

# **THIRD MONITORING REPORT**

**DATED 6<sup>th</sup> JANUARY, 2009**

## **FOR THE PERIOD**

**01<sup>ST</sup> MAY 2007 TO 30<sup>th</sup> JUNE 2008**

**VERSION 02**

**“Babanpur, Killa and Sahoke Mini Hydroelectric Projects”**

**Kotla Hydro Power Private Limited**

**Reference No.UNFCCC00000329 - CDMP**

### **Project Location:**

**Kotla Branch Canal, District Sangrur,  
Punjab, India**

**Kotla Hydro Power Private Limited**

**B-37, Sector-1, Noida – 201301**

**Uttar Pradesh, India**

**Fax No. 91-0120-4621333**

### Current Status of the Project

Three Mini Hydroelectric Power projects aggregating to 3.75 MW at Babanpur, Killa and Sahoke on the Kotla Branch canal, District Sangrur, Punjab, India have been commissioned and operating successfully. Mini Hydroelectric Project at Babanpur (1MW) was commissioned in July 2004, Killa (1.75MW) was commissioned in November 2005 and Sahoke (1MW) was commissioned in October 2006.

The projects were completed with major equipment supplied by the suppliers as under:

**Table 1: Project Details**

S.No.	MHP	Equipment	Qty	Supplier
1	Babanpur	Turbine & its accessories	2	HPP Energy India Private Limited, New Delhi
		Induction Generator	2*500 Kw	
2	Killa	Turbine & its accessories	2	Boving Fouress Limited, Bangalore
		Synchronous Generator	2*875 Kw	
3	Sahoke	Turbine & its accessories	1	Boving Fouress Limited, Bangalore
		Synchronous Generator	1*1000 Kw	

The promoters to the Company provided the entire equity and loan was funded by Indian Renewable Energy Development Agency Limited (IREDA).

The name of the Company has been changed from “Kotla Hydro Power Limited” to “Kotla Hydro Power Private Limited”. The fresh certificate of incorporation and

Host Country approval for the same has been received by the project activity. The records at CDM Registry with respect to the revised modalities of communication signed by all Project Participants have been updated.

During the present monitoring period i.e. 01<sup>st</sup> May 2007 to 30<sup>th</sup> June 2008, all the three (3) Plants exported net energy of 27.20 Million kWh.

## **Statement to What Extent the Project has been Implemented as Planned**

The projects were completed as planned and described in the Project Design Document (PDD).

All the three schemes are in operation continuously (with outages – forced & planned) since commissioning. The project Babanpur started generation on 1<sup>st</sup> July 2004, Killa on 1<sup>st</sup> November 2005 and Sahoke on 31<sup>st</sup> October 2006.

The purpose of the projects is to generate electricity by utilizing water flowing through the existing canal system.

The approved consolidated baseline methodology for the project activity is AMS-I.D, Version 07.

## **Monitoring Period**

This is the third monitoring report associated with the project activity. The first monitoring report covered the period from 26<sup>th</sup> April 2003 to 31<sup>st</sup> March 2006 (Both days included) and the second monitoring report covered the period from 1<sup>st</sup> April 2006 to 30<sup>th</sup> April 2007 (Both days included) and the CERs for the same have already been issued.

The period covered in this monitoring report is from 1<sup>st</sup> May 2007 to 30<sup>th</sup> June 2008 (Both days included). This monitoring report does not cover any period of time covered by the previous monitoring report.

## **Sustainability – Economic and Social Well-being**

The project activity has resulted in sustainable development in the region as follows:

1. Generating clean power by utilizing water has helped in eliminating an equivalent carbon dioxide, sulphur dioxide, nitrogen oxides, SPM *etc.* which would have been otherwise generated to produce electricity.
2. Power generation from a renewable source like water has helped to substitute & conserve considerable amount of finite, non-renewable energy resource (coal & natural gas).
3. Project activity has resulted in creation of direct and in-direct employment in the vicinity.
4. Additional economic benefits have accrued by creation of business opportunity for local stakeholders such as villagers, local shop owners, small contractors, schools, hospitals, etc.
5. Project Area has been lighted with road reflectors and flash lights 24 hours a day which has provided security for the local people commuting in odd hours.
6. Project activity has contributed its share in reducing the demand-supply gap in the power deficit state of Punjab.
7. Helped in Up-gradation of old rural grids and strengthening of country's rural electrification coverage.
8. Helped in strengthening of existing irrigation canals, bridges and roads by up-gradation of these structures.
9. Mechanical Trash racks and trash cleaning machines helped remove trash in the canal resulting in flow of clean water in the canal for irrigation and drinking purposes.
10. Project activity serves a small demonstrative project for clean renewable energy generation in the state. (As these projects are being the first private sector small hydropower projects in the state)
11. Project activity would also contribute to the state exchequer.

## **Obtained Parameters According to Monitoring Plan**

For the project, following parameters were monitored on a continuous basis.

### **Energy:**

- i. The Energy exported (kWh) and Energy imported (kWh) at the interconnection point have been measured from the bidirectional meters (i.e. Trivector Meters) installed at the interconnection points at all 3 (three) project schemes.
- ii. The Net saleable energy has been calculated as a difference between energy exported and energy imported. It is based on monthly joint meter readings.
- iii. Monthly joint meter readings were taken at interconnection point and certified by representatives of Kotla Hydro Power Private Limited (KHPPL) and the purchaser i.e. Punjab State Electricity Board (PSEB).
- iv. The joint meter readings were used to raise invoice for sale of net energy to PSEB.
- v. The energy generated has been measured by the energy meters installed at the generation end on an hourly basis.
- vi. The auxiliary energy consumption has been measured by the auxiliary energy consumption meters installed at the plant on an hourly basis.
- vii. The data of the aforesaid parameters are recorded on hourly basis which are summed into a daily reading.
- viii. The daily readings were aggregated to monthly readings.
- ix. Monthly reports stating the energy exported, energy imported, energy generated and auxiliary energy consumption were prepared by shift-in-charge and verified by plant managers.
- x. The finance department cross checked the data provided by plant managers.
- xi. The above mentioned parameters of the monitoring plan are being tabulated in Table 2 below:

**Table 2: Monitoring Parameters as per Monitoring Plan**

<b>ID number</b>	<b>Data type</b>	<b>Data variable</b>	<b>Data unit</b>	<b>Measured (m), calculated (c) or estimated (e)</b>	<b>Recording Frequency</b>	<b>Proportion of data to be monitored</b>	<b>How will the data be archived? (electronic/ paper)</b>	<b>For how long is archived data to be kept?</b>	<b>Comment</b>
1	Energy	Energy exported	kWh	M	Monthly	Total	Paper	2 years after end of crediting period	This is monitored at interconnection point.
2	Energy	Energy imported	kWh	M	Monthly	Total	Paper	2 years after end of crediting period	This is monitored at interconnection point.
3	Energy	Net saleable energy	kWh	C	Monthly	Total	Paper	2 years after end of crediting period	This is calculated as difference of 1 and 2. It would be based on monthly bills raised by KHPL to PSEB.
4	Energy	Energy generated	kWh	M	Hourly	Total	Paper	2 years after end of crediting period	This is monitored at generation end.
5	Energy	Auxiliary energy consumption	kWh	M	Hourly	Total	Paper	2 years after end of crediting period	This is monitored at the plant.



The month-wise data on energy generated is given in Table 3 below:

**Table 3: Energy Generation (kWh)**

<b>Billing Month</b>	<b>Year</b>	<b>Babanpur</b>	<b>Killa</b>	<b>Sahoke</b>	<b>Total</b>
May	2007	738939	1255625	869520	2864084
Jun	2007	456392	784407	608280	1849079
Jul	2007	637660	1098280	628150	2364090
Aug	2007	764241	1298750	854177	2917168
Sep	2007	699135	1194367	782506	2676008
Oct	2007	664279	1168268	498562	2331109
Nov	2007	522723	923370	573128	2019221
Dec	2007	561674	893170	689200	2144044
Jan	2008	153709	288898	288146	730753
Feb	2008	168047	255150	80174	503371
Mar	2008	778198	1357480	853150	2988828
Apr	2008	288730	505829	321422	1115981
May	2008	700362	1230250	782839	2713451
Jun	2008	221804	386312	271590	879706
<b>Total</b>		<b>7355893</b>	<b>12640156</b>	<b>8100844</b>	<b>28096893</b>

The month-wise data on auxiliary energy consumption is given in Table 4 below:

**Table 4: Auxiliary Energy Consumption (kWh)**

<b>Billing Month</b>	<b>Year</b>	<b>Babanpur</b>	<b>Killa</b>	<b>Sahoke</b>	<b>Total</b>
May	2007	30659	30915	25180	86754
Jun	2007	19192	20077	18320	57589
Jul	2007	27130	28970	21150	77250
Aug	2007	31331	32970	25077	89378

<b>Billing Month</b>	<b>Year</b>	<b>Babanpur</b>	<b>Killa</b>	<b>Sahoke</b>	<b>Total</b>
<b>Sep</b>	2007	28285	29877	23386	81548
<b>Oct</b>	2007	25209	26728	13822	65759
<b>Nov</b>	2007	19593	20770	16748	57111
<b>Dec</b>	2007	21264	21300	20860	63424
<b>Jan</b>	2008	6509	7498	10206	24213
<b>Feb</b>	2008	6237	6230	2314	14781
<b>Mar</b>	2008	28828	32610	22990	84428
<b>Apr</b>	2008	13380	14159	10722	38261
<b>May</b>	2008	27402	32410	22279	82091
<b>Jun</b>	2008	9954	11372	8670	29996
<b>Total</b>		<b>294973</b>	<b>315886</b>	<b>241724</b>	<b>852583</b>

The energy generated data and auxiliary energy consumption data is not used for calculation of emission reductions since energy exported and energy imported data is available for the project activity.

### **Power Generation:**

Month-wise data on Net Saleable Energy for the monitoring period is given in Table 5 below:

As per the Project Design Document, Emission reductions are to be calculated based on the energy exported minus energy imported during shut-down and start-ups by the power plant.

**Table 5: Net Saleable Energy (kWh)**

Billing Month	Year	Energy Exported				Energy Imported				Net Saleable Energy
		Babanpur	Killa	Sahoke	Total	Babanpur	Killa	Sahoke	Total	
May	2007	708280	1224710	844340	2777330	160	70	100	330	2777000
Jun	2007	437200	764330	589960	1791490	1260	1440	880	3580	1787910
Jul	2007	610530	1069310	607000	2286840	130	20	80	230	2286610
Aug	2007	732910	1265780	829100	2827790	120	50	60	230	2827560
Sep	2007	670850	1164490	759120	2594460	220	120	20	360	2594100
Oct	2007	639070	1141540	484740	2265350	60	50	1560	1670	2263680
Nov	2007	503130	902600	556380	1962110	930	1160	1180	3270	1958840
Dec	2007	540410	871870	668340	2080620	390	950	800	2140	2078480
Jan	2008	147200	281400	277940	706540	2970	3950	2460	9380	697160
Feb	2008	161810	248920	77860	488590	3160	4860	3920	11940	476650
Mar	2008	749370	1324870	830160	2904400	60	30	40	130	2904270
Apr	2008	275350	491670	310700	1077720	1070	1280	1720	4070	1073650
May	2008	672960	1197840	760560	2631360	150	150	300	600	2630760
Jun	2008	211850	374940	262920	849710	2810	3770	2180	8760	840950
<b>Total</b>		<b>7060920</b>	<b>12324270</b>	<b>7859120</b>	<b>27244310</b>	<b>13490</b>	<b>17900</b>	<b>15300</b>	<b>46690</b>	<b>27197620</b>

## Emission Reductions

### Baseline Emissions

Sn	Description	Formula	Unit	Value
A	Energy exported		kWh	27244310.00
B	Maximum inaccuracy specification in the meter		%	0.50%
C	Less: Maximum inaccuracy specification in the meter during the month of May, 2007 in MHP Babanpur & MHP Killa only	C=Energy exported of MHP Babanpur & MHP Killa (May, 2007)*0.50%	kWh	9664.95 <sup>#</sup>
D	Less: Maximum inaccuracy specification in the meter during the month of June, 2007 in MHP Killa only	D=Energy exported of MHP Killa (June 2007)*0.50%	kWh	3821.65 <sup>#</sup>
E	Less: Maximum inaccuracy specification in the meter during the month of July, 2007 in MHP Killa only	E=Energy exported of MHP Killa (July 2007)*0.50%	kWh	5346.55 <sup>#</sup>
F	Less: Maximum inaccuracy specification in the meter during the month of April, 2008 only in MHP Babanpur & MHP Killa only	F=Energy exported of MHP Babanpur & MHP Killa (April, 2008)*0.50%	kWh	3835.10 <sup>#</sup>
G	Less: Maximum inaccuracy specification in the meter during the month of May, 2008 only in MHP Babanpur & MHP Killa only	G=Energy exported of MHP Babanpur & MHP Killa (May, 2008)*0.50%	kWh	9354.00 <sup>#</sup>
H	Energy exported based on maximum inaccuracy specification of the meters	H=A-C-D-E-F-G	kWh	27212287.75
I	<b>Energy exported based on maximum inaccuracy specification of the meters - Considered</b>		<b>kWh</b>	<b>27212288.00</b>
J	Energy imported		kWh	46690.00
K	Maximum inaccuracy specification in the meter		%	0.50%

L	Add: Maximum inaccuracy specification in the meter during the month of May, 2007 in MHP Babanpur & MHP Killa only	C=Energy imported of MHP Babanpur & MHP Killa (May, 2007)*0.50%	kWh	1.15 <sup>#</sup>
M	Add: Maximum inaccuracy specification in the meter during the month of June, 2007 in MHP Killa only	M=Energy imported of MHP Killa (June 2007)*0.50%	kWh	7.20 <sup>#</sup>
N	Add: Maximum inaccuracy specification in the meter during the month of July, 2007 in MHP Killa only	N=Energy imported of MHP Killa (July 2007)*0.50%	kWh	0.10 <sup>#</sup>
O	Add: Maximum Inaccuracy specification of the meters during the month of April, 2008 only in MHP Babanpur & MHP Killa	O=Energy imported of MHP Babanpur & MHP Killa (April, 2008)*0.50%	kWh	11.75 <sup>#</sup>
P	Add: Maximum Inaccuracy specification of the meters during the month of May, 2008 only in MHP Babanpur & MHP Killa	P=Energy imported of MHP Babanpur & MHP Killa (May, 2008)*0.50%	kWh	1.50 <sup>#</sup>
Q	Energy imported based on maximum inaccuracy specification of the meters	Q=J+L+M+N+O+P	kWh	46711.70
R	<b>Energy imported based on maximum inaccuracy specification of the meters - Considered</b>		kWh	<b>46712.00</b>
S	<b>Net Saleable Energy</b>	<b>S=I-R</b>	kWh	<b>27165576.00</b>
T	Carbon Emission Factor as per the baseline adopted		kg CO2/kWh	0.942
U	<b>Baseline Emissions</b>	<b>U=(S*T) / 1000</b>	ton CO2	<b>25589.97</b>

**Baseline Emissions : 25589.97**

**Project Emissions : NIL**

**Emission Reductions : Baseline emissions – Project emissions**  
**= 25589.97 - NIL**  
**= 25589 tCO<sub>2</sub>**

# The project proponent has applied a corrective action based on the maximum inaccuracy specification of the meter for energy exported and energy imported for the period May 2007, April 2008 & May 2008 in MHP Babanpur and for the period May 2007, June 2007, July 2007, April 2008 & May 2008 in MHP Killa respectively on account of delay in calibration of the electronic meters (i.e. Trivector Meter) during the aforesaid months. The same is in line with EB guidelines ([http://cdm.unfccc.int/UserManagement/FileStorage/AM\\_CLAR\\_31GVVBIQ27CCHO9J230KKXA2XNAR56](http://cdm.unfccc.int/UserManagement/FileStorage/AM_CLAR_31GVVBIQ27CCHO9J230KKXA2XNAR56)).

## Measures to Ensure the Results/Uncertainty Analysis

As per the Power Purchase Agreement (PPA), the energy exported to Punjab State Electricity Board (PSEB) is recorded from two independent set of meters – Main Meters and Check Meters. Reading of Main Meter is used for arriving at the figures of power exported after deducting auxiliary power.

In the event, the Main Meter is not in operation, then reading from Check Meter installed at the grid substation of PSEB is used for billing. Till date the main meter only has been used for billing purposes.

Energy Generated, auxiliary consumption, energy exported and energy imported are being recorded daily and the same is being verified by Plant Incharge. Since the hourly data logging is carried out along with daily reporting, the uncertainty level of the monitored data used for calculating emission reductions is low. The accuracy of the meters gets further automatically checked at the time of joint meter reading which is being taken every month by PSEB.

The following table indicates the details of Main Meter including their accuracy levels and calibration dates, Energy generation meter and Auxiliary energy consumption meter for all three plants:

**Table 6: Details of Trivector Meter, Generator Panel Meter and Auxiliary Energy Consumption Meter**

Description	Babanpur	Killa	Sahoke
Type	Electronic Bidirectional Trivector Meter	Electronic Bidirectional Trivector Meter	Electronic Bidirectional Trivector Meter
S.No.	5271088	4223074	4223078

Capacity; C.T. Ratio	100/5 A; 100/5 A; M.F – 1	200/5 A; 200/5 A; M.F - 1	100/5 A; 200/5 A; M.F – 1
Accuracy level	(±) 0.50%	(±) 0.50%	(±) 0.50%
Make	L&T	L&T	L&T
Date of Calibration	01/07/2006 26/05/2007 16/10/2007 09/05/2008	18/07/2006 05/07/2007 16/10/2007 09/05/2008	24/02/2007 26/05/2007 16/11/2007 09/05/2008
Calibration Authority	PSEB Meter Mobile Testing Squad (MMTS), Patiala	PSEB Meter Mobile Testing Squad (MMTS), Patiala	PSEB Meter Mobile Testing Squad (MMTS), Patiala
Accuracy Level observed during calibration	(+) 0.14%	(+) 0.07%	(+) 0.06%
Uncertainty level	Low	Low	Low
<b>Energy Generation Meter</b>			
Model	Unit 1&2: 244-InWW	Unit 1: 882-332 Unit 2: TM 7400	882-332
Make	Unit 1&2: Rish Integra 2000	Unit 1: Minsun Unit 2: Elecon Measurement (P) Ltd.	Minsun
Serial No	Unit 1: 04/12/2288 Unit 2 : 04-01-1300A	Unit 1: 6851019 Unit 2 : 23653 TMD 107	68B0511
Accuracy Level	(±) 1.00%	(±) 1.00%	(±) 1.00%



observed during calibration			
Uncertainty level	Low	Low	Low
<b>Auxiliary Energy Consumption Meter</b>			
Model	24-INWW	EM 6400	EM 6400
Make	Rishabh Integra 2000	Enercon	Enercon
Serial No	04/01/1302	57343/1598-3804	54706/977-3004
Accuracy Level observed during calibration	( $\pm$ ) 1.00%	( $\pm$ ) 1.00%	( $\pm$ ) 1.00%
Uncertainty level	Low	Low	Low

No change has taken place in the Main Meter(s) installed at Babanpur, Killa and Sahoke since second verification.

#### **Installation of Meters:**

The Trivector meters have been installed in a temper proof strong steel compartment sealed at every open end. These compartments are again being kept under a completely closed & locked Meter Room made of RCC. The area where the meter room is located is completely fenced and protected by a barbed wire.

#### **Calibration of Meters:**

At the time of installation of the meters, the accuracy and other parameters are checked thoroughly by the manufacturer i.e. L&T and a test report is issued by L&T. The Trivector Meters are also checked for accuracy by PSEB Metering Equipment (ME) Laboratory, Patiala before installation at the site. The Meters which are within the permissible accuracy limits are jointly sealed by 2 officers of the rank of Sr. XEN (One from Sr. Ex. Engr., ME Division, Patiala and second from Sr. Ex. Engr., MMTS, Patiala).

Calibration of the Meters already in operation is carried out at site by PSEB Meter Mobile Testing Squad (MMTS), Patiala. The MMTS officer visits the site and issue a challan in respect to the confirmation of the accuracy of the meters. The date of calibration and signature of officer is indicated on the challan. These challans are laminated by a cellophane material and pasted as a seal on to the Meter Box itself. During the current period under review the Trivector Meters had worked with in the specified accuracy level, though the meter calibration was delayed and same has been verified through subsequent month calibration certificate.

In the event, the officer observes any fault in the meter, then the same is being replaced by the officer and a spare tested meter is installed. The faulty meter is then sent to the PSEB Metering Equipment (ME) Laboratory, Patiala wherein the same is tested and a test report is generated. The meter is again reinstalled by the engineer at the site.

## **Roles and Responsibilities**

KHPPL was the sole agency responsible for implementation and monitoring plan given above.