# PROJECT CONCEPT NOTE (PCN)

CARBON OFFSET UNIT (CoU) PROJECT

**Title: 36 MW Biomass Based Grid Supply Power Project by SDSSSKL, Shirol, India**

**Date of PCN**: 14/12/2023

**First 1st Issuance period**: 01/01/2013 to 31/12/2022 (10 years, 00 Months)

**1s Crediting period**: 01/01/2013 to 31/12/2022 (10 years, 00 Months)


[1] *Crediting period is considered referring to UCR CoU standard August 2022, Version 6.0, Page no. 6*

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

| BASIC INFORMATION | |
|---|---|
| **Title of the project activity** | 36 MW Biomass Based Grid Supply Power Project by SDSSSKL, Shirol, India |
| **Scale of the project activity** | Large scale --- Consolidated |
| **Completion date of PCN** | 14/12/2023 |
| **Project participants** | **Project Proponent**: M/s Shree Datta Shetkari Sahakari Sakhar Karkhana Ltd, Shirol, Maharashtra<br><br>**UCR Aggregator**: Progressive Management Consultants |
| **Host party** | India |
| **Applied methodologies and standardized baselines** | **CDM UNFCCC Methodology**<br>Large-scale Consolidated Methodology<br>**ACM0006**: Electricity and heat generation from biomass (Ver.16.0)<br><br>UCR Standard for Baseline Grid Emission Factor |
| **Type** | Type 1: Renewable Energy Projects |
| **SDG Impacts:** | SDG 7 Affordable and Clean energy<br>SDG 8 Decent work and economic growth<br>SDG 9: Industries, Infrastructure and Innovation<br>SDG 13 Climate Action |
| **Sectoral scopes** | 01 Energy industries (Renewable/Non-Renewable sources) |
| **Estimated amount of total GHG emission reductions per year** | 80255 CoUs |
| **Estimated total amount of average GHG emission reduction for the entire monitoring period (2013-2022)** | **802550** CoUs |

## SECTION A. Description of project activity

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

The project **36 MW Biomass Based Grid Supply Power Project by SDSSSKL, Shirol, India** is located in Datta Nagar, Village: Shirol, Tehsil: Shirol, District: Kolhapur, State: Maharashtra, Country: India.

**The details of the registered project are as follows:**

The project activity is a 36 MW renewable biomass (bagasse) based electricity generation cogeneration facility by the project proponent (PP) M/s. Shree Datta Shetkari Sahakari Sakhar Karkhana Ltd (SDSSSKL). The purpose of the project activity is to generate fossil free electricity using renewable biomass and thereby reduce GHG emissions by displacing fossil fuel dominated grid based electricity with such biomass based renewable electricity.

The commissioning date of this UCR project activity is the date of first commercial supply of power to the grid which was established on **11/08/2011 (as per the PPA dated 21/06/2013).** Grid connectivity was however, established on 04/08/2011.

In a typical sugarcane crushing season, the gross power generation capacity is **33.50 MW**, and in the off-season, it is **36 MW**. Captive consumption is typically **11 MW** and **3.5 MW** during the on- and off-season respectively while approximately **22.50 MW** and **32.50 MW** are exported to the state grid, i.e. Maharashtra State Electricity Distribution Limited (MSEDL).

**Details of Final Grid Connectivity issued to Bagasse Based Power Projects at MSETCL's Network as on 30/11/2021**

| SR NO. | NAME OF THE DEVELOPER | LOCATION | Taluka | District | CAPACITY | Substation Name | Evacuation Arrangement | Date of Final Grid Connectivity | Remark |
|---|---|---|---|---|---|---|---|---|---|
| 20 | M/s JAGRUTI SUGARS AND ALLIED INDUSTRIES LTD. | Talegaon | Devni | LATUR | 13 | | LILO on one ckt of 132 kV CHAKUR - UDGIR line | 21.05.2015 | |
| 21 | M/s BHAIRAVNATH SUGAR WORKS LTD. | Sonari | Paranda | OSMANABAD | 14.5 | 132 kV Paranda | 132kV SCDC line | 17.04.2012 | |
| 22 | M/s LOKMANGAL MAULI INDUSTRIES LTD. | Khed-Lohara(Bk) | Lohara | OSMANABAD | 30 | 132 kV Ujani S/S | 132kV SCDC line | 01.11.2013 | |
| 23 | M/s DR. BABASAHEB AMBEDKAR SSK LTD. | Arvindnagar, | Osmanabad | OSMANABAD | 26 | 132 kV Ujani S/S | 132kV SCDC line | 20.02.2015 | |
| 24 | M/s KANCHESHWAR SUGAR LTD. | Osmanabad | Tuljapur | OSMANABAD | 20 | 220 kV Tuljapur S/S | 132kV SCDC line | | |
| 25 | M/s GANGAKHED SUGAR AND ENERGY PVT. LTD. | Mangrul | GANGAKHED | PARBHANI | 31.8 | 132 kV Gangakhed S/S | 132kV SCDC line | 10.06.2013 | |
| 26 | M/s BALIRAJA SAKHAR KARKHANA LTD. | Kanadkhed | Purna | PARBHANI | 15 | 132 KV Purna S/S | 132kV SCDC line | 28.05.2015 | |
| 27 | M/s. Twentyone Sugar Limited (Erstwhile M/s MAHARASHTRA SHETKARI SUGAR LTD.) | Saikheda | Sonpeth | PARBHANI | 20 | | LILO on one ckt of 132 kV Parli-Parbhani line | 24.01.2014 | |
| 28 | M/s JAWAHAR SHETAKARI SAHAKARI SAKHAR KARKHANA LTD. | Hupri-Yalgud | Hatkanangale | Kolhapur | 12 | | LILO on one ckt of 110 kV Kolhapur-Ichalkarangi line | | |
| 29 | M/s SHREE RENUKA SUGARS LTD. | Ganga Nagar, | HATKANANGALE | Kolhapur | 30 | | LILO on one ckt of 110 kV Mudshingi-Ichalkarangi line | | |
| 30 | M/s SHRI GURUDATT SUGARS LTD. | Takaliwadi | shirol | Kolhapur | 15 | | LILO on 110kV Kurundwad-Miraj line | 16.06.2015 | |
| 31 | M/s URJANKUR SHREE TATYASAHEB KORE WARNA POWER COMPANY LTD. | Warnanagar | Panhala | Kolhapur | 44 | 220/132/33kV Wathar S/s | 132 kV DCDC line | 15.03.2013 | |
| 32 | M/s URJANKUR SHREE DATTA POWER COMPANY LTD. | Dattanagar | Shirol | Kolhapur | 36 | 110kV Jaysingpur S/s. | 110 kV DCDC line | 04-08-11 | |
| 33 | M/s SHREE CHHATRAPATI SHAHU SAHAKARI SAKHAR KARKHANA LTD. | Kagal | KAGAL | Kolhapur | 21.5 | GOKULSHIRGAON S/S | 110 kV SCDC line | | |

MAHADISCOM

MAHARASHTRA STATE ELEC. DISTRIBUTION CO. LTD,
OFFICE OF SUPERINTENDING ENGINEER
ADMINISTRATIVE BUILD, 1st Floor, Tarabai Park,Kolhapur .
Tel No: 2650581 to 84: Fax No: 2656316
Email: sekolhapur@mahadiscom.in(0231)2656316

REF. No. SE/KPC/T/AEV/ No 01287 Dt :

13 FEB 2014

To,
M/s. Urjankur Shree Datta Power Co. Ltd,
IL&FS Finincial Centre, Plot No.-22,G- block,
Bandr Kurla Comlex Mumbai-400051

Sub.:- Synchronisation of 36 Mw Bagasse based Co-generation plant of Urjankur Shree Datta Power Co Ltd, Dattanagar, Shirol Dist- Kolhapur.

Ref.:-1) YOL No.USDPCLMSEDCL/REC/2013-14/01 dtd 11.12.2013
2) Synchronization report dtd.11.08.2011

Dear Sir,

This is to certify that 36 Mw Bagasse based Co-generator of M/s.Urjankur Shree Datta Power Co Ltd, Dattanagar, Shirol Dist- Kolhapur is synchronized with grid on date 11.08.2011 at 22.55 Hrs

NOTARY OF INDIA

REGISTERD & NOTED
AT SERIAL NO. 250
DATE 24/8/2012

Yours Faithfully,

TRUE COPY

Superintending Engineer (KC)
Kolhapur,

**Date of Commissioning Official MSEDL Record**

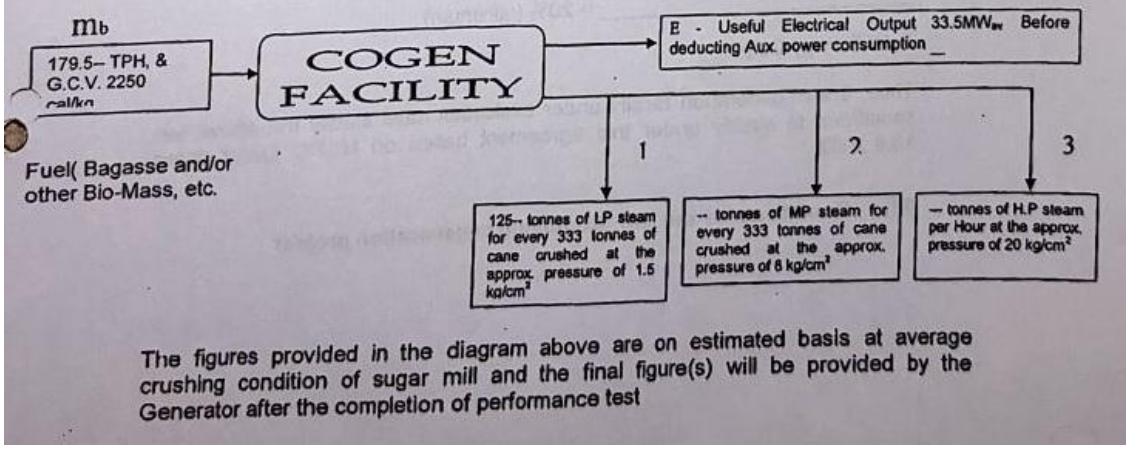
ESTIMATED POWER BALANCE

| Sr. No. | Items | Value in MW (MUs) | |
|---|---|---|---|
| | | Season | Off –season |
| 1. | Gross Power Generation capacity , MW | 33.50 MW | 36.00 MW |
| 2. | i. Power Consumption (For Sugar mill Cane crushing & other main and Auxiliary process), MW | 7.825 MW | 0.700MW |
| | ii. Co-gen Power Plant Auxiliaries, MW | 3.175 MW | 2.80 MW |
| | Total | 11.00 MW | 3.5 MW |
| 3. | Power at delivery point, MW (MUs) | 22.50 MW (97.20 MUs) | 32.50 MW (93.60 MUs) |

**As Per PPA with MSEDL**

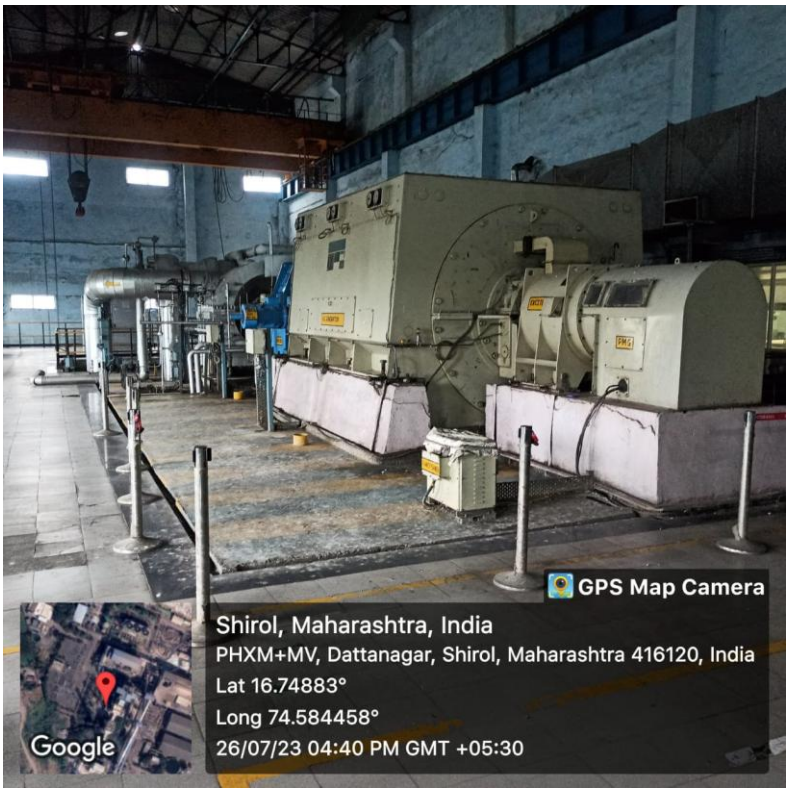
The Co-Generation facility cab be represented in the following block diagram:

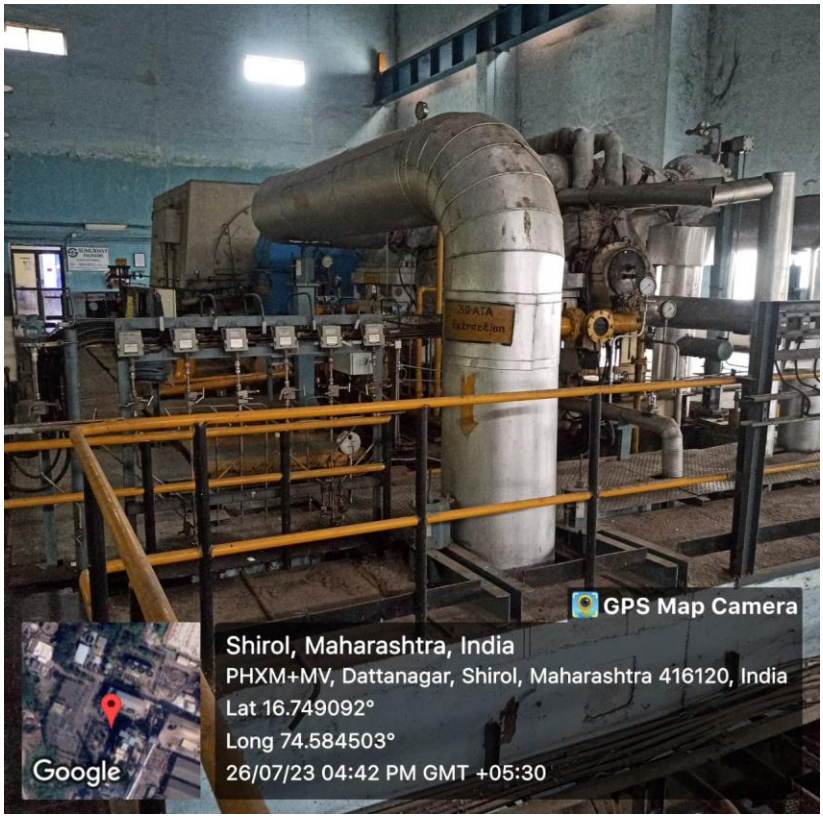
**[Condition 1: 1**




The figures provided in the diagram above are on estimated basis at average crushing condition of sugar mill and the final figure(s) will be provided by the Generator after the completion of performance test

**As Per PPA with MSEDL**


**Purpose of the Project Activity:**

The power co-generation units generate biomass based power for captive consumption of the sugar plant and the sale of surplus power to the state grid. The primary goal of the project activity is to generate electricity using renewable biomass and thereby reduce emissions by displacing fossil fuel dominated grid-based electricity generation with renewable energy-based electricity generation.

During the absence of biomass, coal is used to generate electricity. The use of fossil fuel is limited to the extent of 15% of total fuel consumption as per the regulation of the Ministry of New and Renewable Energy. The amount of fossil fuels co-fired does not exceed 80% of the total fuel fired on an energy basis according to ACM0006- CDM methodology booklet of UNFCCC. Hence the project is eligible for UCR CoUs.

The high pressure boilers are fired by bagasse, a biomass byproduct from the sugar manufacturing process, to generate steam which in turn is fed to the steam turbine to generate power. The overall business is integrated with alcohol distillation and power generation. Prior

to the UCR project activity, the biomass was used for captive steam and power requirements of the PP without grid export.

The UCR project activity involves the construction and operation of a power plant/unit that uses renewable energy sources and supplies electricity to the grid. The UCR project activity qualifies under the environmental additional positive list of pre-approved project types under the UCR carbon incentive model for the issuance of voluntary carbon credits.

**Assured supply of biomass fuel and other barriers to the UCR project activity:**

The PP has set up a separate wing of the Cane Development Department for carrying out the cane development activities within the area of operation to ensure continuous supply of biomass. For the said work the PP has appointed 79 qualified agricultural experts, thus providing employment to the local community and farmers.

The PP has also appointed "Agriculture Assistants or AAs" for every 200 acres of cane area being cultivated to provide advice to the concerned cane growers and farmers in all aspects of the supply chain such as land preparation for cane planting right up to harvesting. These AAs are in close contact with the cane growers at the village level and also provide new inputs about new technology in sugarcane cultivation and motivate farmers in sustainable farming best practice adoption, enabling farmers to increase yield per hectare yield while reducing cost of cultivation.

One of the major constraints associated with the project activity is the availability of sugarcane and there is often a diversion of cane from the sugar mill to khandsaris and ghur manufacturers when sugar prices are high (typically periods of low availability of cane). These manufacturers offer higher prices as they operate in an unorganized sector and have no quality assurance plans. These diversions put a further constraint on cane availability and hence bagasse which again may impact the viability of the project activity. The uncertainty in weather conditions also plays an important role in determining the cane availability in the region. There is a continuous weather-related risk for cane under rain-fed cultivation conditions.

Along with that, there are often chances of diversion of cane by farmers to other sugar mills in the nearby areas. The uncontrolled growth of sugar mills in Maharashtra has led to competition among the sugar mills for natural resource utilization i.e., agriculture farm produce, and leading to farmer options for getting varying prices among the sugar mills in the region. This diversion is an also important constraint faced by the project promoters and can significantly influence the cane-crushing capacity and in turn the power generation capacity of the sugar mill.

The operation of bagasse-based power plants for captive steam and electricity generation for captive use/sale to the grid is common in the sugar industry. It is therefore fair to say that these options are consistent with the applicable laws and regulations as demonstrated by existing practices. **There is no policy in India that mandates the generation of electricity for grid supply from bagasse, hence this is a voluntary project activity**. The policy frameworks for bagasse-based grid electricity supply are governed by the state electricity regulatory commissions which detail the terms of power purchase agreements for such investments.

The Indian sugarcane harvesting has been affected amid the COVID-19 pandemic situation prevailing in the country, and PP has focused on continuing to work closely with the thousands of farmers who rely on the project activity for their sustenance and livelihoods. The PP has further stepped-up efforts towards better cane development and farm management, through the adoption of techniques such as intercropping, conservation of energy and water resources through drip irrigation, waste-water management, and rain-water harvesting.

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

The social, environmental, economic, and technological benefits that contribute to sustainable development are as follows:

**Social benefits:**

**Area of operation:**

| S.No | Name of Taluka | Name of District | Name of the State | No. of Villages |
|---|---|---|---|---|
| 1 | Shirol | Kolhapur | Maharashtra | 50 |
| 2 | Hatkanangle | Kolhapur | Maharashtra | 32 |
| 3 | Karveer | Kolhapur | Maharashtra | 02 |
| 4 | Kagal | Kolhapur | Maharashtra | 03 |
| 5 | Chikodi | Belgaum | Karnataka | 21 |
| 6 | Athani | Belgaum | Karnataka | 07 |
| Total | | | | 115 |

- The project activity provides employment to people from the surrounding villages as in the table above. It covers over 115 villages and provides various employment opportunities for farmers and other unskilled and skilled labour forces.
- The project activity contributes to employment generation in the local area for both skilled and unskilled people for the operation and maintenance of the equipment.

- It has created steady higher value jobs and skilled workers at the facility. The project activity contributes to national energy security by reducing the consumption of fossil fuels.
- The project continuously innovates and modernizes on the technology front. Some of the technologies used are:
    - Auto Cane feeder.
    - Pressure Fedders.
    - High-pressure boilers.
    - Mass flow meter.
    - Semi-kestners.
    - Auto pH Control System.
    - Cooling & condensing automation.
    - Pan automation.
    - Continuous pan.
    - Direct Contact Heater.
    - Vapour Line Juice Heaters.
    - Condensate Heat Recovery System.
    - Super-Heated Wash Water System.
    - Waste Heat Recovery for Sulphur burner.
    - Silo with Automatic Weighing and Stitching System.
    - Well Equipped Sugar Laboratory.
- The project has a well-established hospital to carry out regular health check-ups for the employees in nearby villages and the farmers.
- The project established educational facilities for the benefit of nearby village employees and local people and created confidence in the activities of the Industry.

**Environmental benefits:**

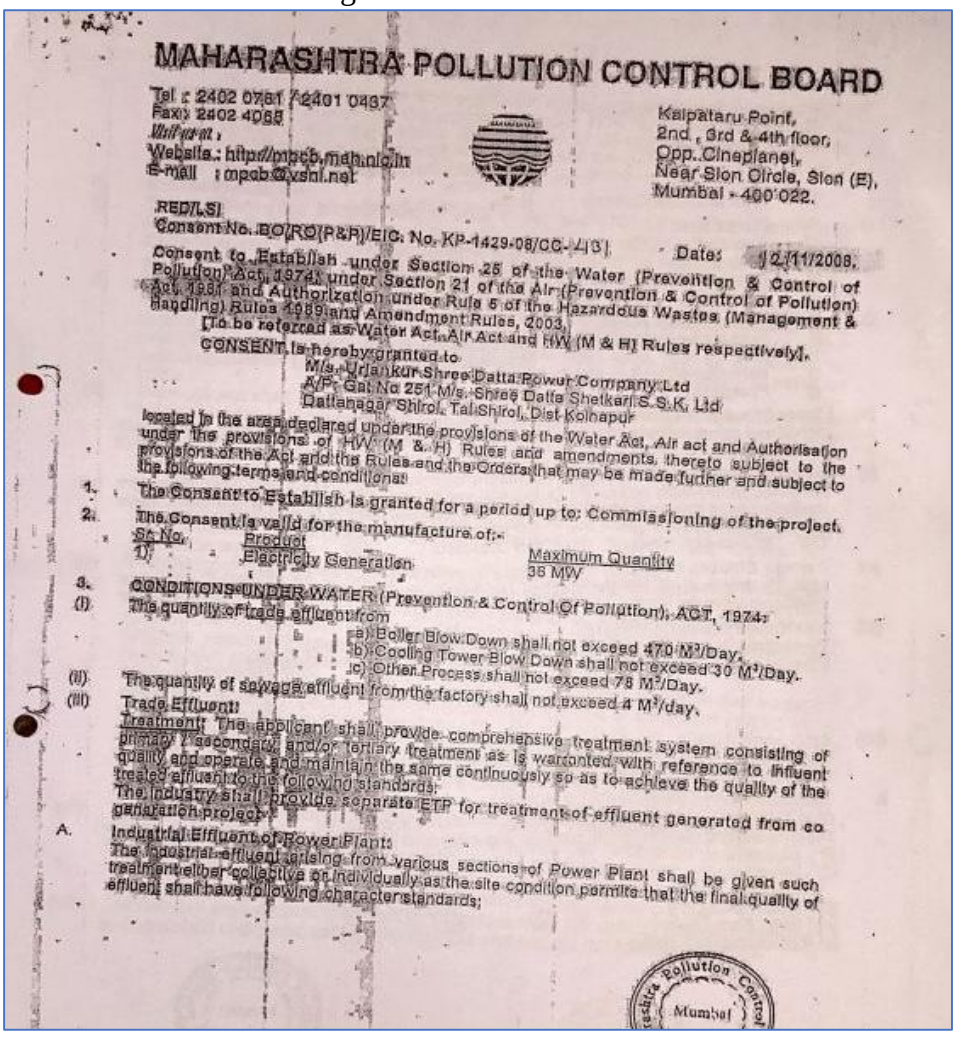
- The project activity is a renewable energy project, which utilizes biomass as a fuel for power generation with grid supply, a move that is voluntary and not mandated under current environmental laws of India. Since this project activity generates green energy in the form of power, it has positively contributed towards the reduction in (demand) use of finite natural resources like coal and oil, minimizing depletion and in turn increasing its availability to other important purposes. Therefore, this project activity helps environmental sustainability by reducing GHG emissions in the atmosphere.
- The treated sugar factory effluent along with spray pond over flow is used for irrigation on 1000acres of land. The excess condensate is used as process water.
- Avoids global and local environmental pollution, leading to a reduction of GHG emissions.
- Enabling the local electricity grid to divert the electricity displaced by the project activity to the nearby needy areas.
- Indirect capacity building by providing a case example to other sugar mills in the region for switching to high-capacity cogeneration configuration, for electricity generation. In addition to the reduction in carbon dioxide (CO2) emissions, the project implementation will result in a reduction of other harmful gases (NOx and SOx) that arise from the

combustion of coal used in power generation. The project activity also leads to reduced ash generation since the ash content in bagasse is lower than that of Indian coal.

- Rainwater Harvesting was done for the entire campus and collected in a pond. The rainwater collected is used for Green belt development.

**Economic benefits:**

- The project activity creates employment opportunities during the project stage and the operation and maintenance of the boiler and turbines.
- The project activity helps in the conservation of fast-depleting natural resources like coal and oil thereby contributing to the economic well-being of the country as a whole.
- The various other benefits due to the project activity ensure that the project is contributing to the sustainable development of the region by bringing in green technologies and processes to a backward region. The technology is indigenous and by implementing such projects the country is showcasing its GHG mitigation actions in its efforts to combat climate change.



MAHARASHTRA POLLUTION CONTROL BOARD

Tel : 2402 0781 / 2401 0487
Fax: 2402 4068
Website : http://mpcb.mah.nic.in
E-mail : mpcb@vsnl.net

Kalpataru Point,
2nd , 3rd & 4th floor,
Opp. Cineplanet,
Near Sion Circle, Sion (E),
Mumbai - 400 022.

RED/LSI
Consent No. BO/RO(P&R)/EIC. No. KP-1429-08/CC-413 Date: 12/11/2008.

Consent to Establish under Section 25 of the Water (Prevention & Control of Pollution) Act, 1974, under Section 21 of the Air (Prevention & Control of Pollution) Act, 1981 and Authorization under Rule 5 of the Hazardous Wastes (Management & Handling) Rules 1989 and Amendment Rules, 2003.
[To be referred as Water Act, Air Act and HW (M & H) Rules respectively].

CONSENT is hereby granted to
M/s. Urjankur Shree Datta Powur Company Ltd
A/P. Gat No 251 M/s. Shree Datta Shetkari S.S.K. Ltd
Dattanagar, Shirol, Tal.Shirol, Dist Kolhapur

located in the area declared under the provisions of the Water Act, Air act and Authorisation under the provisions of HW (M & H) Rules and amendments thereto subject to the provisions of the Act and the Rules and the Orders that may be made further and subject to the following terms and conditions:

1. The Consent to Establish is granted for a period up to: Commissioning of the project.
2. The Consent is valid for the manufacture of:-

| Sr.No. | Product | Maximum Quantity |
|---|---|---|
| 1) | Electricity Generation | 35 MW |

3. CONDITIONS UNDER WATER (Prevention & Control Of Pollution), ACT, 1974:
(I) The quantity of trade effluent from
a) Boiler Blow Down shall not exceed 470 M³/Day.
b) Cooling Tower Blow Down shall not exceed 30 M³/Day.
c) Other Process shall not exceed 78 M³/Day.
(II) The quantity of sewage effluent from the factory shall not exceed 4 M³/day.
(III) Trade Effluent:
Treatment: The applicant shall provide comprehensive treatment system consisting of primary, secondary and/or tertiary treatment as is warranted with reference to influent quality and operate and maintain the same continuously so as to achieve the quality of the treated effluent to the following standards:
The industry shall provide separate ETP for treatment of effluent generated from co generation project.
A. Industrial Effluent of Power Plant:
The industrial effluent arising from various sections of Power Plant shall be given such treatment either collective or individually as the site condition permits that the final quality of effluent shall have following character standards:

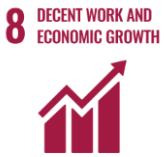
Maharashtra Pollution Control Board Mumbai

**Pollution Board Consent To Establish 12/11/2008**

## United Nations Sustainable Development Goals:

The project activity generates electrical power using Biomass, thereby displacing non-renewable fossil resources resulting in sustainable, economic and environmental development. In the absence of the project activity an equivalent amount of power generation would have taken place through fossil fuel dominated power generating stations. Thus, the renewable energy generation from project activity will result in reduction of the greenhouse gas emissions.

Positive contribution of the project to the following **Sustainable Development Goals (SDG) outcomes:**

| Development Goals Targeted | SDG Target | Indicator (SDG Indicator) |
|---|---|---|
| **SDG 7: Affordable and Clean Energy**   | **7.2:** By 2030, increase substantially the share of renewable energy in the global energy mix<br>**Target: Renewable Power in MWh/yr** | **7.2.1**: Renewable energy share in the total final energy consumption |
| **SDG 8: Decent Work and Economic Growth**   | **8.5** By 2030, achieve full and productive employment and decent work for all women and men, including for young people and persons with disabilities, and equal pay for work of equal value.<br>**Target:**<br>• Training staff annually<br>• Employment of staff | **8.5.1**: Average hourly earnings of female and male employees, by occupation, age and persons with disabilities. |
| **SDG 09: Industries, Infrastructure and Innovation**   | 9.2: Promote inclusive and sustainable industrialization and, by 2030, significantly raise industry's share of employment and gross domestic product, in line with national circumstances, and double its share in least developed countries | The project activity provides employment to people 115 villages in the area. |
| **SDG 13: Climate Action**   | 13.2: Integrate climate change measures into national policies, strategies and planning<br>**Target: Quantity of tCO2 reduced /yr** | **13.2.1**: Number of countries that have communicated the establishment or operationalization of an integrated policy/ strategy |

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

Country : India
District : Kolhapur
Village : Shirol
Tehsil : Shirol
State : Maharashtra


The Project Site is located

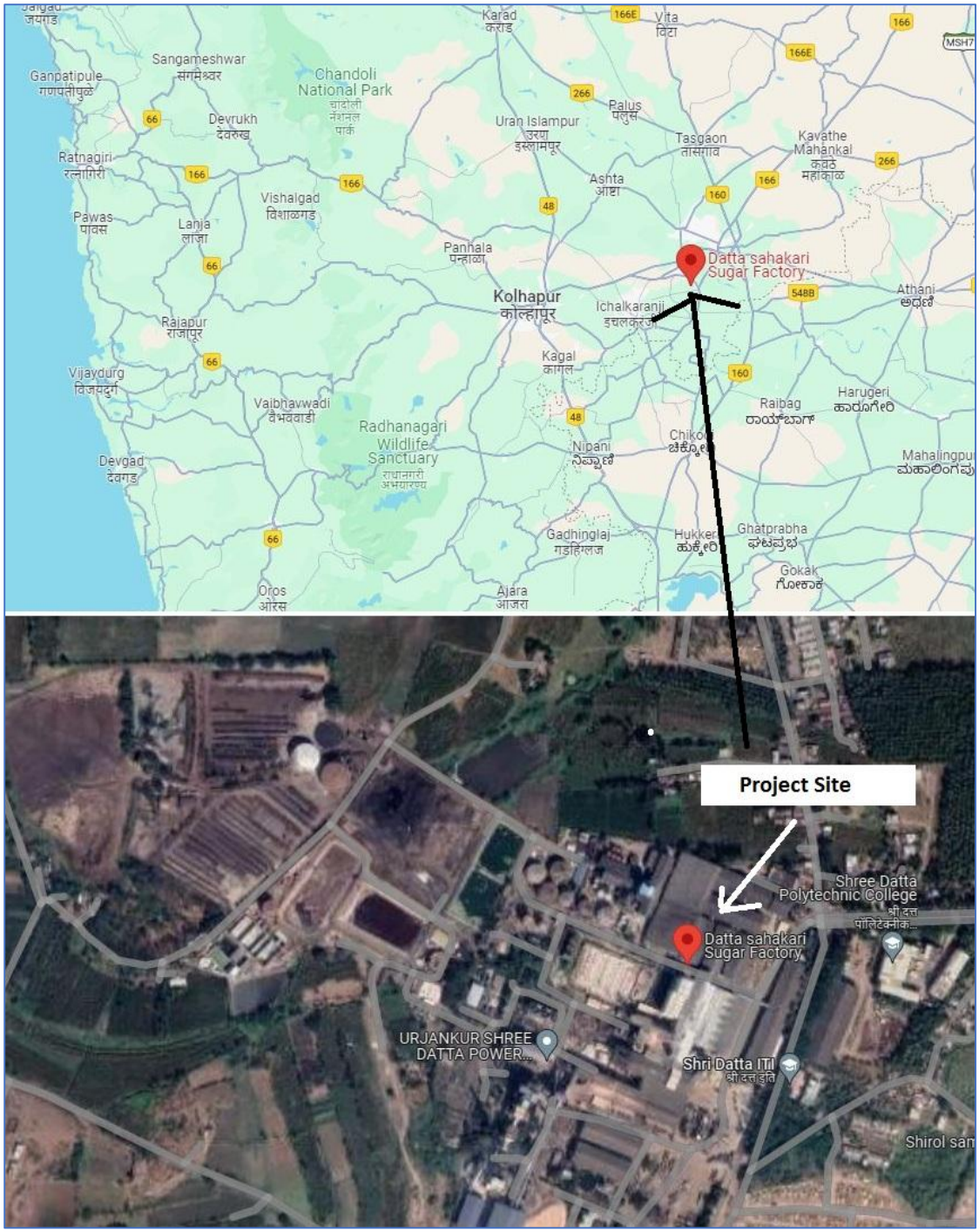
a. 45 Km away from Kolhapur, which is a district in Maharashtra

b. Other important towns nearby are

1. Jaysingpur, at a distance of 06 Km.
2. Sangli, at a distance of 16 Km.

c. Jaysingpur, is the nearest Railway station 07 Km away from the project site.

d. Kolhapur is nearest Airport 45 Km away from factory site.




There are no sensitive, historical, forest reserves and wildlife sanctuaries, etc within a 10 Km radius of the factory site. The Mumbai – Bangalore National Highway (N.H. 4) is 45 Km away from the factory site. The latitude and longitude are 16º44'N and 74º35'E respectively. The Elevation above the Mean Sea Level is 542 m.

## A.4. Technologies/measures >>

The UCR project activity is a grid-connected bagasse-based cogeneration power plant with a high-pressure steam turbine configuration. The UCR project activity is the electricity generation capacity and the installation of facilities for allowing captive use and export of electricity to the electricity grid. The high pressure boilers are fired by bagasse, a byproduct from the sugar manufacturing process to generate steam, which in turn powers the steam turbine to generate power. The technology of biomass residue based high steam pressure power generation itself is known and in use in India. The use of high pressure system allows for increased efficiency levels for electricity generation

The UCR project activity involves the installation of a 36 MW turbo generator along with high pressure 110 kg/cm$^2$ (g) capacity boiler.

The technology of biomass residue-based high steam pressure power generation itself is known and in use in India. The use of a high-pressure system allows for increased efficiency levels for electricity generation.

The project is a green field renewable energy power generation project connected to the grid and supplies electricity to the grid and is used for captive purposes. The project activity is generating electricity using biomass (sugar factory residues) with a 1x180 TPH single drum, Travelling Grate boiler using a 36000 KW, 8 HP turbine whose capacity will be governed at MW.

On **an annual average basis**, the project exports around **115905 MWh** to the Indian electricity grid. Power is generated and supplied in the sugar season and off-season at 11 kV and stepped-up on-site to 132 kV before being transmitted to the nearby Jaysingpur sub-station located at Kolhapur.

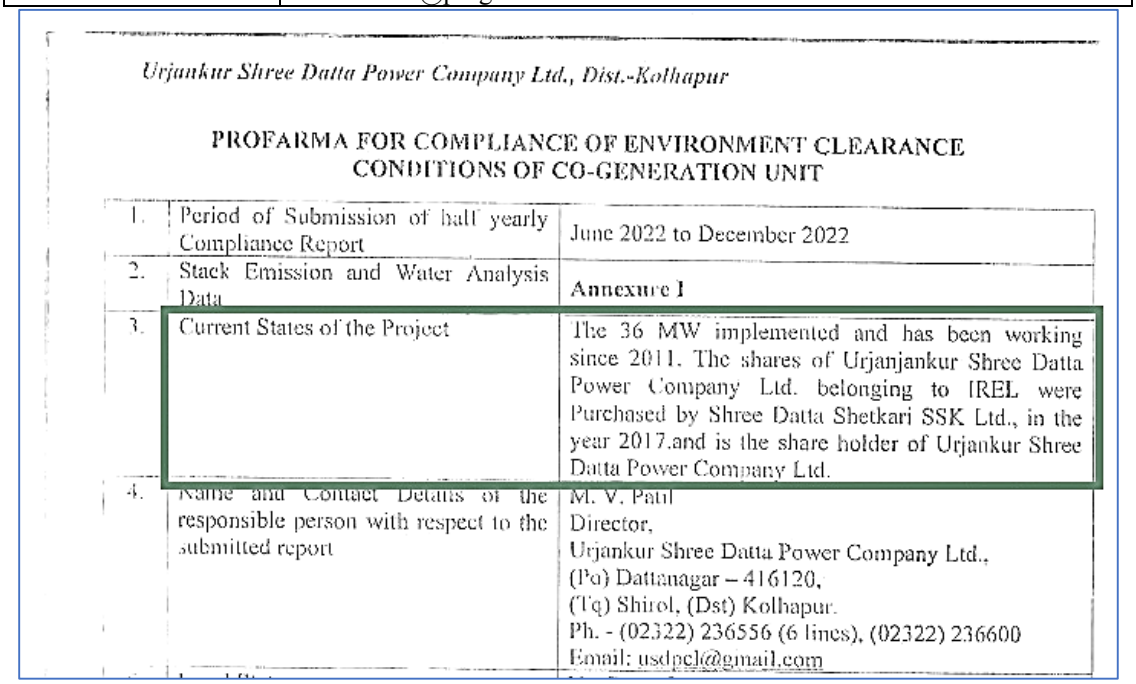
**Technical details of the project activity**

| **BOILER** | |
|---|---|
| Manufacture | IJT (Isgec John Thompson) make 180 TPH High pressure Boiler |
| Type | Single- drum, water tube, Membrane wall, natural circulation, Balanced draught, Top Supported, Travelling Gate boiler |
| Net Steaming capacity at MCR (kg/hr) for Bagasse firing | 180,000 |
| Steam temperature at superheater outlet (Deg C) | 540± 5 |
| Steam Pressure at main steam stop value (kg/cm$^{2)}$ (g) | 109 |
| Peak Capacity of Boiler (Kg/hr) | 198,000 |
| Minimum possible duration for peak capacity/Shift (8 hrs) | 30 Minutes |
| **Turbine** | |
| Make | 36 MW Simense Make |
| Type | Extraction cum condensing |

| | |
|---|---|
| Steam pressure at the TG inlet | 105 ATA |
| Steam temperature at the TG inlet | 535º C |
| Exhaust steam pressure | 0.064 ATA |
| Steam inlet quantity | 179.51 TPH |
| **Gear Box** | |
| Rated Power | 36,000 KW |
| **Energy production** | |
| Gross power | 33.50 (season); 36 MW (off – Season) |
| Auxiliary consumption | 11.00 MW (Season); 3.5 MW (off-season) |
| Net power for export after auxiliary consumption | 22.5 MW (season); 32.50 MW (off-season) |

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

| Party (Host) | Participants |
|---|---|
| India | **Project Proponent**: Shree Datta Shetkari Sahakari Sakhar Karkhana Ltd<br>**UCR Aggregator**: Progressive Management Consultants<br>**UCR** # 110736904<br>**Email**: info@progressive-iso.com |

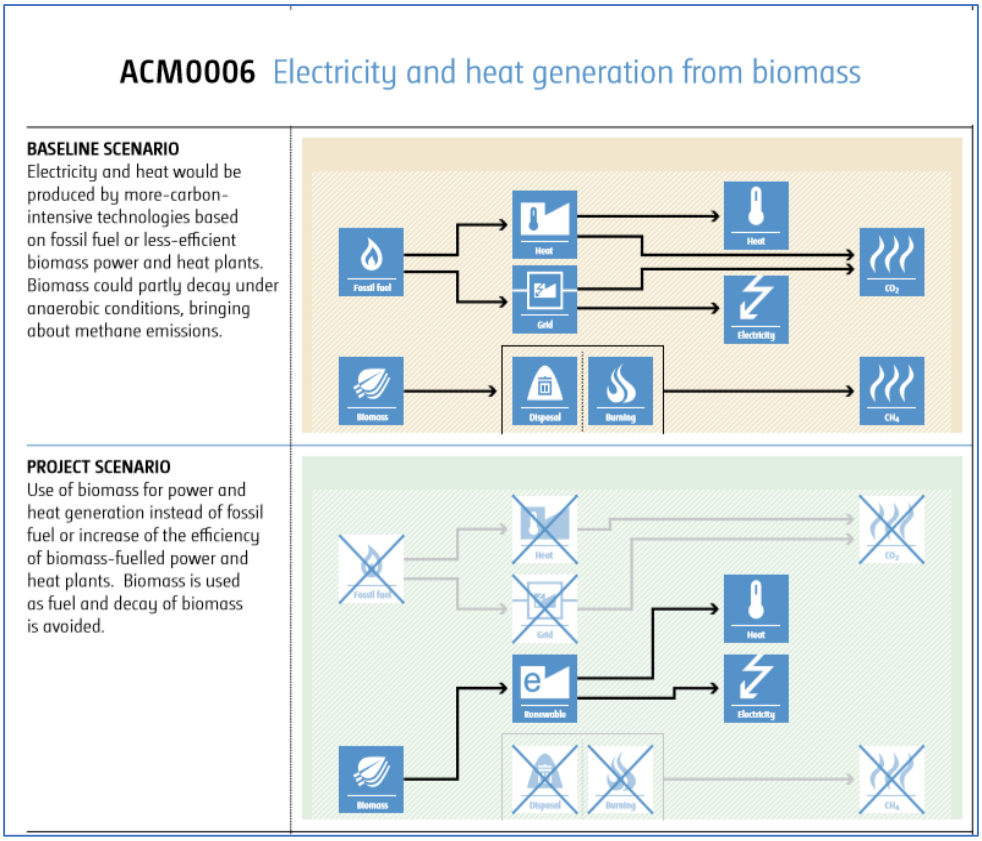


*Urjankur Shree Datta Power Company Ltd., Dist.-Kolhapur*

PROFARMA FOR COMPLIANCE OF ENVIRONMENT CLEARANCE CONDITIONS OF CO-GENERATION UNIT

| | | |
|---|---|---|
| 1. | Period of Submission of half yearly Compliance Report | June 2022 to December 2022 |
| 2. | Stack Emission and Water Analysis Data | Annexure I |
| 3. | Current States of the Project | The 36 MW implemented and has been working since 2011. The shares of Urjanjankur Shree Datta Power Company Ltd. belonging to IREL were Purchased by Shree Datta Shetkari SSK Ltd., in the year 2017.and is the share holder of Urjankur Shree Datta Power Company Ltd. |
| 4. | Name and Contact Details of the responsible person with respect to the submitted report | M. V. Patil<br>Director,<br>Urjankur Shree Datta Power Company Ltd.,<br>(Po) Dattanagar – 416120,<br>(Tq) Shirol, (Dst) Kolhapur.<br>Ph. - (02322) 236556 (6 lines), (02322) 236600<br>Email: usdpcl@gmail.com |

## A.6. Baseline Emissions>>




The approved baseline methodology has been referred from the indicative simplified baseline and monitoring methodologies for selected large scale UNFCCC CDM project activities that involve generation of power and heat in thermal power plants, including cogeneration plants using biomass.

Typical activities under ACM 0006 are new plants, capacity expansions, energy efficiency improvements or fuel switch projects.

The applicable methodology and simplified modalities and procedures for small scale CDM project activities is:

> *"the baseline scenario is displacement of more-GHG-intensive electricity generation in grid."*

**Emission coefficient of fuel used in the baseline scenario**

The $CO_2$ emission factor for grid connected power generation in year y calculated using UCR Standard emission factor is 0.9 $tCO_2/MW_h$ for the period 2013-2022.

## A.7. Debundling>>

This project is not a debundled component of a larger registered carbon offset 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 (Large Scale)

CATEGORY – **ACM0006** *Electricity and heat generation from biomass*, Version 16.0

This methodology is applicable to project activities that operate biomass (co-)fired power and-heat plants. The project activity includes the installation of new plants at a site where currently power or heat generation occurs. The new plant replaces or is operated next to existing plants (capacity expansion projects). Project types included under this methodology are co-generation of power and heat using biomass. Typical activities include capacity expansions, as is the current UCR project activity.

UCR CoU Standard emission factors are used to determine the baseline grid emission factor for the 2013-2022 period.

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

| |
|---|
| The project activity is a power generation project using biomass (bagasse) and displaces CO2 emissions from electricity generation in power plants that are displaced due to the project activity. Since the project activity utilises biomass (bagasse) for the generation of power and supplies it to the local grid, it displaces fossil fuel (coal), and hence it meets the primary applicability criteria of the UCR and UNFCCC CDM methodology project eligibility parameters. The project is also included in the positive list of approved types of activities of the UCR CoU Standard. |
| The project activity is a power-and-heat plant that encompasses cogeneration plants, i.e. a power-and-heat plant in which at least one heat engine simultaneously generates both process heat and power. The total installed capacity of project activity is **36MW** which is acceptable as per the applied large-scale methodology. |
| The installation of a new biomass residue fired power generation unit, which replaces existing power generation capacity fired with fossil fuel as in the project plant (power capacity expansion projects) is also included in this methodology. |
| For the purposes of this methodology, heat does not include waste heat, i.e., heat that is transferred to the environment without utilization, for example, heat in flue gas, heat transferred to cooling towers or any other heat losses. |
| The biomass used by the project plant is not stored for more than one year. 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. |
| The Project Activity uses biomass residues from a production process (e.g., production of sugar), and 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) or in other substantial changes (e.g. product change) in this process. |
| The project activity unit does co-fire fossil fuel and it does not exceed the limit of 25% co-firing fossil fuel criteria as per the UCR Protocol for such projects. |

| |
|---|
| Biomass generated power is used for direct grid supply and for meeting the captive needs at the facility. The project activity involves the grid-connected bagasse-based electricity generation capacity involving the installation of facilities for allowing the export of electricity to the regional grid. |
| Biomass is not sourced from dedicated plantations. The existing installed turbo-generators are fired by bagasse, a by-product of the sugarcane processing and a biomass residue. Biomass used by the project plant is limited to biomass residue (bagasse). |
| Bagasse is burnt in boilers as generated form the sugar mill and does not require any specific technology for its preparation before combustion. No fuel preparation equipment has been installed at site for preparation of bagasse. Hence no significant energy quantities are required to prepare the biomass residues for fuel combustion. |
| The project activity also does not include any GHG emissions related to the decomposition or burning of biomass. The baseline heat emissions for the project activity are not included in the project boundary nor does it claim for emission reductions from heat. |

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

The biomass-based boiler and turbine are within the project boundary. The biomass-based boiler and turbine have unique serial numbers which are visible on the units. The generated electricity is measured using energy meters which also have unique serial numbers. The Monitoring Report will have the details of the same and will be provided to the UCR verifier during the verification process.

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

The project boundary includes the physical, geographical site(s) of:

(a) All plants generating power and/or heat located at the project site fired with biomass, fossil fuels or a combination of both;
(b) All power plants connected physically to the electricity system (grid) that the project plant is connected to.


Leakage Emissions ($LE_{y)}$

Leakage emissions are not applicable as the project activity does not use technology or equipment transferred from another activity.

Hence $LE_y = 0$

| | Source | GHG | Included? | Justification/Explanation |
|---|---|---|---|---|
| Baseline | GHG Emissions from fossil fuel in Grid Baseline Power Generation | $CO_2$ | **Included** | Major source of GHG emissions |
| | | $CH_4$ | Excluded | Excluded for simplification. This is conservative |
| | | $N_2O$ | Excluded | Excluded for simplification. This is conservative |
| | Uncontrolled burning or decay of surplus biomass residue | $CO_2$ | Excluded | Excluded for simplification. This is conservative |
| | | $CH_4$ | Excluded | Excluded for simplification. This is conservative |
| | | $N_2O$ | Excluded | Excluded for simplification. This is conservative |
| Project Activity | Emissions from Biomass Project Activity<br>On-site fossil fuel and electricity consumption due to the project activity (stationary or mobile)<br>Off-site transportation of biomass during cultivation<br>Combustion of biomass residue for electricity and / or heat generation<br>Storage of biomass residue | $CO_2$ | **Included** | Fossil fuel co-fired with biomass is included as a major project emission source.<br>Off-site transportation of biomass during cultivation using default emission factor as per the methodology |
| | | $CH_4$ | Excluded | No fossil fuel / electricity is consumed at the project site due to the project activity. No biomass residue from off-site will be used for the project activity<br>Excluded for simplification. This is conservative |
| | | $N_2O$ | Excluded | Excluded for simplification. This is conservative |

**Project Emissions (PEy)**

The project emissions (PEy) under the methodology may include

- $CO_2$ emissions from transportation of biomass and/or biomass residue to the project site,

- $CO_2$ emissions from on-site consumption of fossil fuels due to project activity,
- $CO_2$ emissions from electricity consumption at the project site that is attributable to the project activity and
- $CH_4$ emissions from combustion of biomass.

where

**$PET_y$** = are the $CO_2$ emissions during the year y due to transport of the biomass to the project plant in tons of $CO_2$,

**$PET_y$** = Default project emissions as per UCR notification dated 04/10/2023 has been applied following the provisions from the TOOL12,

- *For large-scale project activities, apply a net-to-gross adjustment of 10%, i.e. multiply the emission reductions determined based on the applied methodology by 0.9 to determine the final amount of emission reductions that can be claimed*.

**$PE_{FFCO2,y}$** = are the $CO_2$ emissions during the year y due to fossil fuels co-fired by the generation facility in tons of $CO_2$,

**$PE_{EC,y}$** = are the $CO_2$ emissions during the year y due to electricity consumption at the project site that is attributable to the project activity in tons of $CO_2$,

**$GWP_{CH4}$** = is the Global Warming Potential for methane valid for the relevant commitment period and,

**$PE_{Biomass,CH4,y}$** = are the $CH_4$ emissions from the combustion of biomass during the year y.

The proposed project activity does not have any $CO_2$ emissions due to fossil fuel co-firing and from electricity consumption at site. The project activity also doesn't include the $CH_4$ emissions from the combustion of biomass.

Hence,

**$PE_{FFCO2,y}$** = **$PE_{FC,j,y}$** = are the $CO_2$ emissions during the year y due to fossil fuels co-fired by the generation facility in tons of $CO_2$, in process j during the year y ($tCO_2$ / yr);

$$PE_{FC,j,y} = \sum_i FC_{i,j,y} \times COEF_{i,y}$$

**$FC_{i,j,y}$** = the quantity of fuel type i combusted in process j during the year y (mass or volume unit / yr);

**$COEF_{i,y}$** = the $CO_2$ emission coefficient of fuel type i in year y ($tCO_2$ / mass or volume unit);

**i** = the fuel types combusted in process j during the year y.

The coefficient of emission factor of the fuel is calculated in accordance with the option 'B' of the "Tool to calculate project or leakage CO2 emissions from fossil fuel consumption" which states that "The $CO_2$ emission coefficient ***$COEF_{i,y}$*** is calculated based on net calorific value and $CO_2$ emission factor of the fuel type i as follows:"

$$COEF_{i,y} = NCV_{i,y} \times EF_{CO2,i,y}$$

Where:

**COEF** $_{i,y}$ = the $CO_2$ emission coefficient of fuel type i in year y ($tCO_2$/ mass or volume unit);

**NCV** $_{i,y}$ = the weighted average net calorific value of the fuel type i in year y (GJ/ mass or volume unit);

**EF** $_{CO2,i,y}$ = weighted average $CO_2$ emission factor of fuel type i in y

| | | |
|---|---|---|
| CO2 emission factor for coal | 0.09970 tCO2e/GJ | Confirmed from IPCC default values at the upper limit of the uncertainty at a 95% confidence interval as provided in table 1.4 of Chapter1 of Vol. 2 (Energy) of the 2006 IPCC Guidelines on National GHG Inventories (99,700kg/TJ) |
| Hence, the project emission estimate on account of firing of coal fines is calculated as: | COEF $_{I,y}$ = NCV $_{i,,y}$ × EFCO $_{2\,i\,y}$ | = 0.0142358 GJ/kg x 0.09970 tCO2e/GJ<br>= 0.001419305 tCO2e/kg |

**PE**$_{EC,y}$ = 0 and,

**PE**$_{Biomass,CH4,y}$ = 0.

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

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

Renewable energy technology displaces technology using fossil fuels, wherein the simplified baseline is the fuel consumption of the technology that would have been used in the absence of the project activity, times an emission factor for the fossil fuel displaced.

The baseline emissions due to the displacement of electricity are determined by the net quantity of electricity generation as a result of the project activity (incremental to baseline generation) during the year y in MWh times the CO2 emission factor for the electricity displaced due to the project activity during the year y in tCO2/MWh.

Given that power generation for internal consumption is part of the present project activity, emission reductions are only claimed from on-site incremental power generation that is injected into the grid. Therefore, the baseline scenario is the emission of GHG from the present electricity generation mix of the electricity grid.

Emission Reductions ($ER_y$): The emission reductions due to the project activity are calculated as the difference between the baseline emissions and the sum of the project emissions and the leakage:

$ER_y = BE_y - (PE_y + LE_y)$

$BE_y$ = Baseline emissions in year y (t CO2e)

As mentioned in the methodology the baseline emissions are calculated as follows:

$BE_y = EGPJ,_y * EFgrid,_y$

Where:

$EGgrid,_y$ = Quantity of net electricity generation that is fed into the electricity grid as a result of the implementation of the project activity in year y (MWh)

$EFgrid,_y$ = The CO2 emission factor for grid connected power generation in year y calculated using UCR Standard emission factor (0.9 $tCO_2$/MWh).

**$PE_{FFCO2,y}$**= Estimated project activity fossil fuel emissions/yr = **13628 tCO2/yr**
**$PE_y$** = Estimated default (Biomass Cultivation and transport) emissions/yr = **10432 tCO2/yr**

**LEy** = Leakage emissions = 0 tCO2

For this methodology, it is assumed that transmission and distribution losses in the electricity grid are not influenced significantly by the project activity and are therefore not accounted for.

Estimated annual MWh grid supply = **115905 MWh/yr**

Estimated Annual baseline emission reductions **($BE_y$)** = **104314 $tCO_{2eq}$ /yr**

**Estimated Total Annual Emission Reductions ($ER_y$)** = **80255 CoUs /year (80255 tCO2eq/yr)**

**B.6. Prior History>>**

The project has received no public funding. The project activity has not applied to any other GHG program for the generation or issuance of carbon offsets or credits for the current crediting period.

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

There is no change in the start date of the crediting period.

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

There are no permanent changes

**B.9. Monitoring period number and duration>>**

Monitored Period: 01
1st Monitoring Dates: 01/01/2013 to 31/12/2022 (10 years, 00 months)
First Issuance Period: 01/01/2013 to 31/12/2022 (10 years, 00 months)

## B.10. Monitoring plan>>

The monitoring of electricity data revolves around the power generation from the turbine generators and the auxiliary consumption of the power plant. All auxiliary units at the power plant is metered and there are also main meters attached to each turbine generator to determine their total generation.

The total amount of bagasse generated by the sugar plant and consumed in the power generation unit is available based on plant records in tonnes.

The management of the plant has designated one person to be responsible for the collation of data as per the monitoring methodology. The designated person collects all data to be monitored as mentioned in this PCN and reports to the power plant manager.

The electricity generation from turbines and auxiliary consumption is recorded continuously on an hourly basis by the operators in the shift. At the end of the day this data is collated by the engineer in charge and signed off by the power plant manager. The steam data is also manually recorded on an hourly basis from the meters. The data is recorded in logbooks by the operators and the engineer in charge collates the data from these log books and stores them electronically. This data is used by engineer in charge to prepare a monthly report and send it to Plant Head for verification. The monthly reports become a part of the Management Information System (MIS) and are reviewed by the management during the quarterly review meeting.

The monthly reports can be made available during the verification of the project activity, to estimate the monthly emission reductions, which are also, included in the MIS. The monitoring personnel are familiar with the process of monitoring and documentation. They have been maintaining and reviewing the factory records pertaining to the sugar manufacturing.

All the meters are checked and calibrated every 5 years by an independent agency and they are maintained as per the instructions provided by their suppliers. Hence there are no uncertainties or adjustments associated with data to be monitored. An internal audit team, comprising personnel from the factory but from a department other than utility, reviews the daily reports, monthly reports, procedure for data recording and maintenance reports of the meters. This team checks whether all records are being maintained as per the details provided in the PCN. The audit team also enlists the modifications/corrective actions required, if any, in more accurate monitoring and reporting. All the data and reports will be kept at the office of the sugar mill until 2 years after the end of the crediting period or the last issuance of CoUs for the project activity, whichever occurs later.

Though the project is a co-generation project, the **PP shall claim UCR CoUs only based on the electrical energy supplied to grid**, hence, the parameters for steam generation, pressure of steam temperature of steam, feed water inlet temperature are not relevant to the applied methodology and are showcased as being monitored.

Emergency preparedness plans have been laid out to meet with situations leading to unintended emissions. These emergency situations have been identified as:

1. Fire in the fuel yard

2. Fuel spoilage due to water.

These emergency situations haven been taken care by putting up a fire safety system and a water drainage system in the fuel yard. The proposed project activity has also taken under the ISO on operation. The monitoring process is also been covered under the ISO.

| Parameters | Description |
|---|---|
| $Q_{S,y}$ | Quantity of steam supplied per year measured at recipient's end |
| $T_{steam,y}$ | Temperature of steam at the recipient's end |
| $P_{steam,y}$ | Pressure of steam |
| $E_{steam,y}$ | Enthalpy of the saturated steam supplied to the recipient |
| $T_{Feedwater}$ | Temperature of boiler feed water |
| $E_{Feedwater}$ | Enthalpy of feed water |
| $E_{Gthermal,y}$ | Net quantity of thermal energy supplied by the project activity during the year y |
| $B_{Biomass,y}$ | Net quantity of thermal energy supplied by the project activity during the year y |
| $MC_{biomass}$ | Moisture content of the biomass |

| **Data/Parameter:** | **Date of commissioning of biomass boilers** |
|---|---|
| **Data unit:** | Date as per boiler test report. |
| **Description:** | Actual date of commissioning of the project device |
| **Source of data**<br>**Value(s) applied:** | Monitoring Report As and when commissioned |
| **Measurement methods and procedures:** | The construction processes are maintained from initiation to completion dates for the biogas unit. Thus the start date of each of the units installed is recorded in the monitoring report. |
| **Monitoring frequency:** | As and when commissioned fixed and recorded in the monitoring report |
| **Purpose of data:** | To estimate project eligibility |

| **Data / Parameter:** | **$NCV_k$** |
|---|---|
| **Data unit:** | GJ/t |
| **Description:** | Net Calorific Value of Biomass Residue Type K |
| **Source of data value(s) applied:** | Measurements will be carried out by reputed labs and reported in dry biomass basis. |
| **Measurement methods & procedures:** | On site and in labs |
| **Monitoring frequency:** | Every 6 months |
| **Purpose of date:** | Quality control |

| **Data / Parameter:** | **$Q_{biomass,yr}$** |
|---|---|
| **Data unit:** | MT/yr |
| **Description:** | The quantity of bagasse used to generate steam in the boilers each year |
| **Source of data value(s) applied:** | Plant records and log books receipts |

| | |
|---|---|
| **Measurement methods & procedures:** | Monitoring: The quantity of biomass fed into the boiler is contrplled.<br>Data type: Measured<br>Responsibility: Boiler Operator |
| **Monitoring frequency:** | Daily |
| **QA/QC procedures** | The amount of biomass used can be cross checked by the purchase orders and stock inventory |

| | |
|---|---|
| **Data / Parameter:** | **$EG_{project\ plant,\ y}$** |
| **Data unit:** | MWh |
| **Description:** | Net quantity of electricity generated in the project |
| **Source of data value(s) applied:** | Measured. |
| **Measurement methods & procedures:** | This value will be determined annually from the records maintained at the factory. All auxiliary units at the power plant are metered and there is also a main meter attached to turbine generator to determine total generation. |
| **Monitoring frequency:** | The hourly recordings of data is to be taken from energy meters located at the project activity site. This data is to be recorded hourly by the shift attendant and entered into logbooks on site. This hourly data is to be signed off at the end of every shift by an engineer in charge of the shift and again at the end of each day and signed off by the power plant manager. The energy meters are calibrated every 5 years by an independent third party. |
| **QA/QC procedures:** | The parameter is monitored and logged in log sheets. |

| | |
|---|---|
| **Data / Parameter:** | **EF grid,y** |
| **Data unit:** | Grid emission factor |
| **Description:** | tCO2/MWh |
| **Source of data value(s) applied:** | UCR CoU Standard Default for Indian grid<br>0.9 tCO2/MWh for the period 2013-2022 and same is used for the period post 2022 as it is found conservative. |
| **Measurement methods & procedures:** | NA |
| **Monitoring frequency:** | NA |
| **QA/QC procedures:** | The parameter is conservative. |
| **Purpose of data:** | To estimate baseline emissions |

| | |
|---|---|
| **Data / Parameter:** | **EG grid,y** |
| **Data unit:** | MWh |
| **Description:** | Net quantity of electricity supplied to the grid |
| **Source of data value(s) applied:** | JMR and/or Monthly Meter Readings |
| **Measurement methods & procedures:** | Type: Calculated Data type: Monitored<br>This parameter may be checked with the necessary invoices or JMR (issued by the state grid) each month |
| **Monitoring frequency:** | Daily |
| **QA/QC procedures:** | The parameter is monitored by on site energy meters that are calibrated on every 5 years. The hourly recordings of data is to be taken from energy meters located at the project activity site. This data is to be |

| | |
|---|---|
| | recorded hourly by the shift attendant and entered into logbooks on site. This hourly data is to be signed off at the end of every shift by an engineer in charge of the shift and again at the end of each day and signed off by the power plant manager. The energy meters are calibrated by an independent third party. |
| **Purpose of data:** | To estimate baseline emissions |

| **Data/Parameter** | **$FC_{coal,j,y}$** |
|---|---|
| Data unit | Tonnes/yr |
| Description | Quantity of coal fines used in the project activity in the |
| Source of data<br>Value(s) applied | Calculated |
| Measurement methods and procedures | Plant records |
| Monitoring frequency | Manually |
| QA/QC | Measured Daily and recorded monthly. The amount of coal used in the project activity is measured via a calibrated weighbridge system as and when consumed on continuous basis. Weigh bridge undergoes maintenance / calibration subject to appropriate industrial standards, at least annually. The data recorded is cross checked against purchase receipt. Cross check is also made via the measurements with an annual energy balance that is based on purchased quantities and stock changes, and the calibration frequency is once in three years. |
| Purpose of data | To estimate project emissions |

| **Data/Parameter** | **$EF_{CO2,coal,y}$** |
|---|---|
| Data unit | tCO2 /GJ |
| Description | CO2 emission factor for coal |
| Source of data<br>Value(s) applied | Calculated |
| Measurement methods and procedures | CEA |
| Monitoring frequency | Annually |
| QA/QC | A default value is applied as per IPCC guidelines. |
| Purpose of data | To estimate project emissions |