



# PROJECT CONCEPT NOTE

CARBON OFFSET UNIT (CoU) PROJECT

**Title:** 2.5 MW Small Scale Hydro Power project by M/S Baragarh Hydro Power Co. Pvt. Ltd.

Version 2.0

Date 29/12/2022

CoU Issuance Period: 20 Years 04 Months

Date: 21/09/2017 to 31/12/2037



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

BASIC INFORMATION	
Title of the project activity	2.5 MW Small Scale Hydro Power project by M/S Baragarh Hydro Power Co. Pvt. Ltd.
Scale of the project activity	Small Scale
Completion date of the PCN	29/12/2022
Project participants	Creduce Technologies Private Limited (Representator) M/S Baragarh Hydro Power Co. Pvt. Ltd. (Project Proponent)
Host Party	India
Applied methodologies and standardized baselines	Applied Baseline Methodology: AMS-I.D.: “Grid connected renewable electricity generation”, version 18 Standardized Methodology: Not Applicable.
Sectoral scopes	01 Energy industries (Renewable/Non-Renewable Sources)
Estimated amount of total GHG emission reductions	To be estimated during verification [An ex-ante estimate is 7,884 CoUs per year]

## **SECTION A. Description of project activity**

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

The proposed project activity with title under UCR “2.5 MW Small Scale Hydro Power project by M/S Baragarh Hydro Power Co. Pvt. Ltd.”, is a grid-connected Hydro Electric Power project located in Kullu district in the state of Himachal Pradesh (India). The project is an operational activity with continuous reduction of GHG, currently being applied under “Universal Carbon Registry” (UCR).

#### **Purpose of the project activity:**

The proposed project activity is promoted by M/S Baragarh Hydro Power Co. Pvt. Ltd. (herein after called as project proponent ‘PP’). The proposed project activity is installation and operation of Fully horizontal Kaplan turbine having individual capacity 1250 kW with aggregated installed capacity of 2.50 MW in District - Kullu, Himachal Pradesh state of India. This project activity is also called as Lower Aleo small hydroelectric power (SHEP) project.

Lower Aleo SHEP project is a run-of-river project located in Kullu District in the state of Himachal Pradesh. It utilizes flow of Allain and Dhungan Nallah of Beas River in district Kullu. The project envisages a generation capacity of 2.50 MW of power by utilizing the rated net head 22 m. The project activity aims to harness kinetic energy of water (renewable source) to generate electricity. The project activity has been commissioned for commercial operation as on 21/09/2017.

The net generated electricity from the project activity is sold state electricity board i.e., Himachal Pradesh State Electricity Board (HPSEB) under short term power purchase agreement and open access through Indian Energy Exchange Limited (IEX). 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.

Hence, project activity is displacing the estimated annual net electricity generation i.e., 8,760 MWh from the Indian grid system, which otherwise would have been generated by the operation of fossil fuel-based grid-connected power plants. The estimated annual CO<sub>2e</sub> emission reductions by the project activity are expected to be 7,884 tCO<sub>2e</sub>.

The estimated annual average and the total CO<sub>2e</sub> emission reductions by the project activity is expected to be 7,884 tCO<sub>2e</sub>, 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 2.50 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, the 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 Economics:**

Economic well-being refers to additional investment consistent with the needs of the local community. The project activity is associated with a significant investment. This investment is quite significant in a rural area. These activities would contribute to the economic well-being of the local community. The project activity has also provided direct and indirect job opportunities to the local community during construction and shall provide permanent job opportunities during operation. During operation of the project activity, many persons has been employed directly, apart from indirect employment, which would augur well for the economic well- being of the community

**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 the respective

village of Kullu district of Himachal Pradesh, India to understand and discuss all possible concerns related to the 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 is foreseen by them.

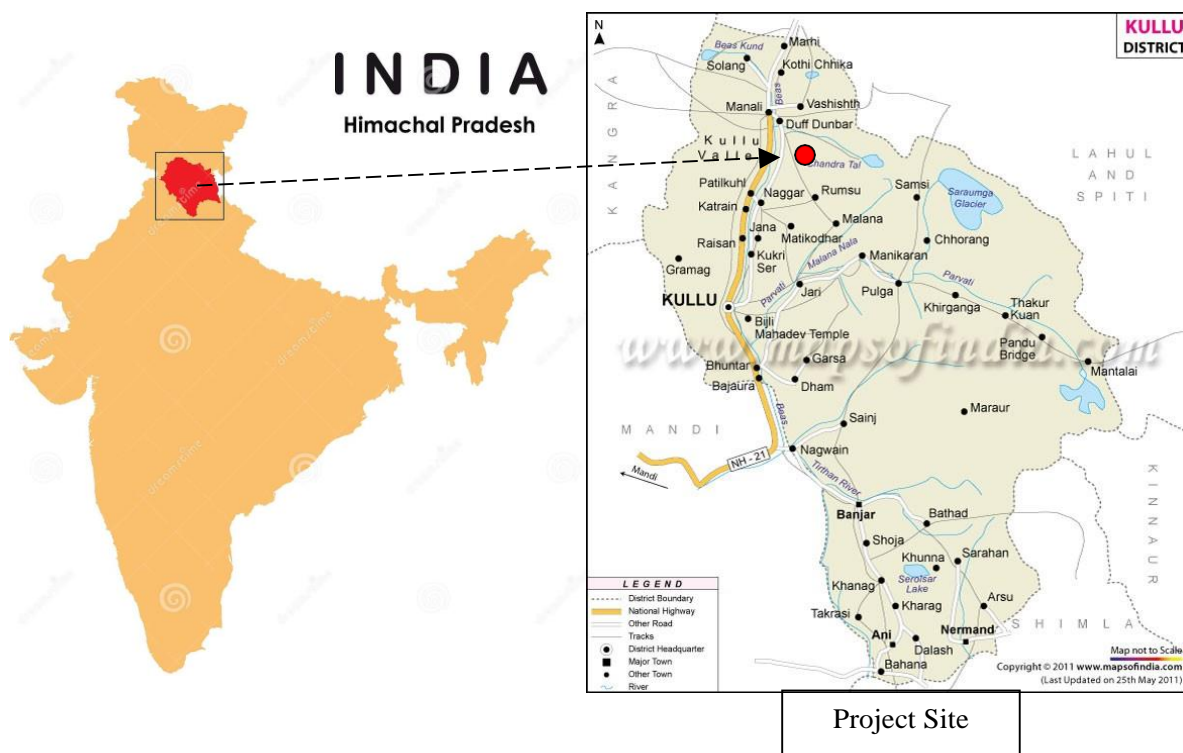
Additionally, there are social, environmental, economic and technological benefits that contribute to sustainable development. The key details have been discussed in the previous section.

### A.3. Location of project activity >>

Country : India  
State : Himachal Pradesh  
District : Kullu  
Village : Prini

The project location is situated near village Prini of Kullu district in the state of Himachal Pradesh. The nearest major railway station to the project site is Kirtpur Railway Station. The Project site is about 45 kms from Kullu. The geographic co-ordinate of the project locations is 32°13'25.4"N, 77°11'28.7"E.

The representative location map is included below:



(Courtesy: google images and www.mapofindia.com)

### A.4. Technologies/measures>>

The project activity involves 2 numbers hydro turbine generators of Kaplan turbine, Fully Horizontal type (1250 kW each) with internal electrical lines connecting the project activity with local evacuation facility. 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:

Turbine Type	Horizontal Full Kaplan
Year of Commissioning	2017
Rated Net Head	22 meters
Rated Turbine output	1336 kW
Turbine Speed	430 rpm
Serial Number	398-02

The hydro turbines have already been commissioned dated 21/09/2017.

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	<p><b>Creduce Technologies Private Limited (Representator)</b></p> <p>Contact person: Shailendra Singh Rao  Mobile: +91 9016850742, 9601378723  Address:  2-O-13,14 Housing Board Colony, Banswara,  Rajasthan - 327001, India</p> <p><b>M/S Baragarh Hydro Power Co. Pvt. Ltd. (Developer)</b>  Address:  Lower Aleo Prini, Tehsil Manali, Dist. Kullu, Himachal Pradesh,  India.</p>

#### A.6. Baseline Emissions>>

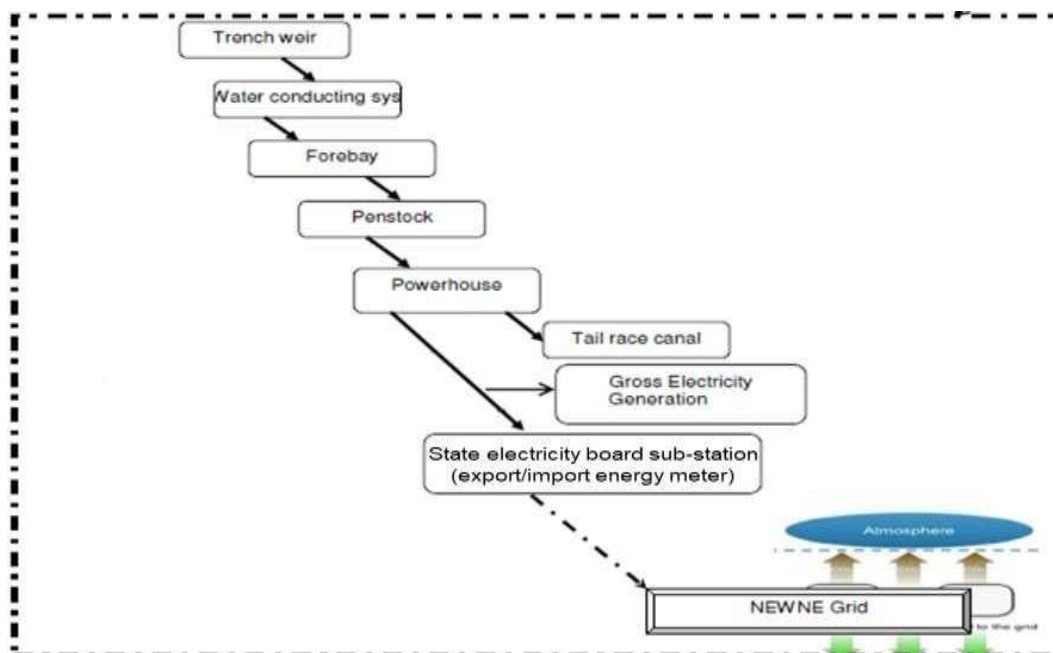
The baseline scenario identified at the PCN stage of the project activity is:

- Grid

In the absence of the project activity, the equivalent amount of electricity would have been generated by the operation of fossil fuel-based grid-connected power plants and fed into NEWNE grid, which is carbon intensive due to use of fossil fuels. Hence, baseline scenario of the project activity is the grid-based electricity system, which is also the pre-project scenario.

Schematic diagram showing the baseline scenario:

#### Project Scenario:



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

#### Baseline Scenario:

As per the approved consolidated methodology AMS-I.D. Version 18, if the project activity is the installation of a new grid-connected renewable power plant/unit, the baseline scenario is the following:

***“The baseline scenario is that the electricity delivered to the grid by the project activity would have otherwise been generated by the operation of grid-connected power plants and by the addition of new generation sources into the grid”.***

The project activity involves setting up of a new SHEP plant to harness the green power from Hydro energy and to supply the produced power to the grid. In the absence of the project activity, the equivalent amount of power would have been supplied by the Indian grid, which is fed mainly by fossil fuel fired plants. Hence, the baseline for the project activity is the equivalent amount of power produced at the Indian grid.

#### A.7. Debundling>>

This project activity is not a debundled component of a larger 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. (Title: “Grid connected renewable electricity generation”, version 18)

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

The project activity involves generation of grid connected electricity from the construction and operation of a new hydro power-based power project. The project activity has installed capacity of 2.50 MW which will qualify for a small-scale project activity under Type-I of the Small-Scale methodology. The project status is corresponding to the methodology AMS-I.D., version 18 and applicability of methodology is discussed below:

Applicability Criterion	Project Case
1. This methodology comprises renewable energy generation units, such as photovoltaic, hydro, tidal/wave, wind, geothermal and renewable biomass: (a) Supplying electricity to a national or a regional grid; or (b) Supplying electricity to an identified consumer facility via national/regional grid through a contractual arrangement such as wheeling.	The project activity involves setting up of a renewable energy (hydro) generation plant that exports electricity to the Indian Grid system, through short term PPA and open access. Hence it fulfills the option (a) of applicability criterion 1.
2. This methodology is applicable to project activities that: (a) Install a Greenfield plant; (b) Involve a capacity addition in (an) existing plant(s); (c) Involve a retrofit of (an) existing plant(s); (d) Involve a rehabilitation of (an) existing plant(s)/unit(s); or (e) Involve a replacement of (an) existing plant(s).	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.
3. Hydro power plants with reservoirs that satisfy at least one of the following conditions are eligible to apply this methodology: (a) The project activity is implemented in existing reservoir, with no change in the volume of the reservoir; or (b) The project activity is implemented in existing reservoir, where the volume of the	It is run of river type of project; hence, this criterion is not applicable.

<p>reservoir(s) is increased and the power density as per definitions given in the project emissions section, is greater than 4 W/m<sup>2</sup>.</p> <p>(c) The project activity results in new reservoirs and the power density of the power plant, as per definitions given in the project emissions section, is greater than 4 W/m<sup>2</sup>.</p>	
<p>4. If the new unit has both renewable and non-renewable components (e.g., a wind/diesel unit), the eligibility limit of 15 MW for a small-scale CDM project activity applies only to the renewable component. If the new unit co-fires fossil fuel, the capacity of the entire unit shall not exceed the limit of 15 MW.</p>	<p>The proposed project is 2.5 MW Hydro Power Project, i.e., only component is renewable power project below 15MW, thus this criterion is not applicable to this project activity.</p>
<p>5. Combined heat and power (co-generation) systems are not eligible under this category.</p>	<p>The project is Hydro Power Project and thus, the criterion is not applicable to this project activity.</p>
<p>6. In the case of project activities that involve the capacity addition of renewable energy generation units at an existing renewable power generation facility, the added capacity of the units added by the project should be lower than 15 MW and should be physically distinct from the existing units.</p>	<p>The proposed project is a greenfield 2.5 MW Hydro Power Project, i.e., no capacity addition was done to any existing power plant. Thus, this criterion is not applicable to this project activity.</p>
<p>7. In the case of retrofit, rehabilitation or replacement, to qualify as a small-scale project, the total output of the retrofitted, rehabilitated or replacement power plant/unit shall not exceed the limit of 15 MW.</p>	<p>The proposed project is a greenfield 2.5 MW Hydro Power Project, i.e., no retrofit, rehabilitation or replacement was done to any existing power plant. Thus, this criterion is not applicable to this project activity.</p>
<p>8. In the case of landfill gas, waste gas, wastewater treatment and agro-industries projects, recovered methane emissions are eligible under a relevant Type III category. If the recovered methane is used for electricity generation for supply to a grid, then the baseline for the electricity component shall be in accordance with procedure prescribed under this methodology. If the recovered methane is used for heat generation or cogeneration other applicable Type-I methodologies such as “AMS- I.C.: Thermal energy production with or without electricity” shall be explored.</p>	<p>The proposed project is a greenfield 2.5 MW hydro power project hence, this criterion is not applicable to this project activity.</p>
<p>9. In case biomass is sourced from dedicated plantations, the applicability criteria in the tool “Project emissions from cultivation of biomass” shall apply.</p>	<p>No biomass is involved, the project is only a Hydro Power Project and thus the criterion is not applicable to this project activity.</p>

### 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)>>

As per applicable methodology AMS-I.D. Version 18, “The spatial extent of the project boundary includes the project power plant and all power plants connected physically to the electricity system that the project power plant is connected to.”

Thus, the project boundary includes the Hydro Turbine Generators and the Indian grid system.

Source		Gas	Included?	Justification/Explanation
Baseline	Grid connected electricity generation	CO <sub>2</sub>	Yes	<b>CO<sub>2</sub> emissions from electricity generation in fossil fuel fired power plants</b>
		CH <sub>4</sub>	No	Minor emission source
		N <sub>2</sub> O	No	Minor emission source
		Other	No	No other GHG emissions were emitted from the project
Project	Greenfield Hydro Power Project Activity	CO <sub>2</sub>	No	No CO <sub>2</sub> emissions are emitted from the project
		CH <sub>4</sub>	No	Project activity does not emit CH <sub>4</sub>
		N <sub>2</sub> O	No	Project activity does not emit N <sub>2</sub> O
		Other	No	No other emissions are emitted from the project

### B.5. Establishment and description of baseline scenario>>

This section provides details of emission displacement rates/coefficients/factors established by the applicable methodology selected for the project.

As per para 19 of the approved consolidated methodology AMS-I.D. Version 18, if the project activity is the installation of a new grid-connected renewable power plant/unit, the baseline scenario is the following:

**“The baseline scenario is that the electricity delivered to the grid by the project activity would have otherwise been generated by the operation of grid-connected power plants and by the addition of new generation sources into the grid”.**

The project activity involves setting up of a new hydro power plant to harness the green power from hydro energy and to use for sale to national grid i.e., India grid system. In the absence of the project activity, the equivalent amount of power would have been generated by the operation of grid-connected fossil fuel-based power plants and by the addition of new fossil fuel-based generation sources into the grid. The power produced at grid from the other conventional sources which are predominantly fossil fuel based. Hence, the baseline for the project activity is the equivalent amount of power produced at the Indian grid.

A "grid emission factor" refers to a CO<sub>2</sub> emission factor (tCO<sub>2</sub>/MWh) which will be associated with each unit of electricity provided by an electricity system. The UCR recommends an emission factor of 0.9 tCO<sub>2</sub>/MWh for the 2013-2020 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 higher emission than the default value. Hence, the same emission factor has been considered to calculate the emission reduction under conservative approach.

## Net GHG Emission Reductions and Removals

$$\text{Thus, } ER_y = BE_y - PE_y - LE_y$$

Where:

$ER_y$	=	Emission reductions in year y (tCO <sub>2</sub> /y)
$BE_y$	=	Baseline Emissions in year y (t CO <sub>2</sub> /y)
$PE_y$	=	Project emissions in year y (tCO <sub>2</sub> /y)
$LE_y$	=	Leakage emissions in year y (tCO <sub>2</sub> /y)

## Baseline Emissions

Baseline emissions include only CO<sub>2</sub> 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.

The baseline emissions are to be calculated as follows:

$$BE_y = EG_{PJ,y} \times EF_{grid,y}$$

Where:

$BE_y$	=	Baseline emissions in year y (t CO <sub>2</sub> )
$EG_{PJ,y}$	=	Quantity of net electricity generation that is produced and fed into the grid as a result of the implementation of this project activity in year y (MWh)
$EF_{grid,y}$	=	UCR recommended emission factor of 0.9 tCO <sub>2</sub> /MWh has been considered, this is conservative as compared to the combined margin grid emission factor which can be derived from Database of Central Electricity Authority (CEA), India. (Reference: General Project Eligibility Criteria and Guidance, UCR Standard, page 4)

## Project Emissions

As per paragraph 39 of AMS-I.D. (version 18) for most renewable energy project activities emission is zero.

$$\text{Hence, } PE_y = 0$$

## Leakage

As per paragraph 42 of AMS-I.D. version-18, 'If the energy generating equipment is transferred from another activity, leakage is to be considered.' In the project activity, there is no transfer of

energy generating equipment and therefore the leakage from the project activity is considered as zero.

**Hence,  $LE_y = 0$**

The actual emission reduction achieved during the first CoU period shall be submitted as a part of first monitoring and verification. However, for the purpose of an ex-ante estimation, following calculation has been submitted:

Estimated annual baseline emission reductions ( $BE_y$ )

= 8,760 MWh/year  $\times$  0.9 tCO<sub>2</sub>/MWh

= 7,884 tCO<sub>2</sub>/year (i.e., 7,884 CoUs/year)

#### **B.6. Prior History>>**

The project activity is a small-scale hydro project and was not applied under any other GHG mechanism prior to this registration with UCR. Also, project has not been applied for any other environmental crediting or certification mechanism. Hence project will not cause double accounting of carbon credits (i.e., CoUs).

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

The start date of electricity generation is considered as a start date of electricity generation. The trial run was conducted on 21/09/2017 for grid synchronization. Hence, it is considered as the start date of crediting period instead of 07/10/2017 (commercial operation date).

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

Not applicable.

#### **B.9. Monitoring period number and duration>>**

First Monitoring Period: 20 Years 04 Months

21/09/2017 to 31/12/2037 (inclusive of both dates)

#### **B.10. Monitoring plan>>**

**Data and Parameters available at validation (ex-ante values):**

Data / Parameter	UCR recommended emission factor
Data unit	tCO <sub>2</sub> /MWh

Description	A "grid emission factor" refers to a CO <sub>2</sub> emission factor (tCO <sub>2</sub> /MWh) that will be associated with each unit of electricity provided by an electricity system. The UCR recommends an emission factor of 0.9 tCO <sub>2</sub> /MWh for the 2013 - 2020 years as a fairly conservative estimate for Indian projects not previously verified under any GHG program. Hence, the same emission factor has been considered to calculate the emission reduction under a conservative approach.
Source of data	<a href="https://a23e347601d72166dcd6-16da518ed3035d35cf0439f1cdf449c9.ssl.cf2.rackcdn.com/Documents/UCRCoUStandardAug2022updatedVer6_09082220127104470.pdf">https://a23e347601d72166dcd6-16da518ed3035d35cf0439f1cdf449c9.ssl.cf2.rackcdn.com/Documents/UCRCoUStandardAug2022updatedVer6_09082220127104470.pdf</a>
Value applied	0.9
Measurement methods and procedures	-
Monitoring frequency	Ex-ante fixed parameter
Purpose of Data	For the calculation of Emission Factor of the grid
Additional Comment	The combined margin emission factor as per CEA database (current version 16, Year 2021) results into higher emission factor. Hence for 2021 vintage UCR default emission factor remains conservative.

**Data and Parameters to be monitored (ex-post monitoring values):**

Data / Parameter	EG <sub>BL, y</sub>
Data unit	MWh/year
Description	Quantity of net electricity supplied to the grid as a result of the implementation of the project activity in year y (MWh)
Source of data	Monthly Joint Meter Readings (JMRs)
Measurement procedures (if any):	Data Type: Measured Monitoring equipment: Energy Meters are used for monitoring Recording Frequency: Continuous monitoring and Monthly recording from Energy Meters, Summarized Annually Archiving Policy: Paper & Electronic Calibration frequency: 5 years (as per CEA provision)
Measurement Frequency:	Monthly
Value applied:	To be applied as per actual data
QA/QC procedures applied:	Calibration of the Main meters will be carried out once in five (5) years as per National Standards (as per the provision of CEA, India) and faulty meters will be duly replaced immediately as per the provision of power purchase agreement. Cross Checking: Quantity of net electricity supplied to the grid will be cross checked from the invoices raised and JMR provided by the project participant.
Purpose of data:	The Data/Parameter is required to calculate the baseline emission.
Any comment:	All the data will be archived till a period of two years from the end of the crediting period.