



# Monitoring Report

## CARBON OFFSET UNIT (CoU) PROJECT



**Title:** 26 MW Bagasse based co-generation by Vitthal Refined Sugar Ltd.

Version 1.0

Date 20/12/2022

First CoU Issuance Period: 5 Years

Monitoring Period: 01/12/2017 to 30/11/2022



| Monitoring Report                                                   |                                                                                                                                             |
|---------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------|
| Title of the project activity                                       | 26 MW Bagasse based co-generation by Vitthal Refined Sugar Ltd.                                                                             |
| UCR Project Registration Number                                     | 177                                                                                                                                         |
| Version                                                             | 1.0                                                                                                                                         |
| Completion date of the MR                                           | 20/12/2022                                                                                                                                  |
| Monitoring period number and duration of this monitoring period     | Monitoring Period Number: 01<br>Duration of this monitoring Period: 5 Years (first and last days included (01/12/2017 to 30/11/2022))       |
| Project participants                                                | Project Proponent: Vitthal Refined Sugars Ltd.<br>Aggregator: Energy Advisory Services Pvt. Ltd.                                            |
| Host Party                                                          | India                                                                                                                                       |
| Applied methodologies and standardized baselines                    | Applied Baseline Methodology:<br><b>ACM0006</b> : Electricity and heat generation from biomass (Ver. 16) & UCR Standard for Emission Factor |
| Sectoral scopes                                                     | 01 Energy industries<br>(Renewable/Non-Renewable Sources)                                                                                   |
| Actual amount of GHG emission reductions for this monitoring period | 2017: 3,783 CoUs                                                                                                                            |
|                                                                     | 2018: 22,724CoUs                                                                                                                            |
|                                                                     | 2019: 8,707CoUs                                                                                                                             |
|                                                                     | 2020: 11,414 CoUs                                                                                                                           |
|                                                                     | 2021: 21,815 CoUs                                                                                                                           |
|                                                                     | 2022: 28,138 CoUs                                                                                                                           |
|                                                                     | <b>Total: 96,583 CoUs</b>                                                                                                                   |

## SECTION A. Description of project activity

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

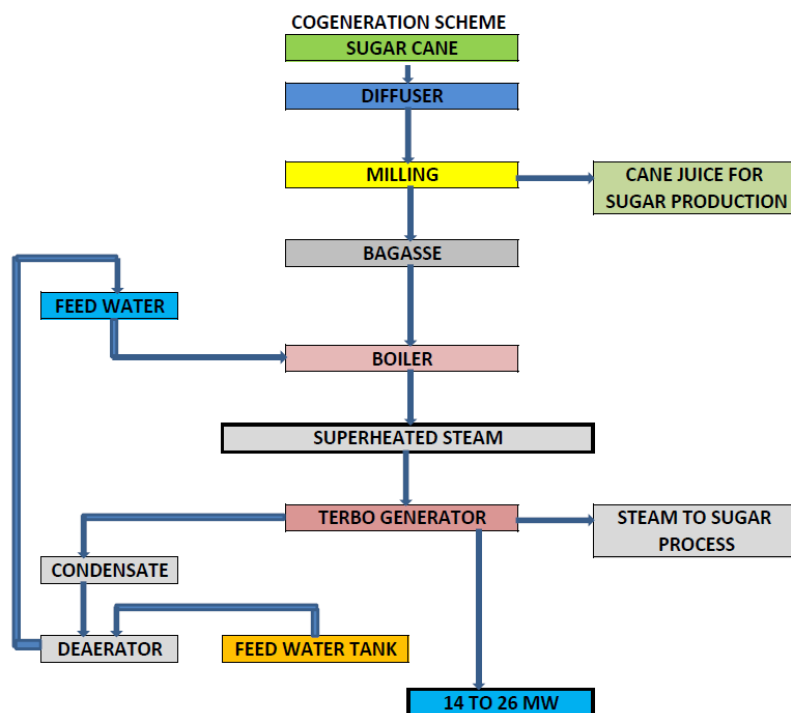
The proposed project activity with title under UCR “26 MW Bagasse based co-generation by Vitthal Refined Sugar Ltd.”, implements a cogeneration power project of 26 MW capacity which operates on mill bagasse only for 160 season days of the sugar mill. The project generates 1,11,076 MWh during the monitoring period of 01/12/2017 to 30/11/2022. The generated electricity is exported through MSEDCL grid for sale to MSEDCL or to third party consumer as per the prevailing tariff. The project is an operational activity with continuous reduction of GHG, currently being applied under “Universal Carbon Registry” (UCR).

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

The project activity is the construction and operation of a power plant/unit that uses renewable energy sources and supplies electricity to the grid as well as generate heat for the captive consumption at 5000 TCD sugar mill. The project activity is thus the displacement of electricity that would be provided to the grid by more-GHG-intensive means and provides long-term benefits to the mitigation of climate change. It is established that the project saves 99,966 tonnes of CO<sub>2</sub> being generated due to the consumption of electricity from the national grid. The electricity export to the MSEDCL grid will displace the fossil fuel based electricity in the national grid system.

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

The project activity involves 1 x 150 TPH boiler with high pressure and temperature configuration (87 kg/cm<sup>2</sup> and 515 °C), 1 x 18 MW back pressure and 1 x 8 MW Double extraction cum condensing Turbine Generator set. The Project activity in a process flow diagram can be expressed as below:



Some of the salient features of the project equipment can be found in the below mentioned table:

| Parameters/Description                          | Value/Units                                                                                                      |
|-------------------------------------------------|------------------------------------------------------------------------------------------------------------------|
| Boiler                                          | 1 No.                                                                                                            |
| Boiler Type                                     | Bi drum type water tube boiler                                                                                   |
| Furnace Type                                    | Travelling grate with spreader stoker to burn bagasse with 50% moisture                                          |
| Furnace                                         | Leak-proof membrane panel type                                                                                   |
| MCR evaporation                                 | 150 t/hr                                                                                                         |
| Steam pressure at super heater outlet           | 87 kg/cm <sup>2</sup>                                                                                            |
| Steam temperature at super heater outlet        | 515 °C                                                                                                           |
| Feed water temperature                          | 165 °C                                                                                                           |
| Efficiency of MCR                               | 71% ± 0.5% on GCV of bagasse having 50% moisture, efficiency determined by heat loss method as per ASME PTC 4.1. |
| Type of Fuel                                    | Bagasse with 50% moisture.                                                                                       |
| Turbo Alternator set                            | 18 MW                                                                                                            |
| Double Extraction cum Condensing type Turbo set | 10 MW @ 0.8 Power factor                                                                                         |

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

The duration of the crediting period corresponding to the monitoring period is covered in this monitoring report.

UCR Project ID : 177  
 Start Date of Crediting Period : 01/12/2017  
 The project was commissioned on : 01/12/2017

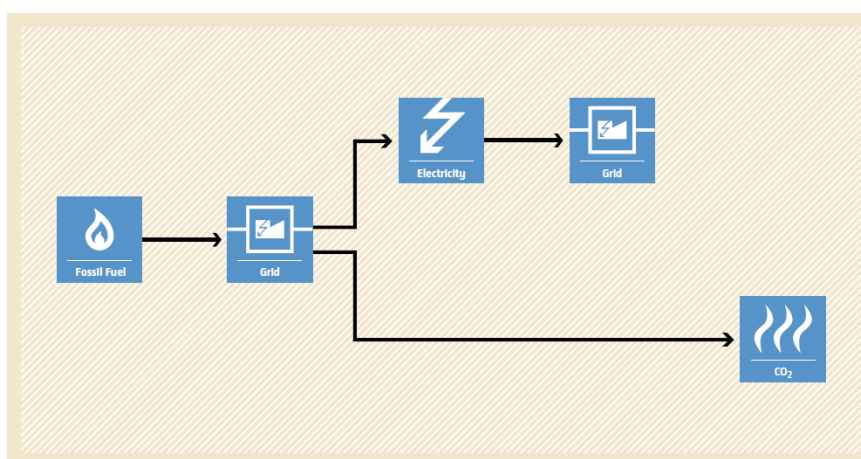
d) Total GHG emission reductions achieved or net anthropogenic GHG removals by sinks achieved in this monitoring period>>

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                                        | 01/12/2017                |
| Carbon credits claimed up to                                                | 30/11/2022                |
| Total ERs generated (tCO <sub>2eq</sub> )                                   | 99,966 tCO <sub>2eq</sub> |

e) 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”.**

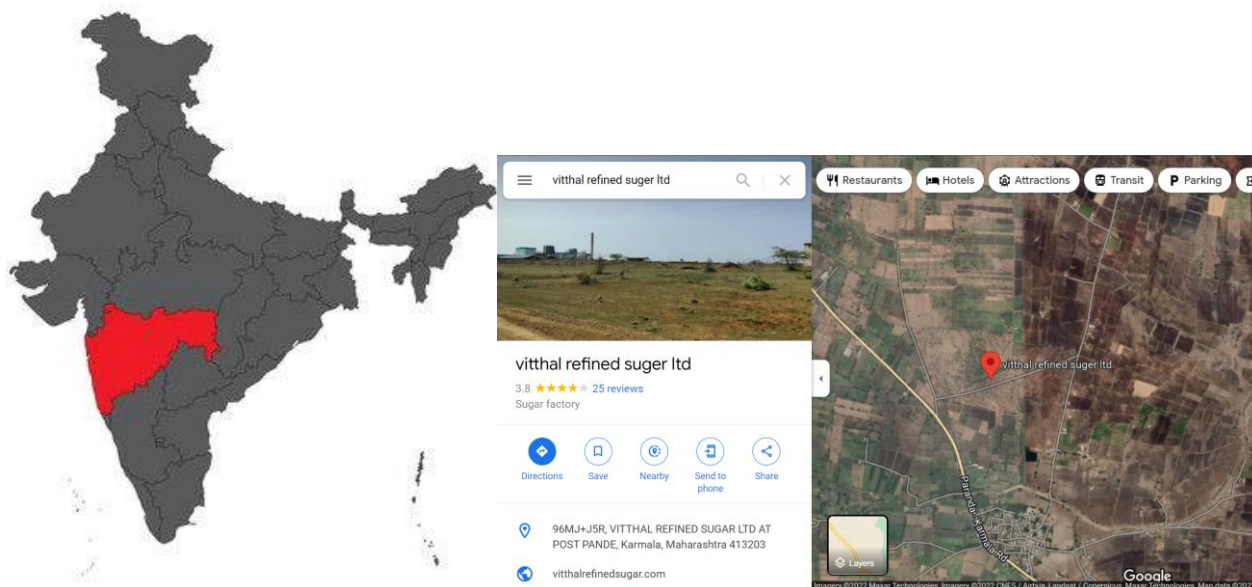


**Figure 1 Baseline Scenario**

## A.2. Location of project activity>>

Country : India  
 Village : Pande  
 Taluka : Karmala

District : Solapur  
 State : Maharashtra  
 Latitude : 18.3852 N  
 Longitude : 75.2304 E



### A.3. Parties and project participants >>

| Party (Host) | Participants                                                                                                                                                                                                                                                                             |
|--------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| India        | <p><b>Project Owner:</b> M/S Vitthal Refined Sugar Ltd.,<br/>At Kamlabhavani Nagar, Post-Pande, Tal.<br/>Karmala, Dist. Solapur, Maharashtra-413203.</p> <p><b>Project Aggregator:</b> Energy Advisory Services<br/>Pvt Limited, Bangalore, Karnataka.<br/>Email: nikhil@easpl.co.in</p> |

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

**SECTORAL SCOPE** - 01 Energy industries (Renewable/Non-Renewable Sources)

**TYPE** - Renewable Energy Projects

**CATEGORY** - ACM0006: “Electricity and heat generation from biomass” Version 16.0

### A.5. Crediting period of project activity >>

Start date : 01/12/2017

Crediting period corresponding to this monitoring period : 5 Years  
01/12/2017 to 30/11/2022 (Both the dates are inclusive)

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

Name : Nikhil Vedprakash  
Contact No : +91 7303201778  
E-Mail : nikhil@easpl.co.in

## 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 technical details of the project activity can be found out in **section A1. (b)** of the document.

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

The technical details of the project activity can be found out in **section A1. (b)** of the document.

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

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 guide lines 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 implementation of the cogeneration power plant 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.

**Environmental well-being:** The project utilizes biomass 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. Consent to establish sugar & co generation unit was granted as per Letter from Maharashtra Pollution Control Board dated 19/05/2014 Consent No: Format 1.0/BO/CAC-CELL/PN-21215-14/E/CAC-4702 Also, it will contribute to reduction GHG emissions . Thus, the project causes no negative impact on the surrounding environment contributing to environmental well-being.

**Economic well-being:** Being a renewable resource, using biomass 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.



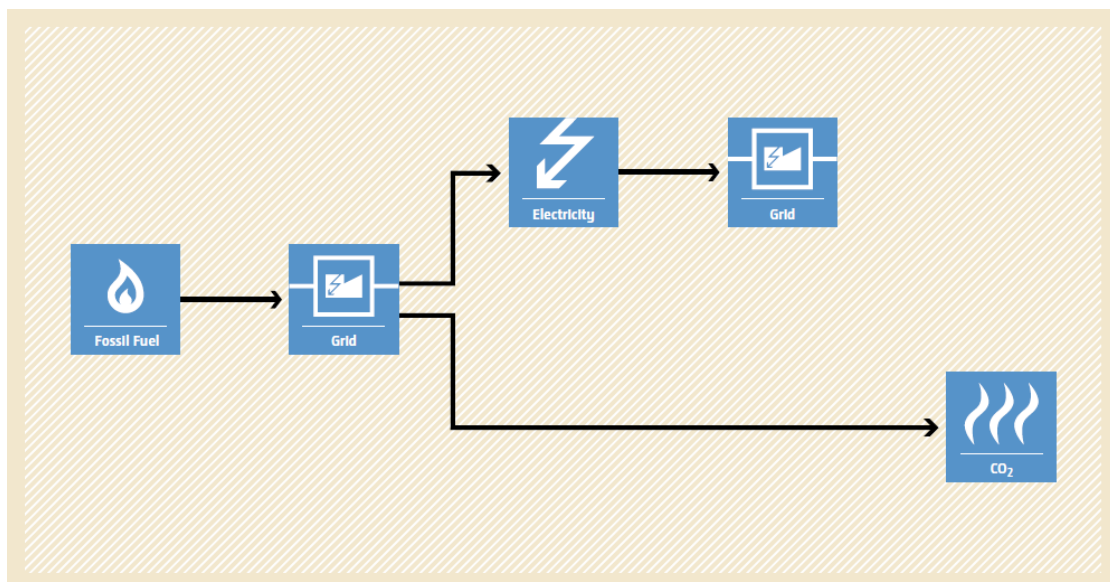
Locally, improvement in infrastructure will provide new opportunities for industries and economic activities to be setup in the area. Apart from getting better employment opportunities, the local people will get better prices for their land, thereby resulting in overall economic development.

**Technological well-being:** The project activity leads to the promotion of cogeneration power plant 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.

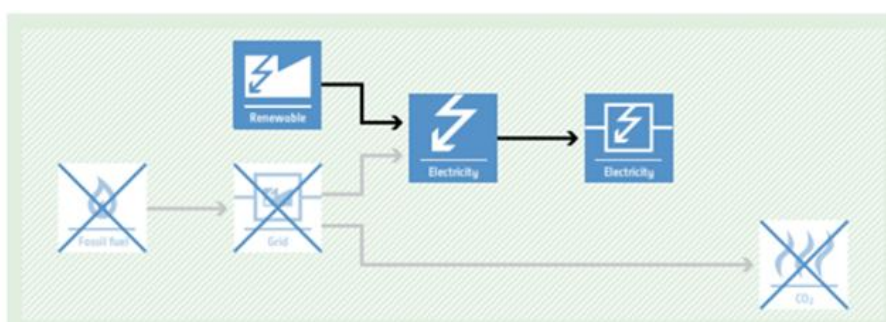
### B.3. Baseline Emissions>>

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 (NEWNE Grid)), which is carbon intensive due to predominantly sourced from fossil fuel-based power plants.

#### Baseline Scenario:



#### Project Scenario:



Thus, this project activity was a voluntary investment which replaced equivalent amount of electricity from the Indian grid. The project proponent was not bound to incur this investment as it

was not mandatory by national and sectoral policies. Thus, the continued operation of the project activity would continue to replace fossil fuel-based power plants and fight against the impacts of climate change. The Project Proponent hopes that carbon revenues from 2017-2022 accumulated as a result of carbon credits generated will help repay the loans and help in the continued maintenance of this project activity.

#### **B.4. Debundling>>**

This project activity is not a de-bundled 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.

**Applied Baseline Methodology:** ACM0006: “Electricity and heat generation from biomass”  
Version 16.0

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

The project activity involves generation of grid connected electricity from the construction and operation of a new cogeneration power-based project for selling it to National and Regional grid. The project activity has installed capacity of 26 MW which will qualify for a large-scale project activity under Type-I of the Large-Scale methodology. The project status is corresponding to the methodology ACM0006, Version 16 and applicability of methodology is discussed below:

| <b>Applicability Criteria</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | <b>Project Condition</b>                                                                                                                             |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>The methodology is applicable under the following conditions:</p> <ul style="list-style-type: none"> <li>(a) Biomass used by the project plant is limited to biomass residues, biogas, RDF2 and/or biomass from dedicated plantations;</li> <li>(b) Fossil fuels may be co-fired in the project plant. However, the amount of fossil fuels co-fired does not exceed 80% of the total fuel fired on energy basis.</li> <li>(c) For projects that use biomass residues from a production process (e.g. production of sugar or wood panel boards), the implementation of the project does not result in an increase of the processing capacity of (the industrial facility generating the residues) raw input (e.g. sugar, rice,</li> </ul> | <p>The project is implemented to use 100% of the bagasse in the crushing season, hence the criteria points (b), (c), (d) and (e) are applicable.</p> |

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                        |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------|
| <p>logs, etc.) or in other substantial changes (e.g. product change) in this process;</p> <p>(d) The biomass used by the project plant is not stored for more than one year;</p> <p>(e) The biomass used by the project plant is not processed chemically or biologically (e.g. through esterification, fermentation, hydrolysis, pyrolysis, bio- or chemical-degradation, etc.) prior to combustion. Drying and mechanical processing, such as shredding and pelletisation, are allowed.</p>                                                                                                                                                                                      |                                                                                                                                        |
| <p>In the case of fuel switch project activities, the use of biomass or the increase in the use of biomass as compared to the baseline scenario is technically not possible at the project site without a capital investment in:</p> <p>(a) The retrofit or replacement of existing heat generators/boilers; or</p> <p>(b) The installation of new heat generators/boilers; or</p> <p>(c) A new dedicated supply chain of biomass established for the purpose of the project (e.g. collecting and cleaning contaminated new sources of biomass residues that could otherwise not be used for energy purposes); or</p> <p>(d) Equipment for preparation and feeding of biomass.</p> | <p>The project is a new greenfield project and hence this criteria is not applicable.</p>                                              |
| <p>If biogas is used for power and heat generation, the biogas must be generated by anaerobic digestion of wastewater, and:</p> <p>(a) If the wastewater generation source is registered as a CDM project activity, the details of the wastewater project shall be included in the PDD, and emission reductions from biogas energy generation are claimed using this methodology;</p> <p>(b) If the wastewater source is not a CDM project, the amount of biogas does not exceed 50% of the total fuel fired on energy basis.</p>                                                                                                                                                  | <p>There is no production of biogas and hence this criteria is not applicable.</p>                                                     |
| <p>In the case biomass from dedicated plantations is used, the “TOOL16: Project and leakage emissions from biomass” shall</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | <p>The bagasse produced as a waste of the sugar mill is being used for the generation of steam and hence this criteria is also not</p> |

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                                                      |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------|
| apply to determine the relevant project and leakage emissions from cultivation of biomass and from the utilization of biomass residues.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | applicable.                                                                                                                          |
| <p>The methodology is only applicable if the baseline scenario, as identified per the “Selection of the baseline scenario and demonstration of additionality” section hereunder, is:</p> <ul style="list-style-type: none"> <li>(a) For power generation: scenarios P2 to P7, or a combination of any of those scenarios; and</li> <li>(b) For heat generation: scenarios H2 to H7, or a combination of any of those scenarios;</li> <li>(c) If some of the heat generated by the CDM project activity is converted to mechanical power through steam turbines, for mechanical power generation: scenarios M2 to M5: <ul style="list-style-type: none"> <li>a. In cases M2 and M3, if the steam turbine(s) are used for mechanical power in the project, the turbine(s) used in the baseline shall be at least as efficient as the steam turbine(s) used for mechanical power in the project;</li> <li>b. In cases M4 and M5, steam turbine(s) generating mechanical power to be used for the same purpose as in the baseline are not allowed;</li> </ul> </li> <li>(d) For the use of biomass residues: scenarios B1 to B5, or a combination of any of those scenarios;</li> <li>(e) For the use of biogas: scenarios BG1 to BG3, or a combination of any of those scenarios.</li> </ul> | As per the UCR list of eligible projects and methodologies found in the UCR Program Manual Ver. 4, this criterion is not applicable. |

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

The project was not applied under any other GHG mechanism. Hence project will not cause double accounting of carbon credits (i.e., COUs).

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

The spatial extent of the project boundary encompasses:

1. All plants generating power and/or heat located at the project site, whether fired with biomass, fossil fuels or a combination of both.
2. All power plants connected physically to the electricity system (grid) that the project plant is connected to.
3. The means of transportation of biomass to the project site.

If the feedstock is biomass residues, the site where the biomass residues would have been left for decay or dumped.

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

As per para 20 of the approved consolidated methodology ACM0006 Version 16, if the project activity is the installation of a new grid-connected renewable power plant/unit, the baseline scenario is the following:

**“All plants generating power and/or heat located at the project site, whether fired with biomass, fossil fuels or a combination of both”.**

##### **Net GHG Emission Reductions and Removals**

- ❖ Emission reductions are calculated as follows:

$$ER_y = BE_y - PE_y - LE_y \quad (\text{Eq. 1})$$

Where,

$ER_y$  = Emissions reductions in year y (t CO<sub>2</sub>)

$BE_y$  = Baseline emissions in year y (t CO<sub>2</sub>)

$PE_y$  = Project emissions in year y (t CO<sub>2</sub>)

$LE_y$  = Leakage emissions in year y (t CO<sub>2</sub>)

- ❖ The Baseline emissions in year y can be calculated as follows:

$$BE_y = EL_{MWh_y} \times EF_{Grid_y} \quad (\text{Eq. 2})$$

Where,

$EL_{MWh_y}$  = Quantity of net electricity supplied to the grid as a result of the implementation of the project activity in year y (MWh)

$EF_{Grid_y}$  = Grid emission factor in year y (t CO<sub>2</sub>/MWh)

$$BE_y = 1,11,076 \times 0.9 = 99,968$$

- ❖ The electricity import from the grid is subtracted from the baseline scenario, hence there is no

separate project emissions.

$$PE_y = 3386 \quad (\text{Eq. 3})$$

- ❖ It is an integrated cogen plant. The biomass is the output of the sugar mill and which is being consumed hence there is no leakage emissions being generated.

$$LE_y = 0 \quad (\text{Eq. 5})$$

Total Emission reduction by the project for the current monitoring period is calculated as below:

Hence,

$$ER_y = 99,968 - 3386 - 0 = 96,583 \text{ CoUs}$$

#### C.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).

#### C.7. Monitoring period number and duration>>

First Monitoring Period : 5 Years  
01/12/2017 to 30/11/2022 (inclusive of both dates)

#### C.8. Changes to start date of crediting period >>

Crediting period start date is 01/12/2017.

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

There are no permanent changes from registered PCN monitoring plan and applied methodology.

#### C.10. Monitoring plan>>

|                                 |                                                                                                                                                     |
|---------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------|
| Parameter                       | $EG_{PJ,y}$                                                                                                                                         |
| Data unit                       | MWh                                                                                                                                                 |
| Description                     | 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. |
| Source of data Value(s) applied | Monthly Electricity Logbook maintained at each Power Plant                                                                                          |
| Procedures                      | The Net electricity generation by the hydro power plant is recorded at the sub-station. At the end of every month Electricity generation report is  |

|                      |                                                                                                              |
|----------------------|--------------------------------------------------------------------------------------------------------------|
|                      | generated based on the total monthly electricity exported to the grid or consumed by nearby local community. |
| Monitoring frequency | Monthly                                                                                                      |
| Purpose of data      | To Calculate Baseline Emission                                                                               |

|                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 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 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/UCRCouStandardAug2022updatedVer6_09082220127104470.pdf">https://a23e347601d72166dcd6-16da518ed3035d35cf0439f1cdf449c9.ssl.cf2.rackcdn.com//Documents/UCRCouStandardAug2022updatedVer6_09082220127104470.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.                                                                                                                                                                                                                                                                                                    |