Monitoring Report

[From 01.05.2006 to 30.04.2007 (both days included)]

18 MW Kemphole Mini Hydel Scheme (KMHS) by International Power Corporation Limited

CDM Project Number 0312

Date: 31st July 2008

Implemented by

International Power Corporation Limited

Defence Colony, HAL, 2nd Stage,

Radhakrishna Building, No.38,

Bangalore, Karnataka 560038

18 MW Kemphole Mini Hydel Scheme (KMHS), by International Power Corporation Limited, India

1. Title of the project activity

18 MW Kemphole Mini Hydel Scheme (KMHS), by International Power Corporation Limited, India

2. Introduction

The purpose of this monitoring report is to calculate the Greenhouse Gas emission reduction achieved by the KMHS - CDM project for periodic verification.

The Second monitoring report covers the activity from 01.05.2006 to 30.04.2007 (both days included).

3. Reference

Methodology: "Consolidated baseline methodology for grid-connected electricity generation from renewable sources" Reference: Approved consolidated baseline methodology ACM0002/Version 04, Sectoral Scope: 1, 30 September 2005

Reference No. ***PDD version 1.3/25th January 2006*** **UNFCCC 00000312**

4. Definitions in the report

CER: Certified Emissions Reduction
GHG: Greenhouse Gases
IPCC: Intergovernmental Panel on Climate Change
JMR: Joint Meter Reading
KPTCL: Karnataka Power Transmission Corporation Limited
PDD: Project Design Document
SEB: State Electricity Board
SREB: Southern region electricity board
SR Grid: Southern region grid

5. General description of the project

5.1. Project Activity

Kemphole Mini Hydel Scheme (KMHS) is an 18 MW (3 X 6 MW) Run-of-the-River hydro power project located at Kemphole stream in Hassan district of Karnataka in India. The main

activity of the project is generation of electricity using hydro potential available in Kemphole stream and exporting the generated power to Karnataka Power Transmission Corporation Ltd. (KPTCL) as per power purchase agreement between the two of them.

KMHS project was completed in two stages; in first stage 2X6 MW units were installed (20th Oct 2003, 20th Nov 2003), in second stage 6 MW was installed (10th Jan 2005). The project activity utilises the water flow and fall available in the Kemphole stream. The project site is located in the dense forests of the Kemphole reserve forest and there is no habitation in the near by area. The project does not involve any displacement of local population and associated rehabilitations. The project uses horizontal Francis turbines for power generation.

The project is based in Netravathi river basin. As this is the first project in the river basin (it is tough terrain), there was no data available for gauging the power potential. Many technological/structural innovations have been introduced in the project activity such as to utilise automatic thrash-rack-cleaning system etc. Further the project activity is in a hilly area and is surrounded by dense forest with no power evacuation facility, for a distance of 29 km, a transmission system (with 124 towers) had to be created by the project proponent to evacuate power in the nearby substation.

5.2. Technical description of the project

Location of the project activity

The KMHS is located in Heggadde village of Hassan district, Karnataka. The project site is located at about 26 km. from Sakaleshpura along Hassan-Mangalore highway.

Technology employed by the project activity

The Project uses well established hydro power generation technology in electricity generation and transmission. A gated weir across Kemphole, downstream of confluence of Kadumanehole with Kemphole is constructed. The river bed level at the gated weir site is 319 m and the full reservoir level of the weir is 340 m. Three horizontal Francis turbines of 6 MW capacity each coupled with horizontal 3 phase, 50 Hz, 500 rpm synchronous generators are used. The gross head available for the project is 68 meters.

A 66 KV double circuit transmission line (total 124 towers over 29 KM) from the switchyard to the 11/66 KV sub-station at Sakaleshpura is used for power evacuation from the project activity.

6. Monitoring methodology and plan:

The project activity meets the applicability criteria of the 'Approved baseline methodology ACM0002'. (Please refer to Section B.2. for details). 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.

The following parameters are required for the estimation of emission reductions:

- Net electricity export to KPTCL grid by the project activity
- The CO_2 emission factor of KPTCL grid

Net electricity export to KPTCL grid is monitored as per the guidance provided in the registered project design document.

The CO_2 emission factor of KPTCL grid has been calculated at the beginning of the crediting period as per the guidance provided in the Approved Consolidated Methodology ACM0002 and is kept fixed for the entire crediting period.

Net electrical energy export: The net quantity of electrical energy exported to KPTCL Grid is monitored by the Main Meter and Check Meter installed in the switchyard area near the plant. The Main Meter readings are used for the estimation of net export to KPTCL Grid.

The Metre specifications are as below:-

SN	Line Details	Make	Serial Number of meter
1	Line 1 – (Main)	L& T Make	03129384
2	Line 1 – (Check metre)	L& T Make	03129382
3	Line 2 – (Main)	L& T Make	03129375
4	Line 2 – (Check meter)	L& T Make	03129379

The above Main metre and Check Metre in the switchyard are sealed by KPTCL and are generally calibrated once in a year by KPTCL with a pre-calibrated meter.

Accuracy: The meters are all tri vector L&T make. The meters .have high accuracy levels of the order of 0.2%, which is reflected by error calculation in calibration reports and the multiplication factor is 90000.

Calibration: Calibration of main meters and check meters is done on yearly by KPTCL people. Calibration Certificates of the Main and Check meters issued by KPTCL from May 2006 onwards are enclosed. Meter testing was done on 29th December 2006 for Line-1 and 6th January 2007 for Line-2 by Karnataka Power Transmission Corporation Limited (KPTCL) personnel.

Dealing with uncertainty: Check meters are provided in line with main meters to take care of any uncertainty related to electricity measurement.

Consideration of error in meters for Line 1 & Line 2

The meters used for energy metering at the project site are under the custody of KPTCL and the agency is responsible for testing and calibration of these meters. PP does not have any control on the meters testing/ calibration.

During the testing of meters on 29th December 2006, the main meter in Line 1 was found to be working outside the permissible limit and KPTCL released the meter on 3rd April 2007, which in turn was sent to the manufacturer M/s Larson and Tubro Ltd. for rectification.

Line 1:

During the tests of the meters on 29th December 2006, a maximum error of 0.6454127% was found in the Main meter and 2.2266469% in the Check meter.

During the period i.e. upto March 2007, KPTCL continued with the same Main meter for billing purpose. From the month of April 2007, however KPTCL took the readings of Check meter as the basis for net electrical energy export in Line 1.

However, for conservative estimation of emission reductions from the project activity during the period from May 2006 – April 2007, net electrical energy export readings have been adjusted to accommodate the maximum errors in the meters. The errors have been discounted for the entire period under monitoring i.e. May 2006 – April 2007. This is most conservative.

For the period between May2006 – Mar2007, an error of 0.6454127% (maximum error observed in the Main meter) and for the month of April 2007, an error of 2.2266469% (maximum error

observed in Check meter) has been adjusted from the recorded net electrical energy export. This is most conservative.

Line 2:

Similarly for Line 2, an error of 0.1941862% in export mode (maximum error observed in the export mode of main meter) and an error of 0.1863014% in import mode (maximum error observed in the import mode of the main meter) have been observed during testing of meter which was well within the permissible error margin. However there was a time lag of four months from the required date of calibration, so for conservative estimations, an error of 0.2% (maximum permissible error) has been adjusted from the recorded net electrical energy export/ import to/ from the grid. This is the most conservative.

The difference between emission reductions with and without error consideration is about 188 CERs. Hence the revised emission reductions from the project activity for the monitored period is now 44477 (earlier figure 44665).

7. Data Monitored

Parameter	**Net Energy to grid as per JMR**	**Energy considered for CER estimation**
	Line 1+Line 2	**Line 1+Line 2**
Month/ Unit ---->	kWh	kWh
May-06	1353600	1347710.2
June-06	4524300	4505150.7
July-06	12397500	12345437.7
August-06	10827900	10782087.7
September-06	10400400	10355911.7
October-06	7070400	7040484.9
November-06	3789000	3773290.5
December-06	2072700	2063936.0
January-07	1180800	1176100.0
February-07	641700	639030.3
March-07	339300	337719.6
April-07	274500	272830.3
Total	**54872100**	54639690

8. GHG Emissions Reduction Estimations

Parameter	Energy considered for CER estimation	Grid emission Factor	Emission Reductions
	Line 1+Line 2		
Month/ Unit ---->	kWh	tCO2/MWh	tCO2
May-06	1347710.2	0.814	1097.0
June-06	4505150.7	0.814	3667.2
July-06	12345437.7	0.814	10049.2
August-06	10782087.7	0.814	8776.6
September-06	10355911.7	0.814	8429.7
October-06	7040484.9	0.814	5731.0
November-06	3773290.5	0.814	3071.5
December-06	2063936.0	0.814	1680.0
January-07	1176100.0	0.814	957.3
February-07	639030.3	0.814	520.2
March-07	337719.6	0.814	274.9
April-07	272830.3	0.814	222.1
Total	54639690		44477

	Designation	Signature	Date
Authorised by :	Executive Director		26.06.2007

Annex-1

Grid Emission Factor

Electricity baseline emission factor is calculated as the weighted average of the Operating Margin emission factor (*EFOM,y*) and the Build Margin emission factor (*EFBM,y*) where the weights *wOM* and *wBM*, by default, are 50% (i.e., *wOM* = *wBM* = 0.5). This is presented in the table below (details provided in the PDD submitted for registration).

Source	**MoU**	**OM (2002-03)**	**OM (2003-04)**	**OM (2004-05)**
Year-wise OM	tCO2/ MWh	0.952	0.978	0.992
OM	tCO2/ MWh	0.974		
BM	tCO2/ MWh	0.655		
Emission Factor-CM	tCO2/ MWh	**0.814**		

Annex 2

The Project was in continuous operation except for 618.25 hours for Unit 1, 744 hours for Unit 2 and 744 hours for Unit 3 due to forced maintenance and also at times non-availability of discharge.

Annex 3

Parameter	Details
No of people employed in project activity	19 staff including 8 labourers