Monitoring Report

CARBON OFFSET UNIT (CoU) PROJECT

Title: 2 MW Small Scale Gunjawani Hydro Electric Project By M/s Ashoka Sathapatya Pvt. Ltd.

Version 1.0

Date 07/11/2022

First CoU Issuance Period: 03 Years and 02 Months

Monitoring Period: 25/11/2018 to 31/12/2021

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

Monitoring Report	
Title of the project activity	2 MW Small Scale Gunjawani Hydro Electric Project By M/s Ashoka Sathapatya Pvt. Ltd.
UCR Project Registration Number	133
Version	1.0
Completion date of the MR	07/11/2022
Monitoring period number and duration of this monitoring period	Monitoring Period Number: 01 Duration of this monitoring Period: 03 Years and 02 Months (first and last days included (25/11/2018 to 31/12/2021)
Project participants	Creduce Technologies Private Limited (Representator) M/s Ashoka Sathapatya 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
Sectoral scopes	01 Energy industries (Renewable/Non-Renewable Sources)
Estimated amount of GHG emission reductions for this monitoring period in the registered PCN	2018: 216 CoUs (216 tCO_2e)
	2019: 3,759 CoUs (3,759 tCO_2e)
	2020: 6,216 CoUs (6,216 tCO_2e)
	2021: 5,865 CoUs (5,865 tCO_2e)
Total:	16,056 CoUs (16,056 tCO_2e)

SECTION A. Description of project activity

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

The proposed project activity with title under UCR "2 MW Small Scale Gunjawani Hydro Electric Project By M/s Ashoka Sathapatya Pvt. Ltd.", is a grid connected Hydro Electric Power project located in Pune districtin the state of Maharashtra (India). The project is an operational activity with continuous reduction of GHG, currently being applied under "Universal Carbon Registry" (UCR).

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

The project activity aims to harness kinetic energy of water (renewable source) to generate electricity. The net generated electricity from the project activity is sold to state electricity board i.e., Maharashtra State Electricity Distribution Co. Ltd. (MSEDCL) under the Power Purchase Agreement (PPA) signed between the Project Proponent (PP) and the utility. In pre-project scenario, electricity delivered to the grid by the project activity would have otherwise been generated by the operation of fossil fuel-based grid-connected power plants and by the addition of new fossil fuel-based generation sources in the grid. Currently, NEWNE grid is connected to large numbers of fossil fuel-based power plants. Hence, project activity is displacing the gross electricity generation i.e., 17,841 MWh from the NEWNE grid. The project activity doesn't involve any GHG emission sources. The annual and the total CO_2e emission reduction by the project activity over the defined monitoring period is as per **Annexure I.**

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

The project activity involves one Horizontal Kaplan generator of 2000 kW capacity. The installed capacity of the power plant is 2 MW (i.e., 2000 kW).

The Project activity comprises of the following different civil structures, combinedly known as hydro power plant. The kinetic energy of water flowing from reservoir is converted into mechanical energy using hydraulic turbine, which is then converted into electrical energy using generator. The water used in this process is again diverted to the river stream through proper arrangements.
Below is the description of different components of a hydro power plant.

1. **Diversion structure (trench weir):** A diversion structure is required across the for diverting its water for power generation. The Nallah bed consists of pebbles, gravels and boulders.
2. **Intake/Power Channel:** The water fed from Desilting tank is led to tunnel inlet portal through a Rectangular R.C.C channel also known as Intake or Power Channel.
3. **Desilting Tank:** A Desilting chamber is considered necessary to remove silt particles to minimize the abrasion effects on the turbine runners.
4. **Penstock:** Water from Forebay is being taken to the Powerhouse to run hydraulic turbine through pressurized penstock pipe running from Forebay tank.
5. **Power House Building:** Power house building is a simple structure housing the generating units, auxiliary equipment, control panels and suitable outlet for tail water discharge.
6. **Tail Race Channel:** Turbine discharge shall be disposed to river through the separate tailrace channel.

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

The duration of the crediting period corresponding to the monitoring period is covered in this monitoring report.

UCR Project ID	:	133
Start Date of Crediting Period	:	25/11/2018
The project was commissioned on	:	25/11/2018

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

The total GHG emission reductions achieved in this monitoring period is as follows:

Summary of the Project Activity and ERs Generated for the Monitoring Period	
Start date of this Monitoring Period	25/11/2018
Carbon credits claimed up to	31/12/2021
Total ERs generated (tCO2e)	16,056 tCO_2e
Leakage	0
Project Emission	0

e) 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".**

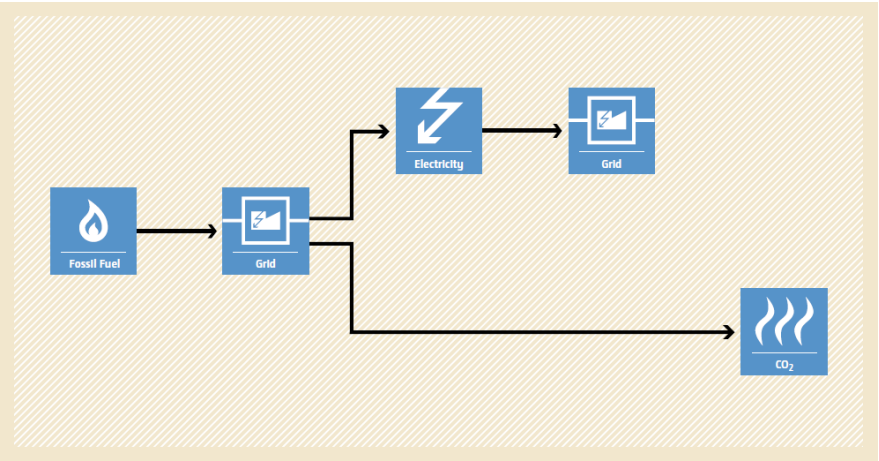


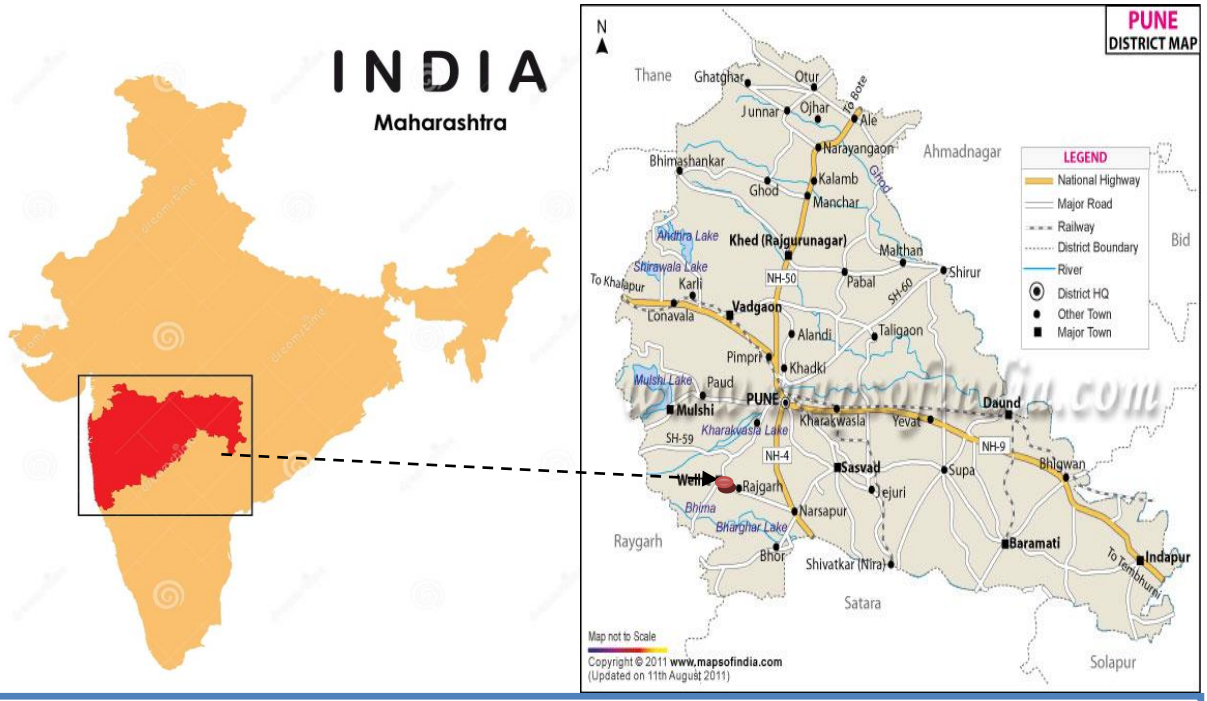
Figure 1 Baseline Scenario

A.2. Location of project activity>>

Country	:	India
State	:	Maharashtra
District	:	Pune
Taluka	:	Velhe
Village	:	Velhe

It is located near Velhe Village, Taluka Velhe, District Pune. The nearest railway station is Pune railway station which is about 67 Km from the dam site. Nearest airport is in Pune International Airport, which is 59 Km from project site. Latitude and longitude coordinates of the Gunjan Dam are 18°18'05.3"N and 73°37'10.8"E.

The representative location map is included below:



Project Site

A.3. 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 Ashoka Sathapatya Pvt. Ltd. (Developer)** Address: - Yashwantnagar, Akluj, Taluka- Malshiras, District- Solapur Maharashtra - 413118, India.

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

SECTORAL SCOPE - 01 Energy industries (Renewable/Non-Renewable Sources)

TYPE - Renewable Energy Projects

CATEGORY - AMS-I. D: "Grid connected renewable electricity generation", Version 18

A.5. Crediting period of project activity >>

Start date : 25/11/2018
Crediting period corresponding to this monitoring period : 03 Years and 02 Months
25/11/2018 to 31/12/2021 (Both the dates are inclusive)

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

Name : Shailendra Singh Rao
Contact No : +91 9016850742, +91 9601378723
E-Mail : shailendra@creduce.tech

SECTION B. Implementation of project activity

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

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

The project consists of one hydro turbine having installed capacity of 2000 kW which was commissioned on 25/11/2018 at Velhe village of District Pune, Maharashtra. M/s Ashoka Sathapatya Pvt. Ltd. is the promoter of this project. Hydro Electric Project, a run of the river development with installed capacity of 2 MW has been envisaged with the purpose of exploitingthe power potential of Left Bank canal of Gunjawani irrigation dam, which utilizes water from Kanand River, a left bank tributary of Gunjawani river which is a tributary of river Nira, tributary of Bhima.

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

The project uses the water from existing dam i.e., Gunjawani irrigation Dam, which utilizes water from Kanand River, a left bank tributary of Gunjawani river which is a tributary of river Nira, tributary of Bhima. The project proposes to install one generating sets of 2000 kW capacity. The technology employed is the Horizontal Kaplan generator.

Maximum Head (Net)	42.955 m
Minimum Head (Net)	9.688 m
Penstock	
Number of Penstock	1
Maximum head	42.955 m
Design discharge	15.904 cumecs.
Diameter of Penstock	2000 mm Diameter
Length of Penstock	384 m
Thickness of Penstock	12 mm
Power House	
Size	16 m x 11 m
Ground Level in the vicinity of Power House	682.50 m
Turbines	
Type	Horizontal Kaplan
Numbers	1
Capacity	2000 KW each
Design Discharge	9.20 cumecs
Design Head	28 m
Generator	
Synchronous Speed	500 rpm
Generation voltage	3.3 KV
Tail Race Channel	
Shape	Trapezoidal
Bed width	3.4 m
Evacuation Arrangement	
Switch yard	25 m X 11 m

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

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 guide lines 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 implementation 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.

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.

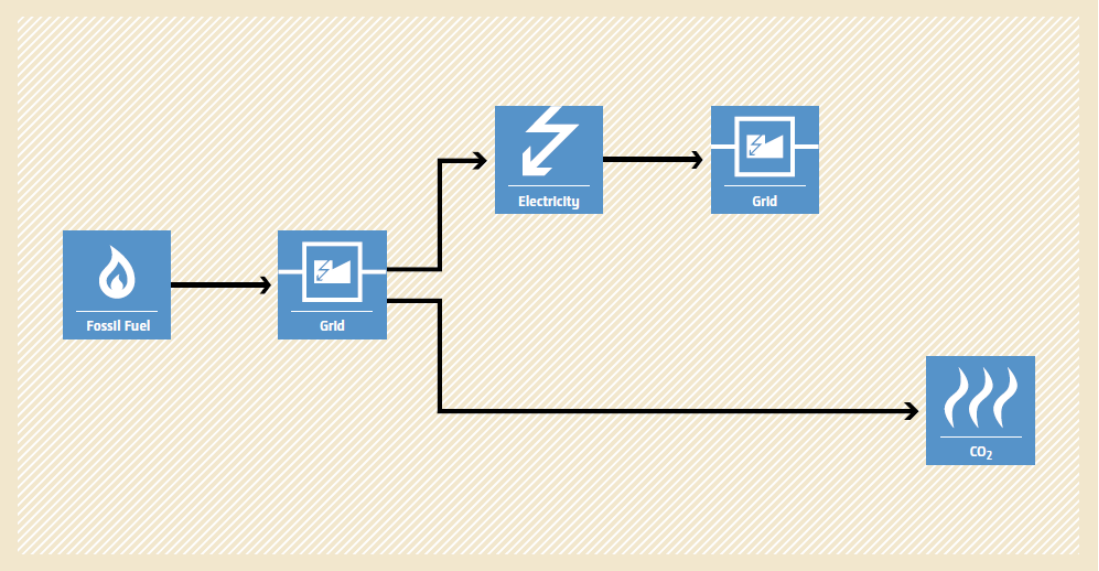
Economic well-being: Being a renewable resource, using Hydro energy to generate electricity contributes to conservation precious natural resources. The project contributes to the economic sustainability through promotion of decentralization of economic power, leading to diversification of the national 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 MW Hydro Turbine Generator 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.

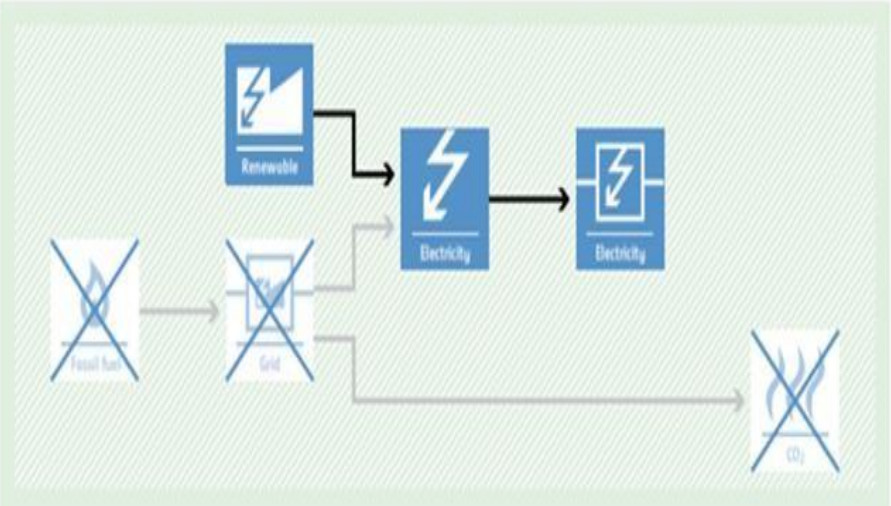
B.3. Baseline Emissions>>

In the absence of the project activity, the equivalent amount of electricity would have been imported from the regional grid (which is connected to the unified Indian Grid system (NEWNE Grid)), which is carbon intensive due to predominantly sourced from fossil fuel-based power plants.

Baseline Scenario:



Project Scenario:



Thus, this project activity was a voluntary investment which replaced equivalent amount of electricity from the Indian grid. The project proponent was not bound to incur this investment as it was not mandatory by national and sectoral policies. Thus, the continued operation of the project activity would continue to replace fossil fuel-based power plants and fight against the impacts of climate change. The Project Proponent hopes that carbon revenues from 2018-2021 accumulated as a result of carbon credits generated will help repay the loans and help in the continued maintenance of this project activity.

B.4. Debundling>>

This project activity is not a de-bundled component of a larger project activity.

SECTION-C: Application of methodologies and standardized baselines

C.1. References to methodologies and standardized baselines >>

Sectoral Scope: 01 Energy industries (Renewable/Non-Renewable Sources).

TYPE I – Renewable Energy Projects.

Applied Baseline Methodology: AMS-I.D**.** "Grid connected renewable electricity generation", Version 18.

C.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 2.00 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 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).	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 $W/m^{2.}$	The project activity utilizes water of Gunjwani irrigation dam. Hence point (a) of criteria 3 is applicable here.
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 2.00 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 the project involves only 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 distinct from the existing units.	This project activity does not involve the capacity addition of an existing project. Therefore, this criterion is not applicable.
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, it does not involve any retrofit measures nor any replacement and hence 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	This is not relevant to the project activity as the project involves only Hydro power generating units.

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.

C.3 Applicability of double counting emission reductions >>

The project was not applied under any other GHG mechanism. Hence project will not cause double accounting of carbon credits (i.e., COUs).

C.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."**

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

Source		Gas	Included?	Justification/Explanation
Baseline	Grid connected electricity generation	**CO_2**	**Yes**	**CO_2 emissions from electricity generation in fossil fuel fired power plants**
		CH_4	No	Minor emission source
		N_2O	No	Minor emission source
		Other	No	No other GHG emissions were emitted from the project
Project	Greenfield Hydro Power Project Activity	CO_2	No	No CO_2 emissions are emitted from the project
		CH_4	No	Project activity does not emit CH_4
		N_2O	No	Project activity does not emit N_2O
		Other	No	No other emissions are emitted from the project

C.5. Establishment and description of baseline scenario (UCR Protocol) >>

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 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 same emission factors as that of the default value. Hence, the same emission factor has been considered to calculate the emission reduction.

Net GHG Emission Reductions and Removals

$ERy = BEy - PEy - LEy$

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 (tCO_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)

Hence,

Baseline Emissions Calculation				
Sr. No	Year	EG_{py} (kWh)	$EF_{grid,y}$	BE_y
1	2018	2,40,037	0.9	216
2	2019	41,76,801	0.9	3,759
3	2020	69,07,549	0.9	6,216
4	2021	65,16,847	0.9	5,865
5	BE (tCO_2e) for the period of 2018 to 2021			16,056

Project Emissions

As per paragraph 39 of AMS-I.D., for most renewable energy project activities emission is zero. Since the project activity is run of river type Hydro Power Plant Installation, project emission for this plant is nil.

Hence,

PEy = 0

Leakage Emissions

As per paragraph 42 of AMS-I.D. Version-18, all projects other than Biomass projects have zero leakage.

Hence,

LE = 0

Total Emission reduction by the project for the current monitoring period is calculated as below:

Hence,

ER = 16,056 – 0 – 0 = 16,056 CoUs

C.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).

C.7. Monitoring period number and duration>>

First Monitoring Period : 03 Years and 02 Months
25/11/2018 to 31/12/2021 (inclusive of both dates)

C.8. Changes to start date of crediting period >>

The start date of crediting under UCR is 25/11/2018, which is Considered for registering and monitoring under UCR and no GHG emission reduction has been claimed after that in in any other registry.

C.9. Permanent changes from PCN monitoring plan, applied methodology or applied standardized baseline >>

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

C.10. Monitoring plan>>

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

Parameter	EG_{PJ}
Data unit	MWh
Description	Total quantity of net electricity generation that is produced and fed into the grid as a result of the implementation of this project activity during the monotoring period.
Source of data Value(s) applied	JMR
Values Applied	17,841
Procedures	The Net electricity generation by the hydro power plant is recorded at the sub-station. At the end of every month Joint Meter Reading (JMR) is generated based on the total monthly electricity exported to the grid.
Monitoring frequency	Monthly
Purpose of data	To Calculate Baseline Emission

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 unit of electricity provided by an electricity system. The UCR recommends an emission factor of 0.9 tCO_2/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 conservative approach.

Source of data	https://a23e347601d72166dcd6-16da518ed3035d35cf0439f1cdf449c9.ssl.cf2.rackcdn.com//Documents/UCRStandardAug2022updatedVer5_030822005728911983.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.

ANNEXURE I (Emission Reduction Calculation)

2 MW Small Scale Gunjawani Hydro Electric Project By M/s Ashoka Sathapatya Pvt. Ltd.

Month - Wise Energy Delivered to Grid (in kWh)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2018	-	-	-	-	-	-	-	-	-	-	9,106	2,30,931
2019	8,00,095	1,88,673	2,27,203	2,01,226	3,34,203	-	50,670	8,21,214	14,47,293	90,117	-	16,107
2020	10,58,850	14,63,933	5,52,813	11,88,394	3,66,703	-	-	10,15,279	7,62,057	4,53,932	45,588	-
2021	12,35,052	12,52,567	6,17,772	3,00,855	6,76,699	4,58,164	5,30,535	6,90,669	5,82,579	1,71,955	-	-

Year-Wise Emission reduction calculation for the project activity

Year	Total No. of Electricity delivered in kWh	Recommended emission factor tCO2/kWh	Total CoUs generated
2018	2,40,037	0.9	216
2019	41,76,801	0.9	3,759
2020	69,07,549	0.9	6,216
2021	65,16,847	0.9	5,865
Total CoUs to be issued for the first monitoring period (Year: 2018 to 2021)			16,056