MONITORING REPORT FORM (F-CDM-MR)
Version 02.0

MONITORING REPORT

Title of the project activity	Vanala Small Scale Hydropower Project
Reference number of the project activity	4576
Version number of the monitoring report	2
Completion date of the monitoring report	10/09/2012
Registration date of the project activity	29/03/2011
Monitoring period number and duration of this monitoring period	1st Monitoring Period Duration (01/06/2011 – 30/06/2012)
Project participant(s)	Him Urja Private Limited
Host Party(ies)	India
Sectoral scope(s) and applied methodology(ies)	Sectoral Scope: 1 Energy industries (renewable - / non-renewable sources) Methodology: AMS-I.D. version 16 - Grid connected renewable electricity generation
Estimated amount of GHG emission reductions or net anthropogenic GHG removals by sinks for this monitoring period in the registered PDD	49,380
Actual GHG emission reductions or net anthropogenic GHG removals by sinks achieved in this monitoring period	35,237

SECTION A. Description of project activity

A.1. Purpose and general description of project activity

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The Vanala Small Scale hydropower project is a 15 MW run of the river type small hydroelectricity generation project located on river Nandakini in Chamoli district of state Uttarakhand. The project involves installation of two horizontal Francis turbines generating sets of 7.5 MW each for hydroelectricity generation. The project activity was synchronised with the grid on 06/12/2009 and is in operation continuously (with outages – forced & planned) since then.

Thus, the project involves electricity generation by conversion of kinetic energy of the water current into electrical energy through installation of a turbine generator system. Specifications of the critical project equipment and structure are detail below:

Turbine

Type	:	Horizontal Francis
Number of turbines	:	2.0
Capacity	:	7.5 MW each
Manufacturer	:	Jyoti Limited

Generator

Type	:	3 phase Synchronous type, vertical shaft, brushless/ fully excitation type
Number of generators	:	2.0
Rated output	:	7500 kW
Rated Voltage	:	11 kV
Frequency	:	50 Hz
Rated speed	:	750 rpm
Manufacturer	:	Jyoti Limited

Diversion Weir

The diversion weir is a permanent raised weir with under sluice to flush out the river bed load near intake.

Desilting Tank

A single basin with two chambers, each half the required settling capacity and dividing wall in between

Powerhouse

The powerhouse is located at about 800m east of Kandai Bridge. It is a reinforced concrete structure that will house the machine floor, control section ad all the mechanical and electrical equipments.

Transmission

An 8.0 km long 66 kV overhead transmission line from the powerhouse to the interconnection point at UPCL substation at Mangroli would be laid down for the project activity.

The project proponent Him Urja Private Limited, by generation of renewable electricity, contributes towards reduction of GHG emissions that would have occurred by generation of equivalent amount of electricity in the fossil fuel based regional grid.

This is the first monitoring report associated with the project activity. The period covered in this monitoring report is from 01/06/2011 to 30/06/2012 (Both days included). The CERs generated in the monitoring period are 35,237 tCO2e.

A.2. Location of project activity

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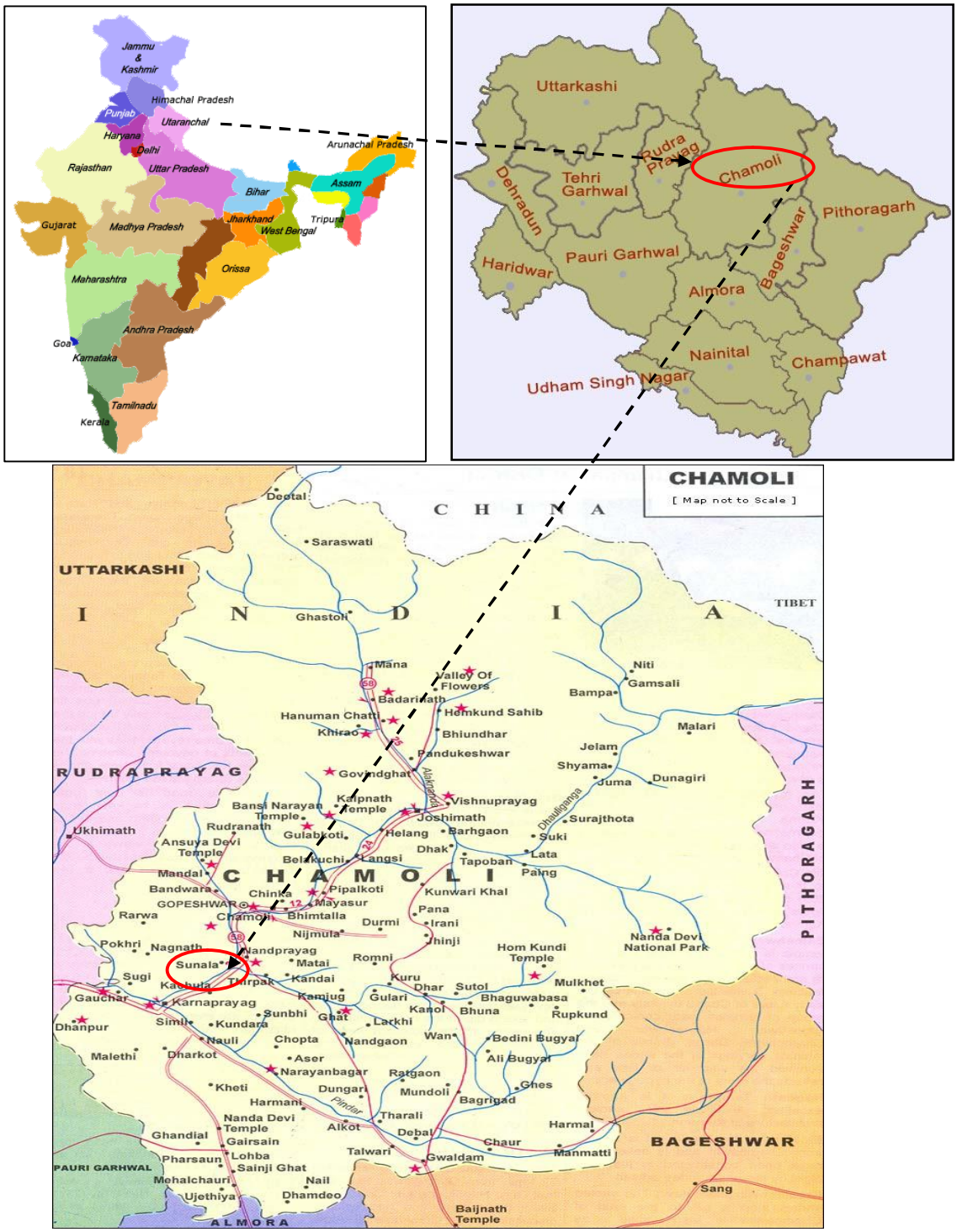
The project activity is located in village Vanala, district Chamoli in state of Uttarakhand, India.

The project is located near Nandprayag, about 200 km from Rishikesh on Haridwar – Badrinath Dham National Highway. The project is located on Nandakini River which is a major tributary of Alaknanda River which originates from river Ganga.

The geographical coordinates of the project activity are as follows:

	WEIR SITE	**POWER HOUSE**
LATITUDE (N)	30^0 16’	30^0 17’
LONGITUDE (E)	79^0 25’	79^0 23’
ELEVATION (masl)	1202.5	1056.0

The project site can be accessed from the Nand Prayag Highway. The nearest road head is Vanala-Kandai village road at a distance of 0.2 km. The Nand Prayag highway is situated at a distance of 10 km from project site. The nearest Rail head is at Rishikesh (BG) – 205 km and the nearest Airport is at Deharadun – 250 km.


Jammu & Kashmir
Himachal Pradesh
Punjab
Utaranchal
Haryana
Delhi
Rajasthan
Uttar Pradesh
Bihar
Arunachal Pradesh
Assam
Jharkhand
West Bengal
Tripura
Gujarat
Madhya Pradesh
Orissa
Maharashtra
Andhra Pradesh
Goa
Karnataka
Tamilnadu
Kerala
Uttarkashi
Rudra Prayag
Chamoli
Tehri Garhwal
Dehradun
Pithoragarh
Pauri Garhwal
Haridwar
Bageshwar
Almora
Nainital
Champawat
Udham Singh Nagar
CHAMOLI
[Map not to Scale]
C H I N A
TIBET
UTTARKASHI
I N D I A
RUDRAPRAYAG
PITHORAGARH
BAGESHWAR
PAURI GARHWAL
ALMORA
C H A M O L I
Deotal
Saraswati
Ghastoli
Mana
Valley Of Flowers
Badarinath
Hemkund Sahib
Hanuman Chatti
Khirao
Bhiundhar
Pandukeshwar
Govindghat
Alaknanda
Vishnuprayag
Kalpnath Temple
Bansi Narayan Temple
Joshimath
Dhauliganga
Surajthota
Ukhimath
Rudranath
Gulabkoti
Helang
Barhgaon
Suki
Ansuya Devi Temple
Dhak
Lata
Tapoban
Pang
Bandwara
Chinka
Pipalkoti
Kunwari Khal
GOPESHWAR
Mayasur
Rarwa
Chamoli
Bhimtalla
Durmi
Pana
Irani
Nijmula
Jhinji
Pokhri
Nagnath
Nandprayag
Matai
Romni
Hom Kundi Temple
Nanda Devi National Park
Sunala
Sugi
Kandai
Kuru
Dhar
Sutol
Mulkhet
Gauchar
Karnaprayag
Kamjug
Gulari
Bhaguwabasa
Sunbhi
Ghat
Kanol
Bhuna
Rupkund
Dhanpur
Simli
Kundara
Lakhi
Nauli
Chopta
Nandgaon
Wan
Bedini Bugyal
Malethi
Dharkot
Aser
Ali Bugyal
Narayanbagar
Ratgaon
Kheti
Dungari
Mundoli
Ghes
Harmani
Pindar
Bagrigad
Nanda Devi Temple
Tharali
Alkot
Harmal
Ghandial
Gairsain
Debal
Chaur
Pharsaun
Lohba
Talwari
Gwaldam
Manmatti
Mehalchauri
Sainji Ghat
Nail
Sang
Ujethiya
Dhamdeo
Baijnath Temple
Niti
Gamsali
Bampa
Malari
Jelam
Shyama
Juma
Dunagiri

A.3. Parties and project participant(s)

Party involved ((host) indicates a host Party)	Private and/or public entity(ies) project participants (as applicable)	Indicate if the Party involved wishes to be considered as project participant (Yes/No)
India (host)	Him Urja Private Limited	No

A.4. Reference of applied methodology

>>

Title: AMS I.D - ***'Grid connected renewable electricity generation',*** Version 16
Main Category: Type I - Renewable Energy Projects
Sub Category: I.D – Renewable electricity generation from a grid

The reference has been taken from the indicative simplified baseline and monitoring methodologies for small-scale CDM project activity categories.

The following tool had been followed for calculation of ex-ante grid emission factor:

"Tool to calculate the emission factor for an electricity system"- Annex 14, version (02)-EB 50

A.5. Crediting period of project activity

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Type: Fixed
Start date: 01/06/2011
Length of the crediting period: 01/06/2011 – 30/05/2021

SECTION B. Implementation of project activity
B.1. Description of implemented registered project activity
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The hydro power plant had been successfully commissioned by Him Urja Private Limited (HUPL) and was registered by CDM Executive Board of UNFCCC on 29th March 2011 (UNFCCC Ref No. 4576) using approved small scale methodology - "Grid connected renewable electricity generation" (AMS-I.D Version 16). The project activity has been in operation continuously (with outages – forced & planned) since its commissioning.

The project involves electricity generation by conversion of kinetic energy of the water current into electrical energy through installation of a turbine generator system. Specifications of the critical project equipment and structure are detail below:

Turbine

Type	:	Horizontal Francis
Number of turbines	:	2.0
Capacity	:	7.5 MW each
Manufacturer	:	Jyoti Limited

Generator

Type	:	3 phase Synchronous type, vertical shaft, brushless/ fully excitation type
Number of generators	:	2.0
Rated output	:	7500 kW
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Desilting Tank

A single basin with two chambers, each half the required settling capacity and dividing wall in between

Powerhouse

The powerhouse is located at about 800m east of Kandai Bridge. It is a reinforced concrete structure that will house the machine floor, control section ad all the mechanical and electrical equipments.

Transmission
An 8.0 km long 66 kV overhead transmission line from the powerhouse to the interconnection point at UPCL substation at Mangroli would be laid down for the project activity.

The plant is in operation continuously (with outages – forced & planned) within the present monitoring period i.e. 01/06/2011 to 30/06/2012 (both days included).

B.2. Post registration changes

B.2.1. Temporary deviations from registered monitoring plan or applied methodology

>> No deviation from registered monitoring plan or applied methodology

B.2.2. Corrections

>> Not applicable

B.2.3. Permanent changes from registered monitoring plan or applied methodology

>> There have been no permanent changes from registered monitoring plan or applied methodology

B.2.4. Changes to project design of registered project activity

>> There has been no change to project design of registered project activity

B.2.5. Changes to start date of crediting period

>> There have been no changes to start date of the crediting period

B.2.6. Types of changes specific to afforestation or reforestation project activity

>> Not applicable

SECTION C. Description of monitoring system

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The net saleable electricity to the grid by the project activity are calculated as the difference between the total electricity exported (EG_{export}) and the total electricity imported (EG_{import}).

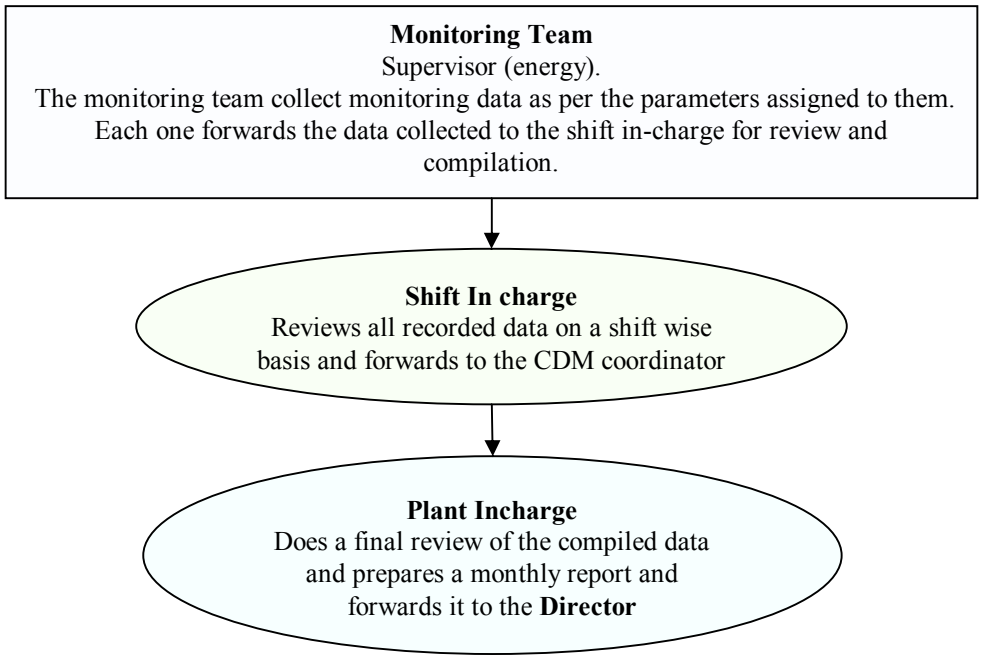
For calculating the EG_{export} and $EG_{import,,}$ a main meter is installed. The meter readings are monitored and recorded at the end of each shift by the shift incharge. The meter readings are monitored and recorded at the end of each shift by the shift incharge. Additionally, a check meter is also installed; readings from theis meter is used to check accuracy of the main meter.

If during the checks, the main meter or the check meter is found to be exceeding the permissible limits of error, the same would immediately be calibrated or replaced with the spare tested/calibrated meter.

Further, the meters are tested, calibrated and certified by a recognised Testing House/Laboratory, after every six months. Spare duly tested and calibrated meters of same accuracy as the main meter/check meter are kept as back up for use as and when required.

The monthly bills raised for payments against net saleable electricity are also archived and used to cross-check EG_y calculated using meter readings of EG_{export} and EG_{import}.

The monitoring team at the floor level consisting of monitoring supervisors are assigned the responsibility of monitoring and recording of parameters for their corresponding shifts. At the end of each shift, the recorded data are reviewed and compiled by the Shift in charge. In case of any irregularity observed, necessary action is taken immediately. The compiled reports are then forwarded to the plant in-charge. On monthly basis, the reports are prepared and forwarded to the senior management after final review and compilation by the CDM coordinator. The following organisation structure is present to operate the project activity:



The onus of reviewing, storing and archiving of information in a suitable manner lies on the plant incharge. The plant incharge will undertake periodic verifications and onsite inspections to ensure the quality and

reliability of the data collected and would take necessary steps in case any abnormality is observed. The plant in charge will also review the data collected and suggest corrective actions wherever required.

These monthly bills raised against net saleable electricity will be preserved for at least two years after the end of the crediting period. HUPL shall also archive the complete metering data at generation end and all the data would be preserved for at least two years after the end of the crediting period.

SECTION D. Data and parameters

D.1. Data and parameters fixed ex ante or at renewal of crediting period

Data/Parameter	**EF_{Grid}**
Unit	tCO_2/MWh
Description	Ex- ante CO_2 emission factor for the northern regional grid
Source of data	Baseline Carbon Dioxide Emission Database, version 4.0, given by Central Electricity Authority, CEA
Value(s) applied	0.8034
Purpose of data	For calculation of baseline emissions
Additional comment	

Data/Parameter	**EF_{OM}**
Unit	tCO_2/MWh
Description	Ex-ante Simple operating margin for calculation of ex-ante grid emission factor
Source of data	Baseline Carbon Dioxide Emission Database, version 4.0, given by Central Electricity Authority, CEA
Value(s) applied	1.0090
Purpose of data	For calculation of ex-ante grid emission factor
Additional comment	

Data/Parameter	**EF_{BM}**
Unit	tCO_2/MWh
Description	Ex-ante Build margin for calculation of ex-ante grid emission factor
Source of data	Baseline Carbon Dioxide Emission Database, version 4.0, given by Central Electricity Authority, CEA
Value(s) applied	0.5977
Purpose of data	for calculation of ex-ante grid emission factor
Additional comment	

D.2. Data and parameters monitored

Data/Parameter	$EG_{BL,y}$
Unit	MWh
Description	Net electricity delivered to the grid at the interconnection point
Measured/Calculated /Default	Calculated as the difference of **(EG_{export})** and **(EG_{import})**
Source of data	Monthly bills for net saleable electricity raised by HUPL.
Value(s) of monitored parameter	43861.08
Monitoring equipment	Not Applicable as this is a calculated parameter
Measuring/Reading/ Recording frequency	The data will be calculated and recorded. Records of monthly electricity sales bills will be used as evidence for net power exported to grid.
Calculation method (if applicable)	Calculated as the difference of **(EG_{export})** and **(EG_{import})**
QA/QC procedures	This is a calculated figure hence no QA/QC procedures are required
Purpose of data	For calculation of the Baseline emissions
Additional comment	The data recorded would be stored for crediting period + 2 years

Data/Parameter	**EG_{export}**
Unit	MWh
Description	Total electrical energy exported by the project activity
Measured/Calculated /Default	Measured parameter
Source of data	Joint Meter Readings, Plant log books
Value(s) of monitored parameter	43897.08
Monitoring equipment	Energy meters installed at the interconnection point **June, 2011** **Main Meter** Make: Secure Meters Limited Accuracy Class: 0.2s Serial number: HRH00403 Type: E3M021 Model: AC 3 Phase 4 Wire Calibration Date: 02/06/2011 Validity: 02/12/2011 **Check Meter** Make: Secure Meters Limited Accuracy Class: 0.2s Serial number: HRH00404 Type: E3M021 Model: AC 3 Phase 4 Wire Calibration Date: 02/06/2011 Validity: 02/12/2011 **November, 2011** **Main Meter** Make: Secure Meters Limited Accuracy Class: 0.2s Serial number: HRH00403 Type: E3M021 Model: AC 3 Phase 4 Wire Calibration Date: 02/11/2011 Validity: 02/05/2012 **Check Meter** Make: Secure Meters Limited Accuracy Class: 0.2s Serial number: HRH00404

	Type: E3M021 Model: AC 3 Phase 4 Wire Calibration Date: 02/11/2011 Validity: 02/05/2012 **June, 2012** **Main Meter** Make: Secure Meters Limited Accuracy Class: 0.2s Serial number: HRH00403 Type: E3M021 Model: AC 3 Phase 4 Wire Calibration Date: 03/06/2012 Validity: 03/12/2012 **Check Meter** Make: Secure Meters Limited Accuracy Class: 0.2s Serial number: HRH00404 Type: E3M021 Model: AC 3 Phase 4 Wire Calibration Date: 03/06/2012 Validity: 03/12/2012
Measuring/Reading/ Recording frequency	The total electricity exported to the grid is measured continuously by the energy meters installed at the interconnection point. The joint meter readings of the meters are recorded at the end of every month. The monitoring data would be recorded in the plant log books.
Calculation method (if applicable)	Not applicable
QA/QC procedures	In order to ensure the highest levels of accuracy in the monitoring procedures, the main meter and the check meter used for the monitoring are checked for accuracy 15 days before the synchronization. The main meter and the check meter would be calibrated after every six months. Each such meters shall be deemed to be working satisfactorily so long as the errors are within the IS of said accuracy class. Spare duly tested and calibrated meters of same accuracy would be kept as back up for use as and when required.
Purpose of data	For calculation of the Net electricity exported to the grid
Additional comment	The data recorded would be stored for crediting period + 2 years

Data/Parameter	**EG_{import}**
Unit	MWh
Description	Total electricity energy imported by the project activity
Measured/Calculated /Default	Measured parameter
Source of data	Joint Meter Readings, Plant log books
Value(s) of monitored parameter	36.00
Monitoring equipment	Energy meters installed at the interconnection point **June, 2011** **Main Meter** Make: Secure Meters Limited Accuracy Class: 0.2s Serial number: HRH00403 Type: E3M021 Model: AC 3 Phase 4 Wire Calibration Date: 02/06/2011 Validity: 02/12/2011 **Check Meter** Make: Secure Meters Limited Accuracy Class: 0.2s Serial number: HRH00404 Type: E3M021 Model: AC 3 Phase 4 Wire Calibration Date: 02/06/2011 Validity: 02/12/2011 **November, 2011** **Main Meter** Make: Secure Meters Limited Accuracy Class: 0.2s Serial number: HRH00403 Type: E3M021 Model: AC 3 Phase 4 Wire Calibration Date: 02/11/2011 Validity: 02/05/2012 **Check Meter** Make: Secure Meters Limited Accuracy Class: 0.2s Serial number: HRH00404

	Type: E3M021 Model: AC 3 Phase 4 Wire Calibration Date: 02/11/2011 Validity: 02/05/2012 **June, 2012** **Main Meter** Make: Secure Meters Limited Accuracy Class: 0.2s Serial number: HRH00403 Type: E3M021 Model: AC 3 Phase 4 Wire Calibration Date: 03/06/2012 Validity: 03/12/2012 **Check Meter** Make: Secure Meters Limited Accuracy Class: 0.2s Serial number: HRH00404 Type: E3M021 Model: AC 3 Phase 4 Wire Calibration Date: 03/06/2012 Validity: 03/12/2012
Measuring/Reading/ Recording frequency	The total electricity imported from the grid is measured continuously by the energy meters installed at the interconnection point. The joint meter readings of the meters will be recorded at the end of every month. The monitoring data would be recorded in the plant log books.
Calculation method (if applicable)	Not applicable
QA/QC procedures	In order to ensure the highest levels of accuracy in the monitoring procedures, the main meter and the check meter used for the monitoring are checked for accuracy 15 days before the synchronization. The main meter and the check meter would be calibrated after every six months. Each such meters shall be deemed to be working satisfactorily so long as the errors are within the IS of said accuracy class. Spare duly tested and calibrated meters of same accuracy would be kept as back up for use as and when required.
Purpose of data	For calculation of the Net electricity exported to the grid
Additional comment	The data recorded would be stored for crediting period + 2 years

D.3. Implementation of sampling plan

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Sampling plan is not applicable for the project activity.

SECTION E. Calculation of emission reductions or GHG removals by sinks
E.1. Calculation of baseline emissions or baseline net GHG removals by sinks
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In reference to the registered PDD, the baseline emissions are the product of the electrical energy baseline $EG_{BL,y}$ expressed in MWh of electricity produced by the renewable generating unit multiplied by the grid emission factor.

$BE_y = EG_{BL,y} * EF_{CO2,grid,y}$

BE_y Baseline Emissions in year y (tCO2)

$EG_{BL,y}$ Quantity of net electricity supplied to the grid as a result of the implementation of the CDM project activity in the year y (MWh)

$EF_{CO2,grid,y}$ CO_2 emission factor of the grid in year y (tCO_2/MWh)

Month	Total Export to the Grid (in MWh)	Total Import from the Grid (in MWh)	Net Export to Grid (in MWh)	Grid Emission Factor	Baseline Emissions (ton CO2)
Jun-11	4253.400	5.640	4247.76	0.8034	3413
Jul-11	3390.840	8.760	3382.08	0.8034	2717
Aug-11	1218.000	10.320	1207.68	0.8034	970
Sep-11	3899.760	5.040	3894.72	0.8034	3129
Oct-11	7914.240	0.480	7913.76	0.8034	6358
Nov-11	5028.360	0.360	5028.00	0.8034	4039
Dec-11	3480.480	0.000	3480.48	0.8034	2796
Jan-12	2635.800	0.360	2635.44	0.8034	2117
Feb-12	1781.880	0.720	1781.16	0.8034	1431
Mar-12	2101.080	0.000	2101.08	0.8034	1688
Apr-12	2273.400	0.240	2273.16	0.8034	1826
May-12	2577.840	2.520	2575.32	0.8034	2069
Jun-12	3342.000	1.560	3340.44	0.8034	2684
Total	**43897.080**	**36.000**	**43861.080**	**0.8034**	**35237**

Thus,

$BE_y = EG_{BL,y} * EF_{CO2,grid,y}$

$= 43861.080 * 0.8034$
$= 35237\ tCO_2$

E.2. Calculation of project emissions or actual net GHG removals by sinks
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Project emissions due to the project activity within the project boundary are nil, the project being a renewable hydroelectric power project.

E.3. Calculation of leakage

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As per the registered PDD, leakage estimation are only required if renewable energy technology is equipment transferred from another activity, or if the existing equipment is transferred to another activity. As no equipment is transferred from another activity, neither is existing equipment being transferred to another activity, hence, leakage emissions need not be accounted.

E.4. Summary of calculation of emission reductions or net anthropogenic GHG removals by sinks

Time Period	Baseline emissions or baseline net GHG removals by sinks (tCO_2e)	Project emissions or actual net GHG removals by sinks (tCO_{2e})	Leakage (tCO_2e)	Emission reductions or net anthropogenic GHG removals by sinks (tCO_2e)
Jun-11	3413	0	0	3413
Jul-11	2717	0	0	2717
Aug-11	970	0	0	970
Sep-11	3129	0	0	3129
Oct-11	6358	0	0	6358
Nov-11	4039	0	0	4039
Dec-11	2796	0	0	2796
Jan-12	2117	0	0	2117
Feb-12	1431	0	0	1431
Mar-12	1688	0	0	1688
Apr-12	1826	0	0	1826
May-12	2069	0	0	2069
Jun-12	2684	0	0	2684
Total	**35237**	**0**	**0**	**35237**

Total baseline emissions: **35237 tCO_2**
Total project emissions: **0 tCO_2**
Total leakage emissions: **0 tCO_2**
Total emission reductions: **35237 tCO_2**

E.5. Comparison of actual emission reductions or net anthropogenic GHG removals by sinks with estimates in registered PDD

Item	Values estimated in ex-ante calculation of registered PDD	Actual values achieved during this monitoring period
Emission reductions or GHG removals by sinks (tCO_2e)	49,380	35,237

E.6. Remarks on difference from estimated value in registered PDD

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The actual quantum of emission reductions achieved in the present monitoring period is lower than the estimated figure in the PDD because the plant was running on a low capacity during the monitoring period.

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History of the document

Version	Date	Nature of revision
02.0	EB 66 13 March 2012	Revision required to ensure consistency with the "Guidelines for completing the monitoring report form" (EB 66, Annex 20).
01	EB 54, Annex 34 28 May 2010	Initial adoption.
Decision Class: Regulatory **Document Type**: Form **Business Function**: Issuance		