PROJECT CONCEPT NOTE

CARBON OFFSET UNIT (CoU) PROJECT

Title: 11 MW bundle of Small-Scale Hydro Power project by M/s. Balaji Energy Pvt. Ltd.

Version 2.0

Date 26-05-2022

First CoU Issuance Period: 04 years 02 months

Date: 07/11/2017 to 31/12/2021

Project Concept Note (PCN)

CARBON OFFSET UNIT (CoU)PROJECT

BASIC INFORMATION	
Title of the project activity	11 MW bundled Small-Scale Hydro Power project by M/s. Balaji Energy Pvt. Ltd.
Scale of the project activity	Small Scale
Completion date of the PCN	26-05-2022
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 34,690 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 2 Small Scale hydel projects 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 34,690 tons of CO_2e / year during the crediting period.

Total cumulative installed capacity of the project would be 11 MW with an annual gross energy generation of 38,544 MWh. These 2 Small-Scale hydel projects will deliver electricity to the national grid, through National transmission network. Both the Small-Scale hydel projects are 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.

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

The proposed project activity with title under UCR "11 MW bundle of Small-Scale Hydro Power project by M/s. Balaji Energy Pvt. Ltd.", is a grid connected Hydro Electric Power project located in Nellore district in the state of Andhra Pradesh (India). The project activity includes the installation and operation of two Small-Scale Hydel Power grid-connected Projects each comprising of two units of hydro Turbine and Generators with an aggregated installed capacity of 11 MW with Technical and Commissioning details as shown in **Annexure-I**.

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., 38,544 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_2e emission reductions by the project activity are expected to be 34,690 tCO_2e.

The estimated annual average and the total CO_2e emission reductions by the project activity is expected to be 34,690 tCO_2e, 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 11 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 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 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 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.

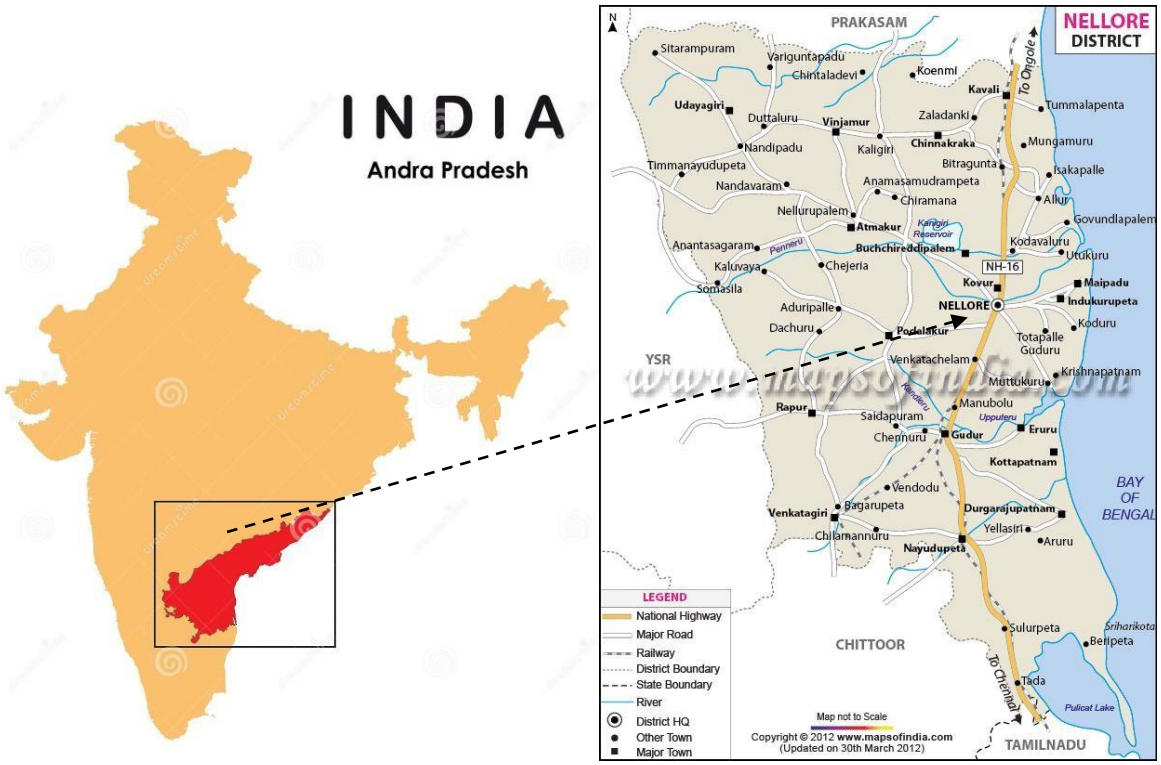
A.3. Location of project activity >>

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

Below table contains location details of the projects.

Sr. No.	Project Name	Latitude & Longitude	Village	District
1	Somasila S.H.P. (2X4 MW)	14°29'15.0"N, 79°18'25.0"E	Somasila	Nellore
2	Somasila NFC Mini Hydro Electric Project (2 X 1.5MW)	14°29'15.0"N, 79°18'25.0"E	Somasila	Nellore

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



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

A.4. Technologies/measures >>

The project activity involves various technologies of hydro turbine generators with internal electrical lines connecting the project activity with local evacuation facility. Project-wise Technical Specifications can be referred in the below table:

Sr. No.	Project Name	No Of Units	Unit Capacity (kW)	Total Capacity (MW)
1.	Somasila S.H.P. (2X4 MW)	2	4000	8
2.	Somasila NFC Mini Hydro Electric Project (3 MW)	2	1500	3
Total Small Scale Hydro Power bundle (in MW)				**11**

The hydro turbines machine specifications and their commissioning dates can be found in **Annexure I.**

The hydro turbines technology specifications are mentioned below.

Specification	Somasila S.H.P (2 x 4MW)
1. Approach Channel	
Length	49 m
Band width	12 m
Bed level	77 m
2. Intake Structure	
Type	10.95 m dia, octagonal structure with trash rack and vertical intake shaft 4.25 m dia
Floor level	+77 m
Top level	+84 m
3. Head race channel	
Shape	Circular/Horse Shoe RCC lined
Diameter	4.75 m
Length	243 m
4. Gate Shaft	
Diameter	6.60 m RCC lined
Top level	+108 m
5. Surge Shaft	
Type	Restricted Orifice Type, RCC lined
Diameter	17.60 m
Orifice Diameter	3.85 m
Top level	+108 m
6. Steel line pressure tunnel	4.75 m dia 18 m long bifurcated to 2.80 m dia 26 m long
7. Power House Units	2 x 4 MW Vertical full Kaplan turbine with vertical shaft synchronous Generator
Size	38.88m x 18m x 41.6m high – main 38.88m x 18m x 41.6m high – auxiliary bay;pit type power house
8. Tail pool size	22m x 20m x 35m deep
9. Tail race tunnel	
Shape	Horse shoe RCC Lined
Diameter	4.75 m
Length	376 m
10. Construction Shaft Diameter	7.4 m, Unlined
11. Tail Race Channel	
Bed width	8 m
Length	483 m

Bed Slope	1 in 1250
12. Switch yard(11/33kV)	
Size	25m x 40m
13. Power evacuation	@Somasila (2 km) and Anantasagram (18km) AP Transco Sub Stations

Specification	Somasila NFC Mini Hydro Electric Project (1.5 x 2) MW
1. Power scheme	
Type of Project	Dam toe based Low head Project
Source of water system	Water flowing into the north feeder canal from head regulator
2. Hydrology	
Source of water	Pennar river
Number of drops	Water level difference of Somasila dam & FSL of NFC
Maximum (Gross)	19 m
Design head (Gross)	17 m
Rated head (Net)	15 m
Power draft	22 Cumecs
Rated Flow Per unit	11 Cumecs
Maximum flow per unit	12 Cumecs
Flow availability	8 months from September to April in a water year based on cropping pattern
3. Intake attached to existing 2 Nos vents	
Diameter	3.2 m
Length including forked tubes	20 m
4. Surgepool	
Internal diameter	12 m
Bottom of Surge Pool	76.50 m
Top of Surge Pool	105 m
No. of outlets to Surge Pool	4
5. Penstock (PS)	
Main Penstock Diameter	2.3 m
Length	18 m
Subsequent PS Diameter	1.7 m
Length of Subsequent PS	4 m each
Design discharge	21.86 Cumecs
Maximum discharge	24 Cumecs
Velocity	5 m/s

6. Power house	
Type	Surface Type Power house
Length	22.69 m
Width	19.28 m
Generator floor level	EL 76.82 m
Generator floor size	10.10m x 11.82m
Service bay size	16.66m x 6.77m
Elevation of service bay	87.05 m
Auxiliary bay size	18.82m x 6m
Number of intake gates	2
Number of DT gates	2
7. Tail race channel	
Length	110m
Bed width	5.8m
Side Slope	0.25:1
Bed fall	1 in 2350
Design Discharge	21.33 Cumecs
8. Power Potential	
Install capacity	3000 kW with 20 % continuous over load
Number of units	2
Rated capacity of each unit	1500 kW
Max capacity of each unit	1800 kW
9. Turbine	
Type of Turbine	Horizontal Full Kaplan Turbine
Number of units	Two
Runner Diameter	1350mm
Center line of Runner	77.82m
Bottom level of draft tube	74.22m
Center level of BF valve	77.82m
10. Generator	
Type	Horizontal synchronous induction generator
Rate capacity	1500 KW with 20% continuous overload
KVA Rating	1660 KVA
Voltage	3.3 KV
Frequency	50 Hz
11. Power house crane	
Type	EOT
Capacity	15 tons
12. Switch Yard	
Size	12 x 20m
Elevation of SY ground	85.60m
Transformer capacity	2.5 MVA

Voltage	3300/33000 Volts

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)	Participant s
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-500063, India.

A.6. Baseline Emissions>>

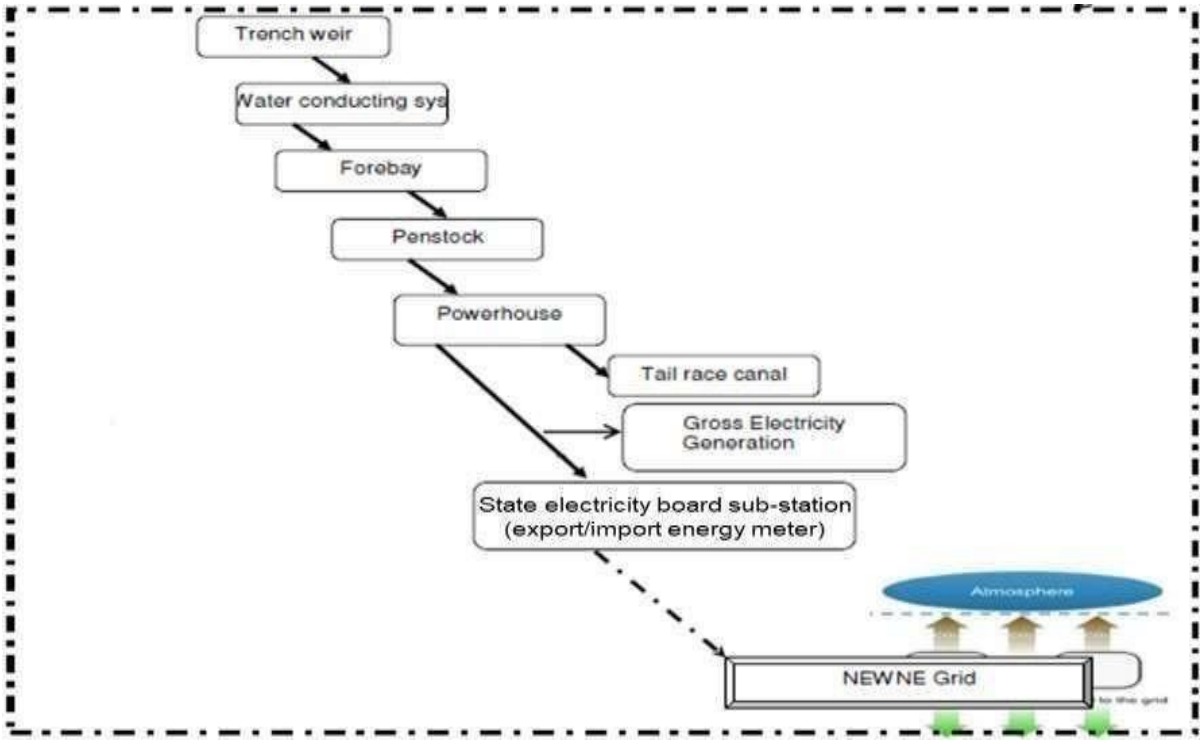
The baseline scenario identified at the PCN stage of the project activity is:

- 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 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.

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 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 11 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 bundled project activity (Project-1 & Project-2) involves setting up of a grid connected renewable energy (Hydro) generation plant for supplying to national grid. Thus, it fulfils the criteria (a) of point 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).	In this Bundled Small Scale Hydro Power Project: - Project-1 involves the addition in the capacity of the existing plant. Hence, Point (b) of criteria 2 is applicable here. Project-2 involves the installation of new mini hydro-electric plant to produce electricity. So, it satisfies the point (a) of criteria 2.

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/m2. (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/m2	In this Small-Scale Hydro Project both the Project-1 and Project-2 are 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 bundled project is 11 MW Hydro power project, i.e., only component is renewable power project below 15 MW, thus the criterion is not applicable to this project activity.
5. Combined heat and power (co-generation) systems are not eligible under this category	This is not relevant to the project activity as both projects only involve Hydro power generating units.
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 distinct1 from the existing units.	In this bundled project activity: - Project-1 involves addition of capacity i.e., 8 MW in an existing small hydro power project on Somasila reservoir. Since the additional capacity is below 15 MW and it is physically distinct from the existing unit, so it full-fills the Point 6 of criteria. Project-2 involves the installation of Greenfield Plant. So, this criterion is not applicable to it.
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 project activity is a new installation and capacity addition in existing, it does not involve any retrofit measures nor any replacement and hence this point is not applicable for the 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 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.	This is not relevant to the project activity as the project involves only Hydro power generating units.
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 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	**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
	Greenfield	CO2	No	No CO2 emissions are emitted from the project

	Hydro Power Project Activity	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, PEy = 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, LEy = 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)

= 38,544 MWh/year × 0.9 tCO_2/MWh

= 34,690 tCO_2/year (i.e., 34,690 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 crediting period will be from the actual date of commissioning mentioned in Annexure I.

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: 04 Years and 02 Months

07/11/2017 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/UCRStandardJan2022updatedVer3_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/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) Generally, the calculation is done by the Authority/Discom and the project proponent has no control over the authority for the calculation. Therefore, based on the joint meter reading certificates/credit notes, the project shall raise the invoice for monthly payments.
	In case the monthly JMR provides net export quantity, the same will be directly considered for calculation. However, if the JMR does not directly provide "net electricity" units, then quantity of net electricity supplied to the grid shall be calculated using the parameters reflected in the JMR. For example, the difference between the measured quantities of the grid export and the import will be considered as net export: $EG_{PJ,y} = EG_{Export} - EG_{Import}$
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 by the project participant to the grid.

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.

ANNEXURE-I (Technical Specification and Commissioning Details of each unit of the projects)

Project details				
Project name	Somasila S.H.P. (2X4 MW)		Somasila NFC Mini Hydro Electric Project (3 MW)	
Unit no	1	2	1	2
Capacity	4000 kW	4000 kW	1500 kW	1500 kW
Type of Turbine	Vertical Kaplan Turbine with vertical shaft synchronous generator		Horizontal Full Kaplan turbine	
Date of commission	29-11-2017		07-11-2017	
Meter Serial No	APX01609		APX01084	
Meter makes	SECURE(P)300		SECURE(P)300	