PROJECT CONCEPT NOTE

CARBON OFFSET UNIT (CoU) PROJECT

Title: Wanger Homte Hydro Electric Project

Version 2.0

Date: 10/07/2022

First CoU Issuance Period: 1 years, 0months

Date: 15/02/2021 to 31/12/2021

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

BASIC INFORMATION	
Title of the project activity	Wanger Homte Hydro Electric Project in Himachal Pradesh
Scale of the project activity	Large Scale
Completion date of the PCN	10/07/2022
Project participants	M/s Panchhor Hydro Power Pvt. Ltd.
Host Party	INDIA
Applied methodologies and standardized baselines	ACM0002 Version 20.0 Large-scale Consolidated Methodology Grid-connected electricity generation from renewable sources Baseline is CO_2 emissions from electricity generation in fossil fuel fired power plants that are displaced due to the project activity
Sectoral scopes	01 Energy industries (Renewable/Non-Renewable Sources)
Estimated amount of total GHG emission reductions	112,856 CoU (112,856 tCO_2e) per year

SECTION A. Description of project activity

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

The project Wanger Homte Hydro Electric Project is located in Village Kafnu, District Kinnaur in the State of Himachal Pradesh in India.

Purpose of the project activity:

Proposed Wanger-Homte Hydro Electric Project is a run - of - the river type development on Bhabha Khad, a tributary of River Satluj. The scheme envisages diversion of Bhabha Khad inflows by constructing a raised crested type diversion weir. The diverted inflows will be carried through conveyance channel/tunnel to a surface desilting tank, which will be designed to exclude all silt particles down to 0.20 mm size. The silt free water will be carried through power tunnel up to underground Surge Tank. The inflows will be led to surface power house through a surface penstock to feed three no's Francis turbine driven generating units of 8.20 MW each (Total 24.60 MW). Power house is located near village Kafnu at El ± 2440 m. Electricity will be generated at 11KV and stepped up to 66KV through three no's of 12.5 MVA transformers. Further the electricity from the project activity will be exported to the grid system of Himachal Pradesh state electricity board limited. The project activity started commercial operation and generated electricity will be exported to a grid system of Himachal Pradesh state electricity board limited from 15th Feb 2021.

Govt. of Himachal Pradesh has entrusted the task of implementation of Wanger Homte Hydro Electric Project to M/s Panchhor Hydro Power Pvt Ltd in the private sector on Build, Own, Operate and Maintain basis.
The project activity started commercial operation and generated electricity will be exported to a grid system of Himachal Pradesh state electricity board limited from 15th Feb 2021.

As mentioned above three number of Francis turbine driven generating units of 8.20 MW each are installed as part of the project activity making the total installed power generation of 24.60 MW. The power generation during 75% dependable year has been worked out as 130.62 MU as per the approved Detailed Project Report (DPR). After allowing 0.5 % power to be consumed in auxiliaries, 0.5% in transformation losses, 2% in Transmission Losses and 1% towards Local Area Development Fund (LADF) as mutually agreed in the Power Purchase Agreement. Taking into account these the net energy available for sale is 125.3952 (0.96*130.62) MU per year.

As determined in Section A.6, the baseline scenario relates to the electricity generation in the connected Grid by the operation of grid connected power plants and by the addition of new generation sources. As explained in Section B.6, the implementation of this hydropower plant will result in displacement of electricity that would be provided by more GHG intensive means. Thus, the project activity is estimated to reduce the annual average GHG emission of 112,856 tonnes of CO_2e per year.

Positive environmental and other ESG credentials of the project:

In the present scenario of continuing unreliable power situation and having regard to global warming phenomenon the utilization of small power potential abundantly available in the perennial streams of Himachal Pradesh assumes significance. It is also the call of the National Policy to develop renewable resources of energy to conserve fossil fuels and valuable foreign exchange. In addition, the significant socio-economic development in an environment friendly manner triggered off by the development of small hydel schemes in hilly and remote areas deserves special consideration. The Wanger-Homte Hydroelectric Project has been conceived against this background reducing the global warming damage and to meet the power needs of the rural population. This should usher a new era of socio-economic development in the neighbouring areas of the project in District Kinnaur, Himachal Pradesh.

Environmental Aspects:

Wanger-Homte Hydro Electric Project is being envisaged as Run-of- the river type development without any storage of water. The flow conditions in the Khad are left undisturbed except the diversion of design discharge at diversion weir site for the purpose of power generation requirement. Flows diverted for power generation shall be led to the Bhabha Khad at powerhouse through tailrace channel.

Bhabha Khad does not support aquatic life. The scheme shall not endanger the species of flora and fauna in the area as fish ladder shall be provided at the diversion weir and adequate provision shall be made that the

sufficient water is left in the river.

The components of the project are proposed on barren land and very small area of the cultivable land is required for the project. The construction of project facilities also does not involve felling of any tree. The danger of erosion and disturbance to hill slopes is minimal

No major construction of road is required. The construction of roads and project components will not involve felling of neither any tree nor lead to deposition of excavated material in the Khad to affect environment adversely.

Since the local labour will be deployed only skilled and specialists would be brought from outside and thus a small colony shall only be needed

Submergence

As there is no storage structure, therefore, no submergence is involved. The water shall be diverted through the diversion weir in the Khad bed itself, no land shall be submerged.

There is no habitation on the left bank between the weir and powerhouse site, there will not be any displacement of any population. Only very small area of cultivated land is required for the project components.

Effect On Climate

As the project is very small having no submergence and impoundment of the order that could even influence the microclimate of the region, there will be no effect of the project on the climate.

Social well-being:

Social well-being is assessed by contribution by the project activity towards improvement in living standards of the local community.

The project activity has resulted in increased job opportunities for the local population on temporary and permanent basis.

Manpower was required both during erection and operation of the hydro plants. This has resulted in poverty alleviation of the local community and development of basic infrastructure leading to improvement in living standards of the local population.
The social, environmental, economic and technological benefits which contribute to sustainable development on account of implementation and operation of the Project are discussed below.

Social benefits:

Social impacts and benefits of the project activity are summarised below:

- The project area lies in Inner Himalayas and is one of the backward areas of the State due to harsh climate and difficult communication.
- The local population depends on forest for fuel, heating requirements. This project shall provide electricity to the population for domestic use and thus it shall help in reducing the pressure on forest.
- The project operation will help to conserve kerosene, oil products and wood used for space heating, cooking, lighting and other purposes by local people.
- The project will promote small-scale industrial unit for local needs.
- The Power generated from this project is proposed to be supplied to the HPSEBL/HPPTCL grid so as to mitigate power crises in India. This power can be used locally which will reduce long transmission losses
- Local labour will be deployed during construction and operation of the project and only skilled and specialists would be brought from outside.

The other objectives of the project are:

- To increase productivity and output in rural areas by reducing the cost of energy thereby increases efficiency and profitability.
- To add to the standard of living in village communities i.e. to promote entrepreneurship and formation

of NGO's

- To create employment opportunities and thus help check rural migration to urban areas.

Environmental benefits:

Environmental impacts and benefits of the project activity are summarised below:

- Wanger-Homte Hydro Electric Project is a Run-of- the River type development without any storage of water.
- The Project activity shall not endanger the species of flora and fauna in the area. Fish ladder shall be provided at the diversion weir and adequate provision shall be made that the sufficient water is left in the river.
- The components of the project are proposed on barren land and very small area of the cultivable land is required for the project.
- The construction of project facilities does not involve felling of any tree.
- The danger of erosion and disturbance to hill slopes is minimal.
- No major construction of road is required. The construction of roads and project components will not involve felling of neither any tree nor lead to deposition of excavated material in the Khad to affect environment adversely.
- Only skilled and specialists would be brought from outside and thus a small colony shall only be needed.

The project also contributes towards other environmentally beneficial objectives like:

- To conserve kerosene, oil products and wood used for space heating cooking, lighting and other purposes by local people.
- To conserve forests those are being knocked down at an alarming rate to meet rural energy needs.
- To reduction in emission of green house gases.
- To preserve biological diversity.
- To arrest the pollution of water.
- To preserve ozone layer.
- To reduce global warming

Economic benefits:

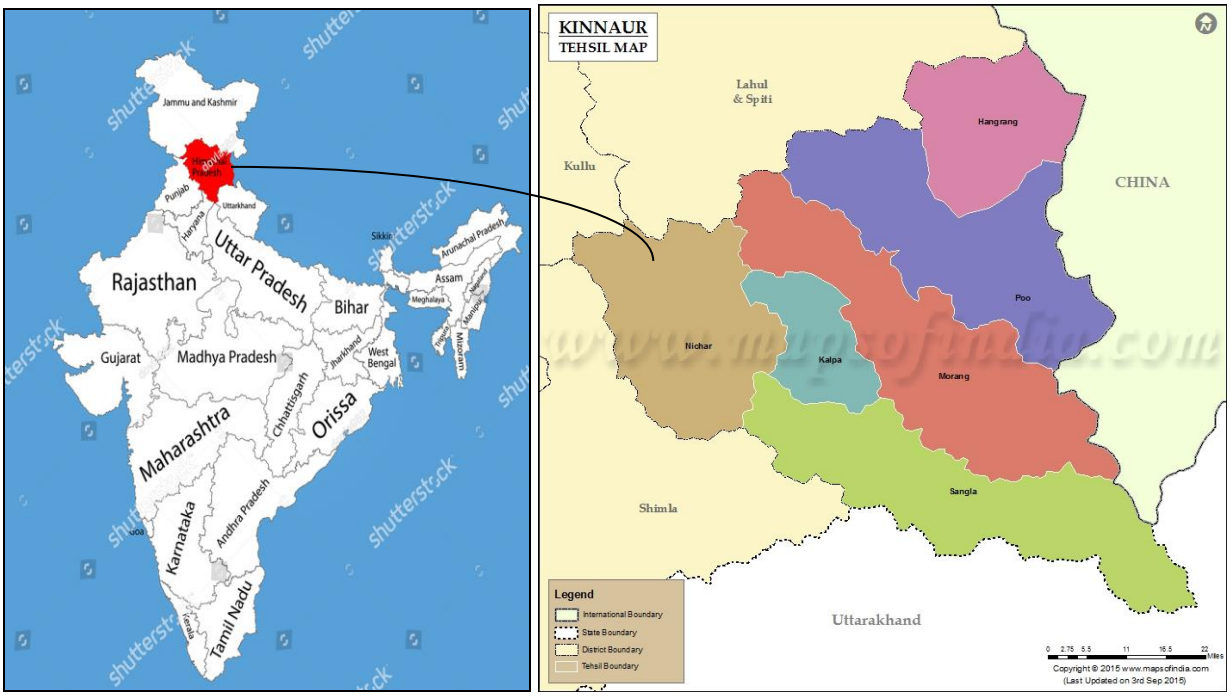
Economic impacts and benefits of the project activity are summarised below:

- Helps to conserve kerosene, oil products and wood used for space heating cooking, lighting and other purposes by local people.
- Employment for Local labour deployed during construction and operation of the project and only skilled and specialists would be brought from outside
- The Power generated from this project is proposed to be supplied to the HPSEBL/HPPTCL grid so as to mitigate power crises in northern region. This Power can be used locally which will reduce long transmission losses
- The project will promote small-scale industrial unit for local needs.

The State of Himachal Pradesh presently has installed capacity of 326 MW (excluding central sector projects). At present the state does not face any shortage so far as energy availability is concerned, but there is peak load deficit to the tune of 12% in winter. However, the State is expected to face shortages both in peak load and energy availability in future. In view of resource crunch and administrative reasons the Govt. of Himachal Pradesh decided to invite Private Investors for harnessing the hydro power potential available in the State on selective basis.

A.3. Location of project activity >>

Country: India
District: Kinnaur
Village: Kafnu
Tehsil: Nichar
State: Himachal Pradesh
Code: 171009



A.4. Technologies/measures >>

The proposed Wanger -Homte SHEP is a run of River scheme on Bhabha Khad, a tributary of Satluj River located in District Kinnaur. The project envisages the construction of Trench Type weir across Bhabha Khad, Feeder Channel (from Intake to Control Structure) Feeder Tunnel (from Control Structure to Desilting Tank), Underground Desilting Tank, Head Race Tunnel (from Desilting Tank to Head Pond), Head Pond and Chamber, Head Race / Penstock Tunnel (from Head Pond to Surge Tank), Under Ground Surge Tank, Surface Penstock and a Surface Power House having 24.60 MW installed capacity on the right bank of Bhabha Khad at Kafnu village. Bhabha Khad is a tributary of Satluj River and Wanger-Homte 24.6 MW SHP Panchhor Hydro Power Private Limited joins it from right bank near Wangtu of Himachal Pradesh. It is a perennial Nallah, which emanates at an Elevation of ± 5315 M and flows mostly in south-westerly to westerly direction before it joins Satluj.

Specification	Value
Diversion Weir	Trench Type Weir, 15 M Long, 3M Wide
Desilting Tank	Underground Conventional hopper type. One Chamber of 60.00 M x 11.00 M size
Head Pond & Chamber	Size 4.00 M x 5.00 M
Surge Shaft	Circular Underground, Size 11.75 M dia, 31.60 M Height
Penstock	Circular, Steel Penstock, Main Penstock 0f 2500 MM Dia and Three branch Penstocks of 1450 MM Dia
Power House	Surface type, of Size of 65 mtr x 18 mtr. Installed Capacity 24.60 MW, Gross Head ± 186.77M, Net Head ± 182.49M,
Turbines	Horizontal Shaft Francis Turbine, Three Numbers each of Capacity 8200 kW, Speed 750 rpm, Make: TPSC (India) Pvt Ltd
Generators	Horizontal shaft synchronous, brushless, Three generators each of rated capacity 8200 kW, • Power factor 0.9 lag, Frequency 50 Hz, Rated Voltage 6.6 kV, Overload capacity 20%
Power & Energy Generation	Energy generation in 75% dependable year 130.62 MU
Tail Race	Tunnel of size 3.40 m x 3.40 m to Bhabha Khad
Diesel Generator	Capacity-62.5 KVA Make: SUDHIR POWER LTD

A.5. Parties and project participants >>

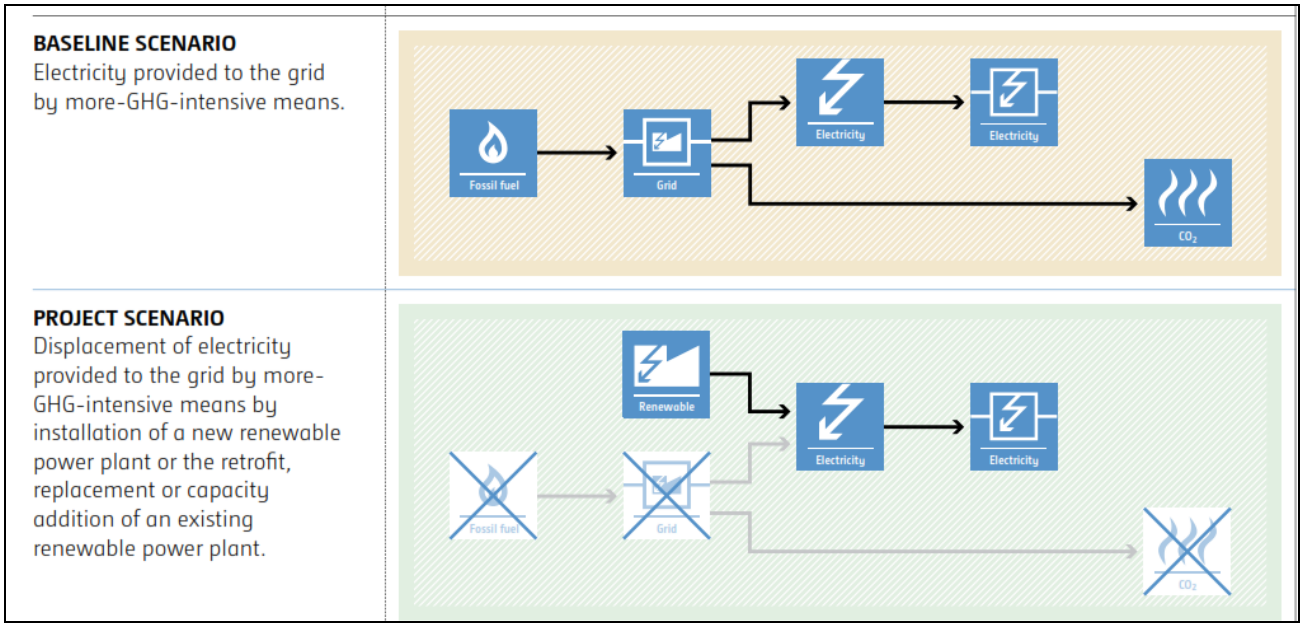
Party (Host)	Participants
INDIA	M/s Panchhor Hydro Power Pvt Ltd Registered/correspondence office: Address: Plot No. 226, Road No.78, Phase-III, Jubilee Hills, Hyderabad-500096.

A.6. Baseline Emissions>>

The baseline scenario is 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.

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

- The baseline scenario is 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, by more-GHG-intensive means means as reflected in the Emission Factor of the connected grid system.



A.7. Debundling>>

This Wanger-Homte hydroelectric project 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-

ACM0002, Version 20.0 (Title: Large-scale Consolidated Methodology: - Grid-connected electricity generation from renewable sources).

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 an installed generation capacity of 24.6 MW and the CDM methodology ACM0002 Version 20.0 Consolidated Methodology for "Grid-connected electricity generation from renewable sources" is selected. The applicability of methodology to the project case are discussed below:

Applicability criterion specified in ACM 0002, version 20.0	**Project Case**
This methodology is applicable to grid-connected renewable energy power generation project activities that: (a) Install a Greenfield power plant; (b) Involve a capacity addition to (an) existing plant(s); (c) Involve a retrofit of (an) existing operating plants/units; (d) Involve a rehabilitation of (an) existing plant(s)/unit(s); or (e) Involve a replacement of (an) existing plant(s)/unit(s).	The project activity involves installation of a new green field renewable energy power plant/unit of one of types hydro power plant/unit without reservoir
The project activity may include renewable energy power plant/unit of one of the following types: hydro power plant/unit with or without reservoir, wind power plant/unit, geothermal power plant/unit, solar power plant/unit, wave power plant/unit or tidal power plant/unit; In the case of capacity additions, retrofits, rehabilitations or replacements (except for wind, solar, wave or tidal power capacity addition projects) the existing plant/unit started commercial operation prior to the start of a minimum historical reference period of five years, used for the calculation of baseline emissions and defined in the baseline emission section, and no capacity expansion, retrofit, or rehabilitation of the plant/unit has been undertaken between the start of this minimum historical reference period and the	The project activity involves a renewable energy power plant of types hydro power plant/unit. The Project activity is green field type and no capacity addition, retrofit or rehabilitation or Replacement is existing plant/unit is involved.

Applicability criterion specified in ACM 0002, version 20.0	Project Case
implementation of the project activity	
In case of hydro power plants, one of the following conditions shall apply:[1] The project activity is implemented in existing single or multiple reservoirs, with no change in the volume of any of the reservoirs; or The project activity is implemented in existing single or multiple reservoirs, where the volume of the reservoir(s) is increased and the power density, calculated using equation (7), is greater than 4 W/m^2; or The project activity results in new single or multiple reservoirs and the power density, calculated using equation (7), is greater than 4 W/m^2; or The project activity is an integrated hydro power project involving multiple reservoirs, where the power density for any of the reservoirs, calculated using equation (7), is lower than or equal to 4 W/m^2, all of the following conditions shall apply: The power density calculated using the total installed capacity of the integrated project, as per equation (8), is greater than 4 W/m^2; Water flow between reservoirs is not used by any other hydropower unit which is not a part of the project activity; Installed capacity of the power plant(s) with power density lower than or equal to 4 W/m^2 shall be: Lower than or equal to 15 MW; and Less than 10 per cent of the total installed capacity of integrated hydro power project.	The project activity is implemented on an existing run off river.
In the case of integrated hydro power projects, project proponent shall: Demonstrate that water flow from upstream power plants/units spill directly to the downstream reservoir and that collectively constitute to the generation capacity of the integrated hydro power project; or Provide an analysis of the water balance covering the water fed to power units, with all possible combinations of reservoirs and without the	The project activity is not part of an integrated hydro power projects

Applicability criterion specified in ACM 0002, version 20.0	Project Case
construction of reservoirs. The purpose of water balance is to demonstrate the requirement of specific combination of reservoirs constructed under CDM project activity for the optimization of power output. This demonstration has to be carried out in the specific scenario of water availability in different seasons to optimize the water flow at the inlet of power units. Therefore, this water balance will take into account seasonal flows from river, tributaries (if any), and rainfall for minimum of five years prior to the implementation of the CDM project activity	
7. The methodology is not applicable to: (a) Project activities that involve switching from fossil fuels to renewable energy sources at the site of the project activity, since in this case the baseline may be the continued use of fossil fuels at the site; (b) Biomass fired power plants/units	The Project activities does not involve (a)switching from fossil fuels to renewable energy sources at the site of the project activity, since in this case the baseline may be the continued use of fossil fuels at the site; or (b) Biomass fired power plants/units or (c) retrofits, rehabilitations, replacements, or capacity additions,

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

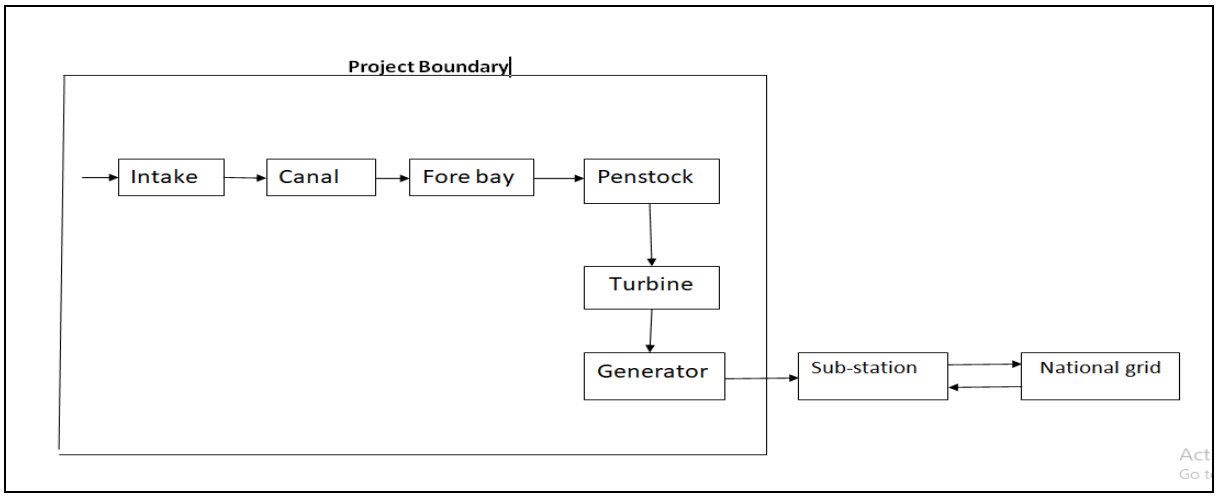
There is no double accounting of emission reductions in the project activity as:

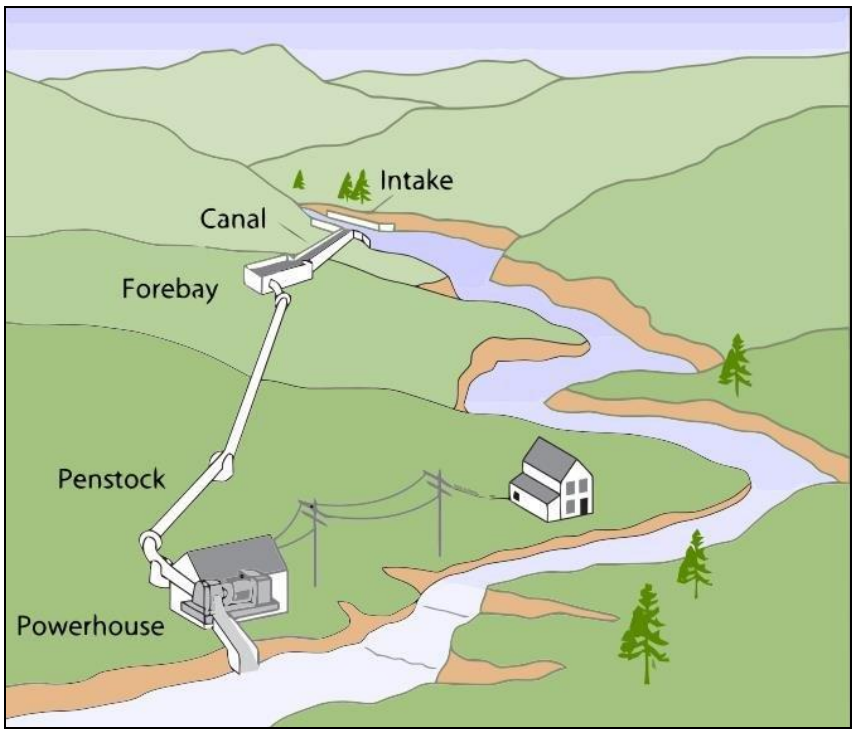
- Project is uniquely identifiable based on its location coordinates,
- Project has dedicated connection point,
- Project is associated with energy meters which are dedicated to the consumption point for project developer.

B.4. Project boundary, sources and greenhouse gases (GHGs)>>

According to ACM0002, for the baseline emission factor, the spatial extent of the project boundary includes the project site and all power plants connected physically to the electricity system that the project power plant is connected to.

The spatial extent of project boundary encompasses the physical extent of the national electricity grid, which includes the project site and all power plants connected physically to the electricity system.





Details of GHG sources in Baseline and Project scenario are given below

	Source	GHG	Included?	Justification/Explanation
Baseline	CO_2 emissions from electricity generation in fossil fuel fired power plants that are displaced due to the project activity	CO_2	Yes	Major source of emission
		CH_4	No	Minor source of emission
Project Activity	For hydro power plants, emissions of CH_4 from the reservoir	CO_2	No	Minor source of emission
		CH_4	No	No methane emission from project activity.

B.5. Establishment and description of baseline scenario (UCR Standard or Methodology) >>

According to ACM0002, Version 20.0 for project activities that do not modify or retrofit an existing electricity generation facility, the baseline scenario is the "Electricity delivered to the grid by the project would have otherwise been generated by the operation of grid-connected power plants and by the addition of new generation sources, as reflected in the combined margin (CM)."

As per ACM 00002,

Estimated Emission Reductions: $ER_y = BE_y - PE_y$

Where ,

ER_y = Emissions reductions in a year y (t CO_{2e}/yr).
BE_y = Baseline Emissions in a year y (t CO_2e/yr).
PE_y = Project Emissions in a year y (t CO_2e/yr).

For the green field hydro project activity, the baseline emissions are to be calculated as follows:

$$BE_y = EG_{PJ,y} \times EF_{grid,CM,y}$$ Equation (1)

Where:

BE_y = Baseline emissions in year *y* (t CO_2/yr)

$EG_{PJ,y}$ = Quantity of net electricity generation that is produced and fed into the grid as a result of the implementation of the project activity in year *y* (MWh/yr)

$EF_{grid,CM,y}$ = Combined margin CO_2 emission factor for grid connected power generation in year *y* calculated using the latest version of "TOOL07: Tool to calculate the emission factor for an electricity system" (t CO_2/MWh)

As per the approved DPR for the project activity, power generation during 75% dependable year has been worked out as 130.62 MU. This value is calculated using average hydrology data for the river, a plant utilization factor, a loss factor and known plant capacity of 24.6 MW.

As per DPR 0.5 % power to be consumed in auxiliaries, 0.5% in transformation losses, 2% in Transmission Losses, 1% towards LADF are considered. Taking into account these the estimated quantity of net electricity generation that is produced and fed into the grid as a result of the implementation of the CDM project activity is: 0.96*130.62= 125.3952 MU per year.

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. An emission factor of 0.9 tCO_2/ MWh for the 2014- 2020 years, recommended by the UCR as a fairly conservative estimate for Indian projects not previously verified under any GHG program is used for baseline emission calculation.

Therefore, baseline emission of the project activity BE_y = 125395 × 0.9 = 112856(tCO_2/yr)

Project Emissions from water reservoirs of hydro power plants ($PE_{HP,y}$)

As the project activity is a-run of the river facility without storage reservoir, project emissions from water reservoirs of hydro power plants considered in ACM 0002 version 20.0 is not applicable for the project activity.

Therefore, project emission $PE_{HP,y}$ of the Project activity according to ACM0002, version 20.0, are zero.

The project is equipped with diesel generator of 62.5 kVA to meet emergency requirements of electricity to Power House,the emissions from the usage of fossil fuel (Diesel) in the Diesel Generator will be accounted as project emissions calculated based on the following equation.

$PE_{diesel,y} = F_{i,y} * Density_i * NCV_{deisel} * EF_{CO2,i} * OXID / 10^6$

Where,

$PE_{diesel,y}$ is project emission from combustion of fossil fuel in DG set in the project activity during the year y

$F_{i,y}$ is the quantity of fossil fuel (diesel) combusted in the DG set in the project activity during the year y

NCV_{diesel} is Net calorific value of diesel

$EF_{CO2,i}$ is the Carbon dioxide emission factor of the fuel type i

Oxid is the oxidation factor considered as one as per IPCC 2006

The project emission from DG set is considered as zero *ex ante*

Therefore, the Project Emission is zero

Leakage

As per paragraph 53 of ACM 0002, version 20.0 no other leakage emissions are considered and the emissions potentially arising due to activities such as power plant construction are neglected. ‘
Hence, LEy= 0

Therefore, estimated annual or total baseline emission reductions (BE_y) = 112,856 CoUs /year (112,856 tCO_{2eq}/yr).

The actual emission reduction achieved during the first CoU period shall be submitted as a part of first monitoring and verification.

B.6. Prior History>>

The project activity has not applied to any other GHG program for generation or issuance of carbon offsets or credits for the said crediting period.

B.7. Changes to start date of crediting period >>

No change in crediting period.

Crediting period start date is 15/02/2021.

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

Not applicable.

B.9. Monitoring period number and duration>>

First Issuance Period: 0 year, 10 months 17days – 15/02/2021 to 31/12/2021 (inclusive of both dates)

B.8. Monitoring plan>>

PARAMETERS BEING MONITORED OR USED IN EMISSION REDUCTIONS DETERMINATION

Data/Parameter	$EF_{grid,CM,y}$
Data unit	tCO_2 /MWh
Description	Combined margin CO_2 emission factor for grid connected power generation in year y
Source of data Value(s) applied	The UCR Standard An emission factor of 0.9 tCO2/MWh for the 2014- 2020 years is used for ex-ante estimation which is recommended by The UCR Standard as a fairly conservative estimate for the 2014- 2020 years for Indian projects not previously verified under any GHG program.
Measurement methods and procedures	As per recommendation by The UCR Standard
Monitoring frequency	Yearly
Purpose of data	Calculation of baseline emission

Data/Parameter	$EG_{PJ,y}$
Data unit	MWh/yr
Description	Quantity of net electricity generated and supplied by the project power plant to the grid in year y.
Source of data Value(s) applied	Direct measurement using energy meters Main Meter Sr.No.0019002801 Make: L&T ER300P Class: 0.2S Calibration frequency: Once in a year Check Meter Sr.No.0019002786 Make: L&T ER300P Class: 0.2S Calibration frequency: Once in a year
Measurement methods and procedures	Use electricity meters installed at the grid interface for electricity export to grid. In case of grid and net electricity generation: This parameter should be either monitored using bi-directional energy meter or calculated as difference between (a) the quantity of electricity supplied by the project plant/unit to the grid; and (b) the quantity of electricity the project plant/unit from the grid. If it is calculated, then the following parameters shall be measured: (a) The quantity of electricity supplied by the project plant/unit to the grid; and (b) The quantity of electricity delivered to the project plant/unit from the grid. Meter Calibration Frequency: Once in year. Accuracy class: 0.2S.
Monitoring frequency	Continuous measurement and at least monthly recording.
QA/QC procedures:	There are two meters (1 main meter and 1 check meter) employed for measuring the electricity generation from the project and reading will be taken on monthly basis. The readings of main and check meters will be compared and a conservative value will be taken if the difference is more than permissible limit. The electricity meter will be subject to regular maintenance and testing in accordance with the stipulation of the meter supplier and/or as per the requirements set by the grid operators or national requirements. The calibration of meters, including the frequency of calibration, should be done once in year or requirements set by the meter supplier or requirements set by the grid operators. The accuracy class of the meters is 0.2S. According to the grid operators or national requirements.

Data/Parameter	$COEF_i$
Data unit	tCO_2/TJ

Data/Parameter	$EG_{PJ,y}$
Description	CO_2 emission coefficient of fuel type I (Diesel)
Source of data	IPCC 2006 upper bound value at 95% confidence interval Web Link: http://www.ipcc-nggip.iges.or.jp/public/2006gl/pdf/2_Volume2/V2_2_Ch2_Stationar y_Combustion.pdf
Value(s) applied	74.8
Measurement methods and procedures	-
Monitoring frequency	-
Purpose of data	Calculation of project emission

Data/Parameter	F i,y
Data unit	Litres
Description	Quantity of fossil fuel type I (Diesel) combusted in the project plant during year y
Source of data Value(s) applied	On-site measurements
Measurement methods and procedures	Fuel purchase bills
Monitoring frequency	Every purchase
Purpose of data	Calculation of project emission.
QA/QC procedures:	The purchase quantity of fuel is being considered to be conservative in the computation of project emissions

Data/Parameter	Density $_i$
Data unit	Kg/Litre
Description	Density of fossil fuel used for the project site (Diesel)
Source of data	From supplier or that given in the web page of IS 1460 :1995 or its amendments https://dieselnet.com/standards/in/fuel.php
Value(s) applied	845 kg/m3
Measurement methods and procedures	Fuel purchase bills
Monitoring frequency	Every purchase
Purpose of data	Calculation of project emission.
QA/QC procedures:	The purchase quantity of fuel is being considered to be conservative in the computation of project emissions

Data/Parameter	NCV_i
Data unit	Tj/Gg
Description	Calorific value of Diesel
Source of data	From IPCC 2006 http://www.ipcc-nggip.iges.or.jp/public/2006gl/pdf/2_Volume2/V2_2_Ch2_Stationar y_Combustion.pdf

Value(s) applied	43.3
Measurement methods and procedures	-
Monitoring frequency	-
Purpose of data	Calculation of project emission.
QA/QC procedures:	

Details on monitoring procedure

Installation of energy meters: The electricity delivered to grid by the project and imported from grid by the project will be monitored as per the Power Purchase Agreement with HPPTCL/HPSEBL. One set of main meter and check meter shall be provided at the grid Interconnection point in HPPTCL substation at Wangtoo.

The meters shall be of accuracy class 0.2 as defined in the applicable IEC/ Indian Standard. The meters shall be capable of measuring and recording the various parameters and shall conform to specification adopted by HPPTCL/ HPSEB. These shall be tested and calibrated periodically in conformance to the standard regulations.

Metered Net Electricity Export Data: Monthly Joint Meter reading of Main and Check meters shall be taken by HPPTCL/HPSEB and PHPPL and recorded and signed by both parties.

Net saleable energy is the energy received at interconnection point (power export-power import) less the supply to government as per the PPA (1% of electricity).

This net energy sale data can be cross checked against the monthly invoices raised by PHPPL to HPPTCL for the quantity of electricity exported Energy supplied to grid from the project.