PROJECT CONCEPT NOTE

CARBON OFFSET UNIT (CoU) PROJECT

Title: 12 MW Small Scale Mini Hydel Power Project by M/S Balaji Energy Pvt. Ltd.

Version 2.0

Date 11/07/2022

First CoU Issuance Period: 8 Years

Date: 01/01/2014 to 31/12/2021

Project Concept Note (PCN)

CARBON OFFSET UNIT (CoU)PROJECT

BASIC INFORMATION	
Title of the project activity	12 MW Small Scale Mini Hydel Power Project by M/S Balaji Energy Pvt. Ltd.
Scale of the project activity	Small Scale
Completion date of the PCN	11/07/2022
Project participants	Creduce Technologies Private Limited (Representator) M/s. Balaji Energy 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 37,843 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 involves construction and operation of Small-Scale hydel project in the state of Andhra Pradesh in India. The project activity has been essentially conceived to generate clean energy by utilizing the hydro potential of the water flowing in the Somasila irrigation channel. It causes minimum environmental impacts and will reduce inhabitants' dependence on fossil fuels. This in turn will lead to reduction of greenhouse gas (GHG) emissions by an estimated 37,843 Tonnes of CO_2e/year during the crediting period.

Total cumulative installed capacity of the project would be 12 MW with an annual gross energy generation of 42,048 MWh. This Small-Scale hydel project will deliver electricity to the national grid, through National transmission network. This Small-Scale hydel project is being developed by M/s. Balaji Energy Pvt. Ltd.

Purpose of the project activity:
The main purpose of the project activity is to generate renewable electrical energy through sustainable means without causing any negative impact on the environment, and to contribute to climate change mitigation efforts.
Apart from the generation of electrical power, the project also contributes to the following.

- Sustainable development of the region.
- Rural development, as all the projects are located in rural areas.
- Generation of additional employment for the local stakeholders.

The proposed project activity is promoted by M/s. Balaji Energy Pvt. Ltd. (Herein after called as project proponent 'PP'). The proposed project activity is installation and operation of Small-Scale Hydel Power on-grid Project comprising of 2 units of hydro Turbine and Generators with an aggregated installed capacity of 12 MW. The project activity has been commissioned for commercial operation as on 02/01/2006 for 10 MW capacity which was later amended to 12 MW as mentioned in the amended PPA agreement document which was made after the approval was given by the APERC Letter no:
APERC/JD(PPP)/DD(PPP)/F.No.E-523 (Vol.VI)/D.No.205/2020, Dt. 18-03-2020.

The net generated electricity from the project activity is sold to the respective state electricity board i.e., Andhra Pradesh under the Power Purchase Agreement (PPA) signed between the PP and the Andhra Pradesh Transmission Corporation (APTRANSCO). 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. 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., 42,048 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 CO2e emission reductions by the project activity are expected to be 37,843 tCO2e.

The estimated annual average and the total CO2e emission reductions by the project activity is expected to be 37,843 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 12 MW Small Scale hydro turbine generators into the region and will promote practice for small scale industries to reduce the dependence on carbon intensive energy supply to meet its 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.
- 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 Andhra 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 activity, the PP 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.

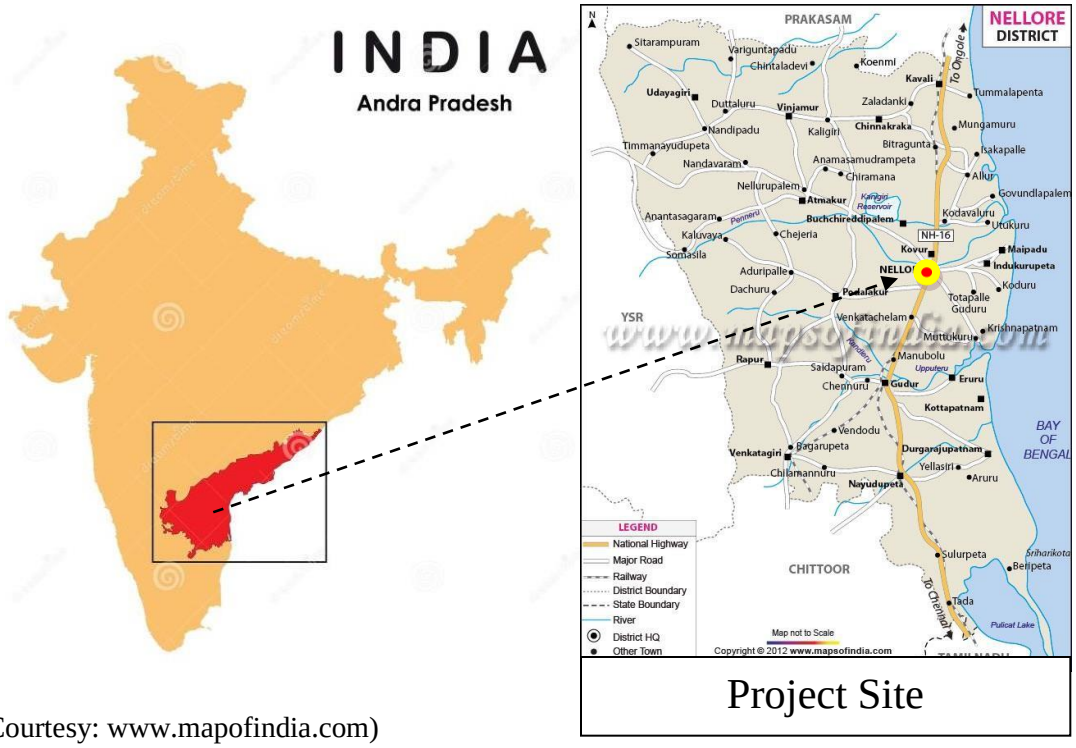
Rational: as per 'Central Pollution Control Board (Ministry of Environment & Forests, Govt. of India)', final document on revised classification of Industrial Sectors under Red, Orange, Green and White Categories (07/03/2016), it has been declared that hydro project activity falls under the "White category". 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.

A.3. Location of project activity

Country : India
State : Andhra Pradesh
District : Nellore
Village : Somasila

The Project is located near Somasila village about 90 kms north of Nellore on Nellore – Tisa – Bairagarh highway in Nellore district of Andhra Pradesh. The geographic co-ordinate of the project locations is Latitude: 14°29'15.0"N, Longitude: 79°18'25.0"E.

The representative location map of the project locations is indicated below:



(Courtesy: www.mapofindia.com)

A.4. Technologies/measures

The project activity involves 2 hydro turbine generators of vertical full Kaplan turbine with vertical shaft synchronous generator. Capacity of each installed turbine is of 6000 kW and aggregated installed capacity of the hydro power project is 12 MW.

The other salient features of the technology are:

Approach channel	
Length	49 m
Bed Width	12 m
Bed Level	+77 m
Intake Structure	
Type	10.95 m diameter, Octagonal Structure with trash rack and vertical intake shaft
Floor Level	+77 m
Top Level	+84 m
Head Race Tunnel	
Shape	Circular/Horse Shoe, RCC lined
Diameter	4.75 m
Length	243 m
Gate Shaft	
Diameter	6.60 m, RCC Lined
Top Level	+108 m
Surge Shaft	
Type	Restricted Orifice Type, RCC Lined
Diameter	17.60 m
Orifice diameter	3.85 m
Top Level	+108 m
Steel Lined Pressured Tunnel	4.75 m Diameter 13 m long bifurcated to 2.80 m diameter 26 m long
Power House	
Units	2X6 MW, Vertical full Kaplan Turbine with Vertical Shaft synchronous Generator
Size	38.88 m X 18 m X 41.60 m high- Main 38.88 m X 7.75 m X 4.80 m high- Auxiliary Bay; Pit type power house
Tail Pool	
Size	20 m X 20 m X 35 m deep
Tail Race Tunnel	
Shape	Horse Shoe, RCC lined
Diameter	4.75 m
Length	376 m
Construction Shaft	

Diameter	7.40 m, Unlined
Tail Race Channel	
Bed Width	8 m
Length	483 m
Bed slope	1 in 1250
Switch Yard	
(11/33 kV)	
Size	25 m X 40 m

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	**Creduce Technologies Private Limited (Representator)** Contact person: Shailendra Singh Rao Mobile: +91 9016850742, 9601378723 Address: 2-O-13,14 Housing Board Colony, Banswara, Rajasthan - 327001, India **M/s. Balaji Energy Pvt. Ltd. (Developer)** Address: 5-9-19, Ist Floor Laxmi Narsinh Estate, Secretariat Road Saifabad Hyderabad Pin Code-600063, India.

A.6. Baseline Emission

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 or regional 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.

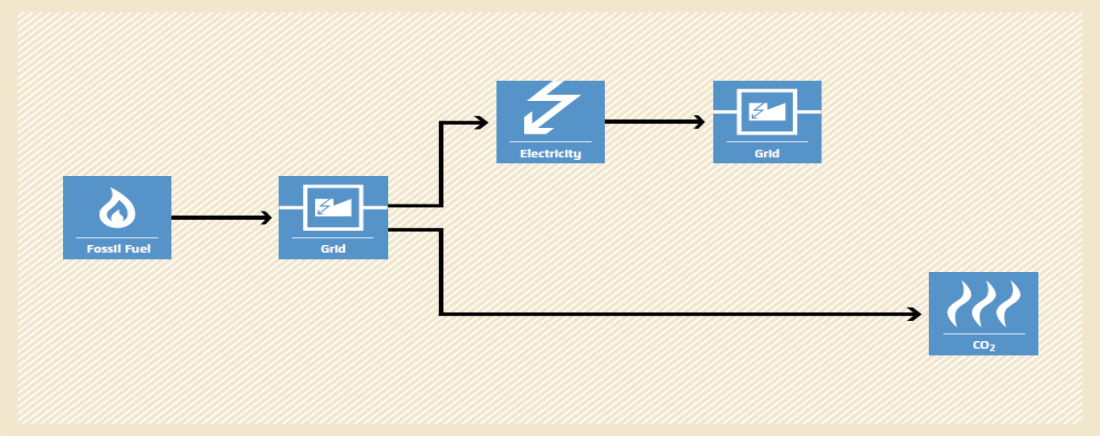
Baseline Scenario:

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:

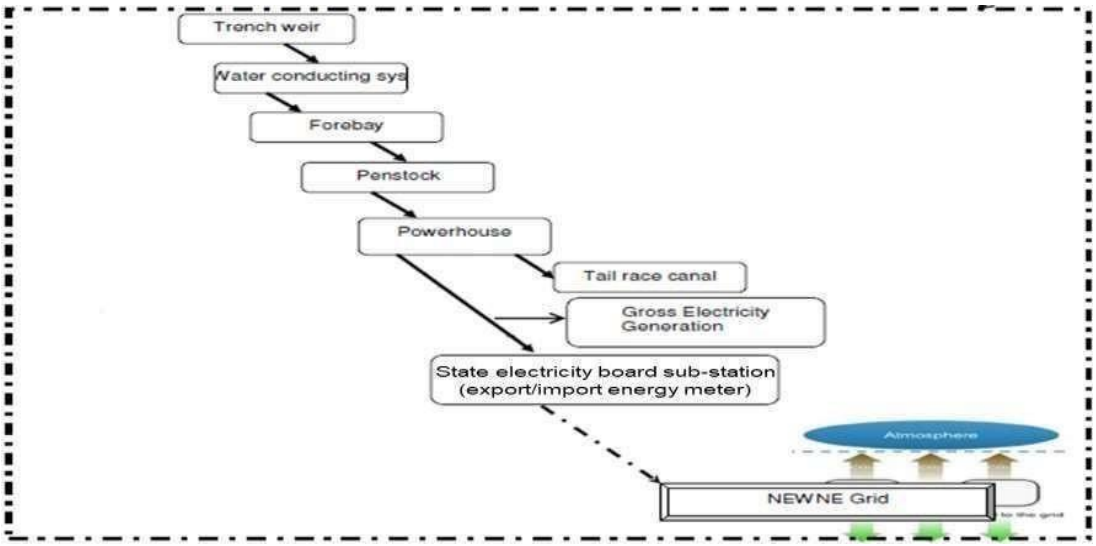
"The baseline scenario is that the electricity delivered to the grid by the project activity would have otherwise been generated by the operation of grid-connected power plants and by the addition of new generation sources into the grid".

The project activity involves setting up of a new 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.

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.

A.7. Debundling

This project activity is not a de-bundled 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 12 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 is a Renewable Energy Project which falls under applicability criteria option 1 (a) i.e., "Supplying electricity to a national or a regional grid". Hence the project activity meets the given applicability criterion.
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 reservoir(s) is increased and the power density as per definitions given in the project emissions section, is greater than 4 W/m^2. (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^2.	This Small-Scale Hydro Project is implemented on an irrigation channel of an existing reservoir with no change in the volume of the reservoir. Thus, point (a) of the criteria 3 is applicable.
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.	The proposed project is 12 MW Hydro Power Project, i.e., only component is renewable power project below 15MW, thus this criterion is not applicable to this project activity.
5. Combined heat and power (co-generation) systems are not eligible under this category.	The project is Hydro Power Project and thus, the criterion is not applicable to this project activity.
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.	The proposed project is a greenfield 12 MW Hydro Power Project, and it involves capacity addition to an existing power plant. Thus, this criterion is applicable to this project activity.
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.	The proposed project is a greenfield 12 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.
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	The proposed project is a greenfield 12 MW hydro power project hence, this criterion is not applicable to this project activity.

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.	
9. In case biomass is sourced from dedicated plantations, the applicability criteria in the tool "Project emissions from cultivation of biomass" shall apply.	No biomass is involved, the project is only a Hydro Power Project and thus the criterion is not applicable to this project activity.

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 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	**CO2**	**Yes**	**CO2 emissions from electricity generation in fossil fuel fired power plants**
		CH4	No	Minor emission source
		N2O	No	Minor emission source
		Other	No	No other GHG emissions were emitted from the project
Project	Greenfield Hydro Power Project Activity	CO2	No	No CO2 emissions are emitted from the project
		CH4	No	Project activity does not emit CH4
		N2O	No	Project activity does not emit N2O
		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 through PPA arrangement. 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_2 emission factor (tCO_2/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_2/MWh for the 2014-2020 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

Thus, $ER_y = BE_y - PE_y - LE_y$

Where:

ER_y = Emission reductions in year y (tCO_2/y)
BE_y = Baseline Emissions in year y ($t\ CO_2/y$)
PE_y = Project emissions in year y (tCO_2/y)
LE_y = Leakage emissions in year y (tCO_2/y)

Baseline Emissions

Baseline emissions include only CO_2 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_2)
$EG_{PJ,y}$	=	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_2/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, dated 28/11/2014), for most renewable energy project activities emission is zero.

Hence, PE = 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 = 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 (BEy)
= 42,048 MWh/year × 0.9 tCO_2/MWh
= 37,843 tCO_2/year (i.e., 37,843 CoUs /year)

B.6. Prior History>>

The project activity was applied for the registration in CDM with Project ID: 1201, titled "10 MW Somasila Hydro Power Project for a grid system by Balaji Energy Pvt.Ltd.". The latest update can be found on the below mentioned link.
https://cdm.unfccc.int/Projects/DB/DNV-CUK1182338073.37/view

No credits were issued as the project was rejected by the CDM authorities. Reason for which is explained on the above given link. So, the first monitoring period in case of UCR will be 01/01/2014. 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 crediting period will be from 01/01/2014.

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 : 08 Years

01/01/2014 to 31/12/2021 (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_2 /MWh
Description	A "grid emission factor" refers to a CO_2 emission factor (tCO_2/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_2/MWh for the 2014 - 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 conservative approach.
Source of data	https://a23e347601d72166dcd6-16da518ed3035d35cf0439f1cdf449c9.ssl.cf2.rackcdn.com//Documents/UCRS tandardJan2022updatedVer3_180222035328721166.pdf
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	$EG_{PJ,y}$
Data unit	MWh
Description	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).
Source of data Value(s) applied	JMR
Procedures	The Net electricity generation by the Hydro power Plant is recorded by the project proponent in the record logs. At the end of every month, JMR report is generated based on the total monthly electricity exported to the grid.
Monitoring frequency	Monthly
Purpose of data	To estimate Baseline Emission