



Monitoring Report

CARBON OFFSET UNIT (CoU) PROJECT



Title: 4.9 MW Darna Small Hydro Electric Project in Nashik District of Maharashtra

Version 01.1

Date: 09/04/2022

First CoU Issuance Period: 08 years, 00 months

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



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

Monitoring Report	
Title of the project activity	4.9 MW Darna Small Hydro Electric Project in Nashik District of Maharashtra
UCR Project Registration Number	074
Version	01.1
Completion date of the MR	09/04/2022
Monitoring period number and duration of this monitoring period	Monitoring Period Number: 01 Duration of this monitoring Period: 01/01/2014 to 31/12/2021 (first and last days included)
Project participants	DLI Power (India) Private Limited (Project Proponent and also the Sole Representor)
Host Party	India
Applied methodologies and standardized baselines	Applied Baseline Methodology: AMS-I.D.: "Grid connected renewable electricity generation", version 18 Standardized Methodology: Not Applicable
Sectoral scopes	01 Energy industries (Renewable/Non-Renewable Sources)
	2014: 4,123 CoUs (4,123 tCO _{2eq})
	2015: 9,541 CoUs (9,541 tCO _{2eq})
	2016: 10,154 CoUs (10,154 tCO _{2eq})
	2017: 11,926 CoUs (11,926 tCO _{2eq})
Estimated amount of GHG emission reductions for this monitoring period in the registered PCN	2018: 16,080 CoUs (16,080 tCO _{2eq})
	2019: 9,577 CoUs (9,577 tCO _{2eq})
	2020: 14,698 CoUs (14,698 tCO _{2eq})
	2021: 13,396 CoUs (13,396 tCO _{2eq})
	Total: 89,495 CoUs (89,495 tCO_{2eq})

SECTION A. Description of project activity

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

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

The purpose of the proposed project activity is to generate electricity using hydro energy which is a clean and renewable source of energy for power generation. As per an ex-ante estimate, the project will generate approximately 24,222 MWh of electricity per annum. The power generated by the project activity is sold to state electricity board connected to Indian grid system. For this purpose, the energy metering system are installed at feeding point with the grid.

This project activity is promoted by 'DLI Power (India) Private Limited' (herein after called as Project Proponent or PP). The project activity is the installation and operation of 2 horizontal shaft Kaplan hydro turbine generators having capacity of 2450 kW each with aggregated installed capacity of 4.90 MW, located in the village Nandgaon of Nashik district in the state of Maharashtra in India. This small-scale Hydro Power project has already been commissioned on 11/01/2011. Thus, the project is an operational activity with continuous reduction of GHG, currently being executed under "Universal Carbon Registry" (UCR).

The net generated electricity from the project activity is sold to state electricity board i.e., Maharashtra State Electricity Distribution Company Limited (MSEDCL) under the Power Purchase Agreement (PPA) signed between the 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. As the nature of the hydro project, no fossil fuel is involved for power generation in the project activity. The electricity produced by the project is directly contributing to climate change mitigation by reducing the anthropogenic emissions of greenhouse gases into the atmosphere by displacing an equivalent amount of power at grid.

The project activity has achieved total GHG emission reduction of **89,495 tCO₂e** for overall period of 8 years starting from 1st Jan 2014 to 31st Dec 2021 (both days included) during this first monitoring and verification cycle. Since the project activity generates electricity through hydro energy, a clean renewable energy source it will not cause any negative impact on the environment and thereby contributes to climate change mitigation efforts.

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

This project activity also known as Darna small hydroelectric power project (SHEP) is a project on Darna dam. Dam is operated and maintained by Government of Maharashtra, Water Resources Department (GOMWRD). It is one of the oldest masonry gravity dams, built in 1916 to meet the water demand of drought prone eastern part of the Ahmednagar and Nashik District of Maharashtra State. Water from the dam is released as per the irrigation requirement of these areas. Sluices are provided to control the flow of water through the reservoir. After completion of this project activity, water is released through the turbines thereby generating electricity. The voltage at the generator terminals is 3.3 kV, which is stepped up to 33 kV at the nearest substation. The generated electricity is fed / exported into the nearest Wadivarhe sub-station of MSEDCL grid system for transmission & distribution. This project activity is expected to supply a net amount of electricity of 24,222 MWh per year (based on a projected PLF of 60%) to the integrated or unified Indian Grid system. The project utilises a net head of about 19.43 m. The technological details have been provided in Section B.1.a.

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

UCR Project ID or Date of Authorization : 074
Start Date of Crediting Period : 01/01/2014
Project Commissioned : 11/01/2011
Monitoring Period : 01/01/2014 to 31/12/2021

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})	89,495 tCO _{2eq}
Leakage	0 tCO _{2eq}

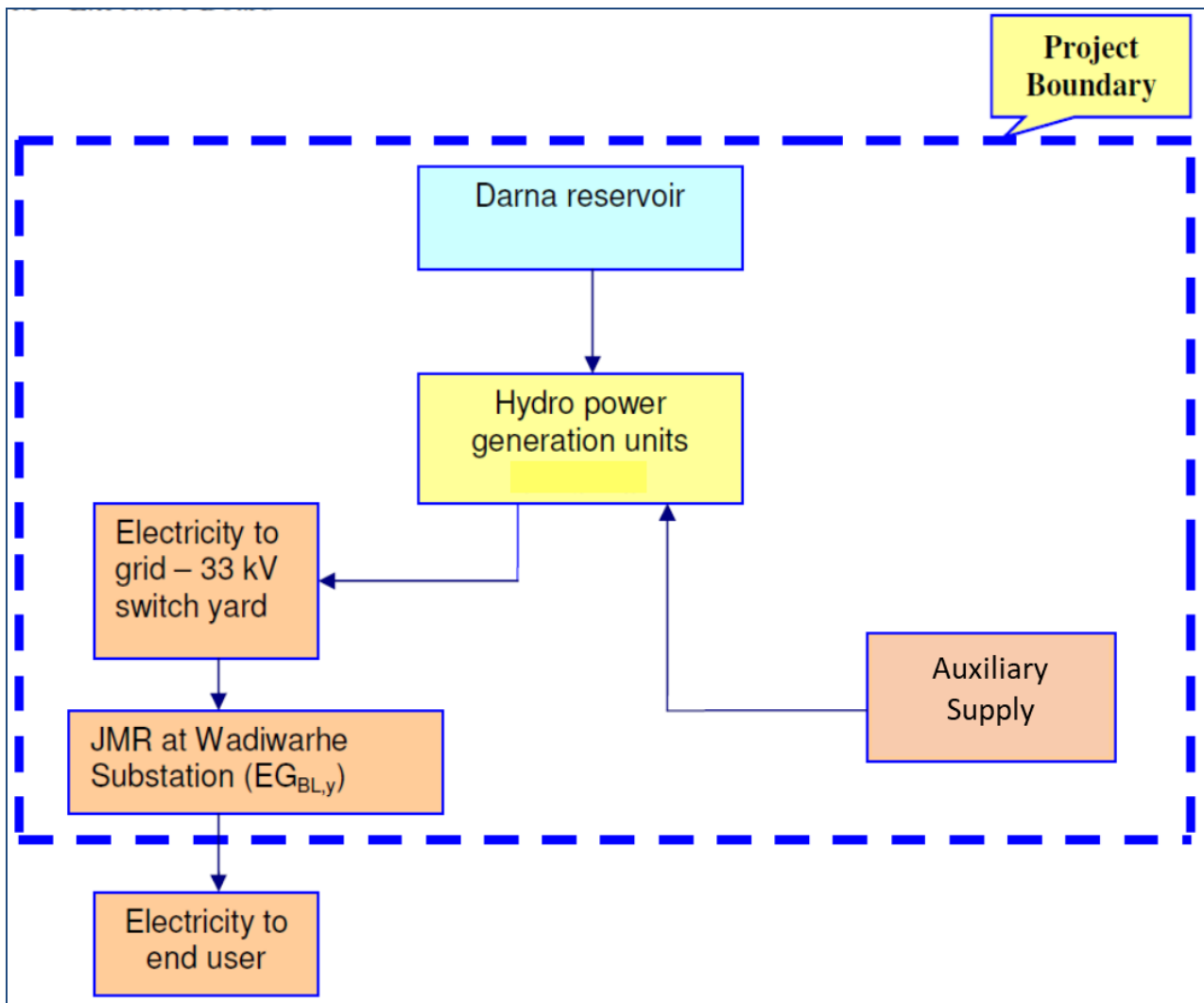
e) Baseline Scenario>>

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

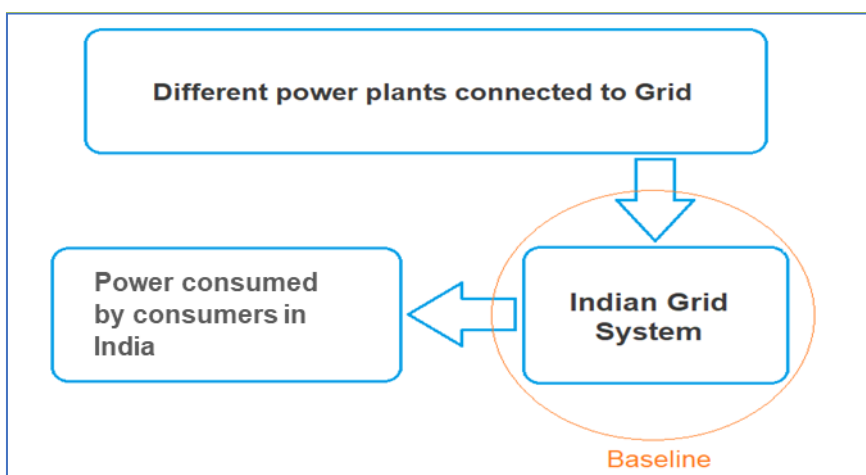
- Grid

In the absence of the project activity the equivalent amount of electricity would have been imported from the regional grid (which is connected to the unified Indian Grid system), which is carbon intensive due to predominantly sourced from fossil fuel-based power plants. Hence, baseline scenario of the project activity is the grid-based electricity system, which is also the pre-project scenario. The schematic diagram showing the baseline scenario:

Project Scenario:



Baseline Scenario:

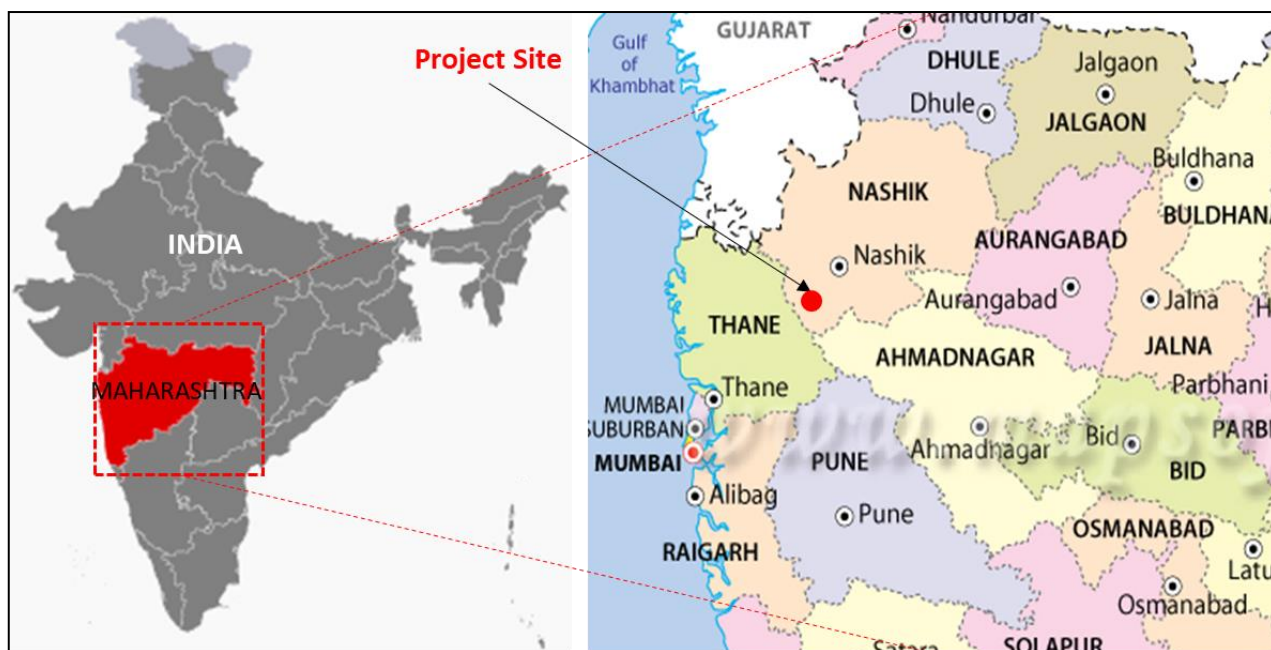


A.2. Location of project activity>>

Country : India
State : Maharashtra
District : Nashik
Village : Nandgaon

This Darna small hydroelectric power project is located in district Nashik of Maharashtra state and harnesses hydro power potential through powerhouse constructed on Darna dam, built on Darna river. Dam is about 170 kms from Mumbai. The nearest big town is Ghoti and closest railhead is at Igatpuri which is about 30 kms away. Ghoti is 25 kms from the project activity and is on busy Mumbai-Agra National Highway No 3. The nearest domestic airport is at Nashik which is about 40 kms. The geographic co-ordinates of the project locations are: 73°45' E & 19°48' N.

The representative location map is included below:



(Courtesy: google map and images)

A.3. Parties and project participants >>

Party (Host)	Participants
India	DLI Power (India) Private Limited (Developer) Address: 6, Shiv Wastu, Tejpal Scheme, Road No.5, Vile Parle, Mumbai - 400057, Maharashtra, India. Contact: Mr. Prakash Therade Ph: +91 98675 32212 Email: ptherade@dlz.com

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

SECTORAL SCOPE:

01, Energy industries (Renewable/Non-renewable sources)

TYPE:

I - Renewable Energy Projects

CATEGORY:

AMS. I.D. (Title: “Grid connected renewable electricity generation”, version 18)

A.5. Crediting period of project activity >>

Length of the crediting period corresponding to this monitoring period: 08 years, 00 months.
Date: 01/01/2014 to 31/12/2021 (inclusive of both dates).

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

Particulars	Details
Name	Mr. Prakash Therade
Designation	GM – Accounts & Finance
Company	DLI Power (India) Private Limited
Address	6, Shiv Wastu, Tejpal Scheme, Road No.5, Vile Parle, Mumbai - 400057, Maharashtra, India
E-mail	ptherade@dlz.com
Contact	+91 98675 32212

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 applied technology is considered to be one of the most environment friendly technologies available as the operation of the hydro turbine generator does not emit any GHGs or any other harmful gases unlike the operation of conventional power plants.

The project activity involves 2 numbers of hydro turbine generators of 2450 kW capacity each with internal electrical lines connecting the project activity with local evacuation facility. The generators generate power at 3.3kV, which can further be stepped up to 33 kV. The project activity can operate in the frequency range of 50 Hz and in the voltage range of 3.3kV \pm 10%. The average lifetime of the generator is around 30 years as per the equipment supplier specification. The other salient features of the technology are:

Design Discharge	14.62 m ³ /sec for Unit 1 and Unit 2
Gross Head	24.51 m
Net Head	19.43 m
Darna Reservoir	
Type	Masonry Dam
Gross Storage	203.44 MCM
Live Storage for Power	193.80 MCM
Top of Dam	571.65 m
Intake Gates	
Numbers	2
Full Reservoir level (FRL)	571.50 m
Maximum draw down level for Power	558.50 m
Size	Rectangular; 1.80 \times 3.00 m
Gate	Individual River Sluice Gates individual for Machine
Water Conductors	
Numbers	2
Type	Boiler Quality Steel
Design Discharge	14.62 cumecs per conductor of Unit 1 and Unit 2
Penstock size	2100 mm dia
Length	65.73 m for Unit 1 and 69.83 m for Unit 2
Power House	
Type	Surfaced Powerhouse (R.C.C structure)
Size	31.225 m \times 35.240 m
Floor level	RL 545.00 Level of CL of Turbine RL 546.40
Tailrace Water Level	Maximum RL 549.086 Minimum RL 547.464
Capacity of OH Crane	30/5 Ton
Turbine	
Make	Kirloskar Brothers Limited, Pune
Type	Horizontal Kaplan S Type

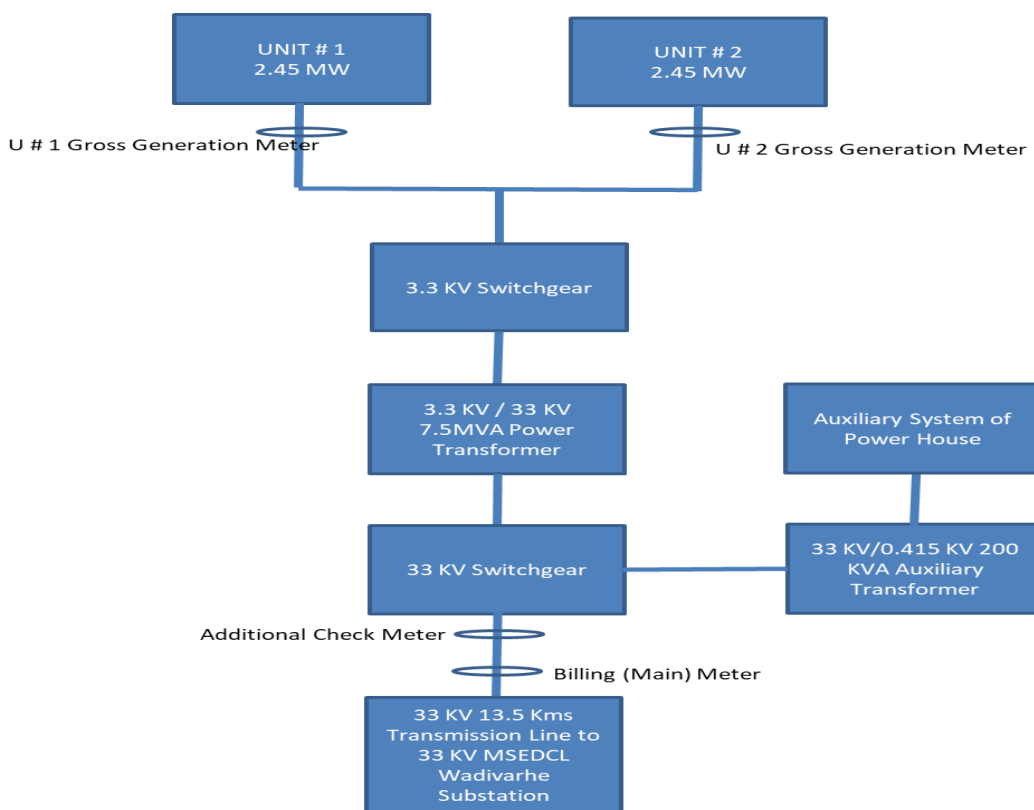
Rating	2 × 2722.23 kVA + 20% COL
Voltage	3300 V
Rated P.F.	0.90
Rated Speed	750 rpm
Gear Box	
Make	Walchandnagar Industries Limited
Type	K45 S
Ratio	350 / 750 rpm
Transformer	
Make	Universal Power Transformer Ltd. Bangalore
Capacity	7500 kVA, 3.3/33 kV 3 Phase, ONAN
Power	
Installed capacity	2 x 2450 kW
No. of unit generated @ 75% dependable	17.76 MU

The hydro turbines have already been commissioned by MSEDCL on 11/01/2011.

In the absence of the project activity the equivalent amount of electricity would have otherwise been generated by the operation of fossil fuel-based grid-connected power plants and fed into Indian grid system, hence baseline scenario of the project activity is the grid-based electricity system, which is also the pre-project scenario as discussed in the previous section.

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

The Schematic diagram of the SHEP are shown below for representation purposes:



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

This project is a greenfield activity where grid power is the baseline. Indian grid system has been predominantly dependent on power from fossil fuel powered plants. The renewable power generation is gradually contributing to the share of clean & green power in the grid; however, grid emission factor is still on higher side which defines grid as distinct baseline.

The Government of India has stipulated following indicators for sustainable development in the interim approval guidelines for such projects which are contributing to GHG mitigations. The Ministry of Environment, Forests & Climate Change, has stipulated economic, social, environment and technological well-being as the four indicators of sustainable development. It has been envisaged that the project shall contribute to sustainable development using the following ways:

Economic well-being: The project is a clean technology investment decided based on carbon revenue support, which signifies boosting up of clean energy investments into the host country and more awareness alongside. The project proponent agrees to provide employment to local people against the manpower requirement in the project activity to bonafide people of the state of Maharashtra, in respect of all the unskilled, skilled, semi-skilled staff and other non-executives as may be required for execution, operation and maintenance of the project. The project activity will contribute in reduction of power demand-supply gap in the region in an environment friendly manner, thus meeting the development needs of the country. In many cases, the local people also get better prices for their land, thereby resulting in overall economic development.

Social well-being: The project will facilitate communication development and access infrastructures in the area, which will help in civic development and enhance various livelihood options for the villagers, helping them improving their standard of living. Thus, project will improve the economical index around the project area.

Technological well-being: The project activity leads to the promotion of 4.90 MW hydro turbine generators 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 technology used is safe and well-practised and leads to technological well-being.

Environmental well-being: The project activity, being dam based hydro scheme, will be having no impacts on the local environment and the community living in the vicinity. It will generate power using zero emissions hydro-based power generation facility which helps to reduce GHG emissions and specific pollutants like SO_x, NO_x, and SPM associated with the conventional thermal power generation facilities. The electricity to be generated by the proposed project activity will be replacing the carbon intensive thermal energy (by equivalent amount) dominated power generation from the respective grid system, thus will help in reducing GHG emission from the atmosphere. Also, being a renewable resource, use of hydro energy to generate electricity contributes to resource conservation. It reduces the dependence on fossil fuels and conserves natural resources which are on the verge of depletion. Thus, the project causes no negative impact on the surrounding environment contributing to environmental well-being.

With regards to ESG credentials:

At present specific ESG credentials have not been evaluated, however, the project essentially contributes to various indicators which can be considered under ESG credentials. Some of the examples are as follows:

Under Environment:

The following environmental benefits are derived from the project activity:

- Produces renewable electricity without any GHG emissions.
- Reservoir based hydro power plant without any negative impact on the surrounding ecology.
- No increase in volume of reservoir and no land inundation, hence no disturbance to the natural habitat.

For the project proponent, energy sale pattern is now based on renewable energy due to the project and it also contributes to GHG emission reduction and conservation of depleting energy sources associated with the project baseline. Hence, project contributes to ESG credentials.

Under Social:

The social well-being is assessed by contribution to improvement in living standards of the local community. The project activity is located in remote villages of industrially backward district of Maharashtra. The implementation of the project activity has provided job opportunities to the local community; contribute in poverty alleviation of the local community and development of basic amenities to community leading to improvement in living standards of the community.

Under Governance:

Governance criteria relates to overall operational practices and accounting procedure of the organization. With respect to this project, the PP practices a good governance practice with transparency, accountability and adherence to local and national rules & regulations etc. The technical and financial transparency has been attained by the well structure monitoring practice at the project sites. The electricity generated from the project can be accurately monitored, recorded and further verified under the existing management practice of the company. Also, the project activity is a hydel power project owned and managed by the proponent for which all required NOCs and approvals are received.

Thus, the project and the proponent ensure good credentials under ESG.



Therefore, it can be concluded that project does not harm or does not have any negative impact. However, as part of this project activity such positive attributes are not separately claimed. Only the emission reductions are claimed under UCR.

B.3. Baseline Emissions>>

This section provides details of emission displacement rates/coefficients/factors established by the applicable methodology selected for the project.

As per the approved consolidated methodology AMS-I.D. Version 18, if the project activity is the installation of a new grid-connected renewable power plant/unit, the baseline scenario is the following:

“The baseline scenario is that the electricity delivered to the grid by the project activity would have otherwise been generated by the operation of grid-connected power plants and by the addition of new generation sources into the grid”.

The project activity involves setting up of a new hydro power plant to harness the green power from hydro energy and to use for sale to national grid 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 each 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 higher emission than the default value. Hence, the same emission factor has been considered to calculate the emission reduction under conservative approach which could be referred in emission reduction calculation spreadsheet and in section C.5.

B.4. Debundling>>

This project activity is not a debundled 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

CATEGORY:

AMS. I.D. (Title: “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 operation of a new hydro power-based power project. The project activity has installed capacity of 4.90 MW which will qualify for a small-scale project activity under Type-I of the Small-Scale methodology. The project status is corresponding to the methodology AMS-I.D., version 18 and applicability of methodology is discussed below:

Applicability Criterion	Project Case
1. This methodology comprises renewable energy generation units, such as photovoltaic, hydro, tidal/wave, wind, geothermal and renewable biomass: (a) Supplying electricity to a national or a regional grid; or (b) Supplying electricity to an identified consumer facility via national/regional grid through a contractual arrangement such as wheeling.	The project activity involves setting up of a renewable energy (hydro) generation plant that exports electricity to the fossil fuel dominated Indian electricity grid system. Thus, the project activity meets this applicability conditions.
2. Illustration of respective situations under which each of the methodology (i.e. AMS-I.D: Grid connected renewable electricity generation”, AMS-I.F: Renewable electricity generation for captive use and mini-grid” and AMS-I.A: Electricity generation by the user) applies is included in Table 2	According to the point 1 of the Table 2 in the methodology – “Project supplies electricity to a national/ regional grid” is applicable under AMS I.D. As the project activity supplies the electricity to the regional grid which is a regional grid, the methodology AMS-I.D. is applicable.
3. 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 Project activity involves the installation of new power plant at a site where there was no renewable energy power plant operating prior to the implementation of the project activity. Thus, Project activity is a Greenfield plant and satisfies this applicability condition (a).
4. Hydro power plants with reservoirs that satisfy at	As the project activity is a reservoir based

Applicability Criterion	Project Case
<p>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>hydro power plant, which is implemented in an existing reservoir without change in the volume. Thus, this criterion (a) is relevant for the project activity.</p>
<p>5. 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 rated capacity of the project activity is 4.90 MW with no provision of Co-firing fossil fuel. Hence, meeting with this criterion.</p>
<p>6. Combined heat and power (co-generation) systems are not eligible under this category</p>	<p>This is not relevant to the project activity as the project involves only hydro power generating units.</p>
<p>7. 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.</p>	<p>There is no other existing renewable energy power generation facility at the project site. Therefore, this criterion is not applicable.</p>
<p>8. 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.</p>	<p>The project activity is a new installation, it does not involve any retrofit measures nor any replacement and hence is not applicable for the project activity.</p>
<p>9. 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.</p>	<p>This is not relevant to the project activity as the project involves only hydro power generating units.</p>
<p>10. In case biomass is sourced from dedicated</p>	<p>This is not relevant to the project activity</p>

Applicability Criterion	Project Case
plantations, the applicability criteria in the tool “Project emissions from cultivation of biomass” shall apply.	as the project involves only hydro power generating units.

C.3. Applicability of double counting emission reductions >>

There is no double accounting of emission reductions in the project activity due to the following reasons:

- Project is uniquely identifiable based on its location coordinates,
- Project has dedicated commissioning certificate and connection point,
- Project is associated with energy meters which are dedicated to the generation/feeding point with the grid.

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 that the project power plant is connected to.*”

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

Source		Gas	Included	Justification/Explanation
Baseline	Grid connected electricity generation	CO ₂	Yes	CO₂ 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 Bundled Solar 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) >>

Net GHG Emission Reductions and Removals

$$\text{Thus, } ER_y = BE_y - PE_y - LE_y$$

Where:

ER_y = Emission reductions in year y (tCO₂/y)

BE_y = Baseline Emissions in year y (tCO₂/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	=	Baseline emissions in year y (t CO ₂)
$EG_{PJ,y}$	=	Quantity of net electricity generation that is produced and fed into the grid as a result of the implementation of this project activity in year y (MWh)
$EF_{grid,y}$	=	UCR recommended emission factor of 0.9 tCO ₂ /MWh has been considered. (Reference: General Project Eligibility Criteria and Guidance, UCR Standard, page 4)

Project Emissions

As per paragraph 39 of AMS-I.D, version 18, for most renewable energy project activities emission is zero.

As per applied methodology only emission associated with the fossil fuel combustion, emission from operation of DG Set, would be accounted for the project emission on actuals. Therefore, following project emission type has been considered for the project activity:

Diesel consumption:

The project also involves consumption of minor quantity of Diesel in standby DG Set. So, the formula used to calculate the project emissions due to diesel consumption is provided below:

$$PE_{\text{Diesel}} = \sum DC_y \times P \times NCV_{\text{Diesel}} \times EF_{\text{CO2Diesel}}$$

Where:

PE_{Diesel} = Project Emission due to Diesel consumed during monitoring period in DG set

DC_y = Diesel Consumption in Liters (lit)

P = Density of Diesel (0.86 kg/lit)
 NCV_{Diesel} = Net Calorific Value of Diesel
 $EF_{CO_2\text{Diesel}}$ = IPCC 2006 Emission factor for Diesel

Hence, $PE_y = PE_{\text{Diesel}} = 5.515 \text{ tCO}_2\text{e}$

Leakage

As per paragraph 22 of AMS-I.D. version-18, 'If the energy generating equipment is transferred from another activity, leakage is to be considered.' In the project activity, there is no transfer of energy generating equipment and therefore the leakage from the project activity is considered as zero.

Hence, $LE_y = 0$

The actual emission reduction achieved during the first CoU period (i.e., period for this monitoring report) is calculated in detail in separate spreadsheet. The same is provided as attachment below for reference.

Overall emission reduction achieved by the project activity for this current monitoring period is demonstrated below:

$$\begin{aligned}
 BE_y &= 99,448 \text{ MWh} \times 0.9 \text{ tCO}_2/\text{MWh} \\
 &= 89,503.96 \text{ tCO}_2\text{e}
 \end{aligned}$$

$$\begin{aligned}
 ER_y &= BE_y - PE_y - LE_y \\
 &= 89,503.96 - 5.515 - 0 \\
 &= 89,498.445 \text{ tCO}_2\text{e}
 \end{aligned}$$

The final net ER value considered for claim for the current monitoring period = 89,495 tCO₂e (i.e., 89,495 CoUs)

Rational: This final value is conservative as all annualized ER values are rounded down and final sum is considered for reporting, which gives the most conservative result.

The vintage wise break up is given under the ER excel sheet and also included under the Appendix 2 of this report.

C.6. Prior History>>

The project activity is a small-scale hydro project and has not achieved any registration or issuance under any other GHG mechanism prior to this registration with UCR. However, project was applied under Clean Development Mechanism (CDM) of UNFCCC for initial listing under the title "Darna Small Hydro Project of DLI Power (India) Private Limited", for the Period of Comments "11 Feb 2010 to 12 Mar 2010"; but did not proceed further in the validation process. This information can be verified from the CDM web interface.

Also, project has not been applied for any other environmental crediting or certification mechanism under any regional or national or international platforms other than UCR. Hence project will not cause double accounting of carbon credits (i.e., COUs).

C.7. Monitoring period number and duration>>

First CoU Issuance Period: 8 years, 0 months

Date: 01/01/2014 to 31/12/2021 (inclusive of both dates).

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

There is no change in the start date of crediting period.

The start date of crediting under UCR is considered as 01/01/2014, and no GHG emission reduction has been claimed so far.

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

Not applicable.

C.10. Monitoring plan>>

Data and Parameters available at validation (ex-ante values):

Data / Parameter	UCR recommended emission factor
Data unit	tCO ₂ /MWh
Description	A "grid emission factor" refers to a CO ₂ emission factor (tCO ₂ /MWh) which will be associated with each unit of electricity provided by an electricity system. The UCR recommends an emission factor of 0.9 tCO ₂ /MWh for the 2014-2020 years as a fairly conservative estimate for Indian projects not previously verified under any GHG program. Hence, the same emission factor has been considered to calculate the emission reduction under conservative approach.
Source of data	https://a23e347601d72166dcd6-16da518ed3035d35cf0439f1cdf449c9.ssl.cf2.rackcdn.com/Documents/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
	The combined margin emission factor as per CEA database (current version 16, Year 2021) results into higher emission factor. Hence for 2021 vintage UCR default emission factor remains conservative.

Data / Parameter	P
Data unit	kg/lit
Description	Density of diesel
Source of data	http://www.fast-tek.com/TM104.pdf http://www.iocl.com/Products/DieselSpecifications.pdf

Value applied	0.860
Measurement methods and procedures	Fixed Value has been taken from the publicly available data source.
Purpose of Data	Calculation of project emission
Comments	This parameter is fixed ex-ante for the entire crediting period.

Data / Parameter	NCV _{diesel,y}
Data unit	GJ/Ton
Description	Net calorific value of the Diesel in year y
Source of data	As options a, b & c are not available, the project proponent chooses option d i.e., IPCC default values at the upper limit of the uncertainty at a 95% confidence interval as provided in Table 1.2 of Chapter 1 of Vol. 2 (Energy) of the 2006 IPCC Guidelines on National GHG Inventories and is fixed Ex-ante. This is in accordance to the “Tool to calculate project or leakage CO ₂ emissions from fossil fuel combustion”, latest version applied.
Value applied	43.30
Measurement methods and procedures	IPCC Default Value is considered.
Purpose of Data	Calculation of project emission
Comments	This parameter is fixed ex-ante for the entire crediting period.

Data / Parameter	EF _{CO₂,diesel,y}
Data unit	tCO ₂ e/TJ
Description	CO ₂ emission factor of diesel in year y
Source of data	IPCC default value
Value applied	74.8
Measurement methods and procedures	As options a, b & c are not available, the project proponent chooses option d i.e., IPCC default values at the upper limit of the uncertainty at a 95% confidence interval as provided in Table 1.4 of Chapter 1 of Vol. 2 (Energy) of the 2006 IPCC Guidelines on National GHG Inventories and is fixed Ex-ante. This is in accordance to the “Tool to calculate project or leakage CO ₂ emissions from fossil fuel combustion” latest version applied.
Purpose of Data	Calculation of project emission
Comments	This parameter is fixed ex-ante for the entire crediting period.

Data and Parameters to be monitored (ex-post monitoring values):

Data / Parameter	EG _{PJ,y}
Data unit	MWh / year
Description	Net electricity supplied to the grid by the project activity

Source of data	Monthly Joint Meter Readings (JMRs)
Measurement procedures (if any):	<ul style="list-style-type: none"> • Data Type: Measured • Monitoring equipment: Energy Meters are used for monitoring (details attached in the Appendix-1) • Recording Frequency: Continuous monitoring and Monthly recording from Energy Meters, Summarized Annually • Archiving Policy: Paper & Electronic • Calibration frequency: 5 years (as per CEA provision) <p>Generally, the calculation is done by the Authority/Discom and PP has no control over the authority for the calculation. Therefore, based on the joint meter reading certificates/credit notes, PP shall raise the invoice for monthly payments.</p> <p>In case the monthly JMR provides net export quantity, the same will be directly considered for calculation. However, if the JMR does not directly provide “net electricity” units, then quantity of net electricity supplied to the grid shall be calculated using the parameters reflected in the JMR.</p> <p>For example, the difference between the measured quantities of the grid export and the import will be considered as net export:</p> $EG_{PJ,y} = EG_{Export} - EG_{Import}$ <p>Thus, $EG_{PJ,y}$ is the net export which will be either directly sourced from the monthly generation statements (such as JMR) or to be calculated from export and import values reported.</p>
Measurement Frequency:	Monthly
Value applied:	99,448 (this is the cumulative value for the entire monitoring period, yearly values are reported in the ER sheet)
QA/QC procedures applied:	<p>Calibration of the Main meters will be carried out once in five (5) years as per National Standards (as per the provision of CEA, India) and faulty meters will be duly replaced immediately as per the provision of power purchase agreement. The same practice has been followed during the current monitoring period.</p> <p>Cross Checking: Quantity of net electricity supplied to the grid will be cross checked from the invoices raised by the project participant to the grid.</p>
Purpose of data:	The Data/Parameter is required to calculate the baseline emission.
Any comment:	All the data will be archived till a period of two years from the end of the crediting period.

Data / Parameter	DC _y
Data unit	Liters

Description	Diesel consumption by the standby DG set in year y
Source of data	Plant Records
Measurement methods and procedures	The diesel quantity available in the diesel storage tanks is recorded daily by PP in the plant log book. The diesel consumption has been recorded in the logbook in litres. However, based on the density of diesel of about 0.86 kg/lit, the diesel consumption in tons is calculated.
Frequency of monitoring/recording	Continuously and recorded monthly basis.
Value monitored	2,029 (this is the cumulative value for the entire monitoring period, yearly values are reported in the ER sheet)
Monitoring equipment	Calculated
QA/QC procedures to be applied	The measured data will be cross checked with total diesel procurement using payment receipts.
Purpose of the data	Calculation of project emissions.
Calculation method	Data Type: Measured & Calculated Data Archiving: Paper/ Electronic.
Comments	The data would be archived up to two years after the end of crediting period.

APPENDIX - 1:

Energy Meter Details applicable for the project activity:

Details	Gross Meter		Main Meter	Additional Check meter
	Unit #1	Unit #2		
Serial Number	D0008420	D00088421	HT01160009	HT01150036
Make	Secure	Secure	Wallaby	Wallaby
Meter accuracy	0.2	0.2	0.2	0.2
Meter CT Ratio	600/ 1 A	600 / 1 A	-/1A	-/1A
Meter PT Ratio	3.3. kV/110 V	3.3. kV/110 V	11 kV/110 V	3.3. kV/110 V
Latest testing date:	25/08/2020	25/08/2020	25/08/2020	25/08/2020

Meter Testing Details:

Gross Generation Meter		Billing Main Meter	Additional Check Meter	Remarks
Unit # 1	Unit # 2			
SECURE ELITE 115 D0008420	SECURE ELITE 115 D0008421	ELSTER M++ 05123037	ELSTER M++ 05126103	Meters installed before January 2014
18-Jan-14	18-Jan-14	16-Jan-14	16-Jan-14	
5-Jul-14	5-Jul-14	4-Jul-14	4-Jul-14	
4-Feb-15	4-Feb-15	3-Feb-15	3-Feb-15	
4-Jul-15	4-Jul-15	3-Sep-15	3-Sep-15	Billing Main and Additional Check Meters replaced on 11/09/2015
No Change	No Change	EDMI Mk6E HT01150079	EDMI Mk6E HT01150081	
1-Jun-16	1-Jun-16	14-May-16	14-May-16	
4-Feb-17	4-Feb-17	4-Feb-17	4-Feb-17	
18-Nov-17	18-Nov-17	20-Nov-17	14-Dec-17	
No Change	No Change	EDMI Mk6E HT01160009	EDMI Mk6E HT01150036	Billing Main and Additional Check Meters replaced
4-Jul-18	4-Jul-18	7-Jul-18	7-Jul-18	
29-Jun-19	29-Jun-19	22-Jun-19	22-Jun-19	
-	-	19-Feb-20	19-Feb-20	
25-Aug-20	25-Aug-20	25-Aug-20	25-Aug-20	
-	-	12-Jan-22	12-Jan-22	

APPENDIX - 2:

Final summary of CoUs claim under this monitoring period:

Year	Unit	Value
2014	tCO ₂ e	4,123
2015	tCO ₂ e	9,541
2016	tCO ₂ e	10,154
2017	tCO ₂ e	11,926
2018	tCO ₂ e	16,080
2019	tCO ₂ e	9,577
2020	tCO ₂ e	14,698
2021	tCO ₂ e	13,396
Total Emission Reduction:	tCO₂e	89,495