



Verification Report for

Project : 6 MW Small Scale Baner II Hydro Electric Project by
Prodigy Hydro Power Pvt. Ltd.

UCR Project ID : 181

Name of Verifier	SQAC Certification Pvt. Ltd.
Date of Issue	August 01, 2022
Project Proponent	M/s Prodigy Hydro Power Pvt. Ltd.
UCR Project Aggregator	Aajeeth Innovation LLP
Work carried by	Mr. Santosh Nair
Work reviewed by	Mr. Praful Shinganapurkar

Summary:

SQAC Certification Pvt. Ltd. has performed verification of the “6 MW Small Scale Baner II Hydro Electric Project by Prodigy Hydro Power Pvt. Ltd., Himachal Pradesh. The project activity is installation and operation of two Horizontal Francis Turbine having individual capacity 3000 kW (2 x 3.0 MW) with aggregated installed capacity of 6.0 MW in District Kangra, Himachal Pradesh state of India. This project activity is also called as Baner-II 2x3 MW SHEP or Baner-II 2x3 MW Small Hydro Electric Project. The purpose of this plant installation and power generation is for grid supply.

Verification for the period : **27/06/2015 to 31/12/2021**

The GHG emission reductions were calculated on the basis of UCR Protocols which draws reference from, UCR Protocol Standard Baseline, Type I (Renewable Energy Projects) UNFCCC Methodology Category AMS I.D.: “Grid connected renewable electricity generation” Ver 18. Owing to the Covid pandemic, the verification was done remotely by way of video calls / verification, phone calls and submission of documents for verification through emails.

SQAC is able to certify that the emission reductions from the 6 MW Small Scale Baner II Hydro Electric Project by Prodigy Hydro Power Pvt. Ltd., (UCR ID – 181) for the period **27/06/2015 to 31/12/2021** amounts to **98,084 CoUs** (98,084tCO₂eq)

Accredited by 5 Jupiter House, Callera Park, Aldermaston, Reading Berkshire RG7 8NN, United Kingdom (UK).

India Office: Off. No. 4, Fifth Floor, Buildmore Business Park, New Canca Bypass Road, Khorlim, Mapusa, Goa – 403 507

Web: www.sqac.in

Email: info@sqac.in Tel: 7219716786 / 87



Detailed Verification Report:

Purpose:

The project activity aims to harness kinetic energy of water (renewable source) to generate electricity. The net generated electricity from the project activity is sold to state electricity board i.e., Himachal Pradesh State Electricity Board (HPSEB) under the Power Purchase Agreement (PPA) signed between the Project Proponent (PP) and the utility. In pre-project scenario the PP was importing the required electricity from the state utility i.e., HPSEB (is a part of regional grid, earlier known as NEWNE grid) to meet its captive requirement of electrical energy. Currently, NEWNE grid is connected to large numbers of fossil fuel-based power plants. Hence, project activity is displacing the gross electricity generation i.e., 17,161 MWh from the NEWNE grid, which otherwise would have been imported from the NEWNE grid. This project activity is also called as Baner-II 2x3 MW SHEP or Baner-II 2x3 MW Small Hydro Electric Project. The project activity doesn't involve any GHG emission sources.

The location of project activity is as per the details listed below:

Country	: India
Village	: Jia
District	: Kangra
State	: Himachal Pradesh
Latitude	: 32° 09' 33" N
Longitude	: 76° 26' 55"
Commissioning date	: 27/06/2015

Scope:

The scope covers verification of emission reductions from the project - 6 MW Small Scale Baner II Hydro Electric Project by Prodigy Hydro Power Pvt. Ltd., (UCR ID – 181)

Criteria:

Verification criteria is as per the requirements of UCR Standard.

Description of project:

The project activity titled, 6 MW Small Scale Baner II Hydro Electric Project by Prodigy Hydro Power Pvt. Ltd., is located in Village: Jia, District: Kangra, State: Himachal Pradesh, Country: India.

This small Hydroelectric Project is a run-of-river project on Baner Khad stream in district Kangra, Himachal Pradesh. The project has a generation capacity of 6.0 MW of power by utilizing the available head. The project activity harnesses kinetic energy of water (renewable source) to generate electricity. The project comprises a Trench weir which diverts the water into an intake placed on the bank of the river. The diverted water passes through Desilting basin. Desilted water enters into water conductor system, forebay and the steel pressure shaft. A surface powerhouse is suitably located on a terrace at left bank of the river. Tail

water from the powerhouse is discharged back into the khad. The project activity has been commissioned for commercial operation as on 27/06/2015.

The project activity involves 2 numbers hydro turbine generators of Francis Horizontal axis type (3000 kW each) with internal electrical lines connecting the project activity with local evacuation facility. The generators generate power at 3.3 kV, which can further be stepped up to 33 kV. The project activity can operate in the frequency of 50 Hz and the voltage of 3.3 kV. The average life time of the generator is around 35 years as per the equipment supplier specification. The other salient features of the technology are:





Salient Features of Baner-II (6 MW)

LOCATION	
District	Kangra
Name of River	Baner Khad
HYDROLOGY	
Catchment area at diversion site (km ²)	42
Design Discharge (m ³ /s)	5.54
DIVERSION STRUCTURE	
Type	Trench Weir
FSL (masl)	1342
HFL (masl)	1343.75
Average Bed level (masl)	1342
FEEDER CHANNEL	
Type	Trapezoidal
Size (m)	1.00 (bottom) x 3.00 (top) x 3.00 (height)
Length (m)	19
FOREBAY TANK	
Type	RCC Rectangular Tank
Size (m)	165 (L) x 35 (W) x 7 (D)
Storage Capacity (cum)	28800
Top Level of structure (m)	1343.5
MDDL (m)	1337.6
Penstock Entry Level (m)	1335.3
PENSTOCK	
Type	Surface Circular Steel
Number	One (Main), Two (Branches)
Diameter (m)	1.6 (Main), 0.90 (Each Branch)
Length (m)	1980 (Main), 50 (Each Branch)
POWERHOUSE	
Type	Surface
Installed Capacity (MW)	6
Rated Net Head (m)	130
Tail water level (masl)	1387
TURBINE	
Type	Horizontal axis Francis
Numbers	Two
Rated Output	3.0 MW each
Year of Commissioning/ Completion	
Commercial Operation Date (COD)	27-06-2015

The total GHG emission reductions achieved in this monitoring period is as follows:

Summary of the Project Activity and ERs Generated for the Monitoring Period	
Start date of this Monitoring Period	27/06/2015
Carbon credits claimed up to	31/12/2021
Total ERs generated in this crediting period (tCO _{2eq})	98,084 tCO _{2eq}
Leakage	0

The baseline scenario identified is:

- the electricity delivered to the grid by the project activity that would have otherwise been generated by the operation of fossil fuel-based grid-connected power plant and fed into NEWNE grid, which is carbon intensive due to use of fossil fuels.

NEWNE – North East West and North-East Grid, is now a part of unified Indian Grid system

Level of Assurance:

The verification report is based on the information collected through interviews conducted over video calls / phone calls, supporting documents provided during the verification, Project Concept Note (PCN) / Monitoring Report (MR), submitted to SQAC. The verification opinion is assured provided the credibility of all the above.

Verification Methodology:

Review of the following documentation was done by SQAC Verifier, Mr. Santosh Nair, who is experienced in such projects.

- Project Concept Note (PCN)
- Monitoring Report (MR)
- Commissioning Report
- Calibration report
- Data provided upon request of all the documents of the related projects

Sampling:

Not applicable.

Persons interviewed:

- | | |
|-------------------------|--|
| 1. Mr. Anish Sharma | : M/s. Prodigy Hydro Power Pvt. Ltd. |
| 2. Mr. Aajeeth Kumar | : M/s. Aajeeth Innovation LLP. |
| 3. Ms. Rangamani | : M/s. Engineered Power Resources India Pvt Ltd. |
| 4. Mr. Narayanaswamy MK | : M/s. Engineered Power Resources India Pvt Ltd. |
| 5. Mr. Rakesh Badgal | : M/s. Prodigy Hydro Power Pvt. Ltd. |

Documentation Verified:

- Project Concept Note (PCN)
- Monitoring Report (MR)
- Calibration Reports
- Joint Meter Reading (JMR)
- Energy Bills
- Breakdown Reports
- Commissioning Certificates

Applied methodologies and standardized baselines :

UCR Protocol Standard Baseline

AMS.I.D – Grid connected renewable electricity generation (Version 18.0)

Application of methodologies and standardized baselines**References to methodologies and standardized baselines**

SECTORAL SCOPE – 01 Energy industries (Renewable/Non-renewable sources)

TYPE I – Renewable Energy Projects

CATEGORY – AMS. I.D. – Grid connected renewable electricity generation (Version 18.0)

Applicability of methodologies and standardized baselines

This methodology comprises of activities that include the construction and operation of a power plant that uses renewable energy sources and supplies electricity to the grid (Greenfield power plant).

This project is included within the UCR Standard Positive List of technologies and are within the small-scale CDM thresholds (e.g., installed capacity up to 15 MW). The positive list comprises of: (a) The grid-connected renewable electricity generation technologies of installed capacity up to 15 MW

Project activity involves power generation with capacity 6 MW which is less than 15MW. The option (a) of applicability criteria 2 is applicable as project is a Greenfield plant /unit. Hence the project activity meets the given applicability criterion.

The option (a) of applicability criteria 2 is applicable as project is a Greenfield plant /unit. Hence the project activity meets the given applicability criterion of the UNFCCC CDM Methodology.
--

The project activity is run of river type of project activity.
The project activity is a new installation, it does not involve any retrofit measures nor any replacement.
The project activity is not a combined heat and power (co-generation) system.
No biomass is involved, the project is only a run of river Hydro Electric Project.
The project activity is a voluntary coordinated action. The project activity is a greenfield 6 MW Hydro Electric Project, i.e., no capacity addition was done to any existing power plant.
The project activity is not a landfill gas, waste gas, wastewater treatment and agro-industries project, and does not recover methane emissions and is not eligible under any relevant Type III category.
The project activity comprises of a renewable energy generation through run of river hydro electric power and displaces fossil fuel powered electricity from the regional grid by supplying renewable power to the grid itself. Hence this UNFCCC CDM Methodology is applicable and fulfilled.
The project activity involves installation of new power plants at listed sites where there was no renewable energy power plant operating prior to implementation of project.

Applicability of double counting emission reductions

The project is not registered with any other voluntary market (National or International). Agreement for Double Counting Avoidance from Proponent has been provided duly signed on 30.07.2022

Project boundary, sources and greenhouse gases (GHGs)

The project boundary encompasses the physical, geographical site of the wind energy power plant, the energy metering equipment and the connected regional electricity grid.

	Source	GHG	Included?	Justification/Explanation
Baseline	Grid connected electricity	CO2	Included	Major source of emission
		CH4	Excluded	Excluded for simplification. This is conservative.
		N2O	Excluded	Excluded for simplification. This is conservative.
Project Activity	Greenfield Power Project	CO2	Excluded	Excluded for simplification. This is conservative.
		CH4	Excluded	Excluded for simplification. This is conservative.
		N2O	Excluded	Excluded for simplification. This is conservative.

Net GHG Emission Reductions and Removals

Thus, $ER_y = BE_y - PE_y - LE_y$

Where:

ER_y = Emission reductions in year y (tCO₂/y)

BE_y = Baseline Emissions in year y (t CO₂/y)

PE_y = Project emissions in year y (tCO₂/y)

LE_y = Leakage emissions in year y (tCO₂/y)

Establishment and description of baseline scenario (UCR Protocol)

Baseline emissions include only CO₂ emissions from electricity generation in power plants that are displaced due to the project activity. The methodology assumes that all project electricity generation above baseline levels would have been generated by existing grid-connected power plants and the addition of new grid- connected power plants.

Total Capacity: 6 MW

Annual Emission Reductions: $BE_y = EG_{BL,y} \times EF_{CO_2grid,y}$

Where:

BE_y = Baseline emissions in year y (t CO₂)

$EG_{BL,y}$ = Quantity of net electricity supplied to the grid as a result of the implementation of the UCR project activity in year y (MWh)

$EF_{CO_2grid,y}$ = CO₂ emission factor of the grid in year y (t CO₂/MWh) as determined by the UCR Standard

A "grid emission factor" refers to a CO₂ emission factor (tCO₂/MWh) which will be associated with each unit of electricity provided by an electricity system. The UCR recommends an emission factor of 0.9 tCO₂/MWh for the 2015-2020 years as a fairly conservative estimate for Indian projects not previously verified under any GHG program. Also, for the vintage 2021, the combined margin emission factor calculated from CEA database in India results into same emission factors as that of the default value. Hence, the same emission factor has been considered to calculate the emission reduction.

Issuance Period: 06 years, 06 months – 27/06/2015 to 31/12/2021

$(BE_y) = 108986.2 \text{ MWh} \times 0.9 \text{ tCO}_2/\text{MWh} = 98,084 \text{ tCO}_2\text{e}$ (i.e., 98,084 CoUs) after rounding off

Total baseline emission reductions (BE_y) = 98,084 CoUs (98,084 tCO₂eq)

Annual baseline emission reductions (BE_y)

Month	Total Plant Generation (in MU)						
	2015	2016	2017	2018	2019	2020	2021
January	0	0.1071	0.194	0.212	0.454	0.6675	0.3251
February	0	0.1998	0.593	0.308	1.562	0.7644	0.2068
March	0	1.0657	0.489	0.477	1.661	2.1417	0.0886
April	0	0.72	1.11	0.686	2.0261	2.5656	0.8016
May	0	0.894	1.221	0.765	1.3712	2.5123	1.0088
June	0.1965	0.79	2.259	1.062	1.325	2.4383	1.5126
July	3.3791	2.788	3.723	2.862	1.7691	2.9421	2.4367
August	3.5488	3.915	3.296	2.915	2.6094	3.4831	2.2217
September	2.6257	2.023	2.733	2.307	2.1289	2.3827	2.2062
October	1.3511	0.725	1.336	1.984	1.0512	1.0145	1.3146
November	0.4476	0.127	0.318	0.721	0.5357	0.2443	0.4772
December	0.2651	0.0677	0.382	0.374	0.6679	0.3079	0.1972

Total (in MU)	11.8139	13.4223	17.654	14.673	17.1615	21.4644	12.7971
MW/yr	11813.9	13422.3	17654	14673	17161.5	21464.4	12797.1
ER/yr	10632.51	12080.07	15888.6	13205.7	15445.35	19317.96	11517.39
ER/yr (rounddown)	10632	12080	15888	13205	15445	19317	11517
Total	98,084						

Year	Emission Reductions (tCO _{2eq})
2015	10,632
2016	12,080
2017	15,888
2018	13,205
2019	15,445
2020	19,317
2021	11,517
Total	98,084

$$ER_y = BE_y - PE_y - LE_y = 98,084 - 0 - 0$$

Total Emission Reductions (ER_y) = 98,084 CoUs (98,084 tCO_{2eq})

Conclusion:

Based on the audit conducted on the basis of UCR Protocol, which draws reference from UCR Protocol Standard Baseline, AMS.I.D – Grid connected renewable electricity generation (Version 18.0), the documents submitted during the verification including the Data, Project Concept Note (PCN) / Monitoring Report (MR), SQAC is able to certify that the emission reductions from the project - 6 MW Small Scale Baner II Hydro Electric Project by Prodigy Hydro Power Pvt. Ltd. (UCR ID – 181) for the period **27/06/2015 to 31/12/2021** amounts **98,084 CoUs (98,084 tCO_{2eq})**