PROJECT CONCEPT NOTE

CARBON OFFSET UNIT (CoU) PROJECT

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

Version 1.0
Date 14/01/2022

First CoU Issuance Period: 08 years, 00 month
Date: 01/01/2014 to 31/12/2021

Project Concept Note (PCN)
CARBON OFFSET UNIT (CoU) PROJECT

BASIC INFORMATION	
Title of the project activity	4.9 MW Darna Small Hydro Electric Project in Nashik District of Maharashtra
Scale of the project activity	Small Scale
Completion date of the PCN	14/01/2022
Project participants	DLI Power (India) Private Limited (Project Proponent)
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)
Estimated amount of total GHG emission reductions	To be estimated during verification [An ex-ante estimate is 21,800 CoUs per year]

SECTION A. Description of project activity

A.1. Purpose and general description of Carbon offset Unit (CoU) project activity >>

The project activity is a 4.9 MW (2×2.45 MW) Small Hydro Electric Project in Nashik District of Maharashtra, currently titled under UCR as **"4.9 MW Darna Small Hydro Electric Project in Nashik District of Maharashtra"**. This small-scale Hydro Power project has already been commissioned in the village Nandgaon of Nashik district in the state of Maharashtra (India). Thus, the project is an operational activity with continuous reduction of GHG, currently being applied under "Universal Carbon Registry" (UCR).

Purpose of the project activity:

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 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 Maharashtra State Electricity Distribution Company Limited (MSEDCL) grid system for transmission & distribution. This project activity is expected to supply a net amount of electricity of 24,222 MWh per year to the integrated or unified Indian Grid system. The project utilises a net head of about 19.43 m. The project activity is already been commissioned on 11/01/2011.

The net generated electricity from the project activity is sold to state electricity board i.e., 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 is displacing the estimated annual net electricity generation i.e., 24,222 MWh from the Indian grid system (based on a projected PLF of 60%), which otherwise would have been generated by the operation of fossil fuel-based grid-connected power plants. The project activity doesn't involve any GHG emission sources. The estimated annual CO_2e emission reductions by the project activity are expected to be 21,800 tCO_2e.

The estimated annual average and the total CO_2e emission reduction by the project activity is expected to be 21,800 tCO_2e, whereas actual emission reduction achieved during the first CoU period shall be submitted as a part of first monitoring and verification.

Since the project activity will generate 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.

Project's Contribution to Sustainable Development

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 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:

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.

Economic well-being: 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.

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. 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.

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 Economics:

Economic well-being refers to additional investment consistent with the needs of the local community. The project activity has invested significantly (nearly about INR 296.6 million). This investment is quite significant in a rural area. These activities have contributed to the economic well-being of the local community. The project activity has also provided direct and indirect job opportunities to the local community during construction and shall provide permanent job opportunities during operation. During operation of the project activity, many persons has been employed directly, apart from indirect employment, which would augur well for the economic well-being of the community

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

There was no harm identified form the project and hence no mitigations measures are applicable.

Rational: as per 'Central Pollution Control Board (Ministry of Environment & Forests, Govt. of India)', final document on revised classification of Industrial Sectors under Red, Orange, Green and White Categories (07/03/2016), it has been declared that hydro project activity falls under the "White category". White Category projects/industries do not require any Environmental Clearance such as 'Consent to Operate' from PCB as such project does not lead to any negative environmental impacts. Additionally, as per Indian Regulation, Environmental and Social Impact Assessment is not required for small Hydro Projects.

Nevertheless, PP had conveyed about project activity before implementation at respective villages of Nashik district of Maharashtra, India. PP had organised a formal meeting at site office on 26/08/2009 to appraise the local stakeholders about the project activity. Many stakeholders like local panchayat & residents, local farmers, MSEDCL, Maharashtra Pollution Control Board had participated to understand, discuss, record all possible concerns related to environment and socio-economic aspects of the project so that as per requirements mitigation measures can be taken. The feedback and inputs received from local stakeholders confirm that no negative impact is foreseen by them.

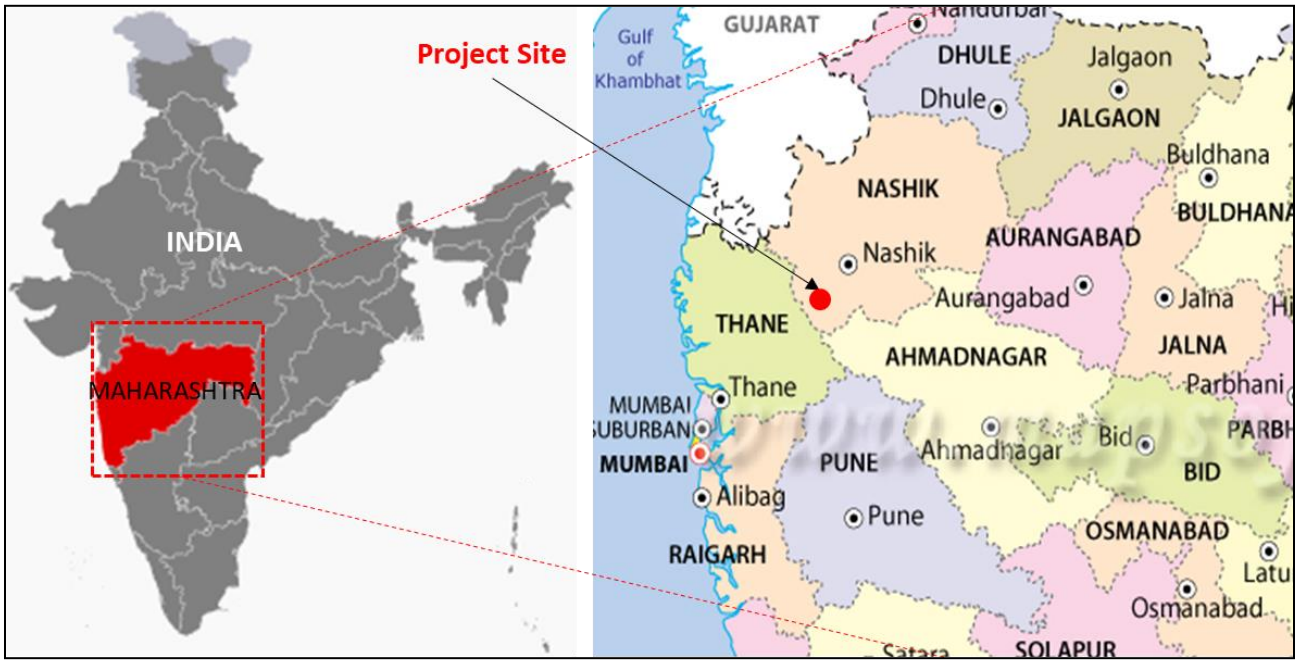
Additionally, there are social, environmental, economic and technological benefits which contribute to sustainable development. The key details have been discussed in the previous section.

A.3. 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 and harnesses hydro power potential through power house 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 km. 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.4. Technologies/measures >>

The project activity involves 2 numbers 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 ± 10%. The average life time 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 m3 / 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 × 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 Power House (R.C.C structure)
Size	31.225 m × 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.

A.5. 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.6. Baseline Emissions>>

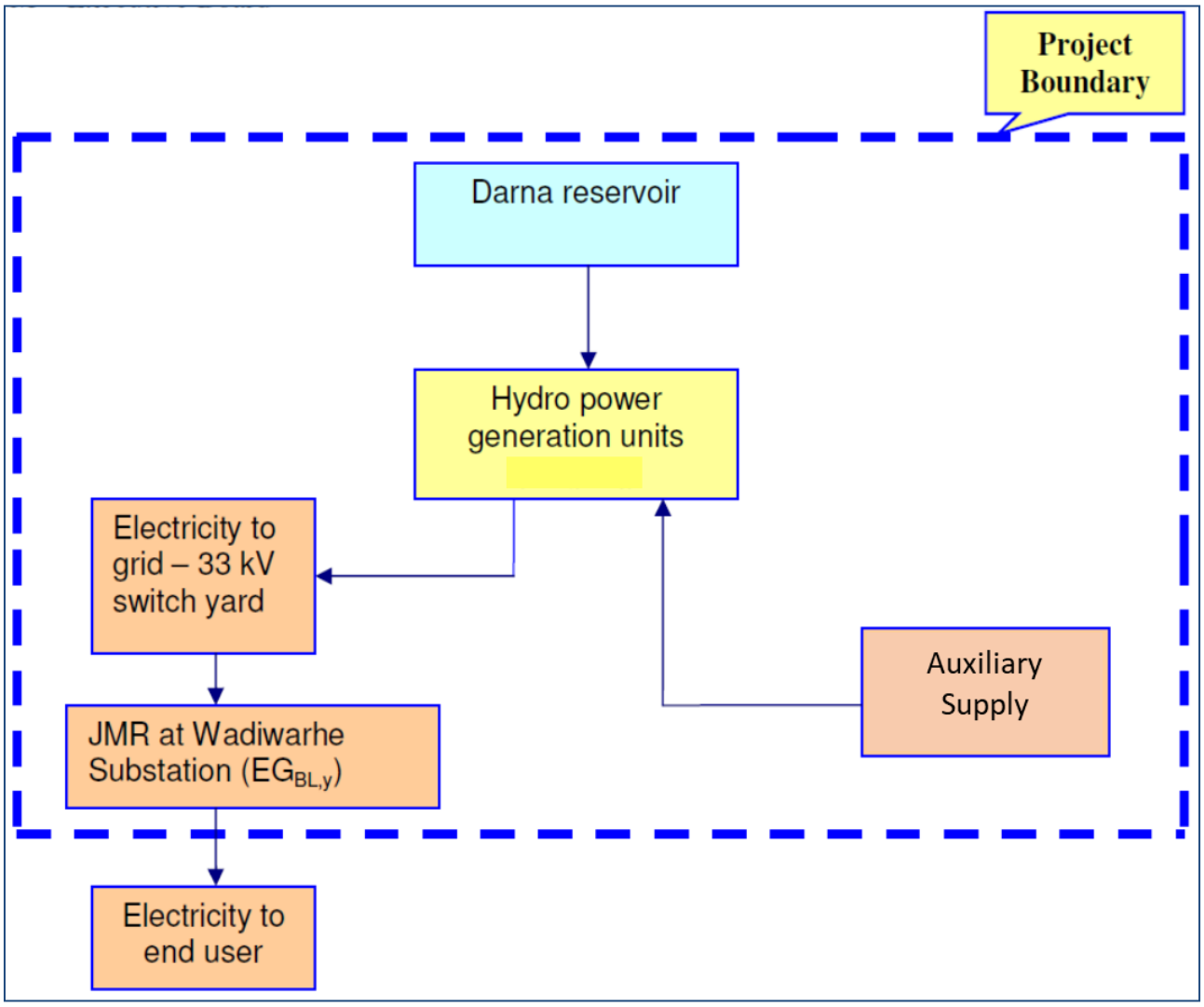
The baseline scenario identified at the PCN stage of the project activity is:

- Grid

In the absence of the project activity, the equivalent amount of electricity would have been generated by the operation of fossil fuel-based grid-connected power plants and fed into Indian grid system, which is carbon intensive due to use of fossil fuels. Hence, baseline scenario of the project activity is the grid-based electricity system, which is also the pre-project scenario.

Schematic diagram showing the baseline scenario:

Project Scenario:



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".

The project activity involves setting up of a new SHEP plant to harness the green power from Hydrel energy and to supply the produced power to the grid. In the absence of the project activity, the equivalent amount of power would have been supplied by the Indian grid, which is fed mainly by fossil fuel fired plants. Hence, the baseline for the project activity is the equivalent amount of power produced at the Indian grid.

A.7. Debundling>>

This project activity is not a debundled component of a larger project activity.

SECTION B. Application of methodologies and standardized baselines

B.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)

B.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); or	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).

Applicability Criterion	Project Case
(e) Involve a replacement of (an) existing plant(s).	
4. Hydro power plants with reservoirs that satisfy at least one of the following conditions are eligible to apply this methodology: (a) The project activity is implemented in existing reservoir, with no change in the volume of the reservoir; or (b) The project activity is implemented in existing reservoir, where the volume of the reservoir(s) is increased and the power density as per definitions given in the project emissions section, is greater than 4 W/m^2. (c) The project activity results in new reservoirs and the power density of the power plant, as per definitions given in the project emissions section, is greater than 4 W/m2	As the project activity is a reservoir based 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.
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.	The rated capacity of the project activity is 4.90 MW with no provision of Co-firing fossil fuel. Hence, meeting with this criterion.
6. Combined heat and power (co-generation) systems are not eligible under this category	This is not relevant to the project activity as the project involves only hydro power generating units.
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.	There is no other existing renewable energy power generation facility at the project site. Therefore, this criterion is not applicable.
8. In the case of retrofit or replacement, to qualify as a small-scale project, the total output of the retrofitted or replacement power plant/unit shall not exceed the limit of 15 MW.	The project activity is a new installation, it does not involve any retrofit measures nor any replacement and hence is not applicable for the project activity.
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	This is not relevant to the project activity as the project involves only hydro power generating units.

Applicability Criterion	Project Case
electricity" shall be explored.	
10. In case biomass is sourced from dedicated plantations, the applicability criteria in the tool "Project emissions from cultivation of biomass" shall apply.	This is not relevant to the project activity as the project involves only hydro power generating units.

B.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.

B.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_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

B.5. Establishment and description of baseline scenario >>

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

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 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 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. 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.

Net GHG Emission Reductions and Removals

Thus, $ER_y = BE_y – PE_y – LE_y$

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 (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:

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

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
$EF_{CO2Diesel}$ = IPCC 2006 Emission factor for Diesel

Hence, $PE_y = PE_{Diesel}$

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 shall be submitted as a part of first monitoring and verification. However, for the purpose of an ex-ante estimation, following calculation has been submitted:

Estimated annual baseline emission reductions (BE_y)
= 24,222 MWh/year × 0.9 tCO_2/MWh
= 21,800 tCO_2/year (i.e., 21,800 CoUs/year)

B.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).

B.7. 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.

B.8. Permanent changes from PCN monitoring plan, applied methodology or applied standardized baseline >>

Not applicable.

B.9. Monitoring period number and duration>>

First Monitoring Period:
08 years, 00 month
01/01/2014 to 31/12/2021 (inclusive of both dates)

B.8. 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
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.

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 CO2 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_2e/TJ
Description	CO2 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 CO2 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):	• 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) 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.

	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. For example, the difference between the measured quantities of the grid export and the import will be considered as net export: $EG_{PJ,y} = EG_{Export} - EG_{Import}$ 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.
Measurement Frequency:	Monthly
Value applied:	24,222 (Annualized average value has been considered here for an ex-ante estimation only, whereas this is an ex-post parameter hence actual value shall be applied during monitoring and verification)
QA/QC procedures applied:	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. 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.
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	To be monitored as per actuals
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:

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

Appendix 2:

Some photographs of the project activity: