



Monitoring Report

CARBON OFFSET UNIT (CoU) PROJECT



3.5 MW Small Scale Hydro Power Project

Title: 3.5 MW Small Scale Hydro Power project by M/S Shiva Energy Resources Pvt. Ltd.
Version 1.0

Date 02/05/2022

First CoU Issuance Period: 03 Years 08 Months

Monitoring Period: 01/05/2018 to 31/12/2021



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

Monitoring Report	
Title of the project activity	3.5 MW Small Scale Hydro Power project by M/S Shiva Energy Resources Pvt. Ltd.
UCR Project Registration Number	058
Version	1.0
Completion date of the MR	02/05/2022
Monitoring period number and duration of this monitoring period	Monitoring Period Number: 01 Duration of this monitoring Period: 03 Years 08 Months (first and last days included (01/05/2018 to 31/12/2021))
Project participants	Creduce Technologies Private Limited (Representator) M/S Shiva Energy Resources 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: 7,403 CoUs (7,403 tCO ₂ eq)
	2019: 13,183 CoUs (13,183 tCO ₂ eq)
	2020: 12,177 CoUs (12,177 tCO ₂ eq)
	2021: 11,231 CoUs (11,231 tCO ₂ eq)
Total:	43,994 CoUs (43,994 tCO ₂ eq)

SECTION A. Description of project activity

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

The proposed project activity with title under UCR “3.5 MW Small Scale Hydro Power project by M/S Shiva Energy Resources Pvt. Ltd.”, is a grid connected Hydro Electric Power project located in Shimla district in the state of Himachal Pradesh (India). The project is an operational activity with continuous reduction of GHG, currently being applied under “Universal Carbon Registry” (UCR). This project is a run-of river project.

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., Himachal Pradesh State Electricity Board (HPSEB) 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., 48,882 MWh from the NEWNE grid. The project activity doesn't involve any GHG emission sources. The annual and the total CO₂e 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 2 horizontal shaft Pelton hydro turbine of 1750 kW capacity each. The aggregated installed capacity of the power plant is 3.50 MW (i.e., 2 X 1750 kW).

The Project activity comprises of the following different civil structures, combinedly known as hydro power plant. The kinetic energy of water flowing from river 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 Nallah 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. **Forebay Tank:** The Forebay is provided to ensure supply of immediate water demand on starting the generating units and to meet the demand in emergency like breach of power channel.
5. **Penstock:** Water from Forebay is being taken to the Powerhouse to run hydraulic turbine through pressurized penstock pipe running from Forebay tank.
6. **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.
7. **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 : 058
 Start Date of Crediting Period : 01/05/2018

Units	Installed Capacity	Commissioning Date
Unit-I	1.750 MW	01/05/2018
Unit-II	1.750 MW	01/05/2018

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	01/05/2018
Carbon credits claimed up to	31/12/2021
Total ERs generated (tCO _{2eq})	43,994 tCO _{2eq}
Leakage	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”.**

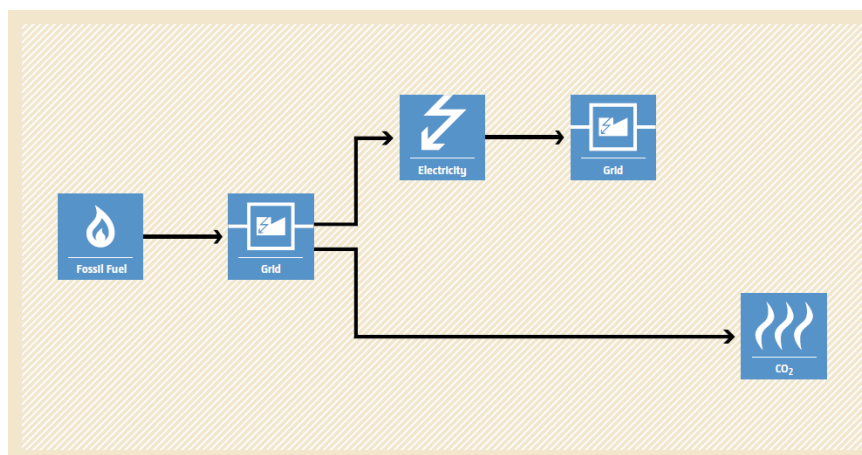


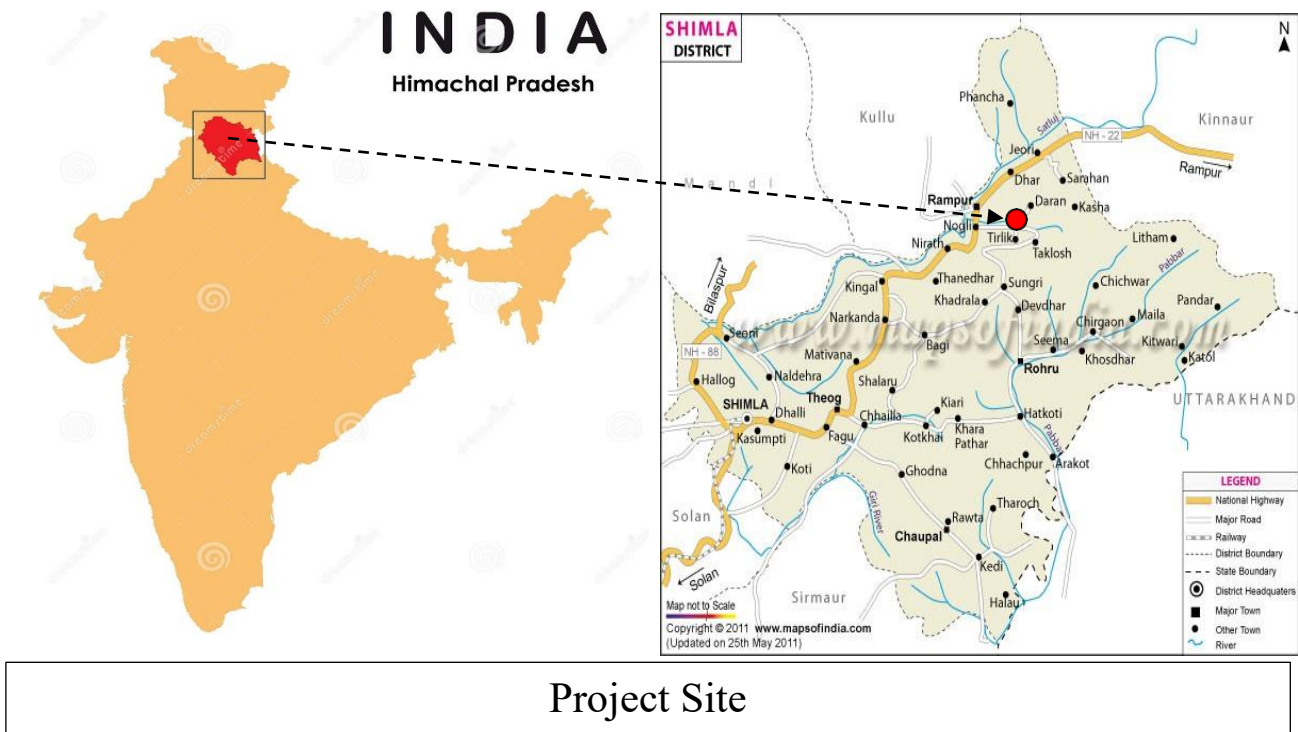
Figure 1 Baseline Scenario

A.2. Location of project activity>>

Country : India
State : Himachal Pradesh
District : Shimla
Village : Kinnu & Bari

The project location is situated near village Kinnu and Bari of Shimla district in the state of Himachal Pradesh. The nearest major railway station to the project site is Shimla Railway Station located about 196 kms. The Project site is about 28 kms from Shimla-Kinnaur highway Road. The geographic coordinate of the project locations is 31°27'47.4"N 77°50'20.5"E.

The representative location map is included below:



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 Shiva Energy Resources Pvt. Ltd. (Developer) Address: 19, Ward No. 7, MCA Area, Old Bus Stand, Gandhi Chowk, Hamirpur, Himachal Pradesh, Pin- 177001, 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 : 01/05/2018
Crediting period corresponding to this monitoring period : 03 Years 08 Months
01/05/2018 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 two hydro turbines having aggregated installed capacity of 3500 KW which were commissioned on 01/05/2018 at Kinnu & Bari village of District Shimla, Himachal Pradesh. M/S Shiva Energy Resources Pvt. Ltd. is the promoter of this project. The project generates clean energy by utilizing the kinetic energy of flowing water from the river Satluj.

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

The project activity involves 2 numbers hydro turbine generators of Pelton Wheel Horizontal type (1750 kW each) with internal electrical lines connecting the project activity with local evacuation facility. The generators generate power at 0.415 kV, which can further be stepped up to 33 kV. The project activity can operate in the frequency of 50 Hz and the voltage of 0.415kV. The average life time of the generator is around 35 years as per the equipment supplier specification. The other salient features of the technology are:

Design Discharge	1.73 cumecs, 0.865 from each
Gross Head	233.10 m
Net Head	228.00 m
Diversion Weir	
Type	Trench weir
Shape	Rectangle
Length	10 m
Intake Tank (2 Nos.)	
Shape	Rectangular
Design Discharge	1.60 Cumecs each
Total Size	3.10m x 1.0m x 1.0m
Flushing pipe	0.5m dia.
Desilting Tank	
Length	15.0 m
Width	10.00 m
Height	2.0 m
Settling velocity	0.035 m/sec
Type / Material	Hopper type, RCC
Particle size to be excluded	0.30 mm and above
Forebay Tank	
Capacity	350 cumecs
Size	Diameter 11 m, Total Height 4.8 m
Storage	3 minutes capacity
Spill Way	
Material	RCC
Length of Spillway	4.0 m

Penstock and HRT Channel	
Number	1 No.
Diameter of primary Penstock	800 mm
Diameter of Penstock at trifurcation	1000 mm
Length of Penstock	330 m
Tunnel Horse shoe type	145 m
Plate Thickness	12 mm
Size of Gate Valve	1000 mm diameter
Power House	
Type	Surface Power house
Size	16.5 m x 10 m x 6.5 m
Capacity	2 x 1750 kW
Gross head	233.10 m
Net head	228.00 m
Electromechanical Equipment	
Turbine type	Pelton Wheel Horizontal Type
Turbine number	02 Nos.
Capacity of each turbine	1750 kW
Type of generators	Synchronous
Rated Discharge	0.865 cumecs
Normal Speed	210 RPM
Tail Race	
Shape	Rectangle
Material	RCC
Length	20 m
Power	
Installed capacity	2 x 1750 kW
No. of unit generated @ 75% load factor	15.815 MU

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.

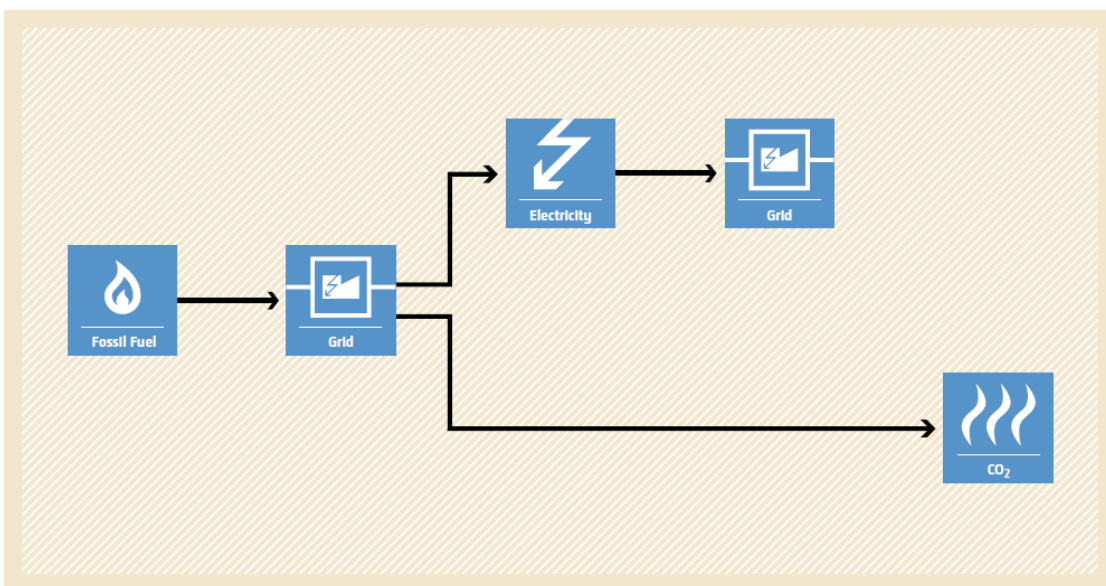
Economic well-being: Being a renewable resource, using Hydro energy to generate electricity contributes to conservation precious natural resources. The project contributes to the economic sustainability through promotion of decentralization of economic power, leading to diversification of the national 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 3.5 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 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.

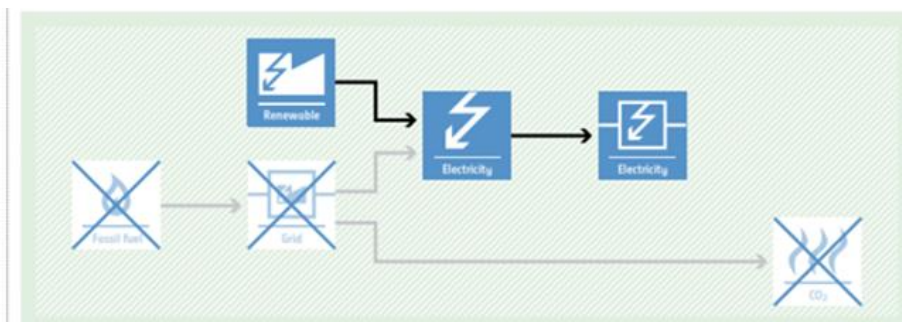
Baseline Scenario:



Project Scenario:

PROJECT SCENARIO

Displacement of electricity provided to the grid by more-GHG-intensive means by installation of a new renewable power plant or the retrofit, replacement or capacity addition of an existing renewable power plant.



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 project for selling it to state electricity board i.e., Himachal Pradesh State Electricity Board (HPSEB) under the Power Purchase Agreement (PPA) signed between the Project Proponent (PP) and the utility. The project activity has installed capacity of 3.5 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
<p>1. This methodology comprises renewable energy generation units, such as photovoltaic, hydro, tidal/wave, wind, geothermal and renewable biomass:</p> <p>(a) Supplying electricity to a national or a regional grid; or</p> <p>(b) Supplying electricity to an identified consumer facility via national/regional grid through a contractual arrangement such as wheeling.</p>	<p>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”.</p> <p>Hence the project activity meets the given applicability criterion.</p>
<p>2. This methodology is applicable to project activities that:</p> <p>(a) Install a Greenfield plant;</p> <p>(b) Involve a capacity addition in (an) existing plant(s);</p> <p>(c) Involve a retrofit of (an) existing plant(s);</p> <p>(d) Involve a rehabilitation of (an) existing plant(s)/unit(s); or</p> <p>(e) Involve a replacement of (an) existing plant(s).</p>	<p>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.</p>
<p>3. Hydro power plants with reservoirs that satisfy at least one of the following conditions are eligible to apply this methodology:</p> <p>(a) The project activity is implemented in existing reservoir, with no change in the volume of the reservoir; or</p> <p>(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.</p> <p>(c) The project activity results in new reservoirs and the power density of the power plant, as per definitions given in the project emissions section, is greater than 4 W/m².</p>	<p>It is run of river type of project; hence, this criterion is not applicable.</p>
<p>4. If the new unit has both renewable and non-renewable components (e.g., a wind/diesel unit), the eligibility limit of 15 MW for a small-scale CDM project activity applies only to the renewable component. If the new unit co-fires fossil fuel, the capacity of the entire unit shall not exceed the limit of 15 MW.</p>	<p>The proposed project is 3.5 MW Hydro Power Project, i.e., only component is renewable power project below 15MW, thus this criterion is not applicable to this project activity.</p>

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 3.5 MW Hydro Power Project, i.e., no capacity addition was done to any existing power plant. Thus, this criterion is not applicable to this project activity.
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 3.5 MW Hydro Power Project, i.e., no retrofit, rehabilitation or replacement was done to any existing power plant. Thus, this criterion is not applicable to this project activity.
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.	The proposed project is a greenfield 3.5 MW hydro power project hence, this criterion is not applicable to this project activity.
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 ₂ O	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 ₂ O	No	Project activity does not emit N ₂ O
		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 CO₂ emission factor (tCO₂/MWh) which will be associated with unit of electricity provided by an electricity system. The UCR recommends an emission factor of 0.9 tCO₂/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

$$ER_y = BE_y - PE_y - LE_y$$

Where:

- ER_y = Emission reductions in year y (tCO₂/y)
- BE_y = Baseline emissions in year y (t CO₂/y)
- PE_y = Project emissions in year y (tCO₂/y)
- LE_y = Leakage emissions in year y (tCO₂/y)

Baseline Emissions

Baseline emissions include only CO₂ emissions from electricity generation in power plants that are displaced due to the project activity. The methodology assumes that all project electricity generation above baseline levels would have been generated by existing grid-connected power plants and the addition of new grid-connected power plants.

The baseline emissions are to be calculated as follows:

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

Where:

$$BE_y = \text{Baseline emissions in year } y \text{ (tCO}_2\text{)}$$

$$EG_{PJ,y} = \text{Quantity of net electricity generation that is produced and fed into the grid as a result of the implementation of this project activity in year } y \text{ (MWh)}$$

$$EF_{grid,y} = \text{UCR recommended emission factor of } 0.9 \text{ tCO}_2\text{/MWh} \text{ has been considered, this is conservative as compared to the combined margin grid emission factor which can be derived from Database of Central Electricity Authority (CEA), India. (Reference: General Project Eligibility Criteria and Guidance, UCR Standard, page 4)}$$

Hence,

$$BE = 48,882 \times 0.9 = 43,994 \text{ tCO}_2\text{eq}$$

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,

$$PE = 0$$

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,

$$ER_y = 43,994 - 0 - 0 = 43,994 \text{ CoUs}$$

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 08 Months
01/05/2018 to 31/12/2021 (inclusive of both dates)

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

Crediting period start date is 01/05/2018.

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 from water, the employed Hydro Power Plant can only convert Hydro energy into electrical energy and cannot use any other input 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 (HPSEB).

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.
Source of data Value(s) applied	JMR
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 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/UCRStandardNov2021updatedVer2_301121081557551620.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)

3.5 MW Small Scale Hydro Power project by M/S Shiva Energy Resources Pvt. Ltd.

Month - Wise Energy Delivered to Grid (in kWh)												
Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2018	0	0	0	0	7,78,100	6,68,200	12,28,100	14,83,700	18,30,900	12,25,900	6,19,200	3,91,100
2019	2,21,700	1,21,800	7,78,500	19,94,800	20,36,800	13,89,300	18,55,200	17,67,700	16,32,200	11,67,300	12,69,675	4,13,300
2020	3,78,000	5,13,900	9,75,300	17,51,200	19,13,600	16,75,200	16,63,900	18,81,600	14,74,700	6,02,100	3,88,100	3,11,900
2021	2,87,400	2,40,800	4,08,900	8,57,600	17,78,100	15,94,100	16,72,500	18,74,300	18,19,200	11,88,800	5,44,100	2,13,400
Year-Wise Emission reduction calculation for the project activity												
Year	Total No. of Electricity delivered in MWh		Recommended emission factor tCO ₂ /MWh		Total CoUs generated							
2018	8,225		0.9		7,403							
2019	14,648		0.9		13,183							
2020	13,530		0.9		12,177							
2021	12,479		0.9		11,231							
Total CoUs to be issued for the first monitoring period (Year: 2018 to 2021)												43,994