Monitoring Report

CARBON OFFSET UNIT (CoU) PROJECT

2 x 4 MW Balaji Hydro project

2 x 1.5 MW Balaji Hydro project

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

Version 1.0

Date 26-05-2022

First CoU Issuance Period: 04 years 2 months

Monitoring Period: 7/11/2017 to 31/12/2021

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

Monitoring Report	
Title of the project activity	11 MW bundle of Small-Scale Hydro Power project by M/s. Balaji Energy Pvt. Ltd.
UCR Project Registration Number	115
Version	1.0
Completion date of the MR	26-05-2022
Monitoring period number and duration of this monitoring period	Monitoring Period Number: 01 Duration of this monitoring Period: 04 Years and 02 Months (first and last days included (7/11/2017 to 31/12/2021)
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
Sectoral scopes	01 Energy industries (Renewable/Non-Renewable Sources)
Estimated amount of GHG emission reductions for this monitoring period in the registered PCN	2017: 4,029 CoUs (4,029 tCO2eq)
	2018: 15,233 CoUs (15,233 tCO2eq)
	2019: 17,404 CoUs (17,404 tCO2eq)
	2020: 35,354 CoUs (35,354 tCO2eq)
	2021: 42,176 CoUs (42,176 tCO2eq)
Total:	1,14,196 CoUs (1,14,196 tCO2eq)

SECTION A. Description of project activity

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

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 below:

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	

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. The Project activity involves construction and operation of 2 small scale hydel projects which has been essentially conceived to generate clean energy by utilizing the hydro potential of the water flowing in the Somasila irrigation channel.

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 M/S Pushpit Steel Private Limited and M/S Viki Industries Private Limited through wheeling agreement with APSPDCL. i.e., Andhra Pradesh Southern Power Distribution Company Limited, 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., 1,26,885 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.**

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.

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.

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

The project activity involves 4 numbers hydro turbine generators of Kaplan type (11000 kW in Total) with internal electrical lines connecting the project activity with local evacuation facility.

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	:	115
Start Date of Crediting Period	:	7/11/2017

Project Name	Commissioning date
Somasila S.H.P. (2X4 MW)	29/11/2017
Somasila NFC Mini Hydro Electric Project (3 MW)	07/11/2017

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	7/11/2017
Carbon credits claimed up to	31/12/2021
Total ERs generated (tCO_{2eq})	1,14,196 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".**

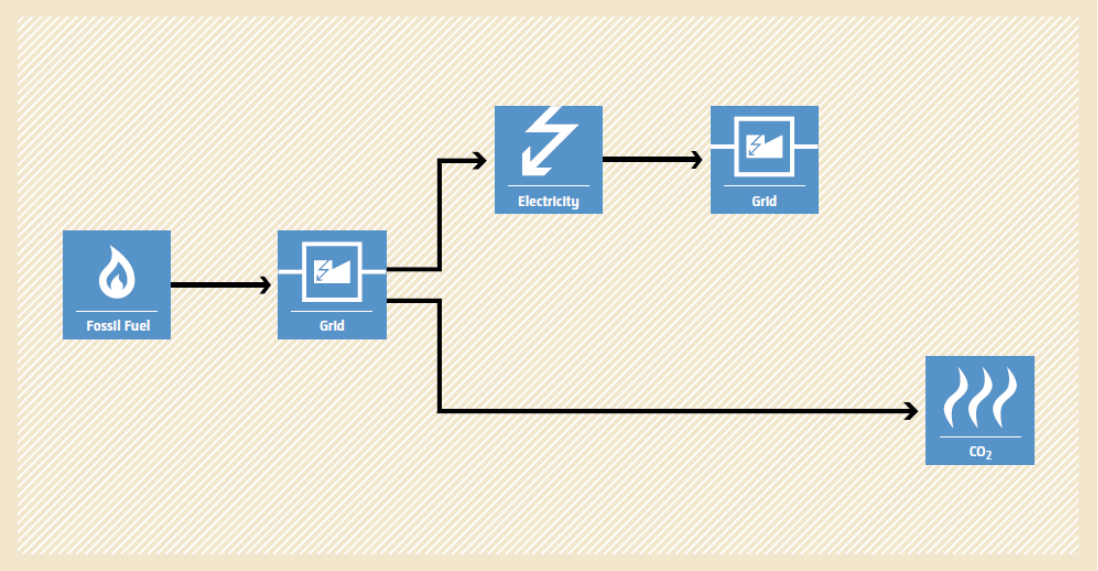


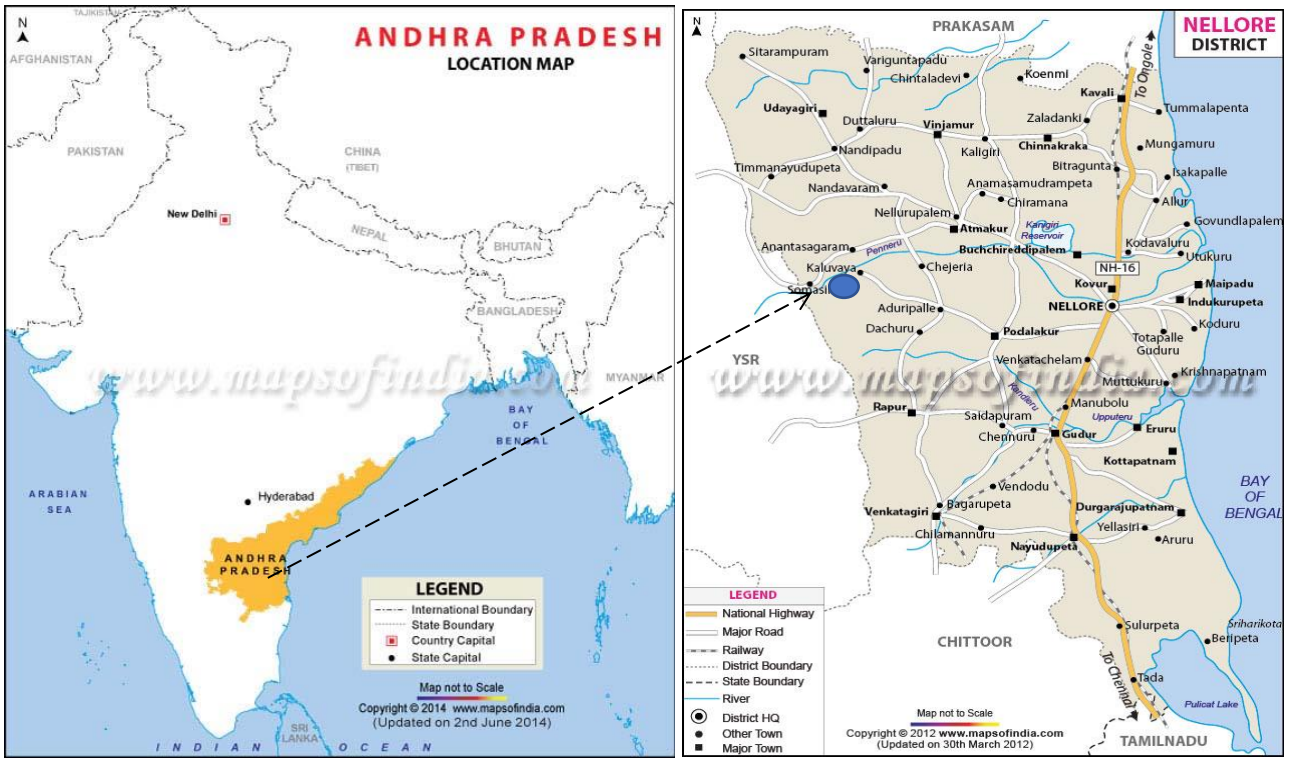
Figure 1 Baseline Scenario

A.2. Location of project activity>>

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

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 (3MW)	14°29'15.0"N, 79°18'25.0"E	Somasila	Nellore

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. Balaji Energy Pvt. Ltd. (Developer)** Address: 5-9-19, Ist Floor Laxmi Narsinh Estate, Secretariat Road Saifabad Hyderabad Pin Code-500063, 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 : 7/11/2017
Crediting period corresponding to this monitoring period : 04 Years and 02 Months
7/11/2017 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 4 hydro turbines having aggregated installed capacity of 11000 kW which were commissioned on 07/11/2017 and 29/11/2017 at Somasila village of District Nellore, Andhra Pradesh. M/S Balaji Energy Pvt. Ltd is the promoter of this project. The Run-of- River project generates clean energy by utilizing the kinetic energy of flowing water from Somasila dam on pennar river in district Nellore, Andhra Pradesh.

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

The project activity involves 4 numbers hydro turbine generators of Kaplan type (11000 kW total) with internal electrical lines connecting the project activity with local evacuation facility. The generators generate power at 3.3 kV, which can further be stepped up to 33 kV. The project activity can operate at rated frequency of 50 Hz and the voltage of 3.3 kV. The average life time of the generator is around 35 years as per the equipment supplier specification. 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 Section A.1. The other salient features of the technology are:

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 diameter, octagonal structure with trash rack and vertical intake shaft 4.25 m diameter.

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 diameter 18 m long bifurcated to 2.80 m diameter 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 3 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

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

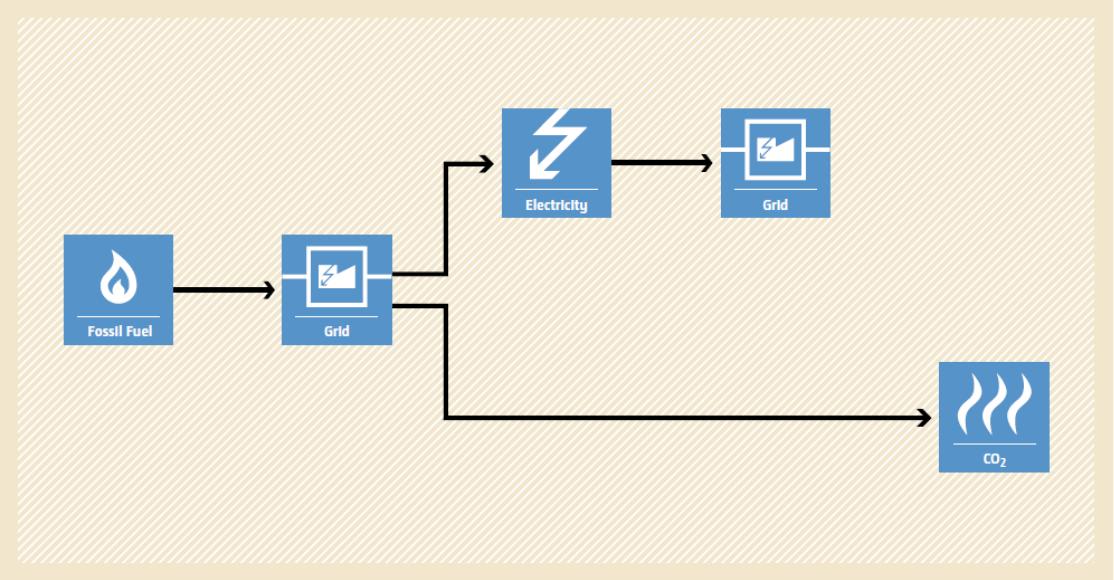
the national energy supply, which is dominated by conventional fuel based generating units. Locally, improvement in infrastructure will provide new opportunities for industries and economic activities to be setup in the area. Apart from getting better employment opportunities, the local people will get better prices for their land, thereby resulting in overall economic development.

Technological well-being: The project activity leads to the promotion of 11 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.

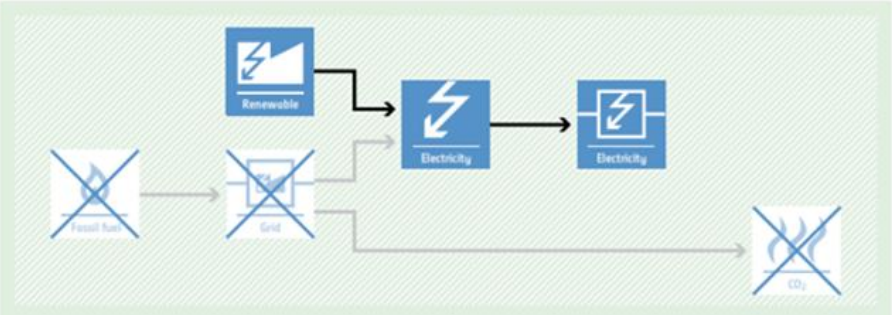
B.3. Baseline Emissions>>

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 2017-2021 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., Andhra Pradesh Southern Power Distribution Company Limited (APSPDCL) under the Power Purchase Agreement (PPA) signed between the Project Proponent (PP) and the utility. 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.

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 Somasila Hydro Electric 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 = 1,26,885 x 0.9 = 1,14,196 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 = 1,14,196 – 0 – 0 = 1,14,196 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 : 04 Years and 2 Months
7/11/2017 to 31/12/2021 (inclusive of both dates)

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

Crediting period start date is 7/11/2017.

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/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)

11 MW bundle of Small-Scale Hydro Power project by M/s. Balaji Energy Pvt. Ltd.												
Month - Wise Energy Delivered to Grid (in kWh)												
Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2017	0	0	0	0	0	0	0	0	0	0	3,17,300	41,59,400
2018	41,48,900	41,35,900	27,52,400	1,98,700	3,07,500	-12,600	-13,300	-600	-10,200	3,74,800	20,41,300	30,03,400
2019	21,64,200	13,34,800	1,36,100	-14,800	-12,800	-11,700	-12,900	1,03,300	23,20,200	45,64,500	45,71,500	41,96,000
2020	52,11,200	63,60,800	19,04,500	7,11,600	43,56,700	37,24,700	16,01,100	4,00,300	18,37,400	40,84,500	41,85,300	49,04,200
2021	61,84,000	51,09,000	42,05,000	28,25,000	38,85,100	33,20,500	11,98,200	27,27,600	34,40,800	47,21,300	28,73,200	63,72,000

Year-Wise Emission reduction calculation for the project activity			
Year	Total No. of Electricity delivered in MWh	Recommended emission factor	Total CoUs generated
2017	4,477	0.9	4,029
2018	16,926	0.9	15,233
2019	19,338	0.9	17,404
2020	39,282	0.9	35,354
2021	46,862	0.9	42,176
Total CoUs to be issued for the first monitoring period (Year: 2017 to 2021)			1,14,196