Monitoring Report

CARBON OFFSET UNIT (CoU) PROJECT

Title: 10.91 MW bundle of Small Scale Hydro Power project by Government of Arunachal Pradesh

Version 1.0

Date 11/05/2022

First CoU Issuance Period: 8 years

Monitoring Period: 01/01/2014 to 31/12/2021

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

Monitoring Report	
Title of the project activity	10.91 MW bundle of Small Scale Hydro Power project by Government of Arunachal Pradesh
UCR Project Registration Number	093
Version	1.0
Completion date of the MR	11/05/2022
Monitoring period number and duration of this monitoring period	Monitoring Period Number: 01 Duration of this monitoring Period: 8 years (first and last days included (01/01/2014 to 31/12/2021)
Project participants	Creduce Technologies Private Limited (Representator) Government of Arunachal Pradesh (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	2014: 6,597 CoUs (6,597 tCO2eq)
	2015: 5,009 CoUs (5,009 tCO2eq)
	2016: 4,346 CoUs (4,346 tCO2eq)
	2017: 13,398 CoUs (13,398 tCO2eq)
	2018: 14,206 CoUs (14,206 tCO2eq)
	2019: 16,064 CoUs (16,064 tCO2eq)
	2020: 16,034 CoUs (16,034 tCO2eq)
	2021: 12,083 CoUs (12,083 tCO2eq)
Total:	87,737 CoUs (87,737 tCO2eq)

SECTION A. Description of project activity

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

The proposed project activity with title under UCR "10.91 MW bundle of Small Scale Hydro Power project by Government of Arunachal Pradesh", comprises of 13 Micro and Small Scale hydel projects in the state of Arunachal Pradesh in India. The project is an operational activity with continuous reduction of GHG, currently being applied under "Universal Carbon Registry" (UCR). These projects are run-of river projects.

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 delivered to the villages in the vicinity, through a mix of National and Regional transmission networks and will also supply power to different commercial customers in the region. 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., 97,485 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 various technologies of hydro turbine generators with internal electrical lines connecting the project activity with local evacuation facility. The aggregated installed capacity of the bundle of power plants sums up to 10.86 MW (i.e., 10,860 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. **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	:	093
Start Date of Crediting Period	:	01/01/2014
The project was commissioned on	:	As per Table below

Project Name	Capacity (in kW)	Year of Commissioning
Shakti Nallah MHS (2 x 50 kW)	100	2008-09
Kitpi SHP Ph-II (2 x 1500 kW)	3000	2008-09
Thingbu MHS (2 x 50 kW)	100	2009-10
Khet MHS (2 x 50 kW)	100	2009-10
Bongleng MHS (2 x 50 kW)	100	2009-10
Tsechu Nallah MHS (2 x 50 kW)	100	2010-11
Bramdhongchung MHS Ph-II (2 x 50 kW)	100	2010-11
Mago MHS (2 x 50 kW)	100	2014-15
Mukto SHP/Shaikangchu SHP (3 x 2000 kW)	6000	2018-19
Nuranang MHS Ph-II (2 x 500 kW)	1000	2019-20
Chellengkhang Ph-I MHS (1 x 30 kW)	30	2004-05
Chellengkhang Ph-II MHS (1 x 30 kW)	30	2008-09
Bramdhongchung MHS Ph-I (2 x 50 kW)	100	2008-09

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	01/01/2014
Carbon credits claimed up to	31/12/2021
Total ERs generated (tCO_{2eq})	87,737 tCO2eq
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".**

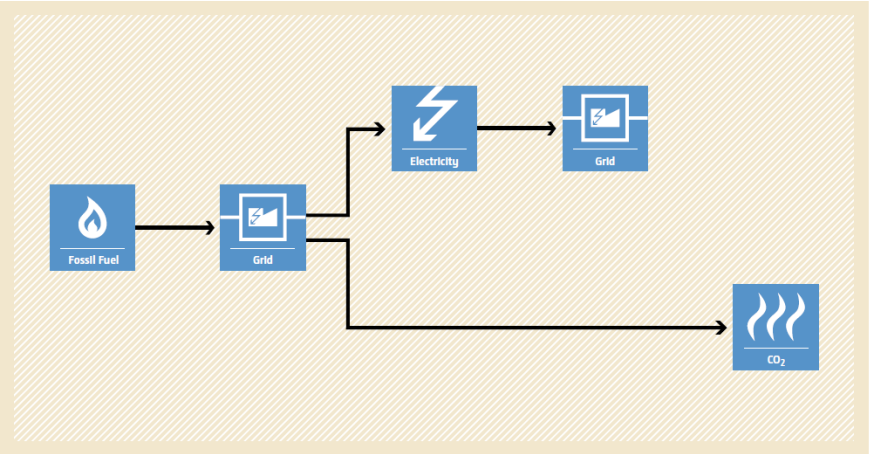


Figure 1 Baseline Scenario

A.2. Location of project activity>>

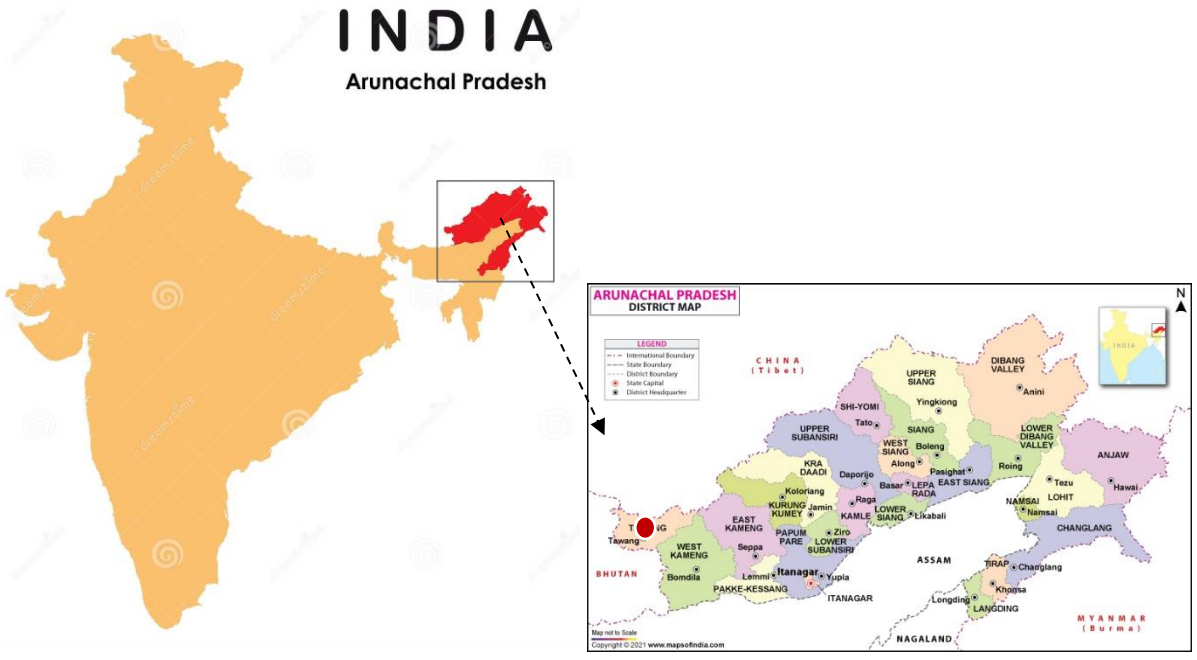
Country : India

State : Arunachal Pradesh

District : Tawang

Below table contains location details of the projects.

Sr. No.	Project Name	Lat. Long.	Village	Town/City	District
1	SHAIKANGCHU SHP	27°33'5.872"N 91°54'0.659"E	Gongkhar	Mukto	Tawang
2	Kitpi Ph-II SHP	27°33'37"N 91°53'28"E	Kitpi	Kitpi	Tawang
3	Nuranang Ph-II MHS	27.595134 N 91.894905 E	Jang	Jang	Tawang
4	Thingbu MHS	27°39'11.7"N 92°06'03.0"E	Thingbu	Thingbu	Tawang
5	BONGLENG MHS	27°30'08"N 91°43'34"E	Bongleng	Bongleng	Tawang
6	Tsechu MHS	27°43'26"N 92°0'27"E	Tsechu	Tsechu	Tawang
7	Khet Nallah MHS	27°32'08"N 91°54'02"E	Khet.	Khet.	Tawang
8	Mago MHS	27°41'27"N 92°12'29"E	Mago.	Thingbu	Tawang
9	Bramdongchung Ph-I MHS	27°36'06"N 91°50'39"E	Bramdongchung	Tawang	Tawang
10	Bramdongchung Ph-II MHS	27°35'56"N 91°36'66"E	Bramdongchung	Tawang	Tawang
11	Shakti MHS	27°60'7185"N 91°71'3883"E	Shakti.	Lumla	Tawang
12	Chellengkhang Ph-I MHS	27°52'8112"N 91°66'0699"E	Chellengkhang	Dudunghar	Tawang
13	Chellengkhang Ph-II MHS	27°52'6179"N 91°66'1826"E	Chellengkhang	Dudunghar	Tawang



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. **Government of Arunachal Pradesh (Developer)** Address: Vidyut Bhawan, Itanagar, Arunachal Pradesh 791111, 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 : 01/01/2014
Crediting period corresponding to this monitoring period : 8 years
01/01/2014 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 technical details of the project activity can be found out in **Annexure-II** attached with the document.

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

The technical details of the project activity can be found out in **Annexure-II** attached with the document.

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

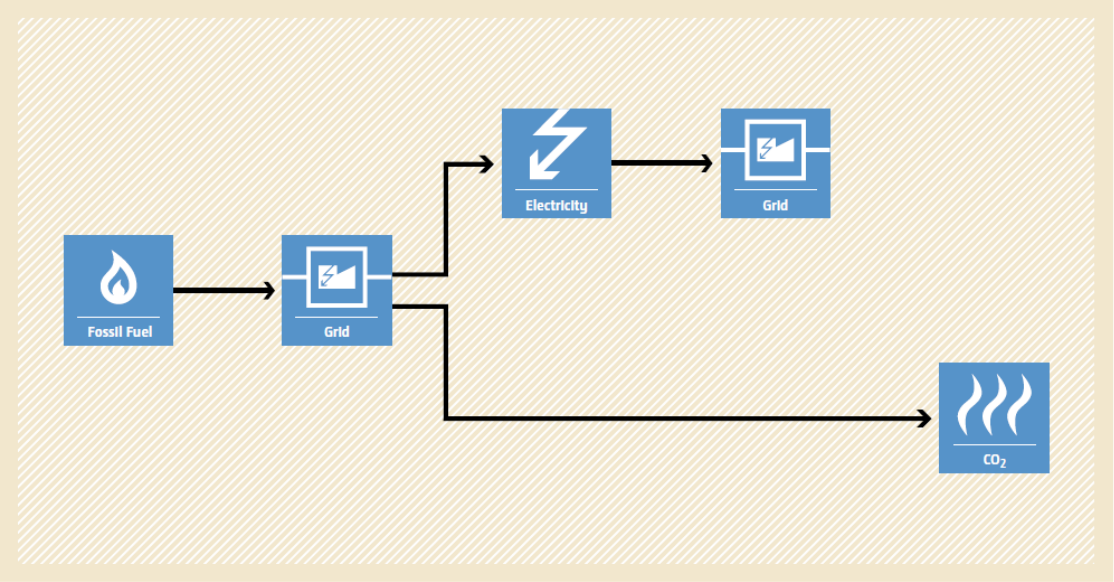
to be setup in the area. Apart from getting better employment opportunities, the local people will get better prices for their land, thereby resulting in overall economic development.

Technological well-being: The project activity leads to the promotion of 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.

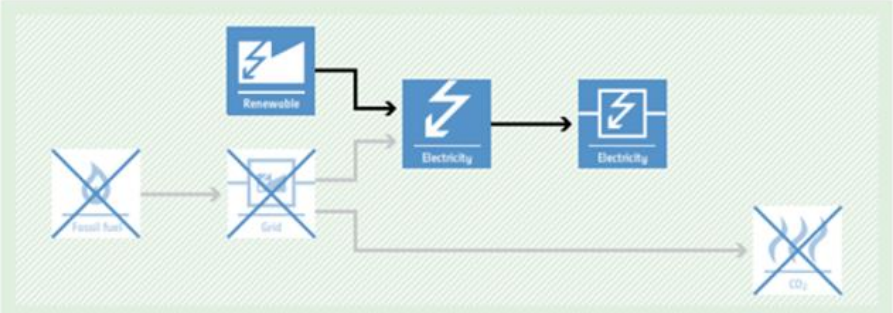
B.3. Baseline Emissions>>

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 2014-2021 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 National and Regional grid. The project activity has installed aggregated capacity of 10.86 MW which will qualify for a small-scale project activity under Type-I of the Small-Scale methodology. The project status is corresponding to the methodology AMS-I.D., Version 18 and applicability of methodology is discussed below:

Applicability Criterion	Project Case
1. This methodology comprises renewable energy generation units, such as photovoltaic, hydro, tidal/wave, wind, geothermal and renewable biomass: (a) Supplying electricity to a national or a regional grid; or (b) Supplying electricity to an identified consumer facility via national/regional grid through a contractual arrangement such as wheeling.	The project activity is a Renewable Energy Project which falls under applicability criteria option 1 (a) i.e., "Supplying electricity to a national or a regional grid". Hence the project activity meets the given applicability criterion.
2. This methodology is applicable to project activities that: (a) Install a Greenfield plant; (b) Involve a capacity addition in (an) existing plant(s); (c) Involve a retrofit of (an) existing plant(s); (d) Involve a rehabilitation of (an) existing plant(s)/unit(s); or (e) Involve a replacement of (an) existing plant(s).	The option (a) of applicability criteria 2 is applicable as project is a Greenfield plant /unit. Hence the project activity meets the given applicability criterion.

3. Hydro power plants with reservoirs that satisfy at least one of the following conditions are eligible to apply this methodology: (a) The project activity is implemented in existing reservoir, with no change in the volume of the reservoir; or (b) The project activity is implemented in existing reservoir, where the volume of the reservoir(s) is increased and the power density as per definitions given in the project emissions section, is greater than 4 W/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.	It is run of river type of project; hence, this criterion is not applicable.
4. If the new unit has both renewable and non-renewable components (e.g., a wind/diesel unit), the eligibility limit of 15 MW for a small-scale CDM project activity applies only to the renewable component. If the new unit co-fires fossil fuel, the capacity of the entire unit shall not exceed the limit of 15 MW.	The proposed project is 10.86 MW Hydro Power Projects, i.e., only component is renewable power project below 15MW, thus this criterion is not applicable to this project activity.
5. Combined heat and power (co-generation) systems are not eligible under this category.	The project is Hydro Power Project and thus, the criterion is not applicable to this project activity.
6. In the case of project activities that involve the capacity addition of renewable energy generation units at an existing renewable power generation facility, the added capacity of the units added by the project should be lower than 15 MW and should be physically distinct from the existing units.	The proposed project is a greenfield 10.86 MW Hydro Power Projects, 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 10.86 MW Hydro Power Projects, 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	The proposed project is a greenfield 10.86 MW hydro power projects hence, this criterion is not applicable to this project activity.

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**	**CO2 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,

BEy = 97,485 x 0.9 = 87,737 tCO2eq

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,

LEy = 0

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

Hence,

ERy = 87,737 – 0 – 0 = 87,737 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 : 8 years
01/01/2014 to 31/12/2021 (inclusive of both dates)

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

Crediting period start date is 01/01/2014.

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 (DHPD).

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	Monthly Electricity Logbook maintained at each Power Plant
Procedures	The Net electricity generation by the hydro power plant is recorded at the sub-station. At the end of every month Electricity generation report is generated based on the total monthly electricity exported to the grid or consumed by nearby local community.
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/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.

ANNEXURE I (Emission Reduction Calculation)

10.91 MW bundle of Small Scale Hydro Power project by Government of Arunachal Pradesh													
Month - Wise Energy Delivered to Grid (in kWh)													
Year	Shakti Nallah MHS (2 x 50 kW)	Kitpi SHP Ph-II (2 x 1500 kW)	Thingbu MHS (2 x 50 kW)	Khet MHS (2 x 50 kW)	Bongleng MHS (2 x 50 kW)	Tsechu Nallah MHS (2 x 50 kW)	Bramdhongchung MHS Ph-II (2 x 50 kW)	Mago MHS (2 x 50 kW)	Mukto SHP/Shaikangchu SHP (3 x 2000 kW)	Nuranang MHS Ph-II (2 x 500 kW)	Chellengkhang Ph-I MHS (1 x 30 kW)	Chellengkhang Ph-II MHS (1 x 30 kW)	Bramdhongchung MHS Ph-I (2 x 50 kW)
2014	59,350	60,10,939	52,558	93,320	11,135	29,473	40,372	22,770	8,73,817	0	36,048	100301	0
2015	62,313	40,06,088	32,864	1,06,204	12,550	32,320	43,025	33,223	11,67,537	0	22,890	45932	0
2016	66,268	30,94,866	49,154	1,03,892	17,032	36,594	60,041	2,280	12,67,272	0	33,252	98484	0
2017	58,398	43,07,328	54,043	39,633	29,326	40,837	43,598	41,120	1,01,75,255	0	38,427	59000	0
2018	47,642	34,20,929	58,612	0	73,676	45,158	19,976	60,234	1,19,17,821	0	38,810	101519	0
2019	6,411	30,88,649	61,730	0	57,922	40,409	5,436	36,810	1,39,54,413	4,43,778	38,114	115098	12
2020	26,708	31,14,871	49,035	23,500	86,645	39,907	355	60,159	1,35,03,981	7,48,472	39,161	122823	59
2021	51,078	46,70,434	48,155	1,02,957	46,458	36,169	15,799	63,381	72,05,731	10,51,879	44,351	88889	0

Year-Wise Emission reduction calculation for the project activity			
Year	Total No. of Electricity delivered in MWh	Recommended emission factor tCO2/MWh	Total CoUs generated
2014	7330	0.9	6,597
2015	5565	0.9	5,009
2016	4829	0.9	4,346
2017	14887	0.9	13,398
2018	15784	0.9	14,206
2019	17849	0.9	16,064
2020	17816	0.9	16,034
2021	13425	0.9	12,083
Total CoUs to be issued for the first monitoring period (Year: 2014 to 2021)			87,737

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

Project Name	SHAIKANGCHU SHP			Kitpi Ph-II SHP		Nuranang Ph-II MHS		Thingbu MHS		BONGLENG MHS	
Unit No.	1	2	3	1	2	1	2	1	2	1	2
Capacity (in kW)	2000	2000	2000	1500	1500	500	500	50	50	50	50
Type of Turbine	Double Jet Pelton Turbine			Double Jet Pelton Turbine		Single Jet Pelton Turbine		Crossflow (Horizontal)		Crossflow (Horizontal)	
Turbine Make	Boving Fouress Pvt.Ltd.			GUGLER HYDRO ENERGY Gmbh.		PENTAFLO HYDRO PRIVATE LIMITED.		Jalshakti, Engineer Pvt.Ltd.		Jalshakti, Engineering Pvt. Ltd	
Date of Comission	03-02-2015			16-12-2008		17-05-2019		07-09-2009		12-10-2009	
Meter Serial No.	PLC Mouted metre			34 150 132116.		203303/13321-2510, 80143524.		09/06/3257		-	-
Meter Make	Allen - Bradley.			Schneider Electric.		Conserv		RISH MASTER 3430		RISH MASTER 3430	

Project Name	Tsechu MHS		Khet Nallah MHS		Mago MHS		Bramdongchung Ph-I MHS		Bramdongchung Ph-II MHS	
Unit No.	1	2	1	2	1	2	1	2	1	2
Capacity (in kW)	30	30	50	50	50	50	50	50	50	50
Type of Turbine	Crossflow (Horizontal)		Crossflow (Horizontal)		Crossflow (Horizontal)		Crossflow (Horizontal)		Crossflow (Horizontal)	
Turbine Make	Gita Flow Pumps		M/s Jalshakti, Engineer Pvt.Ltd.		M/s Jalshakti, Engineer Pvt.Ltd.		M/s Jalshakti, Engineer Pvt.Ltd.		Gita Flow pumps	
Date of Comission	07-09-2012		20-06-2010		25-06-2014		20-10-2008		15-10-2011	
Meter Make	RISH MASTER 3430		RISH MASTER 3430		RISH MASTER 3430		RISH MASTER 3430		RISH MASTER 3430	

Project Name	Shakti MHS		Chellengkhang Ph-I MHS	Chellengkhang Ph-II MHS
Unit No.	1	2	1	1
Capacity (in kW)	50	50	30	30
Type of Turbine	Crossflow (Horizontal)		Crossflow (Horizontal)	Crossflow (Horizontal)
Turbine Make	M/s Jalshakti, Engineer Pvt.Ltd.		ossberger GmbH + Co. KG	Firma Cink-MVE, Karlovy Vary
Date of Comission	15-03-2009		05-01-2005	11-11-2009
Meter Make	RISH MASTER 3430		-	-