



PROJECT CONCEPT NOTE

CARBON OFFSET UNIT (CoU) PROJECT



Title: 1 MW Jiwa Small Hydro Electric Project in Kullu District of Himachal Pradesh

Version 1.0
Date 05/03/2022

First CoU Issuance Period: 08 years, 03 months
Date: 01/01/2014 to 31/03/2022



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

BASIC INFORMATION

Title of the project activity	1 MW Jiwa Small Hydro Electric Project in Kullu District of Himachal Pradesh
Scale of the project activity	Small Scale
Completion date of the PCN	03/03/2022
Project participants	Chevron Hydel (P) Ltd. (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 4,972 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, titled under UCR as “1 MW Jiwa Small Hydro Electric Project in Kullu District of Himachal Pradesh”, is a run of river small hydro power project located in village Siundh of Kullu district in the state of Himachal Pradesh (India). The project is an operational activity with continuous reduction of GHG, currently being applied under “Universal Carbon Registry” (UCR).

Purpose of the project activity:

The proposed project activity is promoted by Chevron Hydel Private Limited (herein after called as Project Proponent or PP). The proposed project activity is installation and operation of one horizontal shaft Francis hydro turbine generators having total capacity of 1000 kW in village Siundh of Kullu district in the state of Himachal Pradesh in India. The project will be able to export around 6.61 GWh of electricity per year to the Himachal Pradesh State Electricity Board (HPSEB) i.e., to the Northern regional grid, which is a part of the integrated or unified Indian Grid system.

This project activity is also known as Jiwa small hydroelectric power project (SHEP), a run-of-the river project that utilizes the flow of the river through Head Race Tunnel (HRT) and penstocks and by using one 1000 kW horizontal Francis turbines connected to a synchronous generator generates electricity. The main structure includes weir, intake forebay, DeSilt tank, chambers, Head Race Tunnel (HRT), surge shaft, penstock, power house and the tailrace discharging water back into the river. The voltage at the generator terminals is 3.3 kV, which is stepped up to 11 kV at the nearest substation before evacuation. The generated electricity is fed into the sub-station of HPSEB grid system for transmission & distribution. The project utilises a gross head of about 105.6 m. The project activity has already been commissioned on 29/12/2006.

The net generated electricity from the project activity is sold to state electricity board i.e., HPSEB 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.

Hence, project activity was designed to displace an estimated annual net electricity generation of 6,610 MWh from the Indian grid system, 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. For the purpose of ex-ante estimation and projection under UCR, the power generation has been calculated based on 65% plant load factor which comes an annual average of 5,694 MWh. The estimated annual CO₂e emission reductions by the project activity are expected to be 4,972 tCO₂e which is calculated after deducting an auxiliary and transmission losses, 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 in India. 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 renewable energy 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 local people against the manpower requirement in the project activity to bonafide people of the state of Himachal Pradesh, 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 1 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.
- Above this project activity undertakes plantation drives on an ongoing basis to conserve and preserve the environment. This has resulted in fewer “landslides” in area which was prone to frequent land slips especially in the monsoon months

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 to poverty alleviation of the local community and development of basic amenities to community leading to improvement in living standards of the community. These could be established from following contribution of project activity;

- After the commissioning of the project activity, it has been providing quality power (proper voltage and frequency) to thousands of households via connected grid. This has had a significant socio-economic impact in the area. Power is utilised by the people for meeting their “heating” needs especially during the harsh winter months. Gone are the days when predominantly people were using wood to tide over the winter months.
- Building of approach Roads and Bridges in the project area has significantly improved transportability in difficult mountainous terrain saving time and money in all local economic activities.
- Proper records are maintained for accidents and mortality in project activity. However, there has been report no casualties at project site on account of proper work practices and ongoing training activities conducted from time to time.
- Project activity also imparts job skills to family members of employees as well as interested rural folks living nearby the site. The nature of skills imparted have resulted in successfully taking up assignments as welders, mechanics, linesmen, etc. Family members of employees working at project site after training have successfully employed in constructions firms in Dubai, Saudi Arabia & Singapore.
- Project activity also actively train interested local population to acquire skills in civil, mechanical, and electrical work such as Masonry work, Painters, Electricians, Pipe Fitters, Mechanics, Welders, etc. Such persons after receiving on the job training at the project have been gainfully employed or have been able to start their own Contracting businesses. Some have also successfully registered with NHPC Project for undertaking periodic contracts. In fact, they have been offered works contract as and when there is any Civil Repair works requirement at the project site.

Under Governance:

Governance criteria relates to overall operational practices and accounting procedure of the organization. With respect to this project, the Project Proponent practices a good governance practice with transparency, accountability and adherence to local and national rules & regulations

etc. The technical and financial transparency has been attained by the well structure monitoring practice at the project sites. The electricity generated from the project can be accurately monitored, recorded and further verified under the existing management practice of the company. Also, the project activity is a hydro power project owned and managed by the proponent for which all required NOCs and approvals are received.

It's also believed that a good economic well-being is a result of good governance. The project contributed to additional investment consistent with the needs of the local community. There was good amount of investment considered to develop this project activity (nearly about INR 90.0 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. It has provided "doorstep" employment to every member living close to the project area. The project has provided jobs to 15 people bringing prosperity to almost 80-90 family members directly.

Additionally, the plant is being operation with adequate staff training, health and safety procedures etc. Due to good governance practice the project also achieved zero casualty in its operation and no operational hazards to employee as well as nearby environment.

Also, from the project activity, proper voltage and availability has resulted in power reliability which led to increasing economic activity in the area. With the passage of time power reliability has given a major boost to micro industries in rural households who have now resorted to mechanisation in a big way. This has led to increase in rural incomes leading to enhanced demand for various domestic appliances transforming lives of the people.

Hence, project contributes to ESG credentials and thus ensures sustainable benefits for the local communities. Also, Project specific social work related details are attached under Appendix 2 of this report.

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 Hydro Projects.

Nevertheless, PP had done public announcement and invited comments from public on the proposed project activity. Many stakeholders like Government of Himachal Pradesh, Public Works Department, HPSEB, Fisheries Department of Himachal Pradesh, Department of Town and Country Planning Department of Irrigation public health and village Panchayat 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 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 >>

Country : India
State : Himachal Pradesh
District : Kullu
Village : Siundh

This Jiwa SHEP project is located near Sainj town of district Kullu of Himachal Pradesh and harnesses hydro power potential through weir constructed on the stream of Jiwa Khad, a tributary of river Sainj in the Beas Basin. The nearest major roadway is Chandigarh–Mandi–Aut–Sainj Road which provided connectivity to major towns. The project site is 245 kms from Chandigarh. The nearest rail head is at Kirat Pur Sahib, which is about 215 km from the project site. The nearest airport is at Bhuntur in Kullu district at about 45 kms. The geographic co-ordinates of the project locations are 77°19'22" E and 31°47'29" N.

The representative location map is included below:



(Courtesy: google map and images)

A.4. Technologies/measures >>

The project activity involves one number hydro turbine generator of 1000 kW capacity 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 of 50 Hz and in the voltage range of $3.3\text{kV} \pm 10\%$. The average lifetime of the generator is around 30 years as per the equipment supplier specification. The other salient features of the technology are:

Design Discharge	1.28 cumecs
Gross Head	105.6 m
Net Head	
Hydrology	
Type of Catchment Area	Rugged and Hilly
Annual Flow (In 75% dependable year)	1.23cumecs (Cubic metre per second)
Diversion Structure	
Type of structure	Trench type weir
Size	20 m x 2.5 m
Intake Structure	
Shape and Size	Well type (3.0 m x 2.5 m x 5.10 m)
De-silting Chamber	
Type	Settling tank
Size	28 m x 5 m
Discharge	1.75 cumecs
Penstock	
Number	One
Diameter	800 mm (I.D.)
Thickness	8 mm
Length	190 m
Power House	
Type	Surfaced Power House (R.C.C structure)
Design Head	102.07 m
Design Discharge	1.28 cumecs
Installed Capacity	1 x 1000 kW
Electromechanical Equipment	
Turbine type	Francis type (horizontal axis)
Turbine number	01 Nos.
Turbine normal speed	1500 rpm
Type of generators	AC Synchronous
Generator Normal Speed	1000 rpm
Generator Rated voltage	3.3kV
Switchyard	
Voltage	11/33 KV
Power	
Installed capacity	2 x 2500 kW
No. of unit generated @ 75% dependable	25.68 MU

The hydro turbines have already been commissioned by HPSEB and the same could be referred by the commissioning letter with Serial number HPSEB/PHE/Jiwa/06 - 2542-49 Dated – 29/12/2006

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	Chevron Hydel (P) Ltd. (Developer) Address: 285, RPS, Sheikh Sarani-1, New Delhi - 110017, India. Contact details: Neeraj Kanwar +91 9810098494 / neerajkanwar14@gmail.com

A.6. Baseline Emissions>>

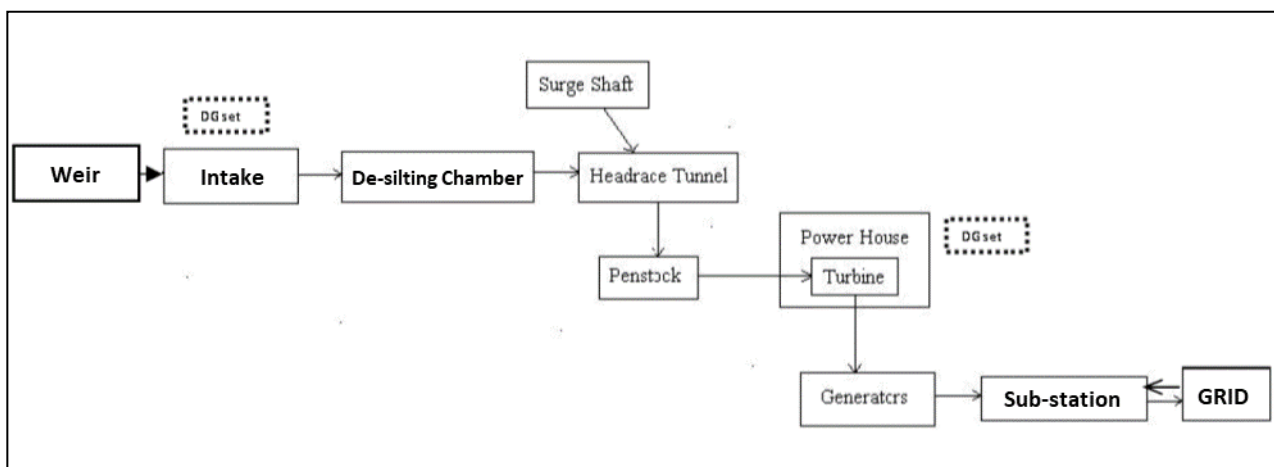
The baseline scenario identified at the PCN stage of the project activity is:

- 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 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: PP had applied the version 13 of the methodology as the project is a VCS registered project. The project was registered at VCS in 2009 with fixed crediting period of 10 years (from 04th January 2007 to 3rd January 2017). During the crediting period PP has not claimed VCUs for all the period and after the completion of crediting period PP has not renewed the project on VCS mechanism. Hence, for UCR submission the 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 operation of a new hydro power-based power project. The project activity has installed capacity of 1.00 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

Applicability Criterion	Project Case
<p>3. This methodology is applicable to project activities that:</p> <ul style="list-style-type: none"> (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). 	<p>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).</p>
<p>4. Hydro power plants with reservoirs that satisfy at least one of the following conditions are eligible to apply this methodology:</p> <ul style="list-style-type: none"> (a) The project activity is implemented in existing reservoir, with no change in the volume of the reservoir; or (b) The project activity is implemented in existing reservoir, where the volume of the reservoir(s) is increased and the power density as per definitions given in the project emissions section, is greater than 4 W/m². (c) The project activity results in new reservoirs and the power density of the power plant, as per definitions given in the project emissions section, is greater than 4 W/m² 	<p>As the project activity is a run-off-river type hydro power plant, this criterion is not relevant for the project activity.</p>
<p>5. If the new unit has both renewable and non-renewable components (e.g., a wind/diesel unit), the eligibility limit of 15 MW for a small-scale CDM project activity applies only to the renewable component. If the new unit co-fires fossil fuel, the capacity of the entire unit shall not exceed the limit of 15 MW.</p>	<p>The rated capacity of the project activity is 1.00 MW with no provision of Co-firing fossil fuel. Hence, meeting with this criterion.</p>
<p>6. Combined heat and power (co-generation) systems are not eligible under this category</p>	<p>This is not relevant to the project activity as the project involves only hydro power generating units.</p>
<p>7. In the case of project activities that involve the capacity addition of renewable energy generation units at an existing renewable power generation facility, the added capacity of the units added by the project should be lower than 15 MW and should be physically distinct from the existing units.</p>	<p>There is no other existing renewable energy power generation facility at the project site. Therefore, this criterion is not applicable.</p>

Applicability Criterion	Project Case
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 electricity” shall be explored.	This is not relevant to the project activity as the project involves only hydro power generating units.
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

Source		Gas	Included?	Justification/Explanation
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 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.

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. (Reference: General Project Eligibility Criteria and Guidance, UCR Standard, page 4)
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Project Emissions:

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

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

Diesel consumption:

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

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

Where:

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

DC_y = Diesel Consumption in liters (lit)

P = Density of Diesel (0.86 kg/lit)

NCV_{Diesel} = Net Calorific Value of Diesel

$EF_{\text{CO2Diesel}}$ = 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 (BE_y)

$$= 5,524 \text{ MWh/year} \times 0.9 \text{ tCO}_2/\text{MWh}$$

$$= 4,972 \text{ tCO}_2/\text{year (i.e. annual avg. of 4,972 CoUs)}$$

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 Voluntary Carbon Standard (VCS) of VERRA. At the time of initial registration, the project was registered with VCS under Markit Registry platform. However, the Markit Registry exited from the carbon operation and during this transition the project documents were not tracked and hence the project status is not visible under VCS (currently operated by VERRA).
- b) In this regard, the Project Proponent has already intimated to VERRA for reconfirming the status of VCS and ensuring the status it's validity under VCS till end of crediting period allotted by VCS at the time of commissioning. However, it's currently under process.
- c) Also, PP has checked and confirmed that after the completion of crediting period under VCS project shall not be renewed under VCS. Therefore once registered with UCR the project will not be active under any other GHG platform.
- d) Additionally, the project has not been applied under any other GHG mechanism part from VCS; also for the current period of COUs, the VCS verification has 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 >>

The start date of crediting under UCR is considered as 01/01/2014, as the project was commissioned in 29/12/2006 and no GHG emission reduction has been claimed from this proposed start date.

Provision: for the purpose of future references, PP would like to keep the provision of changing start date of crediting period for the project activity. Such changes, if required, shall be proposed and communicated to UCR at the time of first verification.

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:

8 years, 03 months

01/01/2014 to 31/03/2022 (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 2021-22 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 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 _{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):	<p>Data Type: Measured</p> <p>Monitoring equipment: Energy Meters are used for monitoring</p> <p>Recording Frequency: Continuous monitoring and Monthly recording from Energy Meters, Summarized Annually</p> <p>Archiving Policy: Paper & Electronic</p> <p>Calibration frequency: 5 years (considered 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. 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 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</p>

	<p>the JMR.</p> <p>For example, if the JMR considers the difference between the measured quantities of the grid export and the import, then net electricity to be consider for emission reduction calculation as:</p> $EG_{PJ,y} = EG_{Export} - EG_{Import}$
Measurement Frequency:	Monthly
Value applied:	<p>5,524</p> <p>(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)</p>
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: Quantity of net electricity supplied to the grid will be cross checked from the invoices raised by the project participant to the grid.</p>
Purpose of data:	The Data/Parameter is required to calculate the baseline emission.
Any comment:	All the data will be archived till a period of two years from the end of the crediting period.

Data / Parameter	DC _y
Data unit	Liters
Description	Diesel consumption by the standby DG set in year y
Source of data	Plant Records
Measurement methods and procedures	The diesel quantity available in the diesel storage tanks is recorded daily by PP in the plant logbook. The diesel consumption has been recorded in the logbook in litres. However, based on the density of diesel of about 0.86 kg/litre, 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	<p>Data Type: Measured & Calculated</p> <p>Data Archiving: Paper/ Electronic.</p>
Comments	The data would be archived up to two years after the end of crediting period.

Appendix 1:

Project Photographs:



Photo of the Weir Site



Photo of the Penstock



Photo of the powerhouse



Photo of the switchyard

Appendix 2:

From Project proponent on social works:

Annexure – VI

Chevron Hydel (P) Ltd. (Developer)

PROJECT SOCIAL WORK

Project social Work is undertaken on an ongoing basis leading to transformation and change in the lives of people in the project and its vicinity. Several activities undertaken by the project have had a significant impact on social and economic life of the rural populace.

The project area had little or no supply of power. The power supply even if available was at very poor voltage which could barely light up the household. After the commissioning of the project, the project has been providing quality power (proper voltage and frequency) to almost 10,000 households. This has had a significant socio – economic impact in the area. Proper voltage and availability has resulted in power reliability leading to increasing economic activity in the area. With the passage of time power reliability has given a major boost to micro industries in rural households who have now resorted to mechanisation in a big way. This has led to increase in rural incomes leading to enhanced demand for various domestic appliances transforming lives of the people. Power is utilised by the people for meeting their “heating” needs especially during the harsh winter months. Gone are the days when predominantly people were using wood to tide over the winter months.

The project has also undertaken several initiatives to mitigate their inconveniences in daily life. These are enumerated below:

AREA INFRASTRUCTURE:

Building of approach Roads and Bridges in the project area has significantly improved transportability in difficult mountainous terrain saving time and money in all local economic activities. The Photographs have been separately appended.

DOOR STEP EMPLOYMENT:

The project has provided “door Step” employment to every member living close to the project area. The project has provided jobs to 15 people bringing prosperity to almost 80 – 90 family members directly.

SKILL DEVELOPMENT:

We impart job skills to family members of employees as well as interested rural folks living nearby the site. The nature of skills imparted have resulted in successfully taking up assignments as electricians, welders, mechanics, linesmen etc. Family members of our employees after training have successfully employed in constructions firms in Dubai, Saudi Arabia & Singapore.

SOIL CONSERVATION:

The project undertakes plantation drives on an ongoing basis to conserve and preserve the environment. This has resulted in fewer “landslides” in area which was prone to frequent land slips especially in the monsoon months.

DEVELOPMENT OF LOCAL CONTRACTORS:

We actively train interested local population to acquire skills in civil / mechanical / electrical work such as Masonry work, Painters, Electricians, Pipe Fitters, Mechanics, Welders etc. Such persons after receiving on the job training at the project have been gainfully employed or have been able to start their own Contracting businesses. Some have also successfully registered with NHPC Project for undertaking periodic contracts. In fact we offer works contract to them as and when any Civil Repair Works are to be undertaken at the project site.