

MONITORING REPORT

“Dolowal, Salar and Bhanubhura Mini Hydroelectric Projects”

Punjab Hydro Power Limited

Reference No.UNFCCC00000328 - CDMP

Project Site:

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

M/s Punjab Hydro Power Limited

B-37, Sector-1

Noida – 201301

Uttar Pradesh, India

Fax No. 91-0120-2443723

Current Status of the Project

There Mini Hydroelectric Power projects aggregating to 4.2 MW at Dolowal, Salar and Bhanubhura on the Kotla Branch canal, District Sangrur, Punjab, India were commissioned in April 2003 and are operating successfully. The projects were completed with the contract for supply and commissioning for all equipment given to reputed contractors as under:

S.No.	MHP	Equipment	Qty	Supplier
1	Dolowal	Turbine & its accessories	2	Triveni Engineers & Industries Ltd., New Delhi
		Induction Generator	2	
2	Salar	Turbine & its accessories	2	Triveni Engineers & Industries Ltd., New Delhi
		Induction Generator	2	
3	Bhanubhura	Turbine & its accessories	2	Boving Fouress Limited, Bangalore
		Induction Generator	2	

The Company provided the entire equity and loan was taken from Indian Renewable Energy Development Agency Limited (IREDA).

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 26 April 2003. The purpose of the projects is to generate electricity by utilizing water flowing through the existing canal system.

Monitoring Period

The monitoring period is from 26.04.2003 to 31.03.2006 (Both days included)

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 would help 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, school, 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 helped in reducing the demand-supply gap in the power deficit state grid.
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 u-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. Electronic energy meters were installed for measuring the gross power generation (export) as well as auxiliary power consumption (import) at the grid interconnection point for all 3 schemes.
- ii. Hourly data recording of the relevant parameters and also the recording of total energy generated for every 8 (eight) hours shift.
- iii. Daily readings were aggregated to monthly readings.
- iv. Monthly reports stating the gross auxiliary and net energy exported were prepared by shift-in-charge and verified by plant managers.
- v. Monthly joint meter readings are taken at interconnection point and certified by representatives of PHPL and the purchaser i.e. Punjab State Electricity Board (PSEB).
- vi. The joint meter readings are used to raise invoice for sale of net energy to PSEB.
- vii. The finance department cross checks the data provided by plant managers.

Month-wise data on net energy exported is given below:

S. No.	Month	Year	Net Power Exported (kwh)			
			Dolowal	Salar	Bhanu-bhura	Total
1	26 April *	2003	81850	81600	49850	213300
2	May	2003	749500	799000	613400	2161900
3	June	2003	753600	778000	653600	2185200
4	July	2003	651700	658000	600500	1910200
5	August	2003	658500	689800	656100	2004400
6	September	2003	778800	781800	736400	2297000

7	October	2003	665300	686870	647200	1999370
8	November	2003	724000	736200	685400	2145600
9	December	2003	735400	749090	709100	2193590
10	January	2004	683720	718500	684100	2086320
11	February	2004	705830	717920	668100	2091850
12	March	2004	796780	821610	721600	2339990
13	April	2004	545180	568080	534300	1647560
14	May	2004	673800	695190	643600	2012590
15	June	2004	316560	317780	315130	949470
16	July	2004	426880	462350	438580	1327810
17	August	2004	451260	476540	476730	1404530
18	September	2004	280870	284920	276650	842440
19	October	2004	327320	337480	336550	1001350
20	November	2004	523690	511760	532260	1567710
21	December	2004	314940	334540	321300	970780
22	January	2005	233290	243180	253500	729970
23	February	2005	136870	155540	157190	449600
24	March	2005	449120	452310	424620	1326050
25	April	2005	486540	500410	478200	1465150
26	May	2005	531460	526760	503030	1561250
27	June	2005	589740	601460	478780	1669980
28	July	2005	489520	504430	469910	1463860
29	August	2005	794290	811450	776980	2382720
30	September	2005	453640	468930	467900	1390470
31	October	2005	367080	385120	369010	1121210
32	November	2005	670480	697940	740790	2109210
33	December	2005	523880	536000	557470	1617350
34	January	2006	662490	658150	702080	2022720
35	February	2006	763740	772030	746960	2282730
36	March	2006	328220	334810	329940	992970
	TOTAL		19325840	19855550	18756810	57938200

- * The generation for the period starting from 26th April 2003 to 30th April 2003 is being considered / confirmed by two alternate methods as under:

Method 1:

The sale proceeds from the aggregate energy generated during construction period i.e. from January 2003 till 25th April 2003 for all the three projects as indicated in the “Schedule E: Expenditure During Construction Period” of the audited balance sheet for the Financial year 2003-2004 is deducted from the sale proceeds of the total energy generated from all three plants for the whole month of January 2003, February 2003, March 2003 and April 2003 as per the invoices raised against PSEB.

The ‘net value’ after deduction provides the sale value of the energy generated during the period – 26th April 2003 to 30th April 2003.

To arrive at the net generation for the period 26th April 2003 to 30th April 2003, the ‘net value’ is divided by the power tariff applicable for that period as per the Power Purchase Agreements signed with PSEB.

Method 2:

The energy generated for the period of 1st April 2003 till 25th April 2003 as per the Daily Generation Report of the plants is reduced from the net energy generated for the whole month of April 2003 as per the joint meter reading for that month taken by PSEB and PHPL jointly. This would provide the energy generated during the period starting from 26th April 2003 to 30th April 2003.

A conservative approach has been taken while considering the energy for the period from 26th April 2003 to 30th April 2003 by taking into account the lowest of Method 1 and 2.

Emission Reductions

Baseline Emissions:

Carbon Emission Factor as per the baseline adopted (kg CO₂/kWh) – 0.942

Net energy exported (kWh) – 57938200

Baseline emissions (ton CO₂) – 54577

Project Emissions: NIL

Emission Reductions:

Baseline emissions – Project emissions

= 54577 - NIL

= 54577

Measures to Ensure the Results/Uncertainty Analysis

The energy exported by each project of Punjab Hydro Power Limited (PHPL) was recorded from one independent main meter installed at the switchyard area of the respective project. Energy export and import given by main meter was used for arriving at the figures of net power exported.

In the event, the main meter is not in operation, then reading from a check meter installed at the grid substation of PSEB is used for raising the energy invoice. Till date the main meter only has been used for billing purposes.

The uncertainty level of the net energy exported by project activity is low. In the event, the main meter is not in operation, the project activity has provision of taking the reading from a check meter installed at the grid substation of PSEB, which would be further used for raising the energy invoice. However, till date the main meter only has been used for billing purposes.

The accuracy level of both the main and the check meter is high. The meters are electronic bidirectional trivector meters of accuracy class 0.5 with maximum uncertainty of $\pm 0.5\%$. These 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.

At the time of installation of the meters, the accuracy and other parameters were checked thoroughly by the manufacturer i.e. L&T and a test report i issued by L&T.

The accuracy of the meters gets automatically checked at the time of joint meter reading which is being taken every month by PSEB. Further, the meters are

being calibrated once in every six months by PSEB. PSEB officials visit the site and issue a challan in respect to the confirmation of the accuracy of the meters. The date of calibration and signature of PSEB official 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, PSEB official observes any fault in the meter, then the same is being replaced by the official and a spare tested meter is installed. The faulty meter is then sent to the Metering Equipment (ME) Laboratory, PSEB, Patiala wherein the same is tested and a test report is generated. The meter is again re-installed by the official at the site.

Roles and Responsibilities

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