11.2008	35720
December 2008	30.11.2008	31.12.2008	27360
January 2009	31.12.2008	31.01.2009	114340
February 2009	31.01.2009	28.02.2009	54470
March 2009	28.02.2009	31.03.2009	54960
<b>Total</b>			<b>513220</b>

**v. Diesel consumed by the stand by DG Set (DC)**

The diesel quantity available in the diesel storage tanks is recorded daily by DLHPPL in the plant log book. The consumption in kgs is derived by multiplying the consumption in litres by 0.88

Month	From	To	Consumption (kgs)
July 2008	27.07.2008	31.07.2008	1.32
August 2008	31.07.2008	31.08.2008	27.72
September 2008	31.08.2008	30.09.2008	19.36
October 2008	30.09.2008	31.10.2008	7.92
November 2008	31.10.2008	30.11.2008	4.4
December 2008	30.11.2008	31.12.2008	7.04
January 2009	31.12.2008	31.01.2009	6.16
February 2009	31.01.2009	28.02.2009	1.76
March 2009	28.02.2009	31.03.2009	7.92
<b>Total</b>			<b>83.60</b>

**vi. Hourly electricity exported to the grid by the project activity as recorded at the main meter (HEE<sub>main \_ meter</sub>)**

This parameter is relevant only in conditions/ circumstances (those days) where the dates of Joint Meter Readings (JMRs) pertaining to the project activity do not match the individual verification periods. Since for the monitoring period under consideration the only days of mismatch are from 27.07.2008 to 31.07.2008 and there was no electricity generation during this period, it can be neglected.

**10. Emission Reductions of the small scale project activity**

The emission reduction calculation of the project activity for the monitoring period under consideration is detailed below

**Baseline Emissions**

The baseline emissions are calculated as per the equation given below

$$BE_y = EG_y * EF_y$$

EG<sub>y</sub> = Electricity exported to the grid by the project activity in kWh year “y”

EF<sub>y</sub> = EF<sub>Western grid, CM, y</sub> = Baseline Emission Factor for the Western regional grid (Combined Margin Approach) whose value is fixed for the crediting period at 0.69 tCO<sub>2</sub>e/MWh



Month wise baseline emissions are tabulated below

Month	From	To	Baseline Emissions (tCO <sub>2</sub> e)
July 2008	27.07.2008	31.07.2008	0
August 2008	31.07.2008	31.08.2008	2993.22
September 2008	31.08.2008	30.09.2008	3897.396
October 2008	30.09.2008	31.10.2008	926.532
November 2008	31.10.2008	30.11.2008	1284.228
December 2008	30.11.2008	31.12.2008	903.348
January 2009	31.12.2008	31.01.2009	4025.736
February 2009	31.01.2009	28.02.2009	1791.792
March 2009	28.02.2009	31.03.2009	1923.444
<b>Total</b>			<b>17745.696</b>

## Project Emissions

### i. Project Emissions on account of Electricity Imported

Project Emissions on account of Electricity Imported are calculated as per the equation below

$$PE_{Import,y} = E_{Import,y} \times EF_{Western\ grid,\ CM,\ y}$$

$PE_{Import,y}$  is the project emissions from import of electricity from the grid during the year y

$E_{Import,y}$  is the electricity imported from the grid by the project activity during the year y

$EF_y = EF_{Western\ grid,\ CM,\ y}$  = Baseline Emission Factor for the Western regional grid (Combined Margin Approach) whose value is fixed for the crediting period at 0.69 tCO<sub>2</sub>e/MWh

### ii. Project Emissions on account of Diesel Consumption

Project Emissions on account of Diesel consumption are calculated as per the equation below

$$PE_{DC,y} = \sum_i DC_y \times COEF$$

Where,

$PE_{DC,y}$  are the CO<sub>2</sub> emissions from fossil fuel combustion (tCO<sub>2</sub>) during the year y

$DC_y$  is the quantity of fuel (diesel) combusted (mass unit) for the year

COEF is the CO<sub>2</sub> emission coefficient of fuel i.e. diesel (tCO<sub>2</sub>/ mass unit)

The CO<sub>2</sub> emission coefficient COEF is calculated based on net calorific value (NCV<sub>diesel</sub>) and CO<sub>2</sub> emission factor (EF<sub>CO<sub>2</sub>-diesel</sub>) of the fuel i.e. diesel as follows:

$$COEF = NCV_{diesel} \times EF_{CO2\_diesel}$$

Where:

COEF is the CO2 emission coefficient of fuel (tCO2/ mass unit)

NCV<sub>diesel</sub> is the net calorific value of the fuel (diesel) (GJ/ mass unit)

EF<sub>CO2\_diesel</sub> is the CO2 emission factor of fuel i.e. diesel.

The NCV<sub>diesel</sub> and EF<sub>CO2\_diesel</sub> have been taken from the '2006 IPCC guidelines on National GHG inventories' as 43.3 (GJ/ton) and 0.0748 (tCO2/GJ).

**Thus, COEF is 3.23884 is tCO2e/ton.**

The project emissions are tabulated below

Month	From	To	Project Emissions on account of Electricity imported Emissions (tCO2e)	Project Emissions on account of Diesel Consumption (tCO2e)	Project Emissions (Total)
July 2008	27.07.2008	31.07.2008	0.86	0.0043	0.86
August 2008	31.07.2008	31.08.2008	5.14	0.0898	5.23
September 2008	31.08.2008	30.09.2008	3.98	0.0627	4.04
October 2008	30.09.2008	31.10.2008	5.66	0.0257	5.68
November 2008	31.10.2008	30.11.2008	5.58	0.0143	5.60
December 2008	30.11.2008	31.12.2008	5.70	0.0228	5.72
January 2009	31.12.2008	31.01.2009	4.43	0.0200	4.45
February 2009	31.01.2009	28.02.2009	6.39	0.0057	6.39
March 2009	28.02.2009	31.03.2009	4.92	0.0257	4.95
<b>Total</b>			<b>42.65</b>	<b>0.2708</b>	<b>42.92</b>

### Emission Reductions

The sheet below calculates the emission reductions as the difference between the baseline emission and project emissions

**Emission reductions of the small project activity**

27 <sup>th</sup> July 2008 to 31 <sup>st</sup> March 2009 (including both days)								
Month	Gross Generation (kWh)	Net export to grid (kWh)	Import from the grid (kWh)	Diesel Consumption (Kgs)	Baseline emission factor (kgCO <sub>2</sub> /kWh)	Baseline Emissions (t CO <sub>2</sub> )	Project Emissions (t CO <sub>2</sub> )	Emission Reduction (t CO <sub>2</sub> )
July - 08 (from 27th to 31st )	0	0	1242.00	1.32	0.69	0	0.86	(0.86)
Aug-08	4424380	4338000	7450.00	27.72	0.69	2993.22	5.23	2,987.99
Sep-08	5761550	5648400	5766.00	19.36	0.69	3897.396	4.04	3,893.35
Oct-08	1369640	1342800	8199.00	7.92	0.69	926.532	5.68	920.85
Nov-08	1896920	1861200	8091.00	4.4	0.69	1284.228	5.60	1,278.63
Dec-08	1336560	1309200	8256.00	7.04	0.69	903.348	5.72	897.63
Jan-08	5948740	5834400	6417.00	6.16	0.69	4025.736	4.45	4,021.29
Feb-08	2651270	2596800	9255.00	1.76	0.69	1791.792	6.39	1,785.40
Mar - 09 (till March 31st )	2842560	2787600	7134.00	7.92	0.69	1923.444	4.95	1,918.50
<b>Total</b>	<b>26231620</b>	<b>25718400</b>	<b>61810</b>	<b>83.6</b>	<b>0.69</b>	<b>17745.696</b>	<b>42.919667</b>	<b>17,702.00</b>

**Comparison of CERs with respect to registered PDD:**

The Reported CER in the PDD is	= 30 , 360 for 27 <sup>th</sup> July 2008 to 26 <sup>th</sup> July 2009
Proportionate CERs for 117 days less	= 20,628
CER in the monitoring report	= <b>17,702</b>

The CER generated is less than the estimation in registered PDD

There have been no emergency incidents in the monitoring period.