MONITORING REPORT (MR)

CARBON OFFSET UNIT (CoU) PROJECT

Title: TEIL Biomass Grid Supply Power Project, Sabitgarh, Uttar Pradesh

UCR PROJECT ID: 267

MR Version 2.0

Date of MR: 22/06/2023

1st CoU Issuance Period: 08 years and 01 months
1st Monitoring Period: 01/12/2014 to 31/12/2022
1st Crediting Period: 01/12/2014 to 31/12/2022

Monitoring Report (MR)

CARBON OFFSET UNIT (CoU) PROJECT

BASIC INFORMATION	
Title of the project activity	TEIL Biomass Grid Supply Power Project, Sabitgarh, Uttar Pradesh
Scale of the project activity	Small Scale
UCR PROJECT ID	267
Completion date of the PCN	22/06/2023
Project participants	**Project Proponent:** Triveni Engineering and Industries Ltd (TEIL) **Aggregator:** Carbon Equalizers, KATNI UCR ID : 660687753
Host Party	India
Applied methodologies and standardized baselines	**CDM UNFCCC** **Small-scale Methodology** **AMS-ID**: Grid connected renewable electricity generation, Ver 18 UCR Standard for Baseline Grid Emission Factor
Sectoral scopes	01 Energy industries (Renewable/NonRenewable Sources)
Estimated total amount of average GHG emission reductions per year (DD/MM/YYYY: Quantity)	01/12/2014-31/12/2014: 963 tCO2 (963 CoUs)
	01/01/2015-31/12/2015: 8363 tCO2 (8363 CoUs)
	01/01/2016-31/12/2016: 10695 tCO2 (10695 CoUs)
	01/01/2017-31/12/2017: 14253 tCO2 (14253 CoUs)
	01/01/2018-31/12/2018: 14711 tCO2 (14711 CoUs)
	01/01/2019-31/12/2019: 13859 tCO2 (13859 CoUs)
	01/01/2020-31/12/2020: 14195 tCO2 (14195 CoUs)
	01/01/2021-31/12/2021: 10107 tCO2 (10107 CoUs)
	01/01/2022-31/12/2022: 11729 tCO2 (11729 CoUs)
Estimated total amount of average GHG emission reductions for the entire monitoring period (2014-2022)	98875 tCo2eq (98875 CoUs)

SECTION A. Description of project activity

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

The project **TEIL Biomass Grid Supply Power Project, Sabitgarh, Uttar Pradesh** is located at Village: Sabitgarh, Tehsil: Khurja, District: Bulandshahar, State: Uttar Pradesh (UP), Country: India (Pin: 203129).

The details of the UCR project activity are as follows:

Purpose of the UCR project activity:
The purpose of the project activity by the project proponent (PP), Triveni Engineering and Industries Ltd (TEIL), is to generate green electricity using renewable biomass and thereby reduce greenhouse gas (GHG) emissions by displacing the fossil fuel dominated grid based electricity with biomass based renewable electricity. The PP exports the surplus power to the grid after meeting its captive and auxiliary power requirements at the project activity site.

The PP is one of the largest integrated sugar manufacturers in India, and across UP, it currently operates large grid-connected and smaller capacity co-generation plants (incidental co-generation facilities). The total installed power generation capacity in the project activity is **13.5 MWh** and the project activity was commissioned on **23/12/2005** for captive heat and power generation using renewable biomsss.

The electricity produced by the project activity is directly contributing to climate change mitigation by reducing the anthropogenic emissions of GHGs into the atmosphere by displacing an equivalent amount of fossil power at grid. The project activity is displacing an estimated annual net electricity generation of approximately **53415 MWh** from the Indian grid system, which otherwise would have been generated by the operation of fossil fuel-based grid-connected power plants. The project activity doesn't involve any GHG emission sources. The estimated annual CO_{2e} emission reductions by the project activity are **14711 tCO_{2e}**, whereas actual emission reductions achieved during the first monitored period is **98875 tCO_{2e}** .

The smaller capacity cogeneration plants within the portfolio of the PP (such as the project activity), operate mostly on medium pressure steam cycles (46 ata/440ºC). These plants are

designed to conduct fully-automated operations, using the latest Distributed Control System (DCS). Highly experienced and skilled manpower operates these plants, thus ensuring trouble-free efficient operations with high uptime and reliable operations, along with very high operating efficiencies. The PP puts significant emphasis on maintaining excellent management of the boiler feed water quality parameters to ensure sustained and trouble free operation of the boiler and the turbine.

As per the power purchase agreement (PPA) between the state electricity board (UPPCL) and PP, dated **04/08/2014**, the project activity, which has an installed total power generation capacity of **13.5 MWh**, is contracted to supply approximately **6 MWh** of this bagasse based power to the grid.

The power synchronization is to the 132/133 KV Khurja-II, Palrajhal Tehsil-Khurja grid substation owned by UPPCL and was first completed in **October 2014,** and UCR carbon credits are being claimed from this date onwards. The power generation is 11 KV, stepped up and evacuated to the 33 KV high voltage switchyard and exported to the UPPCL grid system. All the biomass used at the site qualifies under the definition of biomass residues as outlined in the UNFCCC CDM methodology, i.e. *the biomass residue is a by-product of agricultural activities and no other types of biomass is used*. In the case of the project activity, the biomass residue is bagasse, which is generated from the crushing of sugar cane.

Period	Description
01/12/2014-31/12/2022	Baseline Emission Reductions-121651 tCO2
01/12/2014-31/12/2022	Project Emissions-22776 tCO2
Total Emission Reductions over this Monitored Period	**98875 tCO_{2eq}**

ANNEXURE- I

THE GENERATING COMPANY'S GENERATION FACILITIES

1. THE GENERATING PLANT:

a.-	NAME:	: M/s Triveni Engineering & Ind.Ltd, Unit: Sabitgarh, Teh- Khurja
b.-	LOCATION:	: Village : Sabitgarh, PO-Karora Distt.Bulandshahar(U.P),Pin Cod-203129
c.-	CHIEF EXECUTIVE:	: Mr. Sameer Sinha
d.-	CONTACT PERSON:	: Mr. Sameer Sinha
e.-	MAILING ADDRESS:	: Triveni Engineering & Ind,Ltd, 8th Floor, Express Trade Tower 15-16, Sector 16 A, Noida-201301,UP
f.-	TELEPHONE NUMBER:	: 0120-4308000
g.-	FAX NUMBER:	: 0120-4311011
h.-	EMERGENCY TELEPHONE NUMBER:	Same as above
2.	GENERATING EQUIPMENT:	:
a.-	BOILERS:	: I No. 40 TPH, dumping, grate type of Bagasse fired Boiler M/s Texmaco make.
b.-	TURBO-GENERATOR SETS:	: 6MW,1.5Kg/sq.cm, back pressure turbine of M/s Triveni make
c-.	GENERATION VOLTAGE:	: 11 KV
d-.	SPEED:	: 8280 r.p.m.
e-.	TYPE OF GOVERNOR:	: Woodward
f-.	TRANSFORMER:	: 10 MVA, 11/33 KV
g-	FIRST SYNCHRONISATION WITH 33 KV LINE (INITIAL OPERATION DATE)	: Oct. 2014
h -	Transmission Line:33KV line connecting with 132KV Sub-station of STU COMMERCIAL OPERATION DATE: Oct. 2014	

For Triveni ENG & IND LTD

Group General Manager

EX. CE (PPA)
UPPC
SHAKTI BHAWAN EXTN.
LUCKNOW

Relevant Dates from PPA Copy

Triveni ENGINEERING & INDUSTRIES LTD.
(Formed by the Amalgamation of Triveni Engineering & Industries Ltd. with Gangeshwar Ltd.)
CELL (TURBINE BUSINESS GROUP)
9, 18-RAJENDRA PLACE, NEW DELHI-110 008, INDIA
E-mail : delserve@tbg.trivenigroup.com, care.delhi@tbg.trivenigroup.com • Website : www.trivenigroup.com • FAX : 91-11-25764561 • CALL CENTER : 25826605

27th December 2005

TO WHOM IT MAY CONCERN

This is to inform that we have supplied, erected and commissioned 6 MW Back Pressure Turbo Alternator set at Triveni Engineering & Industries Limited, Unit Sabitgarh, Tehsil : Khurja (District : Bulandshahr) Uttar Pradesh – 203129, successfully during December 2005. The details of our supplied TA set are as follows:

Turbine – Triveni, FR2 SI NO:022

Power : 6000KW

Speed: 8280 (RPM)

Inlet Parameters: 45 ATA/440 Deg C

Alternator: Make :BHEL Frame :G751048 Power : 8000KW

Authorised Signatory

Turbine Division

TRUE COPY ATTESTED

M.V. SINGH
Advocate Notary
NOIDA G.B Nagar

Triveni ENGINEERING & INDUSTRIES LTD.
(Formed by the Amalgamation of Triveni Engineering & Industries Ltd. with Gangeshwar Ltd.)
CELL (TURBINE BUSINESS GROUP)
TEL. : PBX 25764728, 25764729, 25733697 • FAX : 91-11-25764561 • CALL CENTER : 25826605
E-mail : delserve@tbg.trivenigroup.com, care.delhi@tbg.trivenigroup.com • Website : www.trivenigroup.com
18-RAJENDRA PLACE, NEW DELHI-110 008, INDIA

27th December 2005

TO WHOM IT MAY CONCERN

This is to inform that we have supplied, erected and commissioned 1.5 MW Refurbish Back Pressure Turbo Alternator set at Triveni Engineering & Industries Limited, Unit Sabitgarh, Tehsil : Khurja (District : Bulandshahr) Uttar Pradesh – 203129, successfully during December 2005. The details of our supplied TA set are as follows:

Turbine – Make Blohm & Voss, 6T I, Sl NO: 057

Power : 1500KW

Speed: 8500 (RPM)

Inlet Parameters:160 lbs/sq. In. / 450 F

Alternator: Make: SCHORCH Type W7029 / 4 Power: 1500KW

Authorised Signatory
Turbine Division

NOTARY M.V. SINGH Advocate Notary G.B. Nagar, U.P Regn. 1195 GOVT. OF INDIA

TRUE COPY ATTESTED
M.V. SINGH
Advocate Notary
NOIDA G.B Nagar

Triveni Engineering & Industries Ltd. Noida 201301

16 JAN 2016

TRIVENI ENGG. & INDUSTRIES LTD. NOIDA

Triveni TURBINES

22nd July 2015

TO WHOM IT MAY CONCERN

This is to inform that we have supplied, erected and commissioned 6 MW Back Pressure Turbo Alternator set at Triveni Engineering & Industries Limited, Sugar unit Sabitgarh, PO Sabitgarh, Tehsil- Khurja, Dist - Bulandshahr, (UP) -203129, successfully during Nov 2014. The detail of our supplied TA set is as follows:

Turbine: - TST 1060, Sl. No.: 044
Power: - 6000 KW
Speed: - 8280/1500 RPM
Inlet Parameters: - 44.5ATA/435 degree C
Exhaust Pressure: - 2.5ATA
Alternator: - BHEL (Frame: G74904, Power: 7500 KV/6000 KW)

For Triveni Turbine Ltd,
D S Kalsi
Senior Manager
TTL Noida

NOTARY M.V. SINGH Advocate Notary G.B Nagar, U.P Regn. 1198 GOVT. OF INDIA

TRUE COPY ATTESTED
M.V. SINGH
Advocate Notary
NOIDA G.B Nagar
16 JAN 2016

Triveni Engineering & Industries Ltd. Noida-201301

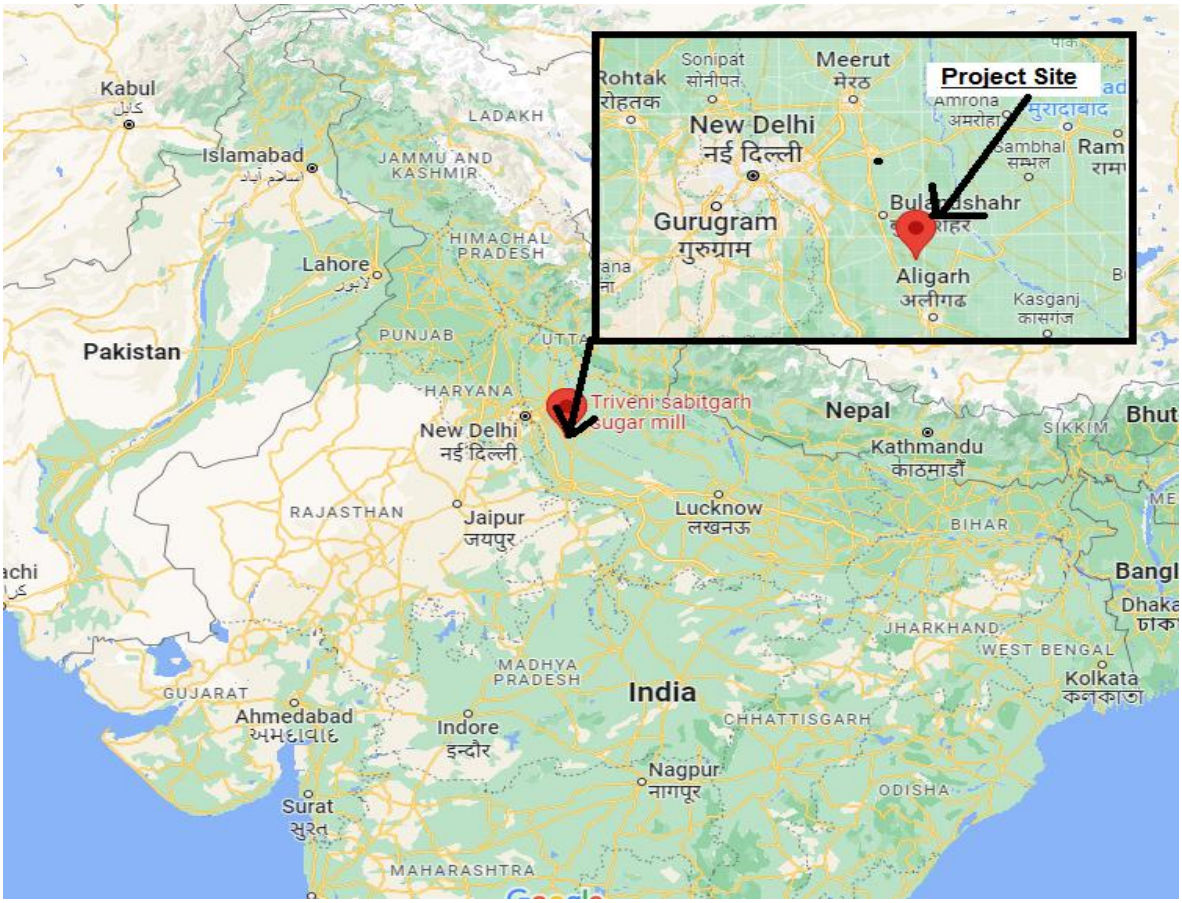
TRIVENI TURBINE LIMITED
(Formerly Triveni Retail Ventures Limited)

Hence, the project activity is a grid-connected biomass (bagasse based) cogeneration power plant with a high pressure steam-turbine configuration. 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. 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 project plant exports power to the Uttar Pradesh Power Corporation Limited (UPPCL), in absence of the project activity, UPPCL would have withdrawn electricity from northern regional grid.

The UCR project activity qualifies under the environmental additional positive list of pre-approved project types under the UCR carbon incentive model for issuance of voluntary carbon credits.

A.2. Location of project activity >>

Country: India
Village: Sabitgarh
Tehsil: Khurja,
District: Bulandshahar
State: Uttar Pradesh (UP),
Latitude: 28° 11' 47.22" N
Longitude: 78° 0' 19.44" E



A.3. 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 the export of electricity to the regional grid.

Description	Boiler #1	Boiler #2	Turbine #1	Turbine #2	Turbine #3
Capacity	80 TPH	25 TPH	6 MW	1.5 MW	6 MW
Temp (°C)	440	315	440	315	440
Pressure (kg/cm^2)	45	11.6	45	11.6	45
Commissioning Year	2005	2008	2005	2008	2014

The plant is designed with all other auxiliary plant systems like

1. Bagasse handling system with storage and processing arrangements,
2. High pressure feed water heaters,
3. Ash handling system,
4. Water treatment plant,
5. Compressed air system,
6. Air conditioning system,
7. Main steam, medium pressure and low pressure steam systems,
8. Fire protection system,
9. water system which include raw water system, circulating water system, condensate system, De-Mineralised water system and service with potable water system and
10. The electrical system for its successful operation.

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.

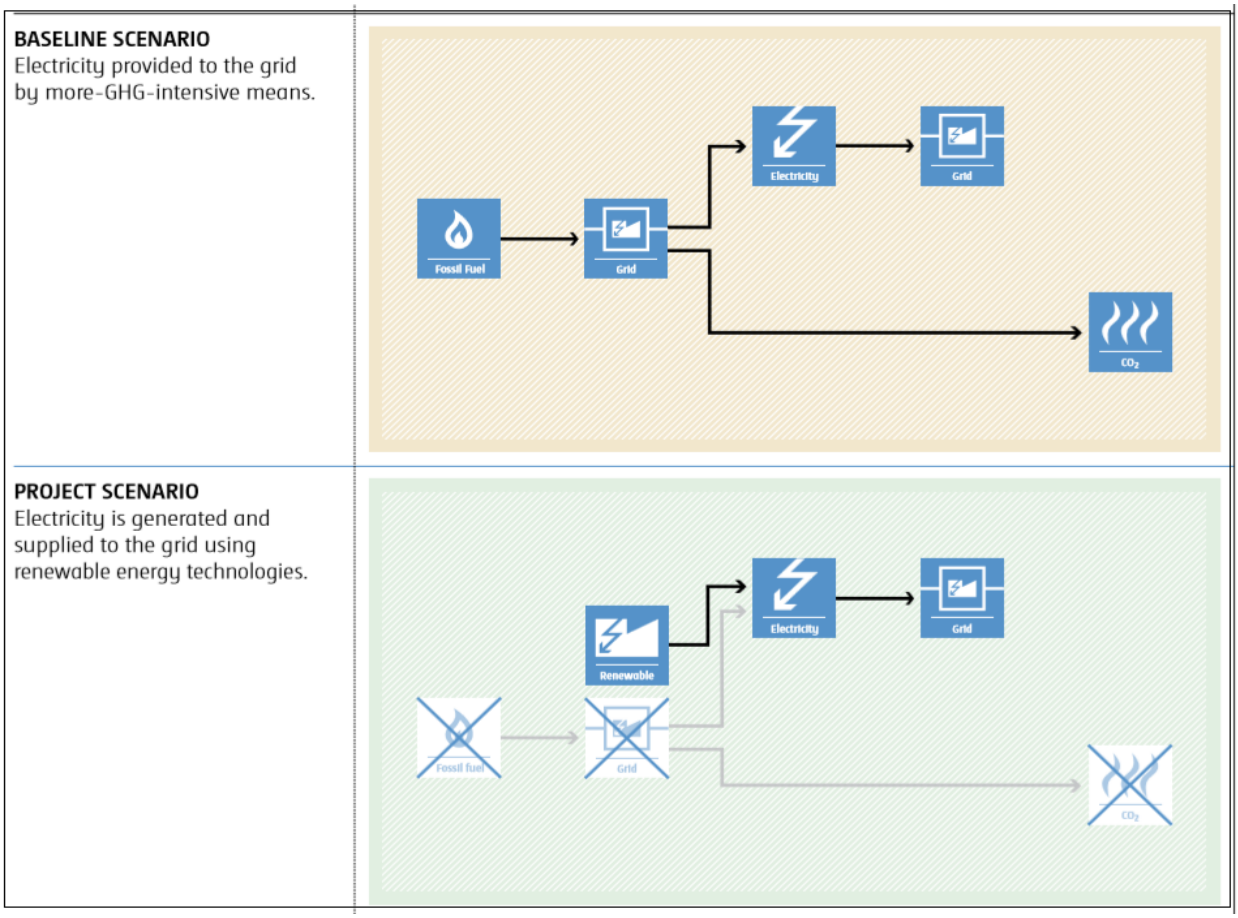
INSTRUMENT DETAILS	
Energy Meter:	
Location	132KV Sub-station, Khurja-II.
Make/Sr. No/Model	Secure Meters Ltd/ UPP43258/APEX 100
Accuracy Class	0.2S
Energy Meter:	
Location	132KV Sub-station, Khurja-II.
Make/Sr. No/Model	Secure Meters Ltd/ UPP68184/APEX 100
Accuracy Class	0.2S
Energy Meter:	
Location	132KV Sub-station, Khurja-II.
Make/Sr. No/Model	Secure Meters Ltd/ UPP43257/APEX 100
Accuracy Class	0.2S

A.4. Parties and project participants>>

Project activity does not involve any public funding from Annex I Party, which leads to the diversion of the official development assistance.

Party (Host)	Participants/Aggregator
India	Project Owner: Triveni Engineering & Industries Ltd (TEIL) Aggregator: Carbon Equalizers, KATNI UCR ID : 660687753 Contact: Mr Vikas Chamadia Email: vikaschamadia@rediffmail.com **Mob**: 9303068600

A.5. Baseline Emissions>>



The approved baseline methodology has been referred from the indicative simplified baseline and monitoring methodologies for selected small scale UNFCCC CDM project activities that involve generation and export of power to the local or national grid using biomass.

Typical activities, under *AMS ID* comprises of renewable energy generation units, such as renewable biomass, including:

- (a) Supplying electricity to a national or a regional grid; or are new plants, capacity expansions, energy efficiency improvements or fuel switch projects.

The applicable 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 tCO2/MWh for the period 2014-2022.

A.6. 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 (Small Scale)

UCR Positive List Environmental Additionality

CATEGORY- ***AMS I.D. Small Scale Consolidated Methodology***

"**Grid connected renewable electricity generation", version 18**

This methodology is applicable to project activities that comprises renewable energy generation units, such as renewable biomass involving:

(a) Supplying electricity to a national or a regional grid;

UCR CoU Standard is used to determine the baseline grid emission factor for the 2014-2022 period.

B.2. Applicabilityofmethodologiesandstandardizedbaselines>>

The project activity is a power generation project using a 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 methodology.
The project activity is included in the Positive List of UCR Approved Scope under the UCR CoU Standard.
The total installed capacity of project activity is 13.5 MW, of which 6 MW is supplied to the grid, which is acceptable as per the applied small scale methodology, since the eligibility limit of 15 MW has been applied under this methodology.
The installation of a new biomass residue fired power generation unit, which replaces or is operated next to existing power generation capacity fired with either fossil fuels or the same type of biomass residue as in the project plant (power capacity expansion projects) is also included in this methodology.
The project activity is not a hydro power project. The project activity does not recover methane from landfill gas, waste gas, wastewater treatment and agro-industries.
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 not co-fire fossil fuel and/or 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 is 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 boilers are fired by bagasse, a byproduct of the sugarcane processing and a biomass residue.
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 doublecounting emissionreductions>>

The biomass boilers and turbines are constructed by the project proponent within the project boundary. The biomass boilers, turbine and energy meters have unique IDs, which is visible on the units. The Monitoring Report has the details of the same and will be provided to the UCR verifier during the verification process.

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

- Project is uniquely identifiable based on its location coordinates,
- Project has dedicated commissioning certificate and connection point,
- Project is associated with energy meters which are dedicated to the generation/feeding point with the grid.

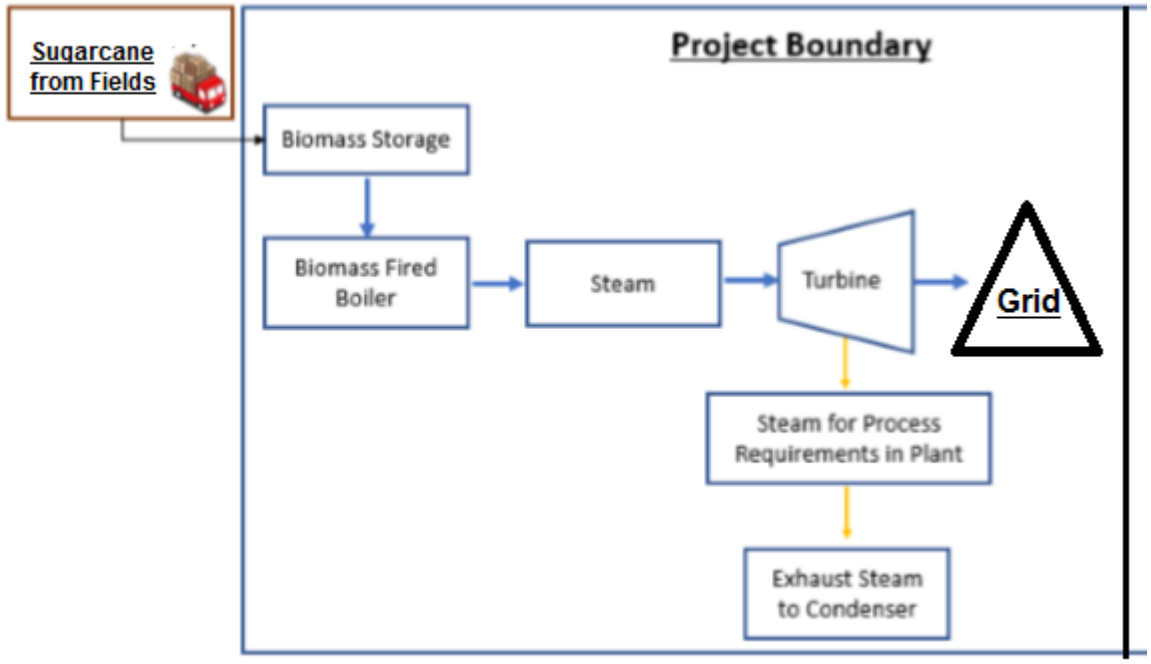
Hence the UCR project activity has never been issued voluntary carbon credits for the current 2014-2022 vintage years and there is no double counting of the credits envisioned. Additionally, the same has been stated in the undertaking provided in the Double Counting Avoidance Assurance Document (DAA) by TEIL.

B.4. Projectboundary,sourcesandgreenhousegases(GHGs)>>

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

(a) the project power plant and all power plants connected physically to the electricity system that the project activity is connected to.

Process flow chart:



Thus, the project boundary includes the biomass-based steam generator, steam turbine generators and the Indian grid system.

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

Leakage Emissions (LE_y)

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

Hence $LE_y = 0$

Project Emissions (PEy)

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 and also the UCR grid emission factor results in conservative estimates of the carbon credits.

Direct off-site emissions in the project activity arise from the biomass transport. The biomass and/or biomass residues may be used as either fuel or feedstock in the project activity as per the Tool16 for project and leakage emissions from biomass. However, the biomass is generated from the in-house processes pertaining to the sugar processing industry, hence, biomass transport is only accounted if biomass is imported from outside the project boundary. The same type of CO_2 emission occurs during transportation of coal from coal mines to thermal power plants (supplying power to state grid). The biomass is collected from the nearby sources and is transported by trucks to the project site. Each truck laden with biomass (sugarcane) is weighed on the electronic weighbridge and the corresponding readings are noted in the plant log books.

Project emissions (**PE $_y$**) involve emissions resulting from the cultivation of biomass, transportation of biomass, processing of biomass, transportation of biomass residues and processing of biomass residues. As an alternative to the monitoring of the parameters needed to calculate the emissions from the biomass (sugarcane) transportation, PP is allowed to apply the following option:

(a) For microscale and small-scale project activities, a default emission factor of 0.0142 tCO2/tonne of biomass. *(source: TOOL16 Methodological tool Project and leakage emissions from biomass Version 05.0*)

B.5. Establishmentanddescriptionofbaselinescenario >>

T

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

Renewable energy technologies that displace technologies using fossil fuels, wherein the simplified baseline is the fuel consumption of the technologies 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 displacement of electricity are determined by net quantity of electricity generation as a result of the project activity (incremental to baseline generation) during the year y in MWh times the CO_2 emission factor for the electricity displaced due to the project activity during the year y in tons CO_2/MWh

Given that steam and electric 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 to the grid***. Therefore, the baseline scenario is the emission of GHG from the present electricity generation mix of the UPPCL grid in the northern region.

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

$ERy = BE_y - (PE_y + LE_y)$

BE_y= Baseline emissions in year y (t CO_{2e})

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

$$BE_y = EG_{pj,y} * EF_{grid,y}$$

Year	The quantity of bagasse used to generate steam in the boilers (*Plant records and log books receipts*)								
2013	**(MTs)**	**2014**	**(MTs)**	**2015**	**(MTs)**	**2016**	**(MTs)**	**2017**	**(MTs)**
Jan	37595.00	Jan	31964.27	Jan	23464.500	Jan	30322.90	Jan	34698.40
Feb	30714.80	Feb	32214.95	Feb	30069.400	Feb	33953.50	Feb	29032.60
Mar	36342.10	Mar	29502.72	Mar	6595.000	Mar	7855.10	Mar	36337.40
Apr	11012.21	Apr	7814.03	Apr	0	Apr	0	Apr	13456.20
May	0	May	0	May	0	May	0	May	0
Jun	0	Jun	0	Jun	0	Jun	0	Jun	0
Jul	0	Jul	0	Jul	0	Jul	0	Jul	0
Aug	0	Aug	0	Aug	0	Aug	0	Aug	0
Sep	0	Sep	0	Sep	0	Sep	0	Sep	0
Oct	0	Oct	Commissioning Date	Oct	0	Oct	0	Oct	0
Nov	0	Nov	3870.30	Nov	4637.64	Nov	15838.00	Nov	34888.00
Dec	26997.13	Dec	38072.30	Dec	28497.67	Dec	38512.00	Dec	35820.00
2018	**(MTs)**	**2019**	**(MTs)**	**2020**	**(MTs)**	**2021**	**(MTs)**	**2022**	**(MTs)**
Jan	36567.00	Jan	33601.69	Jan	37098.87	Jan	36934.76	Jan	37605.02
Feb	34868.00	Feb	33097.60	Feb	35041.09	Feb	36033.60	Feb	35458.99
Mar	35724.00	Mar	34449.82	Mar	35548.98	Mar	40178.53	Mar	38833.39
Apr	32241.96	Apr	32755.15	Apr	36841.90	Apr	37835.47	Apr	37449.99
May	8716.00	May	6397.76	May	11079.30	May	37837.99	May	15698.34
Jun	0	Jun	0	Jun	0	Jun	0	Jun	0
Jul	0	Jul	0	Jul	0	Jul	0	Jul	0
Aug	0	Aug	0	Aug	0	Aug	0	Aug	0
Sep	0	Sep	0	Sep	0	Sep	0	Sep	0
Oct	0	Oct	0	Oct	563.72	Oct	0	Oct	0
Nov	23227.29	Nov	31386.51	Nov	37995.81	Nov	29980.57	Nov	40266.76
Dec	36775.79	Dec	36242.50	Dec	37518.82	Dec	41534.71	Dec	44300.04

Where:

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

$EF_{grid,y}$ = The CO_2 emission factor for grid connected power generation in year y calculated using UCR Standard emission factor (0.9 tCO2/MWh).

LE_y = Leakage emissions = 0

PE_y = Project activity emissions/yr = 0.0142 x Biomass Consumption (MT)/year

Project Emissions (tCO2e)		Total Bagasse Consumed (t)	Total Power Generated (MWh)	Total Power Exported (MWh)
Year	PE y	MT	MWh	MWh
2014	(Oct onwards) 596	(Oct onwards) 41942.60	Full Year 2014 14299.1	(Dec onwards) 1732.895
2015	1325	93264.213	26457.7	10765.453
2016	1797	126481.50	33095.01	13881.01
2017	2617	184232.60	47380.098	18745.2895
2018	2956	208120.04	51517.634	19630.689
2019	2953	207931.04	51912.265	18680.969
2020	3290	231688.50	52343.363	19428.0465
2021	3697	260335.61	42545.1092	15338.84868
2022	3545	249612.52	53415.31	16972.157

Year	BE y Baseline Emissions (tCO2e)	ER y Emission Reductions (tCO2e)
2014	1559	963
2015	9688	8363
2016	12492	10695
2017	16870	14253
2018	17667	14711
2019	16812	13859
2020	17485	14195
2021	13804	10107
2022	15274	11729
	Total	**98875**

B.6. PriorHistory>>

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

B.7.Changes to startdate of crediting period >>

There is no change in the start date of crediting period , i.e. 1st Crediting Period: 01/12/2014 to 31/12/2022

B.8. 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.

B.9.Monitoring period number and duration>>

1st Monitoring Period Duration: 08 years and 01 months
1st Monitoring Period: 01/12/2014 to 31/12/2022

B.10.Monitoringplan>>

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.

Operational records and other evidences have been documented, collected and archived in either hard-copies or electronic manners. The energy generation is metered by calibrated meters. The biomass consumption is measured by Weigh Bridge calibrated after every two year by state government organisation. Steam quantity, temperature and pressure are measured by calibrated meters. The date of calibration and next due date of calibration can be checked against the calibration certificates. All the values can be checked from the source data ie. plant records. The calorific value of biomass can be checked against the third party analysis reports.

The total amount of bagasse generated by the sugar plant can be calculated from the amount of cane crushed in the season (monitored variable), which is obtained from the in house records. Therefore, bagasse can be calculated using the formula:

Bagasse = Cane + Added water – Juice

This quantity will be cross-checked using an annual energy balance using the monitored steam values. The total heat generated as well as the heat generated by the project activity is monitored using the temperature and pressure values and calculating the enthalpies of the steam generated and the feed water.

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 MR and reports to the head of the plant.

The overall project management responsibility remains with the Plant Head. 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 each year 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 of 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 offices 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.

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.

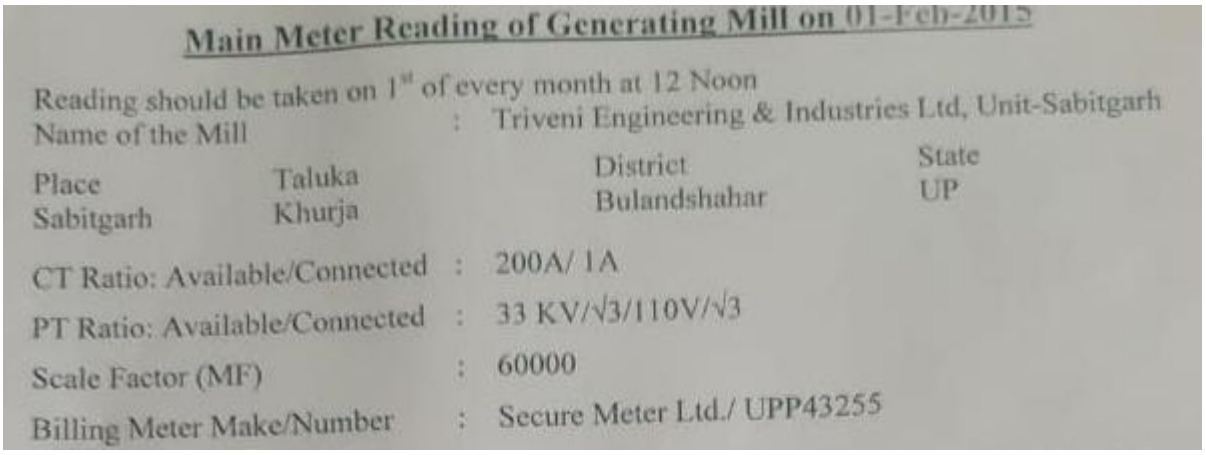
Description	Units	Design Capacity	Avg Operating	Temprature Deg C	Pressure Kg/cm2
Capacity Boiler No- 1	TPH	80	80	440	45
Capacity Boiler No- 2	TPH	25	25	315	11.6
Capacity TG-1	MWH	6	5.9	440	45
Capacity TG-2	MWH	6	5.9	440	45
Capacity TG-3	MWH	1.5	1	315	11.6

Parameters	Description	Measured Data
$Q_{S,y}$	Quantity of steam supplied per year measured at recipient's end	The net heat generated from the project plant is determined as a difference between the steam energy (based on measured steam flow, temperature and pressure) and feed water energy (based on feed water flow, temperature). The outlet steam conditions, pressure and temperature, are continuously monitored using pressure transmitter and temperature sensor respectively. The steam flow rate is monitored on a continuous basis using the steam flow meter. At the boiler outlet, steam pressure and temperature condition, the enthalpy is obtained from the standard steam table. The multiplication of the enthalpy of steam with the steam flow rate, gives the total heat content of the outlet steam from the boiler. Similarly, the enthalpy of feed water has also been monitored and reported and the same was considered to obtain the final Qproject plant which reflects the actual net quantity of heat generation from the project plant boiler. The readings recorded from the flow meter are converted to MWh.
$T_{steam,y}$	Temperature of steam at the recipient's end	A temperature transmitter is used to measure the temperature of the steam produced. The temperature of the steam is monitored on a continuous basis and recorded daily. A daily average value of temperature is recorded in the plant log book.
$P_{steam,y}$	Pressure of steam	A Pressure transmitter is used to measure the pressure of the steam produced. The pressure of the steam generated is monitored on a continuous

		basis and recorded daily. The daily average value is taken from the digital reading and the same is recorded into log books**.**
$E_{steam,y}$	Enthalpy of the saturated steam supplied to the recipient from each boiler	The enthalpy of feed water is obtained from the steam table at the temperature condition of the feed water supplied to the project boilers.
$T_{Feedwater}$	Temperature of boiler feed water	A temperature transmitter is used to measure the temperature of the feedwater and is monitored on a continuous basis and recorded daily. A daily average value of temperature is recoded in to the plant log book**.**
$E_{Feedwater}$	Enthalpy of feed water	Enthalpy of feed water for the project plant from each boiler for the entire monitoring period is recorded.
$EG_{thermal,y}$	Net quantity of thermal energy supplied by the project activity during the year y	The enthalpy of steam is obtained from the steam table by using pressure and temperature condition (temperature and pressure as being monitored above) of the steam generated from the project boiler.
$B_{Biomass,y}$	Net quantity of biomass consumed in year y (on dry basis)	The quantity of biomass type (on "as received" basis) combusted in the project plant is measured on conveyor belt by load cells. Load cells are calibrated on an annual basis according to the standard procedure by the PP. Calibration certificates of load cells are available on site. Calibration of load cell had been done by accredited a NABL (National Accreditation Board for Testing and Calibration Laboratories) approved lab. The amount of biomass combusted in the process can be verified from the plant log books. It is worth mentioning here that this parameter is not being used in the ER calculation.
$MC_{biomass}$	Moisture content of the biomass	NA

Monthly joint meter reading of main meters installed at interconnection points are taken and signed by authorised officials of TEIL and UPPCL on the first day of every month. Records of this joint meter reading are maintained by TEIL and UPPCL. Daily and monthly reports stating the net power export is prepared by the shift in-charge and verified by the plant manager. Power Purchase Agreement (PPA) with UPPCL has been signed. Reliability of energy data is maintained as per PPA. TEIL archives and preserves all the monthly invoices raised against net saleable energy and also archives the complete metering data at generation electronically. All the records are maintained at site. Uttar Pradesh Pollution Control Board (UPPCB) and Environment Department of Uttar Pradesh have prescribed standards of environmental compliance and monitor the adherence to the standards. TEIL has received the 'Consent to Operate' the plant. State's regulatory body of power is Uttar Pradesh Electricity Commission (UPERC) and they have issued consent for the installation of co-generation power plant. As a buyer of the power, the UPPCL is a major stakeholder in the project. They hold the key to the commercial success of the project.

Gross electricity generation is being measured continuously by energy meters. The meter readings are recorded in the plant log books on shift wise basis. Energy meters have been calibrated as per standard procedures by third party agencies which are also according to the monitoring plan. The same can be verified from the calibration certificates provided during the UCR verification process.



Main Meter Reading of Generating Mill on 01-Feb-2015

Reading should be taken on 1st of every month at 12 Noon

Name of the Mill : Triveni Engineering & Industries Ltd, Unit-Sabitgarh

Place	Taluka	District	State
Sabitgarh	Khurja	Bulandshahar	UP

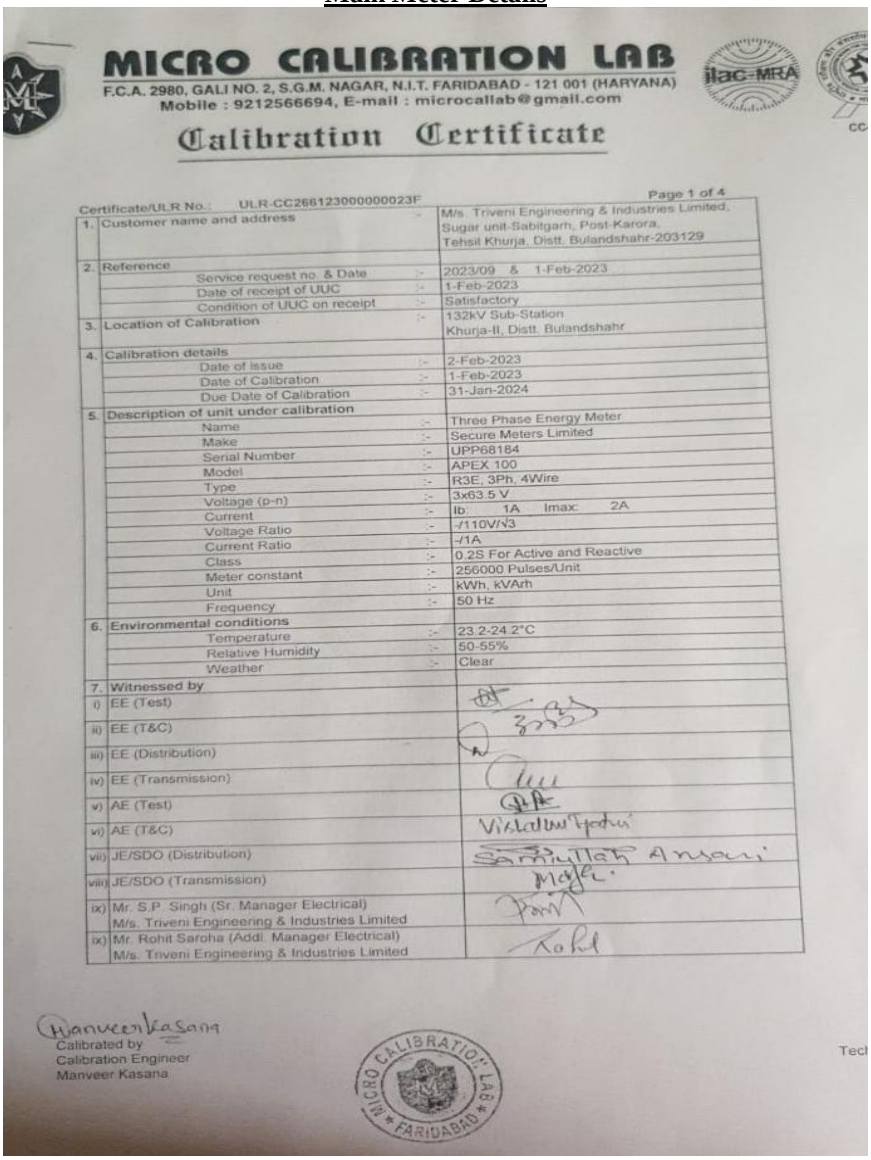
CT Ratio: Available/Connected : 200A/ 1A

PT Ratio: Available/Connected : 33 KV/√3/110V/√3

Scale Factor (MF) : 60000

Billing Meter Make/Number : Secure Meter Ltd./ UPP43255

Main Meter Details



MICRO CALIBRATION LAB

F.C.A. 2980, GALI NO. 2, S.G.M. NAGAR, N.I.T. FARIDABAD - 121 001 (HARYANA)
Mobile : 9212566694, E-mail : microcallab@gmail.com

Calibration Certificate

Page 1 of 4

Certificate/ULR No.: ULR-CC266123000000023F

1.	Customer name and address	:-	M/s. Triveni Engineering & Industries Limited, Sugar unit-Sabitgarh, Post-Karora, Tehsil Khurja, Distt. Bulandshahr-203129
2.	Reference		
	Service request no. & Date	:-	2023/09 & 1-Feb-2023
	Date of receipt of UUC	:-	1-Feb-2023
	Condition of UUC on receipt	:-	Satisfactory
3.	Location of Calibration	:-	132kV Sub-Station Khurja-II, Distt. Bulandshahr
4.	Calibration details		
	Date of issue	:-	2-Feb-2023
	Date of Calibration	:-	1-Feb-2023
	Due Date of Calibration	:-	31-Jan-2024
5.	Description of unit under calibration		
	Name	:-	Three Phase Energy Meter
	Make	:-	Secure Meters Limited
	Serial Number	:-	UPP68184
	Model	:-	APEX 100
	Type	:-	R3E, 3Ph, 4Wire
	Voltage (p-n)	:-	3x63.5 V
	Current	:-	Ib: 1A Imax: 2A
	Voltage Ratio	:-	-/110V/√3
	Current Ratio	:-	-/1A
	Class	:-	0.2S For Active and Reactive
	Meter constant	:-	256000 Pulses/Unit
	Unit	:-	kWh, kVArh
	Frequency	:-	50 Hz
6.	Environmental conditions		
	Temperature	:-	23.2-24.2°C
	Relative Humidity	:-	50-55%
	Weather	:-	Clear
7.	Witnessed by		
i)	EE (Test)		
ii)	EE (T&C)		
iii)	EE (Distribution)		
iv)	EE (Transmission)		
v)	AE (Test)		
vi)	AE (T&C)		
vii)	JE/SDO (Distribution)		
viii)	JE/SDO (Transmission)		
ix)	Mr. S.P. Singh (Sr. Manager Electrical) M/s. Triveni Engineering & Industries Limited		
ix)	Mr. Rohit Saroha (Addl. Manager Electrical) M/s. Triveni Engineering & Industries Limited		

Calibrated by
Calibration Engineer
Manveer Kasana

MICRO CALIBRATION LAB FARIDABAD

Calibration Certificate

MICRO CALIBRATION LAB

F.C.A. 2980, GALI NO. 2, S.G.M. NAGAR, N.I.T. FARIDABAD - 121 001 (HARYANA)
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ilac-MRA

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4.	Calibration details		
	Date of issue	:-	2-Feb-2023
	Date of Calibration	:-	1-Feb-2023
	Due Date of Calibration	:-	31-Jan-2024
5.	Description of unit under calibration		
	Name	:-	Three Phase Energy Meter
	Make	:-	Secure Meters Limited
	Serial Number	:-	UPP43258
	Model	:-	APEX 100
	Type	:-	R3E, 3Ph, 4Wire
	Voltage (p-n)	:-	3x63.5 V
	Current	:-	Ib: 1A Imax: 2A
	Voltage Ratio	:-	-/110V/√3
	Current Ratio	:-	-/1A
	Class	:-	0.2S For Active and Reactive
	Meter constant	:-	128000 Pulses/Unit
	Unit	:-	kWh, kVArh
	Frequency	:-	50 Hz
6.	Environmental conditions		
	Temperature	:-	23.2-24.2°C
	Relative Humidity	:-	50-55%
	Weather	:-	Clear
7.	Witnessed by		
i)	EE (Test)		
ii)	EE (T&C)		
iii)	EE (Distribution)		
iv)	EE (Transmission)		
v)	AE (Test)		
vi)	AE (T&C)		Vishalmi Tripathi
vii)	JE/SDO (Distribution)		Samiullah Ansari
viii)	JE/SDO (Transmission)		
ix)	Mr. S.P. Singh (Sr. Manager Electrical) M/s. Triveni Engineering & Industries Limited		
x)	Mr. Rohit Saroha (Addl. Manager Electrical) M/s. Triveni Engineering & Industries Limited		

Manveer Kasana
Calibrated by
Calibration Engineer
Manveer Kasana

MICRO CALIBRATION LAB * FARIDABAD *

Calibration Certificate

MICRO CALIBRATION LAB

F.C.A. 2980, GALI NO. 2, S.G.M. NAGAR, N.I.T. FARIDABAD - 121 001 (HARYANA)
Mobile : 9212566694, E-mail : microcallab@gmail.com

Calibration Certificate

Certificate/ULR No.: ULR-CC266123000000021F

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2.	Reference		
	Service request no. & Date	:-	2023/09 & 1-Feb-2023
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	Condition of UUC on receipt	:-	Satisfactory
3.	Location of Calibration	:-	132kV Sub-Station Khurja-II, Distt. Bulandshahr
4.	Calibration details		
	Date of issue	:-	2-Feb-2023
	Date of Calibration	:-	1-Feb-2023
	Due Date of Calibration	:-	31-Jan-2024
5.	Description of unit under calibration		
	Name	:-	Three Phase Energy Meter
	Make	:-	Secure Meters Limited
	Serial Number	:-	UPP43257
	Model	:-	APEX 100
	Type	:-	R3E, 3Ph, 4Wire
	Voltage (p-n)	:-	3x63.5 V
	Current	:-	Ib: 1A Imax: 2A
	Voltage Ratio	:-	-/110V/√3
	Current Ratio	:-	-/1A
	Class	:-	0.2S For Active and Reactive
	Meter constant	:-	128000 Pulses/Unit
	Unit	:-	kWh, kVArh
	Frequency	:-	50 Hz
6.	Environmental conditions		
	Temperature	:-	23.2-24.2°C
	Relative Humidity	:-	50-55%
	Weather	:-	Clear
7.	Witnessed by		
i)	EE (Test)		
ii)	EE (T&C)		
iii)	EE (Distribution)		
iv)	EE (Transmission)		
v)	AE (Test)		
vi)	AE (T&C)		Vishalvir Tyagi
vii)	JE/SDO (Distribution)		Samiullah Ansari
viii)	JE/SDO (Transmission)		
ix)	Mr. S.P. Singh (Sr. Manager Electrical) M/s. Triveni Engineering & Industries Limited		
x)	Mr. Rohit Saroha (Addl. Manager Electrical) M/s. Triveni Engineering & Industries Limited		

Manveer Kasana
Calibrated by
Calibration Engineer
Manveer Kasana

MICRO CALIBRATION LAB * FARIDABAD *

Calibration Report

Data/Parameter	**NCV_k**
Data unit	The Net calorific value of the bagasse ("as received" basis) is measured monthly in the internal plant lab and annually by the third party in an accredited lab. The NCV values specified fall in range as per IPCC 2006 Guidelines (1,409,191 to 5,493,456 kCal/Ton). NCVI [Net calorific value of biomass, { MWh/ton }] ranges between 2.56-2.60 MWh/ton.
Description	Net Calorific Value of Biomass Residue Type *K*
Source of data Value(s) applied	Measurements is carried out by reputed labs and reported in dry biomass basis.
Measurement methods and procedures	On site and in labs
Monitoring frequency	Every 6 months
Purpose of data	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. Weighbridge purchase order and installation certificate is provided to the verifier.
Measurement methods and procedures	Monitoring: The quantity of biomass fed into the boiler is controlled. Data type: Measured Responsibility: Boiler Operator
Monitoring frequency	Daily
QA/QC	The amount of biomass used can be cross checked by the purchase orders and stock inventory. Quantity of biomass has been monitored. Biomass measuring device has an accuracy level of +/- 0.5% of full scale, and ranging between 0-120 TPH.

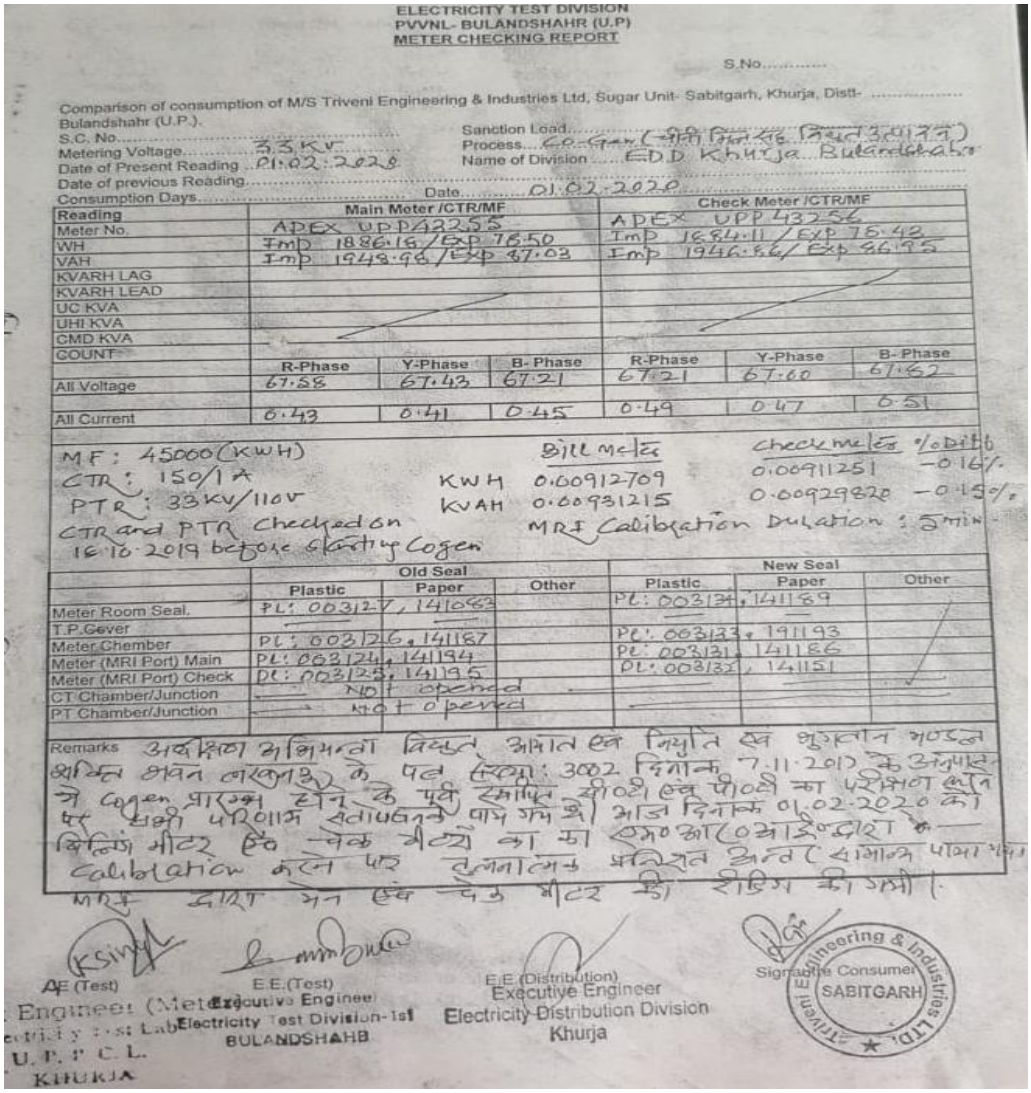
Year	Quantity (MT)
2014	(Oct onwards for Project Emissions) 41942.60
2015	93264.213
2016	126481.50
2017	184232.60
2018	208120.04
2019	207931.04
2020	231688.50
2021	260335.61
2022	249612.52

Data/Parameter	$EG_{project\ plant,\ y}$
Data unit	MWh
Description	Net quantity of electricity generated in the project plant during the year y
Source	TEIL-factory records
Measurement methods and 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 meters attached to each turbine generator to determine their 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 annually by an independent third party
QA/QC	Net electricity production has been calculated by deducting auxiliary consumption from gross generation of the plant. Digital meters calibration procedures are planned. Daily productions details are kept in log books and electronic data base. Energy meters are of class 0.2 with tolerance of 0.5%. All Meters are calibrated by accredited external third party, as per standard procedures, periodically.

Data/Parameter	$EF_{grid,y}$
Data unit	Grid Emission Factor
Description	tCO_2/MW_h
Source of data Value(s) applied	UCR CoU Standard Default for Indian grid 0.9 tCO_2/MW_h for the period 2014-2022
Measurement methods and procedures	NA
Monitoring frequency	NA
QA/QC	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 and procedures	Type: Calculated Data type: Monitored This parameter may be checked with the necessary invoices or JMR (issued by the state grid) each month.
Monitoring frequency	Daily
QA/QC	Energy meters on existing turbines are calibrated on annual basis by NABL accredited labs. Electricity generation in these units are recorded and kept in log books for verification purpose. Energy meters are of class 0.2 with tolerance of 0.5%. All Meters are calibrated by accredited external third party, as per standard procedures, periodically
Purpose of data	To estimate baseline emissions



ELECTRICITY TEST DIVISION
PVVNL- BULANDSHAHR (U.P)
METER CHECKING REPORT

S.No.....

Comparison of consumption of M/S Triveni Engineering & Industries Ltd, Sugar Unit- Sabitgarh, Khurja, Distt- ..... Bulandshahr (U.P.).
S.C. No..... Sanction Load.....
Metering Voltage..... 33 KV Process..... Co-Gen (चीनी मिल से वितरण 33 KV)
Date of Present Reading ..01.02.2020 Name of Division ..... EDD Khurja Bulandshahr
Date of previous Reading.....
Consumption Days..... Date..... 01.02.2020

Reading	Main Meter /CTR/MF			Check Meter /CTR/MF		
Meter No.	APEX UPP43255			APEX UPP43256		
WH	Imp 1886.16/Exp 76.50			Imp 1684.11/Exp 75.42		
VAH	Imp 1948.96/Exp 87.03			Imp 1946.56/Exp 96.95		
KVARH LAG						
KVARH LEAD						
UC KVA						
UHI KVA						
CMD KVA						
COUNT						
	R-Phase	Y-Phase	B-Phase	R-Phase	Y-Phase	B-Phase
All Voltage	67.58	67.43	67.21	67.21	67.60	67.62
All Current	0.43	0.41	0.45	0.49	0.47	0.51

MF: 45000 (KWH)
CTR: 150/1A
PTR: 33KV/110V
CTR and PTR Checked on 16.10.2019 before starting Cogen

	Bill Meter	Check Meter	% Diff.
KWH	0.00912709	0.00911251	-0.16%
KVAH	0.00931215	0.00929820	-0.15%

MRI Calibration Duration : 5 min

	Old Seal			New Seal		
	Plastic	Paper	Other	Plastic	Paper	Other
Meter Room Seal.	PL: 003127, 141063			PL: 003134, 141189		
T.P.Cover						
Meter Chember	PL: 003126, 141187			PL: 003133, 141193		
Meter (MRI Port) Main	PL: 003124, 141194			PL: 003131, 141186		
Meter (MRI Port) Check	PL: 003125, 141195			PL: 003132, 141151		
CT Chamber/Junction	Not opened					
PT Chamber/Junction	Not opened					

Remarks अधिशासी अभियन्ता विद्युत आपूर्ति एवं नियुक्ति एवं मुख्यालय मण्डल अधिष्ठान लखनऊ के पत्र संख्या: 3002 दिनांक 7.11.2017 के अनुपालन में Cogen प्रारम्भ होने के पूर्व समस्त सी०टी० एवं पी०टी० का परीक्षण कराते हुए उसी परिणाम बताये गये थे। आज दिनांक 01.02.2020 को मिलिंग मीटर एवं चेक मीटरों का का एम०आर०आई० द्वारा Calibration करने पर तुलनात्मक प्रस्तुत अन्तर (दोनों पक्षों) MRI द्वारा मेन एवं चेक मीटर की रीडिंग की गयी।

AE (Test) Engineer (Meter) Electricity Test Lab U.P.P.C.L. KHURJA
E.E.(Test) Executive Engineer Electricity Test Division-1st BULANDSHAHR
E.E (Distribution) Executive Engineer Electricity Distribution Division Khurja
Signature Consumer Triveni Engineering & Industries LTD. SABITGARH

Main and Check Meter Test Report