



Monitoring Report

CARBON OFFSET UNIT (CoU) PROJECT



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

UCR PROJECT ID #181
Version 1.0

Date of MR: 02/07/2022

First CoU Issuance Period: 6 years, 6 months
Monitoring Period: 27/06/2015 to 31/12/2021 (both days inclusive)



Monitoring Report (MR) CARBON OFFSET UNIT (CoU) PROJECT

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Title of the project activity	6 MW Small Scale Baner II Hydro Electric Project by Prodigy Hydro Power Pvt. Ltd
UCR Project Registration Number	181
Version	Version 1
Completion date of the MR	02/07/2022
Monitoring period number and duration of this monitoring period	Monitoring Period Number: 1 Duration of this monitoring Period: (first and last days included (27/06/2015 to 31/12/2021))
Project participants	Prodigy Hydro Power Pvt. Ltd (Project Proponent) Aajeeth Innovation LLP (Aggregator)
Host Party	India
Applied methodologies and standardized baselines	Type I (Renewable Energy Projects) UNFCCC Methodology Category AMS I.D.: “Grid connected renewable electricity generation” Ver 18 UCR Protocol Standard Baseline
Sectoral scopes	01 Energy industries (Renewable/NonRenewable Sources)
Estimated amount of GHG emission reductions for this monitoring period	2015: 10632 CoUs (10632 tCO _{2eq})
	2016: 12080 CoUs (12080 tCO _{2eq})
	2017: 15888 CoUs (15888 tCO _{2eq})
	2018: 13205 CoUs (13205 tCO _{2eq})
	2019: 15445 CoUs (15445 tCO _{2eq})
	2020: 19317 CoUs (19317 tCO _{2eq})
	2021: 11517 CoUs (11517 tCO _{2eq})
Total:	98084 CoUs (98084 tCO_{2eq})

SECTION A. Description of project activity

A.1. Purpose and general description of project activity >>

a) Purpose of the project activity and the measures taken for GHG emission reductions >>

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. The project activity is a (2 x 3.0 MW) is a grid connected Hydro Electric Power project which is an operational activity with continuous reduction of GHG, currently being applied under “Universal Carbon Registry” (UCR).

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 annual and the total CO₂e emission reduction by the project activity over the defined monitoring period is as per **Section B.5**.

b) Brief description of the installed technology and equipment>>



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:





c) Relevant dates for the project activity (e.g. construction, commissioning, continued operation periods, etc.)>>

Commissioning Date: 27/06/2015

First CoU Issuance Period: 27/06/2015 to 31/12/2021

Monitoring Period: 27/06/2015 to 31/12/2021

Crediting Period: 6 years 6 months

d) Total GHG emission reductions achieved or net anthropogenic GHG removals by sinks achieved in this monitoring period>>

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 (tCO _{2eq})	98084 tCO _{2eq}
Leakage	0

e) Baseline Scenario>>

The baseline scenario identified at the PCN stage of the project activity 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.

A.2. Location of project activity>>

Country : India

Village: Jia

District: Kangra

State : Himachal Pradesh

Latitude: 32° 09' 33" N

Longitude: 76° 26' 55" E



A.3. Parties and project participants >>

Party (Host)	Participants
India	Project Proponent: Prodigy Hydro Power Private Limited, Bangalore (a sister concern of Engineered Power Resources India (P) Limited) Aggregator: Aajeeth Innovation LLP

A.4. References to methodologies and standardized baselines >>

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

TYPE I - Renewable Energy Projects

CATEGORY- AMS-1.D. - “*Grid connected renewable electricity generation*”, *Version 18.0*

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).

A.5. Crediting period of project activity >>

Crediting Period: 6 years 6 months

A.6. Contact information of responsible persons/entities >>

Aajeeth Innovation LLP,
UCR ID# 356526225,
Email: aajeeth@freezingsun.in

SECTION B. Implementation of project activity

B.1. Description of implemented registered project activity >>

a) Provide information on the implementation status of the project activity during this monitoring period in accordance with UCR PCN>>

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.

b) For the description of the installed technology(ies), technical process and equipment, include diagrams, where appropriate>>



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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 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:

A.2 Do no harm or Impact test of the project activity>>

There was no harm identified from the project and hence no mitigations measures are applicable.

Rational: as per 'Central Pollution Control Board (Ministry of Environment & Forests, Govt. of India)', final document on revised classification of Industrial Sectors under Red, Orange, Green and White Categories (07/03/2016), it has been declared that hydro project activity falls under the "White category". White Category projects/industries do not require any Environmental Clearance such as 'Consent to Operate' from PCB as such project does not lead to any negative environmental impacts. Additionally, as per Indian Regulation, Environmental and Social Impact Assessment is not required for Hydro Projects.

Nevertheless, PP had conveyed about project activity before implementation at respective village of Kangra district of Himachal Pradesh, India to understand, discuss, record all possible concerns related to environment and socio-economic aspects of the project so that as per requirements mitigation measures can be taken. The feedback and inputs received from local stakeholders confirm that no negative impact and all issues were resolved by them.

A.6. Baseline Emissions>>

The baseline scenario identified at the MR stage of the project activity 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.

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.

A.7. Debundling>>

This project activity is not a debundled component of a larger carbon or GHG registered project activity.

SECTION B. Application of methodologies and standardized baselines

B.1. 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

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).

B.2. Applicability of methodologies and standardized baselines >>

This project is included within the UCR Standard Positive List of technologies and is 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.

B.3. Applicability of double counting emission reductions >>

There is no double accounting of emission reductions in the project activity due to the following reasons:

1. • Project is uniquely identifiable based on its location coordinates,
2. • Project has dedicated commissioning certificate and connection point,
3. • Project is associated with energy meters which are dedicated to the consumption point for project developer

B.4. Project boundary, sources and greenhouse gases (GHGs)>>

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

	Source	GHG	Included?	Justification/Explanation
Baseline	Grid-connected electricity	CO ₂	Included	Major source of emission
		CH ₄	Excluded	Excluded for simplification. This is conservative
		N ₂ O	Excluded	Excluded for simplification. This is conservative
Project Activity	Greenfield power project	CO ₂	Excluded	Excluded for simplification. This is conservative
		CH ₄	Excluded	Excluded for simplification. This is conservative
		N ₂ O	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) s.

B.5. 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

Estimated Annual Emission Reductions: $BE_y = EG_{BL,y} \times EF_{CO_2, GRID, y}$

BE_y = Emission reductions in a year y.

where:

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

$EF_{Grid, CO_2, y}$ = 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.

Month	Total Plant Generation (in MU or million kwh) 2015	Total Plant Generation (in MU or million kwh) 2016	Total Plant Generation (in MU or million kwh) 2017	Total Plant Generation (in MU or million kwh) 2018	Total Plant Generation (in MU or million kwh) 2019	Total Plant Generation (in MU or million kwh) 2020	Total Plant Generation (in MU or million kwh) 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	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	98084						

B.6. Prior History>>

The project activity has not been registered or applied for voluntary carbon benefits under any other GHG program and hence there is no double counting issue of CoUs. The project has applied for renewable energy certificates (RECs) and has been issued the same in the past, however, RECs are not classified as voluntary carbon units and are distinct from CoUs. Hence there is no issue of doublecounting the carbon incentive approach.

B.7. Monitoring period number and duration>>

First CoU Issuance Period: 27/06/2015 to 31/12/2021

B.7. Changes to start date of crediting period >>

There is no change in the start date of crediting period between PCN and MR.

B.8. Permanent changes from PCN monitoring plan, applied methodology or applied standardized baseline >>

There are no permanent changes from registered PCN monitoring plan and applied methodology

B.8. Monitoring plan>>

The project activity essentially involves generation of electricity from water, the employed Hydro Power Plant can only convert Hydro energy into electrical energy and cannot use any other input fuel for electricity generation, thus no special ways and means are required to monitor leakage from the project activity. The recording of the electricity fed to the state utility grid is carried out jointly at the incoming feeder of the state power utility (HPSEB).

To ensure that the data is reliable and transparent, the PP has established Quality Assurance and Quality Control (QA&QC) measures to effectively control and manage data reading, recording, auditing as well as archiving data and all relevant documents. The data is monitored on a daily basis and is submitted to PP on a daily basis.

PP has implemented QA&QC measures to calibrate and ensure the accuracy of metering and safety aspects of the project operation. The metering devices are calibrated and inspected properly and periodically, according to state electricity board's specifications and requirements to ensure accuracy in the readings.

Meter	Description
Main Meter #1	KA905504 GT RATIO: 150/1A P.T. Ratio: 33KV/v3/110V/3
Main Meter #1	KA 902053 GT RATIO: 150/1A P.T. Ratio: 33KV/v3/110V/3
Equipment CT Ratio	200/1-1-1-1-1
Multiplication Factor for Main and Check Meter	1333 kwh

Data / Parameter:	EGy																
Data unit:	MWh <table border="1"> <thead> <tr> <th>Year</th><th>Units Mwh</th></tr> </thead> <tbody> <tr><td>2015</td><td>11813.9</td></tr> <tr><td>2016</td><td>13422.3</td></tr> <tr><td>2017</td><td>17654</td></tr> <tr><td>2018</td><td>14673</td></tr> <tr><td>2019</td><td>17161.5</td></tr> <tr><td>2020</td><td>21464.4</td></tr> <tr><td>2021</td><td>12797.1</td></tr> </tbody> </table>	Year	Units Mwh	2015	11813.9	2016	13422.3	2017	17654	2018	14673	2019	17161.5	2020	21464.4	2021	12797.1
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Description:	Quantity of net electricity supplied by the Project Activity to the grid in year y																
Source of data:	JMR. Statement of net export of power to the grid issued Monthly by State Electricity Board or any other competent authority as applicable.																
Measurement procedures (if any):	To be specified by State Electricity Board																
Monitoring frequency:	<p>The net energy exported to the grid is measured every month using calibrated energy meter by the State Electricity Board authorities in the presence of the project implementer or its representatives. The meter/s shall be jointly inspected, and sealed by authorised representatives of the company and the state utility.</p> <p>Measuring procedure: Will be measured by an export-import energy meter. The net electricity exported by the project plant would either be directly sourced as a measured parameter or be calculated by deducting the amount of imported electricity from the total amount of exported electricity.</p> <p>Accuracy class of energy meter: As per Power Purchase Agreement (PPA) or relevant National standards amended/modified from time to time.</p> <p>Calibration Frequency: As per the Central Electricity Authority the testing and calibration frequency should be minimum once in five years. However, the calibration will be done following the relevant applicable National Guidelines updated from time to time during the operation of the project activity.</p> <p>Entity responsible: Aggregator</p>																
QA/QC procedures:	Monitoring frequency: Continuous Measurement frequency: Hourly Recording frequency: Monthly The electricity meter/s record both export and import of electricity from the solar Power plant and the readings with regard to net electricity generated will be used for calculation of emission reductions. The net electricity supplied to the grid will be cross checked with the monthly invoices. The meter/s would be checked for accuracy and the meters will be calibrated as per the procedures of State Electricity Board as per the national or international standards. Measurement results shall be cross checked with records for sold electricity (i.e. invoice).																
Purpose of Data	-Calculation of baseline emissions																

Data/Parameter	$EF_{CO_2, GRID, y}$
Data unit	0.9 tCO ₂ /MWh
Description	Fixed and Conservative over the 1st crediting period
of data Value(s) applied	UCR Standard Protocol As per Standard
Measurement methods and procedures	Fixed
Monitoring frequency	NA
Purpose of data	To estimate baseline emissions