Verification Report for

Project : Chilwaria Biomass Grid Supply Power Project, Bahraich, Uttar Pradesh

UCR Project ID : 266

Name of Verifier	SQAC Certification Pvt. Ltd.
Date of Issue	March 21, 2023
Project Proponent	M/s Simbhaoli Sugars Limited (SSL)
UCR Project Aggregator	M/s Gram Vikas Trust
Work carried by	Mr. Santosh Nair
Work reviewed by	Mr. Praful Shinganapurkar

Summary:

SQAC Certification Pvt. Ltd. has performed verification of the "Chilwaria Biomass Grid Supply Power Project, Bahraich, Uttar Pradesh, India". The project activity involves the renewable biomass (bagasse) based electricity generation within the Chilwaria Sugar Mills Ltd (CSML), which is a unit of Simbhaoli Sugars Mills Ltd. The purpose of the project activity is to generate electricity using renewable biomass with grid supply and thereby reducing GHG emissions by displacing fossil fuel dominated grid based electricity with biomass based renewable electricity.

Verification for the period**: 01/01/2013 to 31/12/2021**

The GHG emission reductions were calculated on the basis of UCR Protocols which draws reference from, UCR Standard for Baseline Grid Emission Factor, CDM UNFCCC Methodology, ACM0006: Grid connected renewable electricity generation (Ver.16.0). Owing to the Covid pandemic, the verification was done remotely by way of video calls / verification, phone calls and submission of documents for verification through emails.

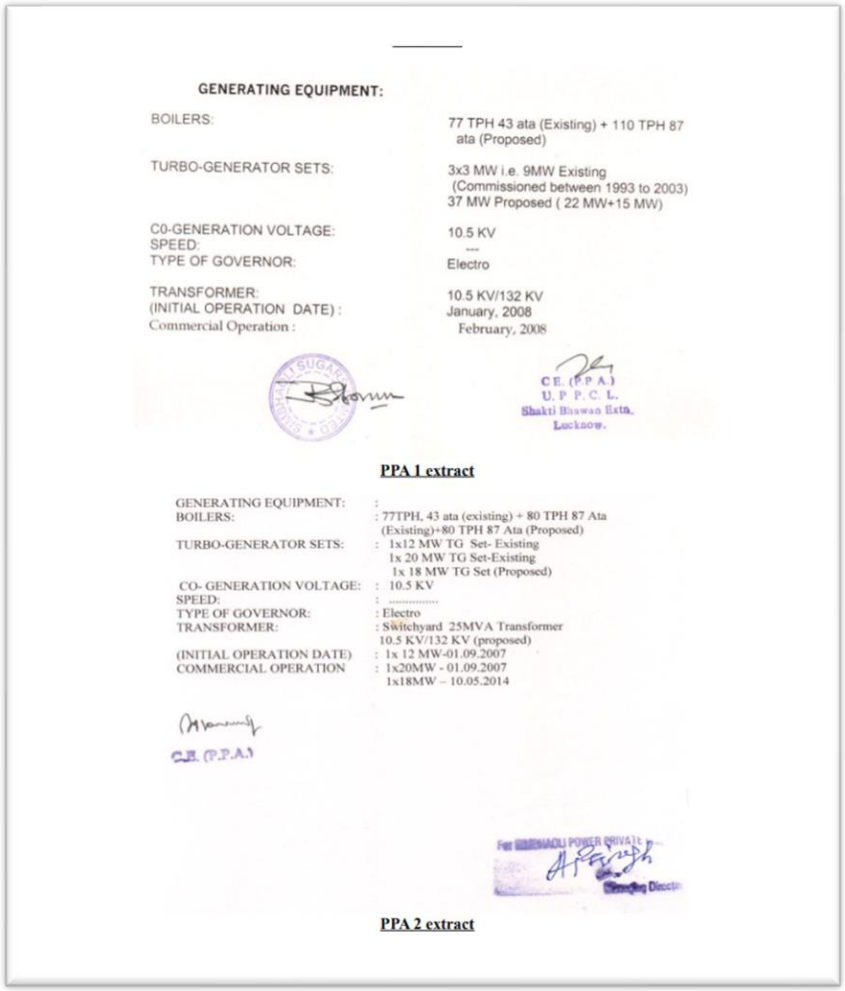
SQAC is able to certify that the emission reductions from Chilwaria Biomass Grid Supply Power Project, Bahraich, Uttar Pradesh, India, (UCR ID – 266) for the period **01/01/2013 to 31/12/2021** amounts to **3,19,139 tCO2 (3,19,139 CoUs)**

Detailed Verification Report:

Purpose:

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 by-product 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.

Renewable biomass power and steam generated from the cogeneration unit is supplied to the sugar plant for captive use, with the surplus power being exported to the UP-state grid (132 KV Grid Substation Bahraich) under a long term PPAs (1 & 2 as in Annex I) at the published rate for bagasse cogeneration.



GENERATING EQUIPMENT:

BOILERS:	77 TPH 43 ata (Existing) + 110 TPH 87 ata (Proposed)
TURBO-GENERATOR SETS:	3x3 MW i.e. 9MW Existing (Commissioned between 1993 to 2003) 37 MW Proposed (22 MW+15 MW)
C0-GENERATION VOLTAGE:	10.5 KV
SPEED:	---
TYPE OF GOVERNOR:	Electro
TRANSFORMER:	10.5 KV/132 KV
(INITIAL OPERATION DATE) :	January, 2008
Commercial Operation :	February, 2008

C.E. (P.P.A.)
U. P. P. C. L.
Shakti Bhawan Extn.
Lucknow.

PPA 1 extract

GENERATING EQUIPMENT:	
BOILERS:	: 77TPH, 43 ata (existing) + 80 TPH 87 Ata (Existing)+80 TPH 87 Ata (Proposed)
TURBO-GENERATOR SETS:	: 1x12 MW TG Set- Existing 1x 20 MW TG Set-Existing 1x 18 MW TG Set (Proposed)
CO- GENERATION VOLTAGE:	: 10.5 KV
SPEED:	: .....
TYPE OF GOVERNOR:	: Electro
TRANSFORMER:	: Switchyard 25MVA Transformer 10.5 KV/132 KV (proposed)
(INITIAL OPERATION DATE)	: 1x 12 MW-01.09.2007
COMMERCIAL OPERATION	: 1x20MW - 01.09.2007 1x18MW – 10.05.2014

C.E. (P.P.A.)

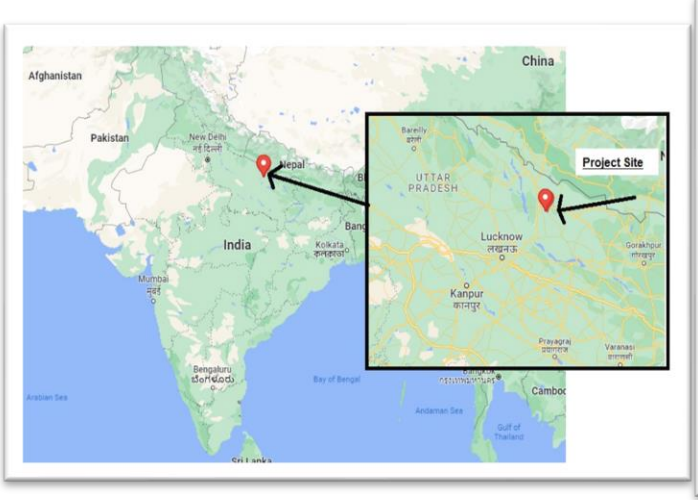
PPA 2 extract

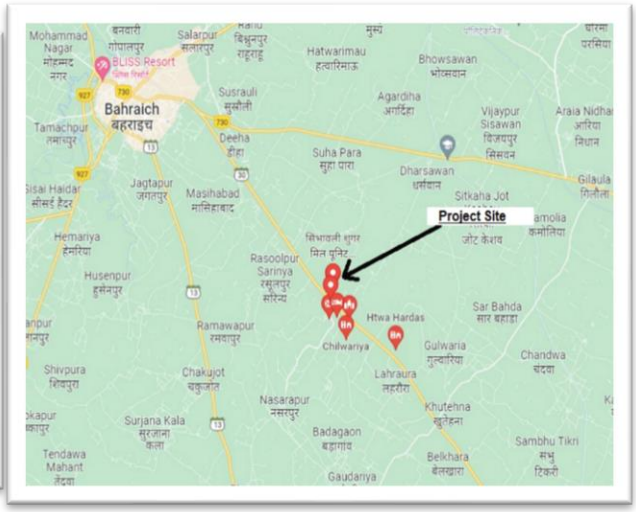
The UCR project activity currently involves two biomass boilers of 80 TPH each (one dumping grate and one retrofitted with a traveling grate), a bleed and back-pressure turbine with rated capacity of 20 MW, a condensing extraction and bleed-type steam turbine-driven generator set with a rated capacity of 18 MW and an old 12MW turbine that operated till June 2013 within the project boundary.

The total installed capacity during the first monitoring period (this report) is 50MW for the period 2013-2021. The start date of the UCR project activity is the date of commercial power supply to the state grid on 01/02/2008

Location of project activity:

Block:	Chilwaria
Road:	Gonda Road,
District:	Bahraich,
State:	Uttar Pradesh,
Country	India
Latitude:	27° 30' 40.644'' N
Longitude:	81° 41' 11.94'' E





Scope:

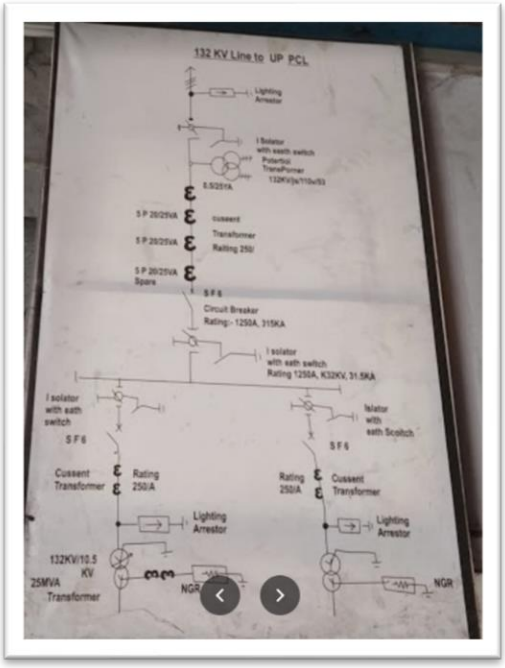
The scope covers verification of emission reductions from the project - Chilwaria Biomass Grid Supply Power Project, Bahraich, Uttar Pradesh, India, (UCR ID – 266).

Criteria:
Verification criteria is as per the requirements of UCR Standard.

Description of project:

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.

The project activity has been able to operate throughout the year and export renewable power to the Uttar Pradesh Power Corporation Limited (UPPCL) grid. The export of electricity hence reduces GHG emissions by replacing the fossil fuel dominated grid-based electricity with a renewable source of electricity. The high-pressure boilers are fired by bagasse, a byproduct from the sugar manufacturing process to generate steam, which in turn powers all the steam turbines to generate electricity. The power generated from the turbines is utilized for captive consumption and the surplus power is exported to the grid. Power is generated both in the sugar season and off-season at 11 kV and stepped-up on-site to 132 kV before being transmitted to the nearby UPPCL substation located at Bahraich.



The high-pressure boilers are fired by bagasse, a by-product 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.

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 UPPCL sub-station located at Simbhaoli.

Boiler Details		
Date of Commissioning	2006	2008
Capacity (TPH)	80	80
Output Temp (^{0}C)	510	510
Output Pressure (kg/cm^2)	87	87
Feed Water Temp (^{0}C)	110	110

Turbine Details			
Date of Commissioning	2007	2008	2014
Capacity (MW)	12	20	18
Inlet Steam Temp (^{0}C)	410	510	510
Inlet Steam Pressure (kg/cm^2)	45	87	87

Level of Assurance:

The verification report is based on the information collected through interviews conducted over video calls / phone calls, supporting documents provided during the verification, Project Concept Note (PCN) / Monitoring Report (MR), submitted to SQAC. The verification opinion is assured provided the credibility of all the above.

Verification Methodology:

Review of the following documentation was done by SQAC Verifier, Mr. Santosh Nair, who is experienced in such projects.

Documentation Verified:

- Project Concept Note (PCN)
- Monitoring Report (MR)
- JMR's

- Calibration Certificates
- Instrumentation calibration test report
- Data provided upon request of all the documents of the related projects.
- Breakdown reports

Sampling:

Not applicable

Person interviewed:

1. Mr. Rajesh Kumar Shrivastav - D.G.M. : M/s. Chilwaria Sugar Mills Ltd (CSML)
2. Mr. Prabhakar Pandey - Manager : M/s. Chilwaria Sugar Mills Ltd (CSML)
3. Mr. Sujit Kumar Roy - Manager : M/s. Chilwaria Sugar Mills Ltd (CSML)

Corrective Action Requests (CARs)

Corrective Action Requests (CARs) and their resolutions are listed below

CAR 1:

In the ER calculations, MWh of 2013 is wrongly fetched (data of biomass has been put in there)

Response from Project Participant

The correction has been made in the ER sheet and accordingly Monitoring Report (V01) has been released after incorporating the related corrections.

Conclusion by Verification Team

Verified Monitoring Report (V01) for correction and found to be matching as per requirement. Hence Corrective Action Request CAR-1 is closed.

CAR 2:

In the ER calculations, the power used for captive consumption has also been taken into consideration while calculating the quantity of electricity exported to grid.

Response from Project Participant

The correction has been made in the Monitoring Report (V01) as it was done by oversight. The wrong column was selected in the ER sheet.

Conclusion by Verification Team

Verified Monitoring Report (V01) for correction and found to be matching as per requirement. Hence Corrective Action Request CAR-2 is closed.

CAR 3:

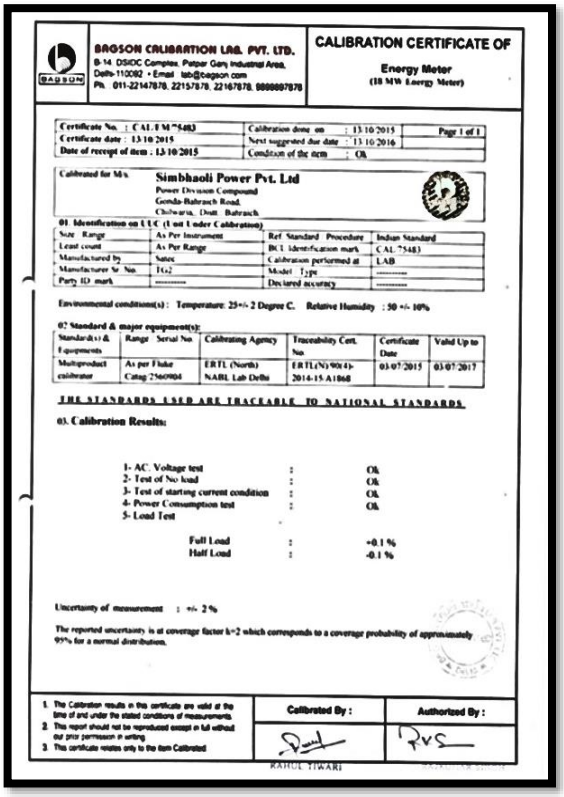
KWH Exported to grid as per JMR/Invoice for the Month of Feb 2021 is 50,40,737 KWH ; however in the ER calculations, it has been taken as 76,38,362 KWH.

Response from Project Participant

The correction has been made in the Monitoring Report (V02) as it was done due to paste error.

Conclusion by Verification Team

Verified Monitoring Report (V02) for correction and found to be matching as per requirement. Hence Corrective Action Request CAR-3 is closed.



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CALIBRATION CERTIFICATE OF
Energy Meter
(10 MW Energy Meter)

Certificate No. : CAL/EM/5483	Calibration done on : 13/10/2015	Page 1 of 1
Certificate date : 13/10/2015	Next suggested due date : 13/10/2016	
Date of receipt of item : 13/10/2015	Condition of the item : Ok	

Calibrated for M/s. **Simbhaoli Power Pvt. Ltd**
Power Division Compound
Gonda-Bahraich Road,
Chilwaria, Distt. Bahraich

01. Identification on UUC (Unit Under Calibration)

Size, Range	As Per Instrument	Ref. Standard Procedure	Indian Standard
Least count	As Per Range	BCL Identification mark	CAL/5483
Manufactured by	Satec	Calibration performed at	LAB
Manufacturer Sr. No.	TG2	Model Type	----------
Party ID mark	----------	Declared accuracy	----------

Environmental conditions(s) : Temperature: 25+/- 2 Degree C. Relative Humidity : 50 +/- 10%

02 Standard & major equipment(s):

Standard(s) & Equipments	Range, Serial No.	Calibrating Agency	Traceability Cert. No.	Certificate Date	Valid Up to
Multiproduct calibrator	As per Fluke Catag 2560904	ERTL (North) NABL Lab Delhi	ERTL(N)/90(4)-2014-15-A1068	03/07/2015	03/07/2017

THE STANDARDS USED ARE TRACEABLE TO NATIONAL STANDARDS

03. Calibration Results:

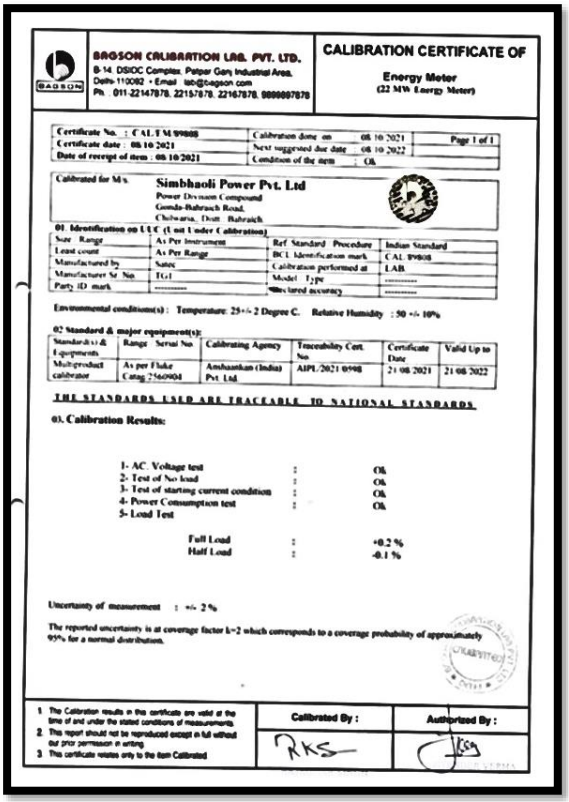
1- AC Voltage test	:	Ok
2- Test of No load	:	Ok
3- Test of starting current condition	:	Ok
4- Power Consumption test	:	Ok
5- Load Test		
Full Load	:	+0.1 %
Half Load	:	-0.1 %

Uncertainty of measurement : +/- 2 %

The reported uncertainty is at coverage factor k=2 which corresponds to a coverage probability of approximately 95% for a normal distribution.

1. The Calibration results in this certificate are valid at the time of and under the stated conditions of measurements.
2. This report should not be reproduced except in full without our prior permission in writing.
3. This certificate relates only to the item Calibrated.

Calibrated By : RAHUL TIWARI
Authorized By :



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CALIBRATION CERTIFICATE OF
Energy Meter
(22 MW Energy Meter)

Certificate No. : CAL/EM/9908	Calibration done on : 08/10/2021	Page 1 of 1
Certificate date : 08/10/2021	Next suggested due date : 08/10/2022	
Date of receipt of item : 08/10/2021	Condition of the item : Ok	

Calibrated for M/s. **Simbhaoli Power Pvt. Ltd**
Power Division Compound
Gonda-Bahraich Road,
Chilwaria, Distt. Bahraich

01. Identification on UUC (Unit Under Calibration)

Size, Range	As Per Instrument	Ref. Standard Procedure	Indian Standard
Least count	As Per Range	BCL Identification mark	CAL/9908
Manufactured by	Satec	Calibration performed at	LAB
Manufacturer Sr. No.	TG1	Model Type	----------
Party ID mark	----------	Declared accuracy	----------

Environmental conditions(s) : Temperature: 25+/- 2 Degree C. Relative Humidity : 50 +/- 10%

02 Standard & major equipment(s):

Standard(s) & Equipments	Range, Serial No.	Calibrating Agency	Traceability Cert. No.	Certificate Date	Valid Up to
Multiproduct calibrator	As per Fluke Catag 2560904	Amhaantkan (India) Pvt. Ltd.	AIPL/2021/0598	21/08/2021	21/08/2022

THE STANDARDS USED ARE TRACEABLE TO NATIONAL STANDARDS

03. Calibration Results:

1- AC Voltage test	:	Ok
2- Test of No load	:	Ok
3- Test of starting current condition	:	Ok
4- Power Consumption test	:	Ok
5- Load Test		
Full Load	:	+0.2 %
Half Load	:	-0.1 %

Uncertainty of measurement : +/- 2 %

The reported uncertainty is at coverage factor k=2 which corresponds to a coverage probability of approximately 95% for a normal distribution.

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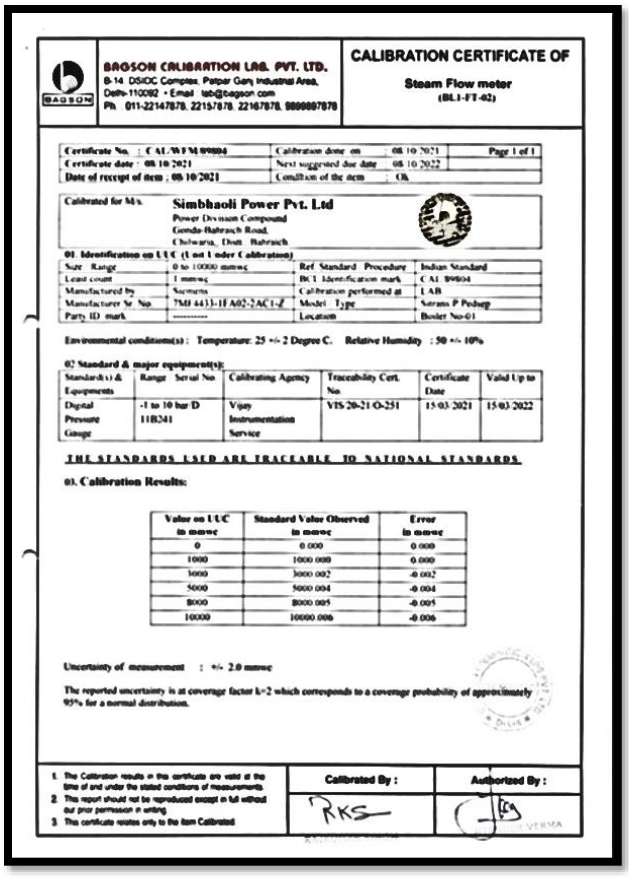
Calibrated By : RKS
Authorized By :



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CALIBRATION CERTIFICATE OF
Steam Flow meter
(BL1-FT-02)

Certificate No. : CAL/WFM/09804	Calibration done on : 08/10/2021	Page 1 of 1
Certificate date : 08/10/2021	Next suggested due date : 08/10/2022	
Date of receipt of item : 08/10/2021	Condition of the item : Ok	

Calibrated for M/s. **Simbhaoli Power Pvt. Ltd**
Power Division Compound
Gonda-Bahraich Road,
Chilwaria, Distt. Bahraich

01. Identification on UUC (Unit Under Calibration)

Size / Range	0 to 10000 mmwc	Ref. Standard / Procedure	Indian Standard
Least count	1 mmwc	BCL Identification mark	CAL/09804
Manufactured by	Surmeta	Calibration performed at	LAB
Manufacturer Sr. No.	7MI4433-1EA02-2AC1-Z	Model / Type	Sstrans P Pedsgp
Party ID mark	----------	Location	Boiler No-01

Environmental conditions(s) : Temperature: 25 +/- 2 Degree C. Relative Humidity : 50 +/- 10%

02 Standard & major equipment(s):

Standard(s) & Equipments	Range / Serial No.	Calibrating Agency	Traceability Cert. No.	Certificate Date	Valid Up to
Digital Pressure Gauge	-1 to 10 bar D 11B241	Vijay Instrumentation Service	VIS/20-21/O-251	15/03/2021	15/03/2022

THE STANDARDS USED ARE TRACEABLE TO NATIONAL STANDARDS

03. Calibration Results:

Value on UUC in mmwc	Standard Value Observed in mmwc	Error in mmwc
0	0.000	0.000
1000	1000.000	0.000
3000	3000.002	-0.002
5000	5000.004	-0.004
8000	8000.005	-0.005
10000	10000.006	-0.006

Uncertainty of measurement : +/- 2.0 mmwc

The reported uncertainty is at coverage factor k=2 which corresponds to a coverage probability of approximately 95% for a normal distribution.

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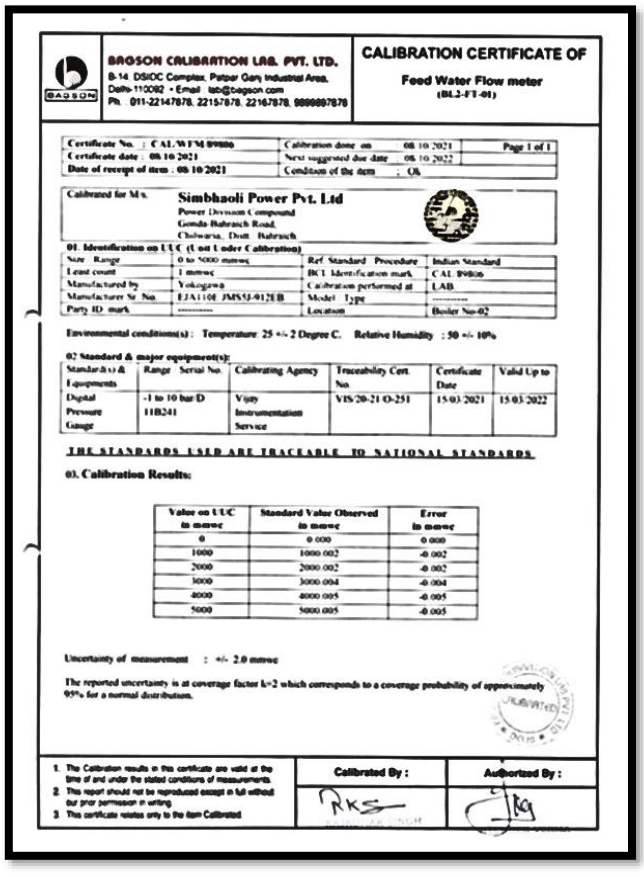
Calibrated By :	Authorized By :
RKS	



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CALIBRATION CERTIFICATE OF
Feed Water Flow meter
(BL2-FT-01)

Certificate No. : CAL/WFM/09806	Calibration done on : 08/10/2021	Page 1 of 1
Certificate date : 08/10/2021	Next suggested due date : 08/10/2022	
Date of receipt of item : 08/10/2021	Condition of the item : Ok	

Calibrated for M/s. **Simbhaoli Power Pvt. Ltd**
Power Division Compound
Gonda-Bahraich Road,
Chilwaria, Distt. Bahraich

01. Identification on UUC (Unit Under Calibration)

Size / Range	0 to 5000 mmwc	Ref. Standard / Procedure	Indian Standard
Least count	1 mmwc	BCL Identification mark	CAL/09806
Manufactured by	Yokogawa	Calibration performed at	LAB
Manufacturer Sr. No.	EJA110E-JMS5J-912EB	Model / Type	----------
Party ID mark	----------	Location	Boiler No-02

Environmental conditions(s) : Temperature: 25 +/- 2 Degree C. Relative Humidity : 50 +/- 10%

02 Standard & major equipment(s):

Standard(s) & Equipments	Range / Serial No.	Calibrating Agency	Traceability Cert. No.	Certificate Date	Valid Up to
Digital Pressure Gauge	-1 to 10 bar D 11B241	Vijay Instrumentation Service	VIS/20-21/O-251	15/03/2021	15/03/2022

THE STANDARDS USED ARE TRACEABLE TO NATIONAL STANDARDS

03. Calibration Results:

Value on UUC in mmwc	Standard Value Observed in mmwc	Error in mmwc
0	0.000	0.000
1000	1000.002	-0.002
2000	2000.002	-0.002
3000	3000.004	-0.004
4000	4000.005	-0.005
5000	5000.005	-0.005

Uncertainty of measurement : +/- 2.0 mmwc

The reported uncertainty is at coverage factor k=2 which corresponds to a coverage probability of approximately 95% for a normal distribution.

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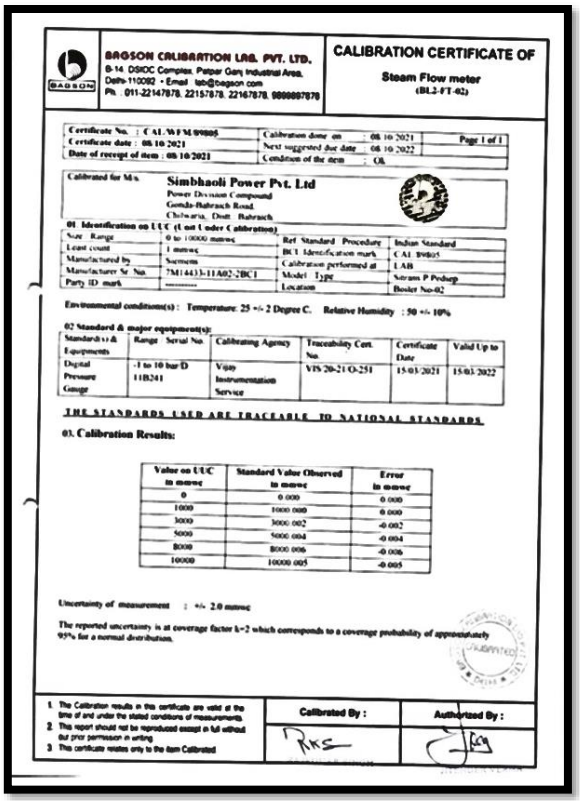
RKS	



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CALIBRATION CERTIFICATE OF
Steam Flow meter
(BL2-FT-02)

Certificate No. : CAL/WFM/09805	Calibration done on : 08/10/2021	Page 1 of 1
Certificate date : 08/10/2021	Next suggested due date : 08/10/2022	
Date of receipt of item : 08/10/2021	Condition of the item : Ok	

Calibrated for M/s. **Simbhaoli Power Pvt. Ltd**
Power Division Compound
Gonda-Bahraich Road,
Chilwaria, Distt. Bahraich

01. Identification on UUC (Unit Under Calibration)

Size / Range	0 to 10000 mmwc	Ref. Standard / Procedure	Indian Standard
Least count	1 mmwc	BCL Identification mark	CAL/09805
Manufactured by	Surmeta	Calibration performed at	LAB
Manufacturer Sr. No.	7MI4433-1EA02-2BC1	Model / Type	Sstrans P Pedsgp
Party ID mark	----------	Location	Boiler No-02

Environmental conditions(s) : Temperature: 25 +/- 2 Degree C. Relative Humidity : 50 +/- 10%

02 Standard & major equipment(s):

Standard(s) & Equipments	Range / Serial No.	Calibrating Agency	Traceability Cert. No.	Certificate Date	Valid Up to
Digital Pressure Gauge	-1 to 10 bar D 11B241	Vijay Instrumentation Service	VIS/20-21/O-251	15/03/2021	15/03/2022

THE STANDARDS USED ARE TRACEABLE TO NATIONAL STANDARDS

03. Calibration Results:

Value on UUC in mmwc	Standard Value Observed in mmwc	Error in mmwc
0	0.000	0.000
1000	1000.000	0.000
3000	3000.002	-0.002
5000	5000.004	-0.004
8000	8000.006	-0.006
10000	10000.005	-0.005

Uncertainty of measurement : +/- 2.0 mmwc

The reported uncertainty is at coverage factor k=2 which corresponds to a coverage probability of approximately 95% for a normal distribution.

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Calibrated By :	Authorized By :
RKS	

Applied methodologies and standardized baselines:

UCR Protocol Standard Baseline

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

TYPE I - Renewable Energy Projects (Large Scale)
UCR Positive List Environmental Additionality

SCALE – Large Scale

CATEGORY- ***ACM0006 Large-scale Consolidated Methodology***
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 is used to determine the baseline grid emission factor for the 2013-2021 period.

Application of methodologies and standardized baselines

- The project activity is a power generation project using a biomass (bagasse) and displaces CO_2 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 a power-and-heat plant that encompasses cogeneration plants, i.e., 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 50MW which is acceptable as per the applied large scale 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.

- 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 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 turbogenerators are fired by bagasse, a by-product 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.

Applicability of double counting emission reductions

The biomass boiler and condensing turbo-generator unit have unique IDs, which are visible on the

unit. The calibration of Meters & Metering for electricity exported to the grid is implemented according to national standards and rules (details provided in Section B.8.). All the records are documented and maintained by the project proponent. The details of the same are provided to the UCR verifier during the verification process.

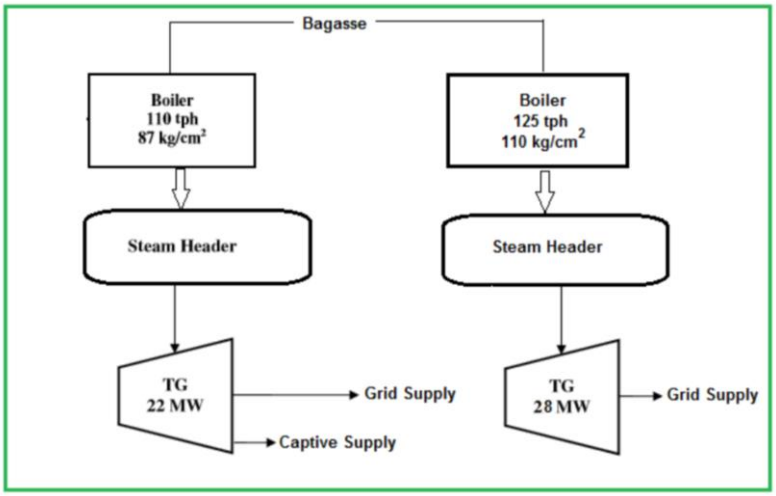
The biomass boilers and turbines are constructed by the project proponent within the project boundary. The biomass boilers, turbines and meters have unique IDs, which is visible on the units. This UCR project activity has never been issued voluntary carbon credits for the current 2013-2021 vintage years and there is no double counting of the credits. Additionally, the same has been stated in the undertaking provided in the Double Counting Avoidance Assurance Document (DAA) by Simbhaoli Sugars Mills Ltd.

Agreement for Double Counting Avoidance from Proponent has been provided duly signed on 03/03/2023

Project boundary, sources and greenhouse gases (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.



Leakage Emissions (LE_y)

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

Hence $LE_y = 0$

	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 On-site fossil fuel and electricity consumption due to the project activity (stationary or mobile) Off-site transportation of biomass residue Combustion of biomass residue for electricity and / or heat generation Storage of biomass residue	CO_2	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. Excluded for simplification. This is conservative
		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. Excluded for simplification. This is conservative.
		N_2O	Excluded	Excluded for simplification. This is conservative.

Project Emissions (PE_y)

The project emissions (PE_y) under the methodology may include:
CO_2 emissions from transportation of 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,
$PEFF_{CO2,\ y}$ = 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 off-site transportation of biomass, or from 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,
PET_y = 0,
$PEFF_{CO2,y}$ = 0,
$PE_{EC,\ y}$ = 0 and,
$PE_{\ Biomass,CH4,y}$ = 0.
Therefore, **PE_y** = 0.

Establishment and description of baseline scenario (UCR Protocol)

The baseline scenario identified 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 (ERy)

$\mathbf{ER_y = BE_y - (PE_y + LE_y)}$

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

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

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

Where:

$\mathbf{EG_{grid,y}}$ = 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)

$\mathbf{EF_{grid,y}}$ = The CO_2 emission factor for grid connected power generation in year y calculated using UCR Standard emission factor (0.9 tCO_2/MWh).

$\mathbf{PE_y}$ = Project activity emissions = 0

$\mathbf{LE_y}$ = Leakage emissions = 0

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.

Month	Quantity of biomass (Tonnes)					Net quantity of electricity generated (Mwh)					KWH Exported to grid as per JMR/Invoice	
	20 MW Plant	18 MW Plant	12 MW Plant			20 MW Plant	18 MW Plant	12 MW Plant				
Jan-13	35080.07		17837.56	52917.63		12594.32		6621.06	19215.38			
Feb-13	29537.19		13316.62	42853.81		10604.33		4942.95	15547.28			
Mar-13	31424.00		17224.19	48648.18		11281.73		6393.39	17675.12			
Apr-13	29426.82		10255.16	39681.98		10564.71		3806.58	14371.29			
May-13			8881.77	8881.77				3296.79	3296.79			
Jun-13			854.97	854.97				317.35	317.35			
Nov-13	30989.31			30989.31		11125.67			11125.67			
Dec-13	34623.60			34623.60	259451.25	12430.44			12430.44	93979.32	4611600	4611.6
Jan-14	33147.15			33147.15		11900.37			11900.37		11201040	
Feb-14	26476.73			26476.73		9505.58			9505.58		9718080	
Mar-14	30237.73			30237.73		10855.84			10855.84		9391920	
Apr-14	28272.94			28272.94		10150.45			10150.45		5918400	
May-14				0.00					0.00		10113840	
Jun-14				0.00					0.00		6291840	
Nov-14	10738.31	1213.01		11951.33		3855.23	483.00		4338.23			
Dec-14	13215.11	21398.25		34613.36	164699.24	4744.44	8520.40		13264.84	60015.31	8812560	61447.68
Jan-15				0.00					0.00		14579520	
Feb-15				0.00					0.00		12189120	
Mar-15				0.00					0.00		13725840	
Apr-15	2057.11	13034.49		15091.60		738.54	5190.10		5928.63		4808880	
Nov-15	851.22			851.22		305.60			305.60			
Dec-15	23256.43	18699.88		41956.32	57899.14	8349.44	7445.95		15795.39	22029.63	9456000	54759.36
Jan-16	23597.53	22703.71		46301.24		8471.90	9040.21		17512.11		11065680	
Feb-16	19880.80	26776.65		46657.45		7137.53	10661.98		17799.51		12045360	
Mar-16		24379.11		24379.11			9707.32		9707.32		8274480	
Nov-16	5828.41	11090.13		16918.54		2092.49	4415.89		6508.38		3910560	
Dec-16	18071.89	24031.62		42103.51	176359.84	6488.11	9568.95		16057.06	67584.37	10673040	45969.12
Jan-17	8156.71	20640.48		28797.19		2928.39	8218.66		11147.06		6349920	
Feb-17	1215.52	12955.54		14171.06		436.39	5158.66		5595.05		3626640	
Nov-17	2209.42	4210.62		6420.04		793.22	1676.59		2469.81		1386000	
Dec-17	20838.46	21281.03		42119.49	91507.78	7481.35	8473.72		15955.07	35166.99	10529520	21892.08
Jan-18	19624.09	29335.82		48959.91		7045.37	11680.99		18726.36		12484320	
Feb-18	19168.99	24262.23		43431.21		6881.98	9660.78		16542.76		11006640	
Mar-18	9198.44	27316.80		36515.24		3302.39	10877.05		14179.44		9864480	
Apr-18				0.00					0.00		5343360	
May-18				0.00					0.00		7504080	
Jun-18				0.00					0.00		3286800	
Nov-18		3571.44		3571.44			1422.08		1422.08		1089840	
Dec-18	20755.18	32638.79		53393.97	185871.77	7451.45	12996.17		20447.62	71318.27	14437440	65016.96
Jan-19	25258.32	32117.57		57375.89		9068.15	12788.63		21856.78		15603360	
Feb-19	17880.49	29176.01		47056.50		6419.39	11617.36		18036.75		12981360	
Mar-19	11289.04	30082.65		41371.69		4052.95	11978.37		16031.32		10594080	
Apr-19	4350.61	14745.30		19095.91		1561.94	5871.31		7433.25		5264400	
May-19		25320.32		25320.32			10082.09		10082.09		8437440	
Jun-19		2763.33		2763.33			1100.31		1100.31			
Nov-19	1874.87			1874.87		673.11			673.11			
Dec-19	16887.50	19336.72		36224.22	231082.73	6062.89	7699.53		13762.42	88976.02		52880.64
Jan-20	10460.55	18985.84		29446.39		3755.51	7559.82		11315.33		6424800	
Feb-20		30601.52		30601.52			12184.97		12184.97		7226880	
Mar-20		16097.69		16097.69			6409.81		6409.81		3960720	
Apr-20		10418.88		10418.88			4148.61		4148.61		3423600	
Nov-20	2491.47			2491.47		894.48			894.48		346450	
Dec-20	22938.81	12625.20		35564.02	124619.97	8235.41	5027.13		13262.54	48215.73	7846725	29229.175
Jan-21	23225.32	7481.96		30707.28		8338.27	2979.18		11317.45		6118637	
Feb-21	15291.45	9474.89		24766.34		5489.88	3772.73		9262.61		5040738	
Nov-21	1967.04			1967.04		706.20			706.20			
Dec-21	22409.73	12611.98		35021.71	92462.37	8045.46	5021.86		13067.32	34353.58	7638362	18797.737
											354604352	**354604.35**

Emission Reductions (ERy) for the period

Year	2013	2014	2015	2016	2017	2018	2019	2020	2021	**Total**
MWh exported	4612	61448	54759	45969	21892	65017	52881	29229	18798	354604
ER y (tCO2eq)	4150	55302	49283	41372	19702	58515	47592	26306	16917	**319139**

Total emission reductions (ER_y) = 3,19,139 tCO_2eq (3,19,139 CoUs)

Conclusions:

Based on the audit conducted on the basis of UCR Protocol, which draws reference from UCR Standard for Baseline Grid Emission Factor, CDM UNFCCC Methodology ACM0006: Grid connected renewable electricity generation (Ver.16.0), the documents submitted during the verification including the Data, Project Concept Note (PCN) / Monitoring Report (MR), SQAC is able to certify that the emission reductions from the project - Chilwaria Biomass Grid Supply Power Project, Bahraich, Uttar Pradesh, India (UCR ID – 266) for the period **01/01/2013 to 31/12/2021** amounts to
3,19,139 tCO_2eq (3,19,139 CoUs)

SQAC Certification Pvt. Ltd. Mapusa-Goa

Santosh Nair
Lead Verifier (Signature)

Praful Shinganapurkar
Senior Internal Reviewer (Signature)

Date: 21/03/2023