



PROJECT CONCEPT NOTE

CARBON OFFSET UNIT (CoU) PROJECT

Title: 2x2.5 MW Sainj Hydro Electric Project implemented in Shimla District of Himachal Pradesh

Version 1.0

Date 15/12/2021

First CoU Issuance Period: 7 years, 11 months

Date: 01/01/2014 to 30/11/2021



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

BASIC INFORMATION

Title of the project activity	2x2.5MW Sainj Hydro Electric Project implemented in Shimla District of Himachal Pradesh
Scale of the project activity	Small Scale
Completion date of the PCN	15/12/2021
Project participants	Creduce Technologies Private Limited (Representator) Himshakti Projects 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 22,348 CoUs per year]

SECTION A. Description of project activity

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

The proposed project tile under UCR is “2x2.5MW Sainj Hydro Electric Project implemented in Shimla District of Himachal Pradesh”, which is a Hydro Power project located in village Dhera of Shimla district in the state of Himachal Pradesh (India). The project is an operational activity with continuous reduction of GHG, currently being applied under “Universe Carbon Registry” (UCR).

Purpose of the project activity:

The proposed project activity is promoted by Himshakti Projects Private Limited (herein after called as project proponent PP). The proposed project activity is installation and operation of 2 horizontal shaft Francis Hydro Turbine generators having individual capacity of 2500 kW each with aggregated installed capacity of 5.00 MW in village Dhera of Shimla district in the state of Himachal Pradesh state of India.

This project activity is a run-of-the-river project that utilizes the flow of the river through Head Race Tunnel (HRT) and penstocks and by using two (2x2.5 MW) horizontal Francis turbines connected to a synchronous generator to generate total energy of 5.00 MW. The main structure includes barrage, intake DeSilting tank, chambers, Head Race Tunnel (HRT), surge shaft, penstock and power house. 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 into the Shillai sub-station of Himachal Pradesh State Electricity Board grid system for transmission & distribution. The project activity is expected to supply a net amount of electricity of 24,832 MWh per year considering 3% losses, to the Northern regional grid, which is a part of the integrated Grid system, i.e. NEWNE (Northern, Eastern Western and North-Eastern) grid. The project utilises a net head of about 90.0 m. The project activity was commissioned on 13/05/2010.

Therefore, no fossil fuel is involved for power generation in the project activity, except a nominal use of diesel gen-set during emergency and/or for backup arrangement. The proposed project activity is also reducing the anthropogenic emissions of greenhouse gases in to the atmosphere by displacing an equivalent amount of power at grid, generated from fossil fuel-based power plants which are connected to the same NEWNE grid (currently designated as unified Indian Grid System).

The net generated electricity from the project activity is sold to Himachal Pradesh State Electricity Board i.e., HPSEB as per Power Purchase Agreement (PPA) signed between them and PP. 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 generation sources in the grid.

Hence, project activity is displacing the estimated annual net electricity generation i.e., 24,832 MWh from the regional grid, 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 average and the total CO₂e emission reductions by the project activity are expected to be 22,348 tCO₂e.

As per ex-ante estimate, the annual average CO₂e emission reduction by the project activity is expected to be 22,348 tCO₂e; whereas actual emission reduction achieved during the first CoU period shall be submitted as a part of first monitoring and verification process.

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, will improve the economical index around the project area.

Economic well-being: The project proponent agrees to provide 70% employment of total manpower requirement in the project activity to bonafide people of the state of Himachal Pradesh, in respect of all the unskilled/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 5 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 a run-of-the-river hydro scheme, will have no requirement of reservoirs and 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.
- Run of river hydro power plant with little 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 state of Himachal Pradesh. 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 INR 359.62 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 from 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, stakeholders’ consultation meeting was conducted on 10th August, 2006 at Panchayat

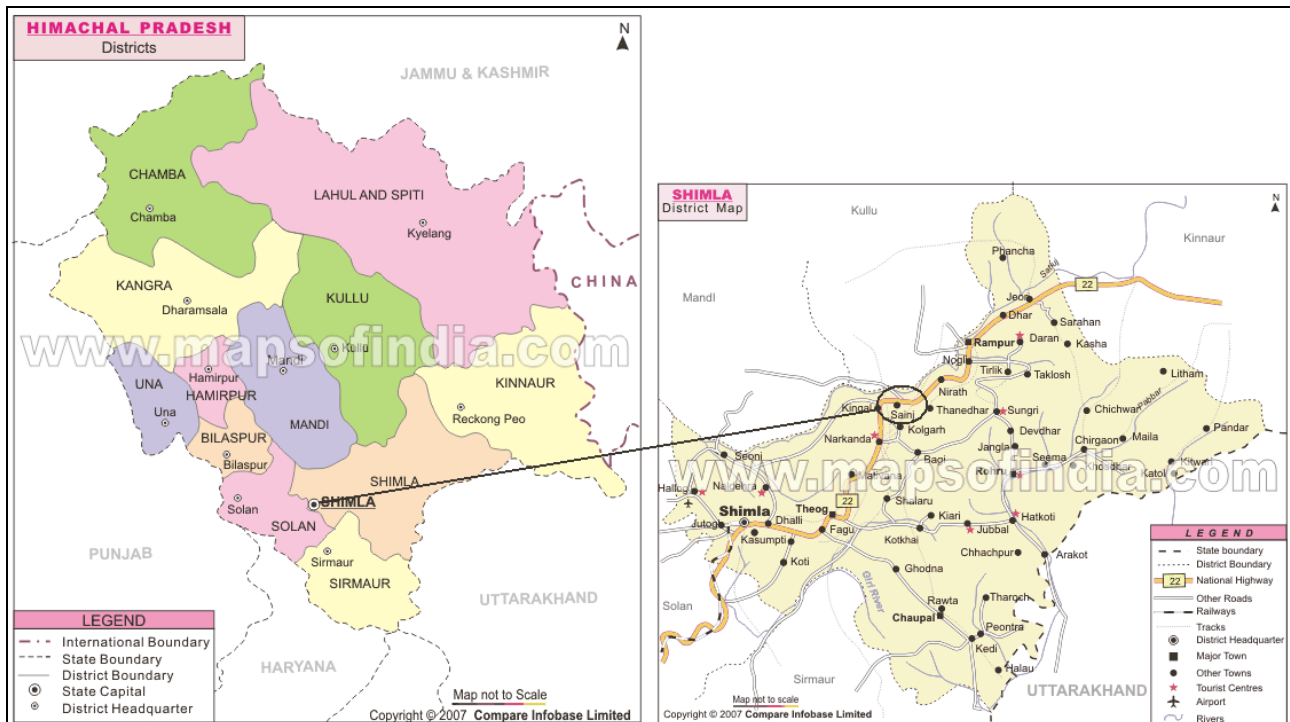
of Bawat (village level governance body falling in the project vicinity) and on 12th September, 2006 at Panchayat of Koti-Bonch by the PP to understand, discuss, record all possible concerns related environment and socio-economic aspects of the project so that as per requirements mitigation measures can be taken. Along with personal invitation, public notices were placed in local newspapers in local language to invite people for the consultation meeting with the agenda of inviting public comments on the project activity. The feedback and inputs received from stakeholders confirm that no negative impact is foreseen by the stakeholders.

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 >>

This Sainj Hydro Electric Project is located in district Shimla of Himachal Pradesh and will envisage harnessing of hydro power potential through barrage constructed on the river upstream of the confluence point where the Gawain Khad joins the Sainj Khad. The project site is accessible by road and is about 100 km from Paonta Sahib to Chaupal, 7 km after Rohnat. The nearest rail head is Dehradun, which is about 140 km from the project site. The geographic co-ordinate of the project locations is 30°48'00"N and 77°40'02"E.

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 2500 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 47.5–51.5 Hz and in the voltage range of 3.3kV \pm 10%. The average life time of the generator is around 40 years as per the equipment supplier specification. The other salient features of the technology are:

Parameter	Details
Hydrology	
Catchment Area	168.48 Sq. Km
Design Discharge	6.60 Cumecs
Gross Head	97 m
Minimum Net Head	90 m
Power & Energy Potential:	
Station Installed Capacity	5 MW
Annual energy export to the grid (3% Losses)	24.832 GWh
Turbine	
Type of turbine	Horizontal shaft Francis
Rated Speed	750 rpm
Number of Units	2
Rated Capacity of each generating unit	2.5 MW
Turbine Setting	+1.0 m
Generator	
Generator Type	Natural air cool, self ventilated
Rated Capacity	2.78 MVA
Rated Speed	750 rpm
Power factor	0.9
Voltage	3.3 KV \pm 10%
Stator & Rotor Winding Insulation	Class-F
Step Up Transformer :	
Capacity	6.5 MVA
Vector Group	Yd 11
Tap Changing Arrangement	On-Load Tap Changer
Rated Voltage (HV)	33 kV
Rated Voltage (LV)	3.3 kV
Type of Cooling	ONAN
Power Evacuation:	
Type of Transmission Line	Single circuit 33 KV Line
Length	20 Km
Number of Circuits	1
Terminating point	Shilai sub-station at HPSEB

The hydro turbines have already been commissioned by HPSEB (Serial number HPSEB/PHE/Sainj HEP/2010- 444-50 Dated – 13/05/2010).

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 NEWNE grid, 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	<p>Creduce Technologies Private Limited (Representator)</p> <p>Contact person: Shailendra Singh Rao Mobile: +91 9016850742, 9601378723 Address: 2-O-13,14 Housing Board Colony, Banswara, Rajasthan - 327001, India</p> <p>Himshakti Projects Private Limited (Developer) Address: 1st Floor, Bhikaji Cama Place, 15 NBCC Tower, New Delhi, Delhi – 110066, India</p>

A.6. Baseline Emissions>>

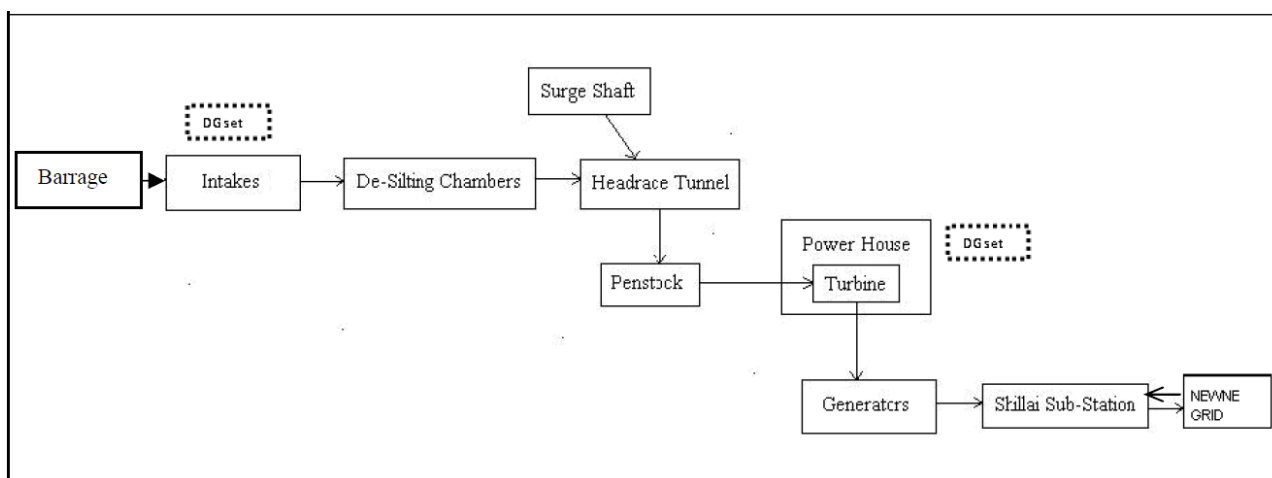
The baseline scenario identified at the PCN stage of the project activity is:

- 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 NEWNE grid, 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 SHP plant to harness the green power from Hydel 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)

Note: This project is a CDM registered project, project proponent had applied the version 15 of the methodology during the CDM registration project under the ID 4272. The project was registered at CDM of UNFCCC on 23rd December 2010 with fixed crediting period of 10 years which was ended as on 31st January 2021. After the completion of crediting period project has not been renewed or applied under any mechanisms. Hence, for UCR latest version of methodology i.e., version 18 is being considered for emission reduction calculation.

B.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 power project. The project activity has installed capacity of 5 MW which will qualify for a small-scale project activity under Type-I of the Small-Scale methodology. The project status is corresponding to the methodology AMS-I.D., version 18 and applicability of methodology is discussed below:

Applicability Criterion	Project Case
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 NEWNE electricity grid. 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 regional grid which is part of unified Indian grid system, the methodology AMS-I.D. is applicable
3. This methodology is applicable to project	The Project activity involves the

Applicability Criterion	Project Case
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 (e) Involve a replacement of (an) existing plant(s).	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 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/m ²	As the project activity is a run-off river type hydro power plant, this criterion is not 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 5.00 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	This is not relevant to the project activity as the project involves only hydro power generating units.

Applicability Criterion	Project Case
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.	
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 consumption point for project developer

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 ₂ O	No	Minor emission source
		Other	No	No other GHG emissions were emitted from the project
Project	Greenfield Hydro Power Project Activity	CO ₂	No	No CO ₂ emissions are emitted from the project
		CH ₄	No	Project activity does not emit CH ₄
		N ₂ O	No	Project activity does not emit N ₂ O
		Other	No	No other emissions are emitted from the project

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. 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.

Net GHG Emission Reductions and Removals

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 (t CO₂/y)

PE_y = Project emissions in year y (tCO₂/y)

LE_y = Leakage emissions in year y (tCO₂/y)

Baseline Emissions

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

The baseline emissions are to be calculated as follows:

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

Where:

BE_y	=	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, 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)

Project Emissions

As per paragraph 39 of AMS-I.D. (version 18, dated 28/11/2014), 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.

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 use of Diesel consumed during this monitoring period in DG set

DC_y = Diesel Consumption in Liters (L)

P = Density of Diesel (0.86Kg/Lit)

NCV_{Diesel} = Net Calorific Value of Diesel

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

Hence, $PE_y = PE_{\text{Diesel}}$

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 (BEy)

$$= 24,832 \text{ MWh/year} \times 0.9 \text{ tCO}_2/\text{MWh}$$

$$= 22,348 \text{ tCO}_2/\text{year} \text{ (i.e., 22,348 CoUs/year)}$$

B.6. Prior History>>

The project activity is a small-scale hydro project, following are the key details under the prior history of the project:

- a) The project activity was applied under Clean Development Mechanism (CDM) of UNFCCC to consider generation or issuance of carbon credits under the project ID and title viz. Project ID: 4272 – “2 x 2.5MW Sainj Hydro Electric Project implemented in Shimla District of Himachal Pradesh” and got registered on 23 December 2010 with fixed crediting period of 10 years i.e., from 01st February 2011 to 31st January 2021. However, no CDM verification took place during this crediting period due to low carbon pricing and higher investment required in the verification and issuance process.
- b) The project was not applied under any other GHG mechanism; also for the current period of COUs, the CDM verification has also not been initiated. 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, as the project was commissioned in 13/05/2010 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:

7 years, 11 months

01/01/2014 to 30/11/2021 (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/ltr
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 ₂ e/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 _{BL,y}
Data unit	MWh / year
Description	Quantity of net electricity supplied to the grid as a result of the implementation of the project activity in year y (MWh)
Source of data	Monthly Joint Meter Readings (JMRs)
Measurement procedures (if any):	<p>Data Type: Measured Monitoring equipment: Energy Meters are used for monitoring 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> <p>Generally, the calculation is done by the Authority/Discom and the project proponent has no control over the authority for the calculation.</p>

	<p>Therefore, based on the joint meter reading certificates/credit notes, the project shall raise the invoice for monthly payments.</p> <p>In case the monthly Joint Meter Reading (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: $EG_{PJ,y} = EG_{Export} - EG_{Import}$</p> <p>$EG_{export}$ = Electricity exported to the grid by the project activity EG_{import} = Electricity imported from the grid by the project activity</p> <p>As per general practice, Joint Meter Reading (JMR) will be taken on Monthly basis as measured from the Interconnection Point is taken by the designated officials of the Himachal Pradesh State Electricity Board (HPSEB) and the project proponent. The joint meter readings shall be recorded and signed by the authorized representative (s) of both HPSEB & the project proponent.</p>
Measurement Frequency:	Monthly
Value applied:	To be applied as per actual data
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.</p> <p>Cross Checking: The net amount of electricity exported to the grid as per certificate issued by HPSEB can be cross verified by the monthly bills.</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 liters. However, based on the density of diesel of about 0.86 kg/liter, 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 upto two years after the end of crediting period.