

SECOND MONITORING REPORT
DATED 11th JANUARY, 2008

FOR THE PERIOD
01ST APRIL 2006 TO 30TH APRIL 2007

“Lohgarh, Chakbhai and Sidhana Mini Hydroelectric Projects”

Aqua Power Limited

Reference No.UNFCCC00000327 - CDMP

Project Location:

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

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Uttar Pradesh, India
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Current Status of the Project

Three Mini Hydroelectric Power projects aggregating to 5.20 MW at Lohgarh, Chakbhai and Sidhana on the Bhatinda Branch canal, District Sangrur, Punjab, India are being set-up. Mini Hydroelectric Project at Lohgarh (2MW) was commissioned in October 2005 , Chakbhai (2MW) was commissioned in November 2004 and Sidhana (1.20MW) was commissioned in October 2007. The plants are operating successfully.

The major equipments have been supplied by reputed contractors as under:

Table 1: Project Details

S.No.	MHP	Equipment	Qty	Supplier
1	Lohgarh	Turbine & its accessories	2	Boving Fouress Limited, Bangalore
		Synchronous Generator	2	
2	Chakbhai	Turbine & its accessories	2	Boving Fouress Limited, Bangalore
		Synchronous Generator	2	
3	Sidhana	Turbine & its accessories	1	Boving Fouress Limited, Bangalore
		Synchronous Generator	1	

The promoters to the Company provided the entire equity and loan was funded by consortium of banks viz. Canara Bank, UTI Bank and Corporation Bank.

During the present monitoring period i.e. 01st April 2006 to 30th April 2007, the two (2) Plants under operation achieved net energy generation of 24.17 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).

The project at Lohgarh (2MW) is in operation continuously (with outages – forced & planned) since October 2005, Chakbhai (2MW) is in operation since November 2004 and Sidhana (1.2MW) is in operation since October 2007.

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



Monitoring Period

This is the second monitoring report associated with the project activity. The previous monitoring report covered the period from 20/11/2004 to 31/3/2006 (Both days included) and the CERs for the same have already been issued.

The period covered in this monitoring report is from 01/04/2006 to 30/04/2007 (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, 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 electronic energy 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 Aqua Power Limited (APL) 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 gross 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 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, gross 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.



The month-wise data on gross energy generated is given in Table 2 below:

Table 2: Gross Energy Generation (kWh)

Billing Month	Year	Chakbhai	Lohgarh	Sidhana	Total
Apr	2006	1076465	861754	0	1938219
May	2006	1194176	1041890	0	2236066
Jun	2006	1461231	1221415	0	2682646
Jul	2006	1449117	1239710	0	2688827
Aug	2006	1551316	1315870	0	2867186
Sep	2006	1145804	971795	0	2117599
Oct	2006	649920	575863	0	1225783
Nov	2006	875871	734879	0	1610750
Dec	2006	664285	562717	0	1227002
Jan	2007	835869	732756	0	1568625
Feb	2007	541574	449182	0	990756
Mar	2007	973616	856374	0	1829990
Apr	2007	990743	865449	0	1856192
Total		13409987	11429654	0	24839641

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

Table 3: Auxiliary Energy Consumption

Billing Month	Year	Chakbhai	Lohgarh	Sidhana	Total
Apr	2006	20305	28754	0	49059
May	2006	23826	31460	0	55286
Jun	2006	28781	35985	0	64766
Jul	2006	28967	36560	0	65527
Aug	2006	30416	37250	0	67666
Sep	2006	23314	29445	0	52759
Oct	2006	12770	17173	0	29943
Nov	2006	17041	23779	0	40820
Dec	2006	14025	21627	0	35652
Jan	2007	17909	26346	0	44255
Feb	2007	10934	15502	0	26436
Mar	2007	19866	28684	0	48550
Apr	2007	22013	30249	0	52262
Total		270167	362814	0	632981



The gross energy generation 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 Energy Exported for the monitoring period is given in Table 4 below:

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

During the period covered under this monitoring report, the accuracy check for energy meters installed at two sites (MHP Lohgarh & MHP Chakbhai) was not performed in the manner defined in the registered PDD. Therefore, as per the EB guidance, http://cdm.unfccc.int/UserManagement/FileStorage/AM_CLAR_J359UPI4G71PM1QMIV_S81FHIEJKYFE, the energy exported to the grid has been reduced by applying a deduction based on maximum inaccuracy specification of the meters i.e. 0.5% and energy imported from the grid has been enhanced by applying a same factor based on the maximum inaccuracy specification of the meters i.e. 0.5%.

The Carbon emission reductions are zero at Sidhana for the monitoring period as the plant had not been commissioned due to un-availability of Canal Closure for completing the In-canal works and additional time-period required for the strengthening / raising of canal banks and remodeling of one village road bridge and one foot road bridge. The plant has now been commissioned on 25th October 2007.



Emission Reductions

Baseline Emissions:

Sn	Description	Formula	Unit	Value
A	Energy exported to the Grid		kWh	24206660.00
B	Maximum Inaccuracy specification of the meters		%	0.50%
C	Less: Maximum Inaccuracy specification of the meters	$C=A*B$	kWh	121033.30
D	Energy exported based on maximum inaccuracy specification of the meters	$D=A-C$	kWh	24085626.70
E	Energy exported based on maximum inaccuracy specification of the meters - Considered		kWh	24085626.00
F	Energy imported from the Grid		kWh	32110.00
G	Maximum Inaccuracy specification of the meters		%	0.50%
H	Add: Maximum Inaccuracy specification of the meters	$H=F*G$	kWh	160.55
I	Energy imported based on maximum inaccuracy specification of the meters	$I=F+H$	kWh	32270.55
J	Energy imported based on maximum inaccuracy specification of the meters - Considered		kWh	32270.00
K	Net Energy Exported based on maximum inaccuracy specification of the meters	$K=E-J$	kWh	24053356.00
L	Carbon Emission Factor as per the baseline adopted		kg CO ₂ /kWh	0.942
M	Baseline Emissions	$M=(K*L) / 1000$	ton CO ₂	22658.26

Baseline Emissions : 22658.26

Project Emissions : NIL

Emission Reductions : Baseline emissions – Project emissions
= 22658.26- NIL
= 22658 tCO₂



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.

Gross power generation, auxiliary consumption, energy exported and energy imported are being recorded daily and the same is being verified by Plant In charge. 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, Gross energy generation meter and Auxiliary energy meter for all three plants:

Table 5: Details of Trivector Meter, Generator Panel Meter and Auxiliary Meter

Description	Lohgarh	Chakbhai	Sidhana
Trivector Meter			
Type	Electronic Bidirectional Trivector Meter	Electronic Bidirectional Trivector Meter	Electronic Bidirectional Trivector Meter
S.No.	4223075	4187462	4223080
Capacity; C.T. Ratio	200/5 A; 200/5 A M.F. - 1	200/5 A; 200/5 A M.F. - 1	125/5 A; 200/5 A M.F. – 1.6



Accuracy level	(±) 0.50%	(±) 0.50%	(±) 0.50%
Make	L&T	L&T	L&T
Date of Calibration	01/06/2007	24/02/2007	
Calibration Authority	PSEB Meter Mobile Testing Squad (MMTS), Ludhiana	PSEB Meter Mobile Testing Squad (MMTS), Patiala	Not Applicable; The plant was under construction during the current monitoring period.
Accuracy Level observed during calibration	(±) 0.13%	(+) 0.05%	
Gross Energy Generation Meter			
Model	882-332	882-332	EM 6400
Make	Minsun	Minsun	Enercon
Serial No	Unit 1: 6851013 Unit 2 : 68B0512	Unit 1: 6851001 Unit 2 : 6790517	66927/3665-0605
Accuracy Level observed during calibration	(±) 1.00%	(±) 1.00%	(±) 1.00%
Auxiliary Energy Meter			
Model	EM 6400	EM 6400	EM 6400
Make	Enercon	Enercon	Enercon
Serial No	56248/1285-3404	E 64/1640-903	66927/3667-0605
Accuracy Level observed during calibration	(±) 1.00%	(±) 1.00%	(±) 1.00%

No change has taken place in the Main Meter(s) installed at Lohgarh and Chakbhai since the initial 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 Trivector Meters already in operation is carried out at site by PSEB Meter Mobile Testing Squad (MMTS), Punjab. 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.

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

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

