

Vishnuprayag Hydro-electric Project (VHEP)

Monitoring report - VERs

Fourth Monitoring Report

Monitoring Period: 01/04/2008 to 30/09/08 (Both days included)

Version: 01

Date: 14/10/2008

1. Title of the project activity

Vishnuprayag Hydro-electric Project (VHEP) by Jaiprakash Power Ventures Ltd. (JPVL)

2. Introduction

The purpose of this monitoring report is to calculate the Greenhouse Gas emission reduction achieved by the above mentioned project activity for the period starting from April 2008 to September 2008.

3. Reference

Methodology: “Consolidated baseline methodology for grid-connected electricity generation from renewable sources” Reference: Approved consolidated baseline methodology ACM0002/Version 06, Sectoral Scope: 1, 19 May 2006.

The project is a Renewable Energy project with maximum output capacity of 400 MW

VCS PD:

Title: Vishnuprayag Hydro-electric Project (VHEP) by Jaiprakash Power Ventures Ltd. (JPVL)

Version 1.0

Completion date: 25/05/2007

4. General description of the project

4.1. Project Activity

Vishnuprayag Hydroelectric Project (VHEP) is a 4 x 100 MW Run-of-the-River Project located across river Alaknanda near Joshimath in district Chamoli of Uttaranchal state of India which has been implemented by Jaiprakash Power Ventures Ltd. (JPVL), a subsidiary of Jaiprakash Associates Limited (JAL). The Project activity is located at a distance of about 525 km from New Delhi. JAL is a well-known business group of India and had entered into agreement with State Government of Uttaranchal, State government of Uttar Pradesh and Uttar Pradesh Power Corporation Limited (UPPCL)

VHEP shall have an underground power station with an installed capacity of 400 MW and shall utilize the water from river Alaknanda. The project is located at Rishikesh - Badrinath highway.

Project activity generates electricity using renewable hydel energy and sells it to UPPCL. JPVL has already been entered into Power Purchase Agreement (PPA) with UPPCL for this purpose. The project site is located in state of Uttaranchal, which was earlier, a part of Uttar Pradesh. The PPA shall remain in principle with UPPCL, although project activity is supplying about 12% free electricity to Uttaranchal state as royalty. As the project activity involves generation of electricity by renewable sources of energy it will reduce anthropogenic Green House Gases (GHG) emissions that would have been generated to supply power to grid using fossil fuel. Here it is important to mention that at present more than 70% of power at the northern grid of India is obtained by fossil fuels.

Emergent Ventures India Pvt Ltd (EVI) is project advisor for the VHEP project.

4.2. Technical description of the project

VHEP is a run of river scheme with no storage dam upstream and downstream. The project as envisaged comprises 17m high diversion barrage across river Alaknanda, two intakes and two underground sedimentation chambers, 11.343 KM long head race tunnel, and underground power station and 1.92 KM long tail race tunnel and outfall works. The water is delivered to the power house through a steel lined pressure shaft. A surge shaft is constructed between the head race tunnel and the pressure shaft which is used to regulate the flow.

The project activity utilizes Impulse type Pelton turbines. In an impulse turbine, the power is generated due to high velocity water stream striking the turbine blades, which are designed in the shape of cups. The cups move as a result of the impact in the same direction as the flow. The turbine shaft is coupled with the shaft of generator.

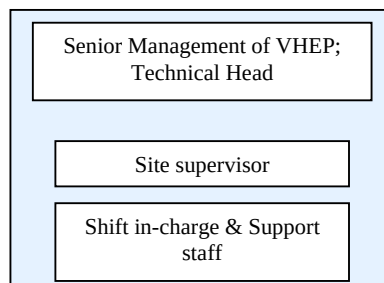
5. Monitoring methodology and plan:

The project activity meets the applicability criteria of the 'Approved baseline methodology ACM0002'. The applicability criteria of the 'Approved monitoring methodology ACM0002' are identical to those of the 'Approved baseline methodology ACM0002'. Therefore the project activity has used the 'Approved monitoring methodology ACM0002' in conjugation with the 'Approved baseline methodology ACM0002' for the project activity.

In keeping with the Monitoring Methodology, the following parameters are to be monitored in the specific project situation:

- Net electricity supplied to the state grid by project activity.
- GEF (grid emission factor) of Northern grid, the grid to which project activity supplies power. The GEF has been fixed ex-ante in the VCS PD, value used is 0.75 tCO₂/MWh.

A project team is constituted with participation from relevant departments. This team will be responsible for data collection and archiving. This team will meet periodically to review performance of project activity check data collected, emissions reduced etc. In case of any irregularity observed by any of the CDM team member, it shall be informed to the concerned person for necessary actions. On monthly basis, these reports shall be forwarded at the management level.



Senior Management of VHEP/Technical Head: Overall responsibility of compliance with the monitoring plan.

Site Supervisor: Responsibility for completeness of data, reliability of data (calibration of meters), and monthly report generation

Shift In-charge: Responsibility of daily report generation

Data Monitoring:

Completeness-

For Electricity generation data: The project activity has installed the latest state-of-art monitoring and control equipment that measure, record, report, monitor and control various key parameters. Real time data collection will happen using these control systems. An hourly log of data is also prepared by the shift in-charge. A daily report of aggregation of these data is also prepared. Parameters monitored are the total power generated, power exported to the grid and auxiliary power consumed (other parameters like head availability, grid issues, frequency etc will also be maintained hourly in the log).

Reliability-

For electricity generation data: automatic control meters for power generation and exports will be regularly maintained. The regular plant operating & maintenance procedures will also include process of regular meter testing, calibration & maintenance.

Actual power generation data will also be metered using power output meter at the substation. The billing invoices for the power sold and meter readings could be used to validate the data accuracy.

Frequency-

The measurement is recorded and monitored on a continuous basis. An hourly log is prepared by the shift in-charge. At the end of the day, hourly data is aggregated in a daily report.

6. Quality Control (QC) and Quality Assurance (QA)

The meters for electricity supplied to state grid are maintained by state electricity board and kept under lock. There is a provision of two transmission lines provided by UPPCL and both lines have one pair of main meter and check meter. These meters are regularly calibrated and the records are maintained by state electricity department. Electricity supply data to the grid could also be cross-checked with the invoices for sale of electricity to the UPPCL

7. GHG Calculations

8.1 Project Activity Emissions

Project activity emissions have been calculated for the amount of electricity imported from the state grid and DG sets for running the auxiliaries.

Month	Electricity imported from the grid (MWh)	Project emissions (Import from grid) (tCO ₂)
Apr-08	58	47
May-08	100	81
Jun-08	127	103
Jul-08	67	54
Aug-08	77	62
Sep-08	58	47
Total	487	394

Month	Total Electricity supplied by DG sets (MWh)	Project emissions (DG sets) (tCO ₂)
Apr-08	1.9	1
May-08	26.9	22
Jun-08	2.9	2
Jul-08	3.7	3
Aug-08	5.6	5
Sep-08	6.6	5
Total	47.5	38

8.2 Leakages

No anthropogenic greenhouse gases by sources outside the project boundary that are significant, measurable and attributable to the project activity are identified. Hence, no leakage is considered from the project activity. In addition, project proponents confirm that the renewable energy technology is not equipment transferred from another activity. Hence, no leakage calculation is required.

8.3 Baseline Emissions

“The baseline is the MWh produced by the renewable generating unit multiplied by an emission coefficient (measured in tCO₂equ/MWh) calculated in a transparent and conservative manner as: **The weighted average emissions (in tCO₂equ/MWh) of the current generation mix.**”

$$BE_y = EF_y \times EG_y$$

Where

BE_y: Baseline emissions due to displacement of electricity during year y in tons of CO₂

EG_y: Electricity supplied to the grid by the project activity during the year y in MWh, and

EF_y: CO₂ baseline emission factor for the electricity displaced due to the project activity in during the year y in tons CO₂/MWh.

Energy supplied to Grid

The energy supplied to grid is measured using electricity meters at the supply points. The net electricity supplied is measured as

$$EG_y = \text{Total Generation} - \text{Auxiliary Consumption}$$

Monthly power generation details are as follows -

Month	Electricity Delivered to the grid by the project activity (kWh)
Apr-08	82985372
May-08	244352483
Jun-08	303319697
Jul-08	309112418
Aug-08	311588779
Sep-08	273952453
Total	1525311202

Grid Emission Factor

GEF has been fixed Ex-ante in the PDD as 0.75 tCO₂/ MWh and the same has been used in calculation of emission reductions in this Monitoring Report

Baseline Emissions

Formula for Baseline emissions as discussed is $GEN_{iy} \times GEF_y$ (for a particular year)

Month	Baseline emissions (tCO ₂)
Apr-08	62239
May-08	183264
Jun-08	227490
Jul-08	231834
Aug-08	233692
Sep-08	205464
Total	1143983

8.4 Emission Reductions

$$ER_y = BE_y - PE_y - L_y$$

Month	Baseline emissions	Project emissions	Leakages	Emission reductions
Apr-08	62239	48	0	62191
May-08	183264	103	0	183161
Jun-08	227490	105	0	227385
Jul-08	231834	57	0	231777
Aug-08	233692	67	0	233625
Sep-08	205464	52	0	205412
Total	1143983	432	0	1143551

BE_y = Baseline Emissions as mentioned in Section 8.3

PE_y = Project emissions as mentioned in section 8.1

L_y = Leakages = 0

So a total Emission Reduction of **1143551 tCO₂** is achieved by Project activity from 1st April 2008 to 30th September 2008 (Both days included)