

PROJECT CONCEPT NOTE

CARBON OFFSET UNIT (CoU) PROJECT



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

Version 1.0

Date of PCN: 26/05/2022 First CoU Issuance Period: 27/06/2015 to31/12/2021 Monitoring Period: 27/06/2015 to 31/12/2021 Crediting Period: 6 years 6 months

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Project Concept Note (PCN) CARBON OFFSET UNIT (CoU) PROJECT

BASIC INFORMATION			
Title of the project activity	6 MW Small Scale Baner II Hydro Electric Project by Prodigy Hydro Power Pvt. Ltd		
Scale of the project activity	Small Scale		
Completion date of the PCN	26/05/2022		
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 total GHG emission reductions per year	15,445 CoUs/yr (15445 tCO _{2eq} /yr)		

SECTION A. Description of project activity

A.1. Purpose and general description of Carbon offset Unit (CoU) project activity >>

The project activity titled, <u>6 MW Small Scale Baner II Hydro Electric Project by Prodigy</u> <u>Hydro Power Pvt. Ltd</u>, 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).

Purpose of the project activity:

The project activity is promoted by M/S **Prodigy Hydro Power Pvt. Ltd** (herein after called as project proponent 'PP'). 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.

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 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 PP and the utility. In pre-project scenario, electricity delivered to the grid by the project activity would have otherwise been generated by the operation of fossil fuel-based grid-connected power plants and by the addition of new fossil fuel-based generation sources in the grid. As the nature of the hydro project, no fossil fuel is involved for power generation in the project activity. The electricity produced by the project is directly contributing to climate change mitigation by reducing the anthropogenic emissions of greenhouse gases into the atmosphere by displacing an equivalent amount of power at grid.

The project activity is displacing an estimated annual net electricity generation i.e., **17,161 MWh** from the Indian grid system, which otherwise would have been generated by the operation of fossil fuel-based grid-connected power plant. The estimated annual average and the total CO2e emission reductions by the project activity is expected to be **15,445 tCO2e**, whereas actual emission reduction achieved during the first CoU period shall be submitted as a part of first monitoring and verification.

Since the project activity will generate electricity through hydro energy, a clean renewable energy source it will not cause any negative impact on the environment and thereby contributes to climate change mitigation efforts.

Project's Contribution to Sustainable Development

Indian economy is highly dependent on "Coal" as fuel to generate energy and for production processes. Thermal power plants are the major consumers of coal in India and yet the basic electricity needs of a large section of population are not being met. This results in excessive demands for electricity and places immense stress on the environment.

Changing coal consumption patterns will require a multi-pronged strategy focusing on demand, reducing wastage of energy and the optimum use of renewable energy (RE) sources. This project is a greenfield activity where grid power is the baseline. The renewable power generation is gradually contributing to the share of clean & green power in the grid; however, grid emission factor is still on higher side which defines grid as distinct baseline.

The Government of India has stipulated following indicators for sustainable development in the interim approval guidelines for such projects which are contributing to GHG mitigations. The Ministry of Environment, Forests & Climate Change, has stipulated economic, social, environment and technological well-being as the four indicators of sustainable development. It has been envisaged that the project shall contribute to sustainable development using the following ways:

Social well-being: The project would help in generating direct and indirect employment benefits accruing out of ancillary units for manufacturing of the hydro turbine generator and for maintenance during operation of the project activity. It will lead to development of infrastructure around the project area in terms of improved road network, etc. and will also directly contribute to the development of renewable infrastructure in the region.

Economic well-being: Being a renewable resource, using hydro energy to generate electricity contributes to conservation precious natural resources. The project contributes to the economic sustainability through promotion of decentralization of economic power, leading to diversification of the national energy supply, which is dominated by conventional fuel based generating units. Locally, improvement in infrastructure will provide new opportunities for industries and economic activities to be setup in the area. Apart from getting better employment opportunities, the local people will get better prices for their land, thereby resulting in overall economic development.

Technological well-being: The project activity leads to the promotion of 6 MW hydro turbine generators into the region and will promote practice for small scale industries to reduce the dependence on carbon intensive grid supply to meet the captive requirement of electrical energy and also increasing energy availability and improving quality of power under the service area. Hence, the project leads to technological well-being.

Environmental well-being: The project utilizes hydro energy for generating electricity which is a clean source of energy. The project activity will not generate any air pollution, water pollution or solid waste to the environment which otherwise would have been generated through fossil fuels. Also, it will contribute to reduction GHG emissions. Thus, the project causes no negative impact on the surrounding environment contributing to environmental well-being.

With regards to ESG credentials:

At present specific ESG credentials have not been evaluated, however, the project essentially contributes to various indicators which can be considered under ESG credentials. Some of the examples are as follows:

Under Environment:

The following environmental benefits are derived from the project activity:

- Produces renewable electricity without any GHG emissions.
- Run-of-river hydro power plant with little impact on the surrounding ecology.
- No increase in volume of reservoir and no land inundation, hence no disturbance to the natural habitat.

For the PP, energy sale pattern is now based on renewable energy due to the project and it also contributes to GHG emission reduction and conservation of depleting energy sources associated with the project baseline. Hence, project contributes to ESG credentials.

Under Social:

The social well-being is assessed by contribution to improvement in living standards of the local community. The project activity is located in remote villages of industrially backward region in the state of Himachal Pradesh. The implementation of the project activity would provide job opportunities to the local community; contribute in poverty alleviation of the local community and development of basic amenities to community leading to improvement in living standards of the community.

Under Governance:

Governance criteria relates to overall operational practices and accounting procedure of the organization. With respect to this project, the Project Proponent practices a good governance practice with transparency, accountability and adherence to local and national rules & regulations etc. This can be further referred from the company's annual report. Also, the project activity is a Hydro Power Project owned and managed by the proponent for which all required NOCs and approvals are received. The electricity generated from the project can be accurately monitored, recorded and further verified under the existing management practice of the company. Thus, the project and the proponent ensure good credentials under ESG.

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

There was no harm identified form 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.3. Location of project activity >>

Country : India Village: Jia District: Kangra State : Himachal Pradesh Latitude: 32° 09' 33" N Longitude: 76° 26' 55" E







A.4. Technologies/measures >>

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:

LOCATION	
District	Kangra
Name of River	Baner Khad
HYDROLOGY	a final a statement
Catchment area at diversion site (km ²)	42
Design Discharge (m ³ /s)	5.54
DIVERSION STRUCTURE	
Туре	Trench Weir
FSL (masl)	1342
HFL (masl)	1343.75
Average Bed level (masl)	1342
FEEDER CHANNEL	
Туре	Trapezoidal
Size (m)	1.00 (bottom) x 3.00 (top) x 3.00 (height)
Length (m)	19
FOREBAY TANK	
Туре	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	
Туре	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	
Туре	Surface
Installed Capacity (MW)	6
Rated Net Head (m)	130
Tail water level (masl)	1387
TURBINE	
Туре	Horizontal axis Francis
Numbers	Two
Rated Output	3.0 MW each
Year of Commissioning/ Completion	
Commercial Operation Date (COD)	27-06-2015

Salient Features of Baner-II (6 MW)

In the absence of the project activity the equivalent amount of electricity would have otherwise been generated by the operation of fossil fuel-based grid-connected power plants and fed into unified India grid system, hence baseline scenario of the project activity is the grid-based electricity system, which is also the pre-project scenario as discussed in the previous section.

A.5. 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 UCR ID# 356526225 Email: aajeeth@freezingsun.in

A.6. Baseline Emissions>>



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.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 rive 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:

- Project is uniquely identifiable based on its location coordinates,
- Project has dedicated commissioning certificate and connection point,
- 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-con electrici		CO_2	Included	Major source of emission
	Grid-connected electricity	CH_4	Excluded	Excluded for simplification. This is conservative
		N ₂ O	Excluded	Excluded for simplification. This is conservative
Greenfield power Project Activity		CO ₂	Excluded	Excluded for simplification. This is conservative
	Greenfield power project	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, ERy = BEy - PEy - LEy Where:

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

BEy = Baseline Emissions in year y (t CO2/y) PEy = Project emissions in year y (tCO2/y)

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

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: $BE_y = EG_{BL,yl} \times EF_{CO2, GRID, y}$

 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)

 $EF_{Grid,CO2,y}$ = 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.

Estimated annual Emission Reductions (ER_y) = 15445 CoUs/yr (15445 tCO_{2eq}/yr)

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.

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

There is no change in the start date of crediting period. The start date of crediting under UCR is considered as 27/06/2015 and no GHG emission reduction has been claimed so far.

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.9. Monitoring period number and duration>>

First CoU Issuance Period: 27/06/2015 to31/12/2021 Monitoring Period: 27/06/2015 to 31/12/2021 Crediting Period: 6 years 6 months

B.8. Monitoring plan>>

Key Data Monitored: • Quantity of net electricity supplied to the grid

1. Monitoring Plan Objective and Organization

PP is the project implementer and monitors the electricity delivered to the electricity grid by the project activity. The data is already archived electronically and is stored since 27/06/2015.

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.

Data / Parameter:	EGy
Data unit:	MWh
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:	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. 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. Accuracy class of energy meter:As per Power Purchase Agreement (PPA) or relevant National standards amended/modified from time to time. 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. Entity responsible: Aggregator
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, CO2, GRID, y
Data unit	tCO2 /MWh
Description	Fixed Ex-Ante
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