Monitoring Report

CARBON OFFSET UNIT (CoU) PROJECT

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

Version 02
Date: 05/05/2022

First CoU Issuance Period: 08 years, 03 months
First Monitoring Period: “01/01/2017 to 31/03/2022” (05 years, 03 months)

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

Monitoring Report	
Title of the project activity	1 MW Jiwa Small Hydro Electric Project in Kullu District of Himachal Pradesh
UCR Project Registration Number	118
Version	02
Completion date of the MR	05/05/2022
Monitoring period number and duration of this monitoring period	Monitoring Period Number: 01 Duration of this monitoring Period[1]: 01/01/2017 to 31/03/2022 (first and last days included)
Project participants	Chevron Hydel (P) Ltd. (Project Proponent and also the Sole Representor)
Host Party	India
Applied methodologies and standardized baselines	Applied Baseline Methodology: AMS-I.D.: "Grid connected renewable electricity generation", version 18 Standardized Methodology: Not Applicable
Sectoral scopes	01 Energy industries (Renewable/Non-Renewable Sources)
Estimated amount of GHG emission reductions for this monitoring period in the registered PCN	2017: 5,978 CoUs (5,978 tCO_{2eq})
	2018: 6,257 CoUs (6,257 tCO_{2eq})
	2019: 6,277 CoUs (6,277 tCO_{2eq})
	2020: 5,525 CoUs (5,525 tCO_{2eq})
	2021: 3,805 CoUs (3,805 tCO_{2eq})
	2022: 396 CoUs (396 tCO_{2eq})
Total:	**28,238 CoUs (28,238 tCO_{2eq})**

[1] The first CoU issuance period registered under UCR was from "01/01/2014 to 31/03/2022". However, currently PP is claiming CoUs only for a partial monitoring period "01/01/2017 to 31/03/2022", with a provision to claim previous period "01/01/2014 to 31/12/2016" at later stage.

SECTION A. Description of project activity

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

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

The purpose of the proposed project activity is to generate electricity using hydro energy which is a clean and renewable source of energy for power generation. The 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. 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 power generated by the project activity is sold to state electricity board connected to Indian grid system. For this purpose, the energy metering system are installed at feeding point with the grid.

This project activity is promoted by 'Chevron Hydel Private Limited' (herein after called as Project Proponent or PP). The 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. This small-scale Hydro Power project has already been commissioned on 29/12/2006. Thus, the project is an operational activity with continuous reduction of GHG, currently being executed under "Universal Carbon Registry" (UCR).

The net generated electricity from the project activity is sold to state electricity board i.e., 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. The export is under the Power Purchase Agreement (PPA) signed between the PP and the utility. In pre-project scenario, electricity delivered to the grid by the project activity would have otherwise been generated by the operation of fossil fuel-based grid-connected power plants and by the addition of new fossil fuel-based generation sources in the grid. As the nature of the hydro project, no fossil fuel is involved for power generation in the project activity. The electricity produced by the project is directly contributing to climate change mitigation by reducing the anthropogenic emissions of greenhouse gases into the atmosphere by displacing an equivalent amount of power at grid.

The project activity has achieved total GHG emission reduction of **47,125 tCO_2e** for overall period of 8 years and 3 months starting from 1st Jan 2014 to 31st Mar 2022 (both days included); however the current monitoring period has been considered starting from 1st Jan 2017, which results into **28,238 tCO_2e** during this first monitoring and verification cycle. Since the project activity generates electricity through hydro energy, a clean renewable energy source it will not cause any negative impact on the environment and thereby contributes to climate change mitigation efforts.

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

This project activity also known as Jiwa small hydroelectric power project (SHEP) is 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: Trench Weir, Intake Structure, Desilting arrangement through SS Coanda Screens, power Pipe, Forebay Tank, Penstock, Powerhouse, Tail race discharging water back into the river. The voltage at the generator terminals is 415V, 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 technological details have been provided in Section B.1.a.

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

UCR Project ID or Date of Authorization : 118
Start Date of Crediting Period : 01/01/2014 (as approved under the UCR PCN)
Project Commissioned : 29/12/2006
Current Monitoring Period : 01/01/2017 to 31/03/2022

d) Total GHG emission reductions achieved or net anthropogenic GHG removals by sinks achieved in this monitoring period>>

The total GHG emission reductions achieved in this monitoring period is as follows:

Summary of the Project Activity and ERs Generated for the Monitoring Period	
Start date of this Monitoring Period	01/01/2017
Carbon credits claimed up to	31/03/2022
Total ERs generated (tCO_{2eq})	28,238 tCO_{2eq}
Leakage	0 tCO_{2eq}

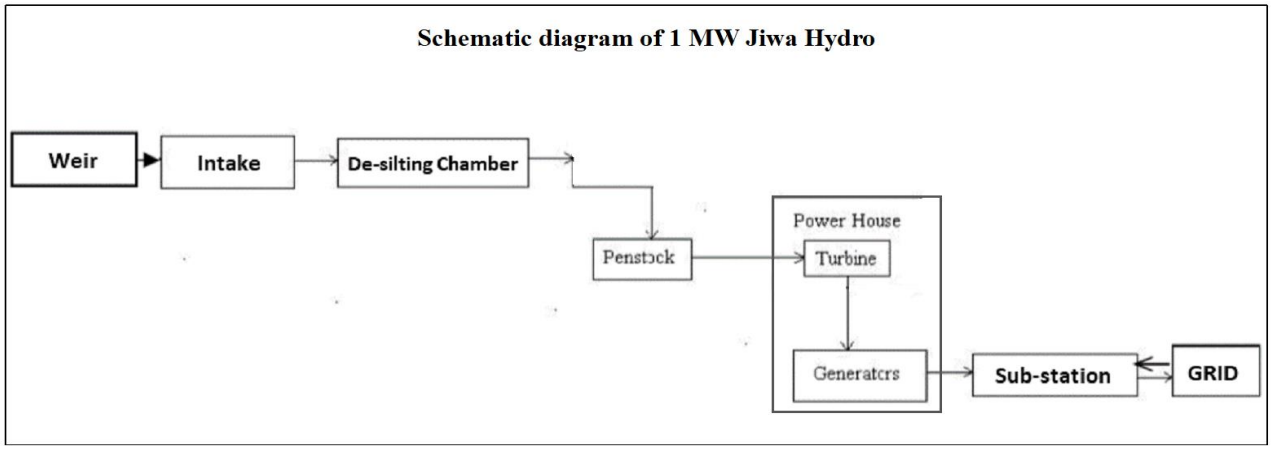
e) Baseline Scenario>>

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

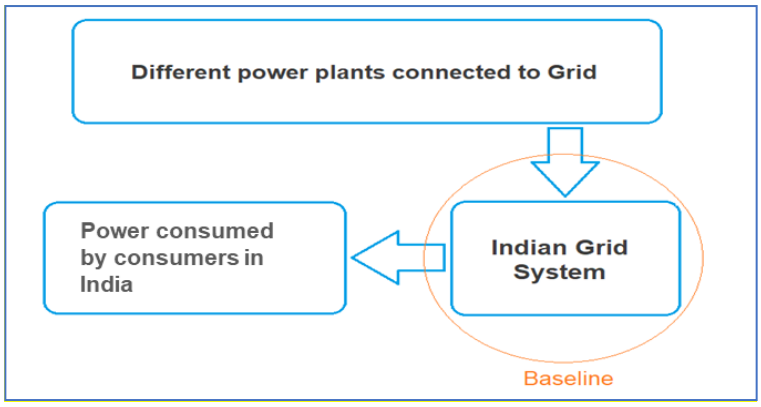
- Grid

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

Project Scenario:



Baseline Scenario:

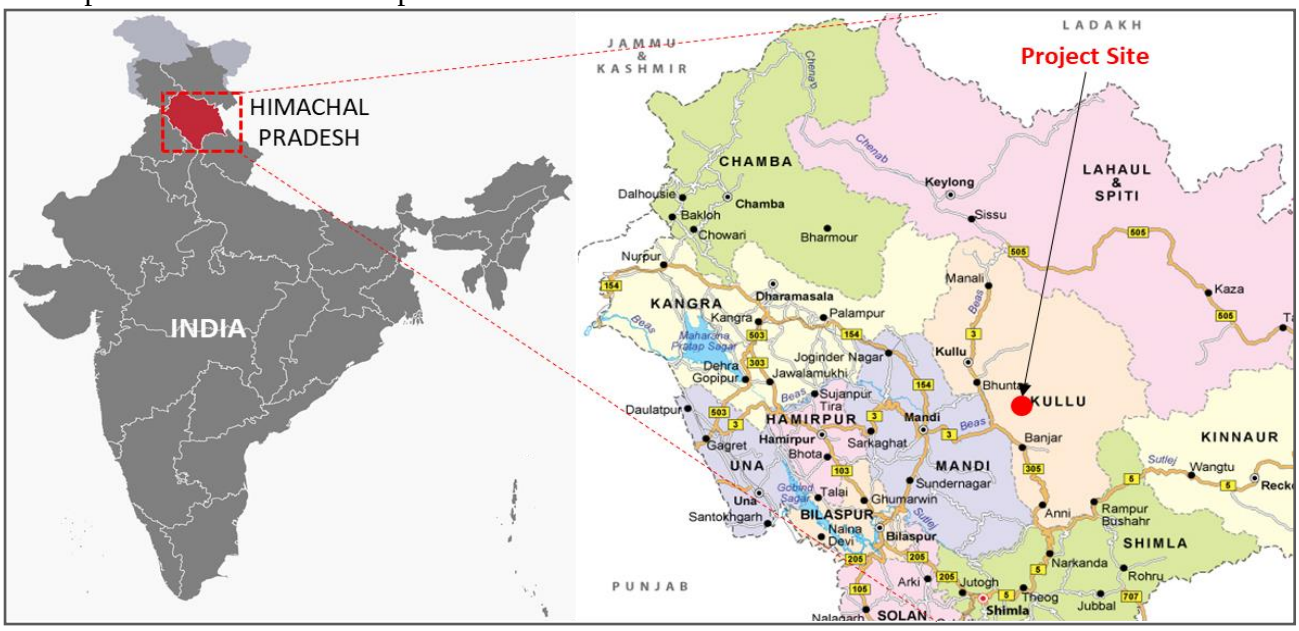


A.2. Location of project activity>>

Country : India
State : 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.3. 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 Ph: +91 9810098494 Email: neerajkanwar14@gmail.com

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

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

TYPE:
I - Renewable Energy Projects

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

A.5. Crediting period of project activity >>

Length of the crediting period corresponding to this monitoring period: 08 years, 03 months.
Date: 01/01/2014 to 31/03/2022 (inclusive of both dates).

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

Particulars	**Details**
Name	Mr. Neeraj Kanwar
Designation	Director
Company	Chevron Hydel (P) Ltd.
Address	285, RPS, Sheikh Sarani-1, New Delhi - 110017, India.
E-mail	neerajkanwar14@gmail.com
Contact	+91 98100 98494

SECTION B. Implementation of project activity

B.1. Description of implemented registered project activity >>

a) Provide information on the implementation status of the project activity during this monitoring period in accordance with UCR PCN>>

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

The project activity involves 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 415kV, 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 415kV to 11kV/11kV ± 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 mentioned in the next section.

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.

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

The key features of the technology are mentioned below[2]:

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

[2] A detailed list of technical specifications and remarks are included under Appendix 2.

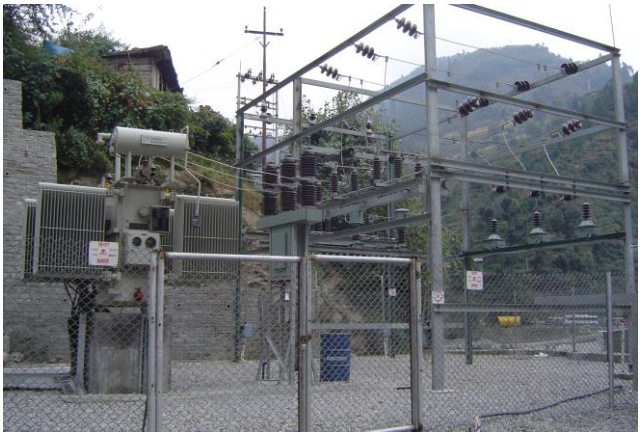
Diameter	800 mm (I.D.)
Thickness	8 mm
Length	190 m
Power House	
Type	Surfaced Power House (R.C.C structure)
Design Head	102.07 m
Design Discharge	1.28 cumecs
Installed Capacity	1 x 1000 kW
Electromechanical Equipment	
Turbine type	Francis type (horizontal axis)
Turbine number	01 Nos.
Turbine normal speed	1500 rpm
Type of generators	AC Synchronous
Generator Normal Speed	1000 rpm
Generator Rated voltage	415kV
Switchyard	
Voltage	11/33 KV
Power	
Installed capacity	1 x 1000 kW
No. of unit generated @ 75% dependable	6.61 MU

Actual project related images are shown below:

Penstock

Weir Site

Powerhouse



Switchyard

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

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

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

Economic well-being: The project 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.

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

Technological well-being: The project activity leads to the promotion of 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.

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

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

B.3. Baseline Emissions>>

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 and operation of a new hydro power plant to harness the green power from hydro energy and to use for sale it to national grid through PPA arrangement. In the absence of the project activity, the equivalent amount of power would have been generated by the operation of grid-connected fossil fuel-based power plants and by the addition of new fossil fuel-based generation sources into the grid. The power produced at grid from the other conventional sources which are predominantly fossil fuel based. Hence, the baseline for the project activity is the equivalent amount of power produced at the Indian grid.

A "grid emission factor" refers to a CO_2 emission factor (tCO_2/MWh) which will be associated with each unit of electricity provided by an electricity system. The UCR recommends an emission factor of 0.9 tCO_2/MWh for the 2014 - 2020 years as a fairly conservative estimate for Indian projects not previously verified under any GHG program. Also, for the vintage 2021, the combined margin emission factor calculated from CEA database in India results into higher emission than the default value. Hence, the same emission factor has been considered to calculate the emission reduction under conservative approach which could be referred in emission reduction calculation spreadsheet and in section C.5.

B.4. Debundling>>

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

SECTION C. Application of methodologies and standardized baselines

C.1. References to methodologies and standardized baselines >>

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

TYPE:
I - Renewable Energy Projects

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

Note: PP had initially 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.

C.2. Applicability of methodologies and standardized baselines >>

The project activity involves generation of grid connected electricity from the operation of a new hydro power-based power project. The project activity has installed capacity of 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
3. This methodology is applicable to project activities that: (a) Install a Greenfield plant;	The Project activity involves the installation of new power plant at a site where there was no renewable energy

Applicability Criterion	Project Case
(b) Involve a capacity addition in (an) existing plant(s); (c) Involve a retrofit of (an) existing plant(s); (d) Involve a rehabilitation of (an) existing plant(s)/unit(s); or (e) Involve a replacement of (an) existing plant(s).	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/m2	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 1.00 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 distinct1 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, rehabilitation or replacement, to qualify as a small-scale project, the total output of the retrofitted, rehabilitated or replacement power plant/unit shall not exceed the limit of 15 MW.	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	This is not relevant to the project activity as the project involves only hydro power generating units.

Applicability Criterion	Project Case
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.

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

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

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

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

As per applicable methodology AMS-I.D. Version 18, "*The spatial extent of the project boundary includes the project power plant and all power plants connected physically to the electricity system that the project power plant is connected to.*"

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

Source		Gas	Included	Justification/Explanation
Baseline	Grid connected electricity generation	**CO_2**	**Yes**	**CO_2 emissions from electricity generation in fossil fuel fired power plants**
		CH_4	No	Minor emission source
		N_2O	No	Minor emission source
		Other	No	No other GHG emissions were emitted from the project
Project	Greenfield Hydro Power Project Activity	CO_2	No	No CO_2 emissions are emitted from the project
		CH_4	No	Project activity does not emit CH_4
		N_2O	No	Project activity does not emit N_2O
		Other	No	No other emissions are emitted from the project

C.5. Establishment and description of baseline scenario (UCR Protocol) >>

Net GHG Emission Reductions and Removals

Thus, $ER_y = BE_y – PE_y – LE_y$

Where:

ER_y = Emission reductions in year y (tCO_2/y)

BE_y = Baseline Emissions in year y (tCO_2/y)

PE_y = Project emissions in year y (tCO_2/y)

LE_y = Leakage emissions in year y (tCO_2/y)

Baseline Emissions

Baseline emissions include only CO_2 emissions from electricity generation in power plants that are displaced due to the project activity. The methodology assumes that all project electricity generation above baseline levels would have been generated by existing grid-connected power plants and the addition of new grid-connected power plants.

The baseline emissions are to be calculated as follows:

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

Where:

BE_y	=	Baseline emissions in year y (t CO_2)
$EG_{PJ,y}$	=	Quantity of net electricity generation that is produced and fed into the grid as a result of the implementation of this project activity in year y (MWh)
$EF_{grid,y}$	=	UCR recommended emission factor of 0.9 tCO_2/MWh has been considered. (Reference: General Project Eligibility Criteria and Guidance, UCR Standard, page 4)

Project Emissions

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

As per applied methodology only emission associated with the fossil fuel combustion 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 PCN also prescribes the provision of counting project emission in case of consumption of Diesel in any standby DG Set. Under such scenario, the formula used to calculate the project emissions due to diesel consumption is provided below:

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

Where:

PE_{Diesel} = Project Emission due to Diesel consumed during monitoring period in DG set
DC_y = Diesel Consumption in Liters (lit)
P = Density of Diesel (0.86 kg/lit)
NCV_{Diesel} = Net Calorific Value of Diesel
$EF_{CO2Diesel}$ = IPCC 2006 Emission factor for Diesel

Thus, $PE_y = PE_{Diesel}$

However, during the monitoring & verification it has been confirmed that a backup DG set was only used on project activity site during construction period. Thereafter, no such backup DG set arrangement was considered. This is because the project activity is only of 1 MW capacity, there is no need for backup power sources and hence, during monitoring period there is no DG set available at plant level or any other equipment consuming diesel for back-up power generation.

Hence, $PE_y = PE_{Diesel} = 0$

Leakage

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

Hence, $LE_y = 0$

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

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

BE_y = 31,379.60 MWh × 0.9 tCO_2/MWh
= 28,241.64 tCO_2e

ER_y = $BE_y – PE_y – LE_y$
= 28,241.64 – 0 – 0
= 28,241 tCO_2e (i.e., rounded value of 28,241 CoUs for the current monitoring period)

Conservative approach:
For the purpose of conservative estimation, the ER value for each vintage year has been calculated as rounded down value and hence the sum of the ER for the current monitoring period is resulted into the most conservative value. Hence, this value has been considered for final reporting.

Thus, ER for the current monitoring period (01/01/2017 to 31/03/2022) = 28,238 CoUs.

C.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, the project will not be active under any other GHG platform beyond the end of VCS crediting period. Therefore, the current monitoring period under UCR is considered from 01/01/2017.

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).

C.7. Monitoring period number and duration>>

First CoU Issuance Period, as per approved UCR PCN: 08 years, 03 months

Current monitoring period considered: 01/01/2017 to 31/03/2022 (inclusive of both dates).
Duration: 05 years, 03 months.

C.8. 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 has kept the provision of changing start date of crediting period for the project activity under the registered UCR PCN. It prescribed that such changes, if required, shall be proposed and communicated to UCR at the time of first verification. Therefore, during this current monitoring period PP has decided to claim CoUs only for a partial monitoring period "01/01/2017 to 31/03/2022" out of the first CoU issuance period, with a provision to claim previous period "01/01/2014 to 31/12/2016" at later stage.

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

Not applicable.

C.10. Monitoring plan>>

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

Data / Parameter	UCR recommended emission factor
Data unit	tCO_2 /MWh
Description	A "grid emission factor" refers to a CO_2 emission factor (tCO_2/MWh) which will be associated with each unit of electricity provided by an electricity system. The UCR recommends an emission factor of 0.9 tCO_2/MWh for the 2014-2020 years as a fairly conservative estimate for Indian projects not previously verified under any GHG program. Hence, the same emission factor has been considered to calculate the emission reduction under conservative approach.
Source of data	https://a23e347601d72166dcd6-16da518ed3035d35cf0439f1cdf449c9.ssl.cf2.rackcdn.com//Documents/UCRStandardNov2021updatedVer2_301121081557551620.pdf
Value applied	0.9
Measurement methods and procedures	-
Monitoring frequency	Ex-ante fixed parameter
Purpose of Data	For the calculation of Emission Factor of the grid
	The combined margin emission factor as per CEA database (current version 16, Year 2021) results into higher emission factor. Hence for 2021 vintage UCR default emission factor remains conservative.

Data / Parameter	P
Data unit	kg/lit
Description	Density of diesel
Source of data	http://www.fast-tek.com/TM104.pdf http://www.iocl.com/Products/DieselSpecifications.pdf
Value applied	0.860
Measurement methods and procedures	Fixed Value has been taken from the publicly available data source.
Purpose of Data	Calculation of project emission
Comments	This parameter is fixed ex-ante for the entire crediting period. However, no diesel is consumed during the entire monitoring period, hence this parameter is no longer applied.

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. However, no diesel is consumed during the entire monitoring period, hence this parameter is no longer applied.

Data / Parameter	$EF_{CO2,diesel,y}$
Data unit	tCO_2e/TJ
Description	CO2 emission factor of diesel in year y
Source of data	IPCC default value
Value applied	74.8
Measurement methods and procedures	As options a, b & c are not available, the project proponent chooses option d i.e., IPCC default values at the upper limit of the uncertainty at a 95% confidence interval as provided in Table 1.4 of Chapter 1 of Vol. 2 (Energy) of the 2006 IPCC Guidelines on National GHG Inventories and is fixed Ex-ante. This is in accordance to the "Tool to calculate project or leakage CO2 emissions from fossil fuel combustion" latest version applied.
Purpose of Data	Calculation of project emission
Comments	This parameter is fixed ex-ante for the entire crediting period. However, no diesel is consumed during the entire monitoring period, hence this parameter is no longer applied.

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

Data / Parameter	$EG_{PJ,y}$
Data unit	MWh / year
Description	Net electricity supplied to the grid by the project activity
Source of data	Monthly Joint Meter Readings (JMRs)
Measurement procedures (if any):	Data Type: Measured Monitoring equipment: Energy Meters are used for monitoring Recording Frequency: Continuous monitoring and Monthly recording from Energy Meters, Summarized Annually Archiving Policy: Paper & Electronic Calibration frequency: 5 years (considered as per CEA provision) 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. In case the monthly JMR provides net export quantity, the same will be directly considered for calculation. However, if the JMR does not directly provide "net electricity" units, then quantity of net electricity supplied to the grid shall be calculated using the parameters reflected in the JMR. For example, 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: $EG_{PJ,y} = EG_{Export} - EG_{Import}$ For this project activity, both Export and Import values are considered (as available from the monthly JMR) and net electricity value has been calculated for each year cumulatively.
Measurement Frequency:	Monthly
Value applied:	31,379.60 (this is the cumulative value for the entire monitoring period, yearly values are reported in the ER sheet)
QA/QC procedures applied:	Calibration of the Main meters will be carried out once in five (5) years as per National Standards (as per the provision of CEA, India) and faulty meters will be duly replaced immediately as per the provision of power purchase agreement. Cross Checking: Quantity of net electricity supplied to the grid will be cross checked from the invoices raised by the project participant to the grid.
Purpose of data:	The Data/Parameter is required to calculate the baseline emission.
Any comment:	All the data will be archived till a period of two years from the end of the crediting period.

Data / Parameter	DC_y
Data unit	Liters
Description	Diesel consumption by the standby DG set in year y
Source of data	Plant Records
Measurement methods and procedures	Not required. *DG set was only used on project activity site during construction period. Thereafter, as the project activity is just of 1 MW capacity, there is no need for backup power sources and hence, during monitoring period there is no DG set available at plant level or any other equipment consuming diesel for back-up power generation. This same could be verified during remote audit.*
Frequency of monitoring/recording	NA
Value monitored	0.00

Monitoring equipment	NA
QA/QC procedures to be applied	NA
Purpose of the data	NA
Calculation method	NA
Comments	The data would be archived up to two years after the end of crediting period. However, no diesel is consumed during the entire monitoring period, hence this parameter is no longer applied.

APPENDIX - 1:

Vintage wise CoU claimed during the current monitoring period:

Units in tCO_2eq:

2014	2015	2016	2017	2018	2019	2020	2021	2022	Total
Not claimed	**Not claimed**	**Not claimed**	**5,978**	**6,257**	**6,277**	**5,525**	**3,805**	**396**	**28,238**

APPENDIX - 2:

Technical specification sheet for the entire project:

DETAILS OF EQUIPMENT AT JIWA SHP, KULLU DISTT, H.P.

S.No.	Name of Equipment	Description / Specifications	Qty	Remarks
	Powerhouse Equipment			
1.	Main Inlet Valve	Butterfly Valve, Working Pressure 9.0 Bar	One	Complete with Housing, Valve Disc, Sealing elements & Actuator
2.	Turbine	Francis Horizontal Turbine, 1658 kW, 1000 RPM, Runner Outlet Diameter 535 mm	One	Complete with Guide vanes, Spiral Casing, Draft Tube & Dewatering arrangement
3.	Generator	Brushless 3 Phase Synchronous Generator, 2000 kVA, 415 V, 50 Hz., 0.8 Pf, 1000 RPM	One	Complete with AVR as per IS
4.	Hydraulic Power Unit	Complete with Gear Pump, Oil Tank, Valves, Thermostat etc.	One Lot	
5.	Cooling Unit	Oil Tank with Gear Pump, filter elements Max. Working Pressure 10 Bar	One Lot	Complete Set.
6.	Control Panels	Governor Panel, Generator LV Panel, Synchronising Panel with ACB & Relay Panel.	One Lot	
7.	Battery Charger / Ventilation & Earthing Eqpt. / Fire Extinguishers / Power & Control Cables & accessories etc.	Complete working unit as per IS	One Lot	
	Switchyard Equipment			
1.	Generator Transformer	Outdoor Type, 2000 kVA, Three Phase, 33-11 kV / 415 V Copper Wound, as per IS 2026, YN d11, Insulation Class A, ONAN		Complete with accessories as per IS
2.	Outdoor Circuit Breaker	Outdoor OHB, SF6, 36 kV, 50 Hz., 2000A, 31.5 kA		Complete with accessories as per IS
3.	Auxiliary Transformer	11 / .0433 kV, 100 kVA, ONAN, 3 Phase, 50 HZ.,		Complete with accessories as per IS
4.	Isolators	33 kV, 400 Amps, Horizontal Mounted, Double Break, manually operated	Two Nos	Complete with Operating mechanism as per IS.
5.	CT's / PT's	Outdoor Oil Cooled Type CT's: 11-33 kV, Ratio 50 – 150A & PT's 11 -33 kV / √3; 110V / √3; 110V / √3	3 Nos each	Complete with accessories as per IS
6.	Lightening Arrestors	9 kV, 10 kA, Class 1	3 Nos	
7.	Interconnection Bay Eqpt.	As per IS		

Chevron Hydel Pvt.

Director