



# PROJECT CONCEPT NOTE

CARBON OFFSET UNIT (CoU) PROJECT

**Title:** 2 MW Small Scale Hydro power project by M/S Leond Hydro Power Private Ltd.

Version 2.0

Date 26/07/2022

First CoU Issuance Period: 04 Years and 01 Months

Date: 16/12/2017 to 31/12/2021



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

| BASIC INFORMATION                                 |   |
|---|---|
| Title of the project activity                     | 2 MW Small Scale Hydro power project by M/S Leond Hydro Power Private Ltd.  |
| Scale of the project activity                     | Small Scale   |
| Completion date of the PCN                        | 26/07/2022  |
| Project participants                              | Creduce Technologies Private Limited (Representator)<br>M/S Leond Hydro Power Private Ltd. (Project Proponent)  |
| Host Party  | India   |
| Applied methodologies and standardized baselines  | Applied Baseline Methodology:<br>AMS-I. D: “Grid connected renewable electricity generation”, version 18<br><br>Standardized Methodology: Not Applicable. |
| Sectoral scopes                                   | 01 Energy industries<br>(Renewable/Non-Renewable Sources)   |
| Estimated amount of total GHG emission reductions | To be estimated during verification<br>[An ex-ante estimate is 6,307 CoUs per year]   |

## **SECTION A. Description of project activity**

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

The proposed project activity with title under UCR “2 MW (2 x 1MW) Small Scale Hydro Power project by M/S Leond Hydro Power Private Ltd.”, is a grid connected Hydro Electric Power project located in village Rawa of Kangra 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 M/S Leond Hydro Power Private Ltd. (herein after called as project proponent ‘PP’). The proposed project activity consists of two pelton wheel turbine having individual capacity 1000 kW with aggregated installed capacity of 2 MW in District - Kangra, Himachal Pradesh state of India.

The Proposed Leond small hydroelectric project (SHEP) is a run of river type which is developed on Leond Nalla, a tributary of Gaj khad which in turn is a tributary of Beas River in District Kangra of Himachal Pradesh. The project envisages a generation capacity of 2 MW of power by utilizing the available net head 252 m. The project activity aims to harness kinetic energy of water (renewable source) to generate electricity. The project comprises a trench weir which diverts the water into an intake placed on the left bank of the river. The diverted water passes through Desilting basin. Desilted water enters into water conductor system, forebay and the steel pressure shaft. A surface powerhouse is suitably located on a terrace at left bank of the river. Tail water from the powerhouse is discharged back into the khad. The project activity has been under commercial operation as on 22/03/2018.

The net generated electricity from the project activity is sold to state electricity board i.e., Himachal Pradesh State Electricity Board Limited (HPSEBL) 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 is displacing the estimated annual net electricity generation i.e., 7,008 MWh from the Indian grid system, which otherwise would have been generated by the operation of fossil fuel-based grid-connected power plants. The estimated annual CO<sub>2</sub> emission reductions by the project activity are expected to be 6,307 tCO<sub>2</sub>e.

The estimated annual average and the total CO<sub>2</sub>e emission reductions by the project activity is expected to be 6,307 tCO<sub>2</sub>e, whereas actual emission reduction achieved during the first CoU period shall be submitted as a part of first monitoring and verification.

Since the project activity will generate electricity through hydro energy, a clean renewable energy source it will not cause any negative impact on the environment and thereby contributes to climate change mitigation efforts.

### **Project's Contribution to Sustainable Development**

Indian economy is highly dependent on “Coal” as fuel to generate energy and for production processes. Thermal power plants are the major consumers of coal in India and yet the basic electricity needs of a large section of population are not being met. This results in excessive demands for electricity and places immense stress on the environment.

Changing coal consumption patterns will require a multi-pronged strategy focusing on demand, reducing wastage of energy and the optimum use of renewable energy (RE) sources. This project is a greenfield activity where grid power is the baseline. The renewable power generation is gradually contributing to the share of clean & green power in the grid; however, grid emission factor is still on higher side which defines grid as distinct baseline.

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

**Social well-being:** The project would help in generating direct and indirect employment benefits accruing out of ancillary units for manufacturing of the hydro turbine generator and for maintenance during operation of the project activity. It will lead to development of infrastructure around the project area in terms of improved road network, etc. and will also directly contribute to the development of renewable infrastructure in the region.

**Economic well-being:** Being a renewable resource, using hydro energy to generate electricity contributes to conservation precious natural resources. The project contributes to the economic sustainability through promotion of decentralization of economic power, leading to diversification of the national energy supply, which is dominated by conventional fuel based generating units. Locally, improvement in infrastructure will provide new opportunities for industries and economic activities to be setup in the area. Apart from getting better employment opportunities, the local people will get better prices for their land, thereby resulting in overall economic development.

**Technological well-being:** The project activity leads to the promotion of 2 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 project leads to technological well-being.

**Environmental well-being:** The project utilizes hydro energy for generating electricity which is a clean source of energy. The project activity will not generate any air pollution, water pollution or solid waste to the environment which otherwise would have been generated through fossil fuels. Also, it will contribute to reduction GHG emissions. Thus, the project causes no negative impact on the surrounding environment contributing to environmental well-being.

### **With regards to ESG credentials:**

At present specific ESG credentials have not been evaluated, however, the project essentially contributes to various indicators which can be considered under ESG credentials. Some of the examples are as follows:

#### **Under Environment:**

The following environmental benefits are derived from the project activity:

- Produces renewable electricity without any GHG emissions.
- Run-of-river hydro power plant with little impact on the surrounding ecology.
- No increase in volume of reservoir and no land inundation, hence no disturbance to the natural habitat.

For the PP, 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 region in the state of Himachal Pradesh. The implementation of the project activity would provide job opportunities to the local community; contribute in poverty alleviation of the local community and development of basic amenities to community leading to improvement in living standards of the community.

#### **Under Governance:**

Governance criteria relates to overall operational practices and accounting procedure of the organization. With respect to this project activity, the PP practices a good governance practice with transparency, accountability and adherence to local and national rules & regulations etc. This can be further referred from the company's annual report. The electricity generated from the project can be accurately monitored, recorded and further verified under the existing management practice of the company. Thus, the project and the proponent ensure good credentials under ESG.

### **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 conveyed about project activity before implementation at respective village of Kangra district of Himachal Pradesh, India to understand, discuss, record all possible concerns related to environment and socio-economic aspects of the project so that as per requirements mitigation measures can be taken. The feedback and inputs received from local stakeholders confirm that no negative impact is foreseen by them.

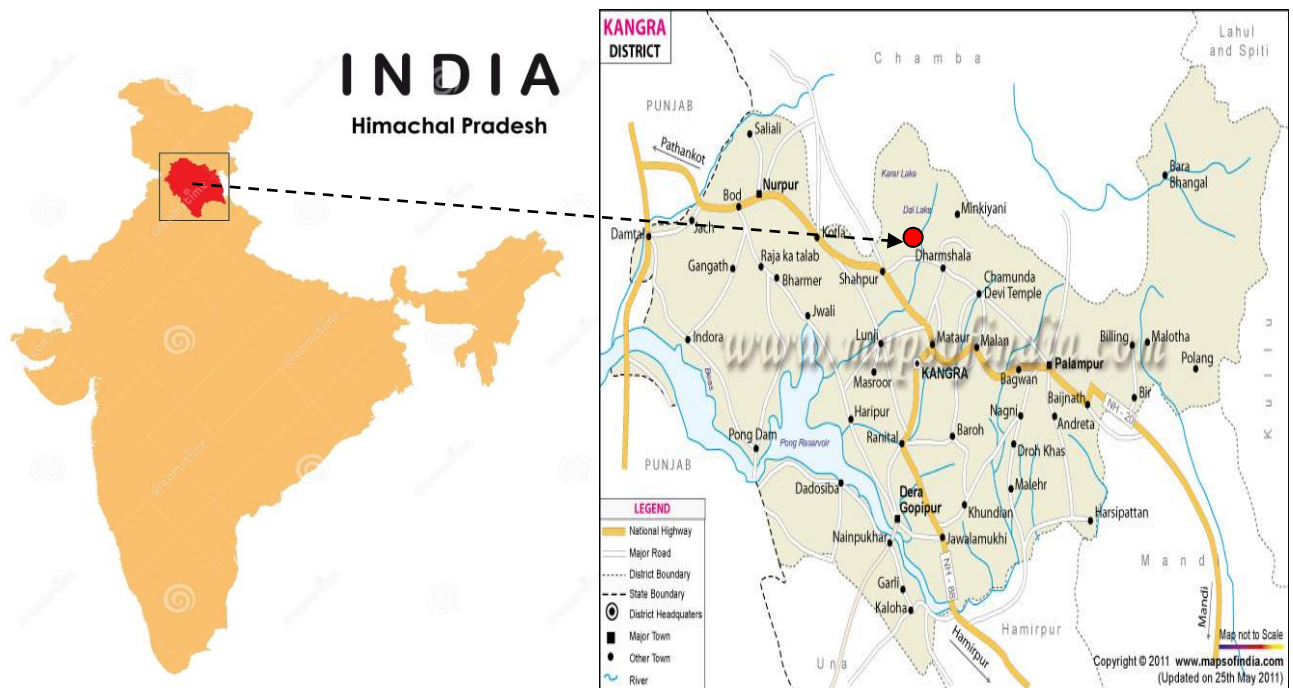
Additionally, there are social, environmental, economic and technological benefits which contribute to sustainable development. The key details have been discussed in the previous section.

### A.3. Location of project activity >>

Country : India  
State : Himachal Pradesh  
District : Kangra  
Tehsil : Dharmashala  
Village : Kareri

The project site is located 20 km from Dharamshala Town in the state of Himachal Pradesh. The nearest railway station is Pathankot 90 km away from site. The geographic co-ordinate of the project locations is 32°16'10.0"N 76°17'13.0"E.

The representative location map is included below:



(Courtesy: google images and www.mapsofindia.com)

#### A.4. Technologies/measures>>

The project activity involves 2 numbers Horizontal Axis Pelton wheel turbine (1000 kW each) with internal electrical lines connecting the project activity with local evacuation facility. The generators generate power at 3.3 kV, which can further be stepped up to 33 kV. The project activity can operate in the frequency of 50 Hz and the voltage of 3.3 kV. The average life time of the generator is around 35 years as per the equipment supplier specification. The other salient features of the technology are:

|                         |                                   |
|-------------------------|-----------------------------------|
| Diversion Weir          |                                   |
| Type                    | Drop type trench weir             |
| River Bed level         | El $\pm$ 1658.35 m                |
| Size                    | 2 m wide, 15 m long               |
| Discharge carried       | 1.67 cumecs                       |
| Single flushing pipe    | 300 mm dia $\pm$ 20 m long        |
| Flushing discharge      | 0.27 cumecs                       |
| Design Flood            | 95 cumecs                         |
| Desilting Arrangement   |                                   |
| Type                    | Surface, Central slit gutter type |
| Size                    | 30 m x 2.5 m x 2.5 m              |
| Water Conductor System  |                                   |
| Type                    | Rectangular Open Channel          |
| Size                    | 0.70 m x 1.10 m                   |
| Length                  | $\pm$ 600 m                       |
| Slope                   | 1 in 300                          |
| Design Discharge        | 0.93 cumecs                       |
| Velocity                | 1.76 m/sec                        |
| Forebay                 |                                   |
| Type                    | Surface                           |
| Size                    | 21m x 4m x 4m                     |
| Storage Capacity        | 168 cum                           |
| Full Forebay level      | El $\pm$ 1652m                    |
| Minimum draw down level | El $\pm$ 1650m                    |
| Peaking Time            | $\pm$ 3 minutes                   |
| Turbine                 |                                   |
| Type                    | Horizontal axis Pelton            |
| Number                  | Two                               |
| Rated Capacity          | 1000 kW                           |
| Speed                   | 1000 rpm                          |
| Generator               |                                   |
| Type                    | Horizontal axis Synchronous       |
| Number                  | Two                               |
| Rate Output             | 1112KVA each                      |
| Overload Capacity       | 20%                               |
| Power factor            | 0.9 lag                           |
| Frequency               | 50 Hz                             |
| Rated Voltage           | 3.3 kV                            |
| Penstock                |                                   |
| Type                    | Circular, Surface Steel Penstock  |
| Size                    | 500 mm dia.                       |

|                            |                             |
|----------------------------|-----------------------------|
| Thickness                  | Varying Between 8mm to 12mm |
| Length                     | ±624m                       |
| Velocity                   | 4.74m/sec                   |
| Centre line at intake      | E1±1648.50m                 |
| Number of branch penstocks | Two                         |
| Size of Branch penstock    | 400mm dia                   |
| Power House                |                             |
| Type                       | Surface Power house         |
| Size                       | 20.50 m x 11 m x 7 m        |
| Capacity                   | 2 x 1000 kW                 |
| Gross head                 | 280 m                       |
| Net head                   | 252 m                       |
| Elevation                  | E1±1380 m                   |
| Tail Water Level           | 1378 m                      |
| Tail Race                  |                             |
| Type & Size                | RCC Box Section (1m x 1.2m) |
| Length                     | ±25 m                       |

#### A.5. Parties and project participants >>

| Party (Host) | Participants  |
|--------------|---|
| India        | <p><b>Creduce Technologies Private Limited (Representator)</b></p> <p>Contact person: Shailendra Singh Rao<br/> Mobile: +91 9016850742, 9601378723<br/> Address:<br/> 2-O-13,14 Housing Board Colony, Banswara,<br/> Rajasthan - 327001, India</p> <p><b>M/S Leond Hydro Power Private Ltd. (Developer)</b><br/> Address:<br/> SKIPTON Villa, Ridge, Near Ritz, Shimla, Himachal Pradesh-<br/> 171001, India.</p> |

#### A.6. Baseline Emissions>>

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

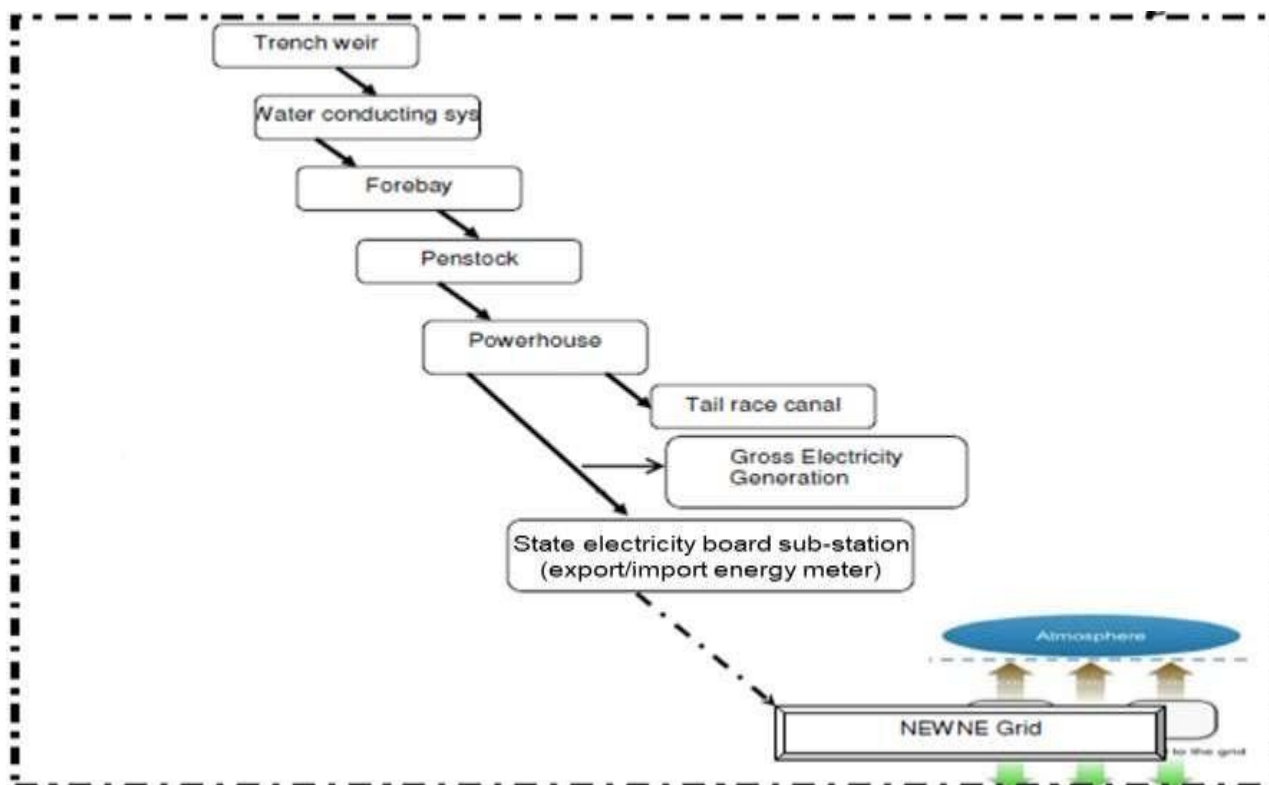
- Grid

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

Schematic diagram showing the baseline scenario:



## Project Scenario:



NEWNE – North East West and North-East Grid, is now a part of unified Indian Grid system.

The project activity involves setting up of a new hydro-electric power plant to produce the electricity and supply it to the national the grid.

## 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 fossil fuel-based grid connected power plants and by the addition of conventional fuel sources into the grid”.*

## A.7. Debundling>>

This project activity is not a de-bundled component of a larger project activity.

## SECTION B. Application of methodologies and standardized baselines

### B.1. References to methodologies and standardized baselines >>

#### SECTORAL SCOPE:

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

#### TYPE:

I - Renewable Energy Projects

#### CATEGORY:

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

### B.2. Applicability of methodologies and standardized baselines >>

The project activity involves generation of grid connected electricity from the construction and operation of a new hydro power-based power project. The project activity has installed capacity of 2 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:<br><br>(a) Supplying electricity to a national or a regional grid; or<br>(b) Supplying electricity to an identified consumer facility via national/regional grid through a contractual arrangement such as wheeling. | The project activity is a Renewable Energy Project which falls under applicability criteria option 1 (a) i.e., “Supplying electricity to a national or a regional grid”.<br><br>Hence the project activity meets the given applicability criterion. |
| 2. This methodology is applicable to project activities that:<br>(a) Install a Greenfield plant;<br>(b) Involve a capacity addition in (an) existing plant(s);<br>(c) Involve a retrofit of (an) existing plant(s);<br>(d) Involve a rehabilitation of (an) existing plant(s)/unit(s); or<br>(e) Involve a replacement of (an) existing plant(s).                      | The option (a) of applicability criteria 2 is applicable as project is a Greenfield plant /unit. Hence the project activity meets the given applicability criterion.  |

|   |   |
|---|---|
| <p>3. 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"> <li>(a) The project activity is implemented in existing reservoir, with no change in the volume of the reservoir; or</li> <li>(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<sup>2</sup>.</li> <li>(c) The project activity results in new reservoirs and the power density of the power plant, as per definitions given in the project emissions section, is greater than 4 W/m<sup>2</sup>.</li> </ul> | <p>It is run of river type of project; hence, this criterion is not applicable.</p>   |
| <p>4. 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 only component is renewable power project below 15 MW, thus this criterion is not applicable to this project activity.</p>   |
| <p>5. Combined heat and power (co-generation) systems are not eligible under this category.</p>   | <p>This criterion is not applicable to this project activity.</p>   |
| <p>6. 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>No capacity addition was done to any existing power plant. Thus, this criterion is not applicable to this project activity.</p>  |
| <p>7. 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.</p>  | <p>The proposed project is installation and operation of greenfield 2 MW hydro power plant, i.e., no retrofit, rehabilitation or replacement was done to any existing power plant. Thus, this criterion is not applicable to this project activity.</p> |
| <p>8. 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-IC.: Thermal energy production with or without</p>   | <p>The proposed project is a greenfield 2 MW hydro project hence, this criterion is not applicable to this project activity.</p>  |

|   |   |
|---|---|
| electricity” shall be explored.   |   |
| 9. In case biomass is sourced from dedicated plantations, the applicability criteria in the tool “Project emissions from cultivation of biomass” shall apply. | No biomass is involved; thus, the criterion is not applicable to this project activity. |

### 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 <sub>2</sub>  | Yes       | CO <sub>2</sub> emissions from electricity generation in fossil fuel fired power plants |
|          |   | CH <sub>4</sub>  | No        | Minor emission source   |
|          |   | N <sub>2</sub> O | No        | Minor emission source   |
|          |   | Other            | No        | No other GHG emissions were emitted from the project                                    |
| Project  | Greenfield Hydro Power Project Activity | CO <sub>2</sub>  | No        | No CO <sub>2</sub> emissions are emitted from the project                               |
|          |   | CH <sub>4</sub>  | No        | Project activity does not emit CH <sub>4</sub>  |
|          |   | N <sub>2</sub> O | No        | Project activity does not emit N <sub>2</sub> 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 fossil fuel-based grid connected power plants and by the addition of conventional fuel 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 i.e., India grid system 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<sub>2</sub> emission factor (tCO<sub>2</sub>/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<sub>2</sub>/MWh for the 2014-2020 years as a fairly conservative estimate for Indian projects not previously verified under any GHG program. Also, for the vintage 2021, the combined margin emission factor calculated from CEA database in India results into higher emission than the default value. Hence, the same emission factor has been considered to calculate the emission reduction under conservative approach.

## Net GHG Emission Reductions and Removals

$$\text{Thus, } ER_y = BE_y - PE_y - LE_y$$

Where:

- ER<sub>y</sub> = Emission reductions in year y (tCO<sub>2</sub>/y)
- BE<sub>y</sub> = Baseline Emissions in year y (t CO<sub>2</sub>/y)
- PE<sub>y</sub> = Project emissions in year y (tCO<sub>2</sub>/y)
- LE<sub>y</sub> = Leakage emissions in year y (tCO<sub>2</sub>/y)

## Baseline Emissions

Baseline emissions include only CO<sub>2</sub> 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 <sub>y</sub>      | = | Baseline emissions in year y (t CO <sub>2</sub> )   |
| EG <sub>PJ,y</sub>   | = | 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 <sub>grid,y</sub> | = | UCR recommended emission factor of 0.9 tCO <sub>2</sub> /MWh has been considered, this is conservative as compared to the combined margin grid emission factor which can be derived from Database of Central Electricity Authority (CEA), India. (Reference: General Project Eligibility Criteria and Guidance, UCR Standard, page 4) |

## Project Emissions

As per paragraph 39 of AMS-I.D. (version 18, dated 28/11/2014), for most renewable energy project activities emission is zero.

**Hence, PE<sub>y</sub> = 0**

**Leakage**

As per paragraph 42 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, LEy= 0**

The actual emission reduction achieved during the first CoU period shall be submitted as a part of first monitoring and verification. However, for the purpose of an ex-ante estimation, following calculation has been submitted:

Estimated annual baseline emission reductions (BEy)

$$= 7008 \text{ MWh/year} \times 0.9 \text{ tCO}_2/\text{MWh}$$

$$= 6,307 \text{ tCO}_2/\text{year (i.e., 6,307 CoUs/year)}$$

## B.6. Prior History>>

The project activity is a small-scale hydro project and was not applied under any other GHG mechanism prior to this registration with UCR. Also, project has not been applied for any other environmental crediting or certification mechanism. 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 changed to 16/12/2017 from 22/03/2018, as the actual electricity generation was reported from 16/12/2017 as per the JMR and invoice/bill of the month of December 2017.

## 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: 04 Years and 01 Months

16/12/2017 to 31/12/2021 (inclusive of both dates)

## B.10. Monitoring plan>>

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

|                                    |   |
|------------------------------------|---|
| Data / Parameter                   | UCR recommended emission factor   |
| Data unit                          | tCO <sub>2</sub> /MWh   |
| Description                        | A "grid emission factor" refers to a CO <sub>2</sub> emission factor (tCO <sub>2</sub> /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 <sub>2</sub> /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                     | <a href="https://a23e347601d72166dcd6-16da518ed3035d35cf0439f1cdf449c9.ssl.cf2.rackcdn.com/Documents/UCRStandardJan2022updatedVer3_180222035328721166.pdf">https://a23e347601d72166dcd6-16da518ed3035d35cf0439f1cdf449c9.ssl.cf2.rackcdn.com/Documents/UCRStandardJan2022updatedVer3_180222035328721166.pdf</a>   |
| Value applied                      | 0.9   |
| Measurement methods and procedures | -   |
| Monitoring frequency               | Ex-ante fixed parameter   |
| Purpose of Data                    | For the calculation of Emission Factor of the grid  |
| Additional Comment                 | The combined margin emission factor as per CEA database (current version 16, Year 2021) results into higher emission factor. Hence for 2021 vintage UCR default emission factor remains conservative.   |

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

|                                  |   |
|----------------------------------|---|
| Data / Parameter                 | $EG_{BL,y}$   |
| Data unit                        | MWh/year  |
| Description                      | Quantity of net electricity supplied to the grid as a result of the implementation of the project activity in year y (MWh)  |
| Source of data                   | Monthly Joint Meter Readings (JMRs)   |
| Measurement procedures (if any): | <p>Data Type: Measured<br/> Monitoring equipment: Energy Meters are used for monitoring<br/> Recording Frequency: Continuous monitoring and Monthly recording from Energy Meters, Summarized Annually<br/> Archiving Policy: Paper &amp; Electronic<br/> Calibration frequency: 5 years (as per CEA provision)</p> <p>Based on the joint meter reading reports, the monthly invoices and bills are generated.</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 the JMR.</p> <p>For example, the difference between the measured quantities of the grid export and the import will be considered as net export:<br/> <math>EG_{PJ,y} = EG_{Export} - EG_{Import}</math></p> |
| Measurement Frequency:           | Monthly   |
| Value applied:                   | To be applied as per actual data  |
| QA/QC procedures applied:        | <p>Calibration of the Main meters will be carried out once in five (5) years as per National Standards (as per the provision of CEA, India) and faulty meters will be duly replaced immediately as per the provision of power purchase agreement.</p> <p>Cross Checking:<br/> 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 periods.   |