

Verification Report for

Project : Renewable Biomass Based Thermal Energy Generation By SIIPL, Manjri, Pune, Maharashtra.

UCR Project ID : 279

| Name of Verifier | SQAC Certification Pvt. Ltd. | | | | | |
|------------------------|---------------------------------------------------------------------|--|--|--|--|--|
| Date of Issue | March 16, 2023 | | | | | |
| Project Proponent | M/s Serum Institute of India Pvt Ltd. (SIIPL), Pune, Maharashtra | | | | | |
| UCR Project Aggregator | Egis India Consulting Engineers Pvt Ltd. | | | | | |
| Work carried by | Mr. Santosh Nair & Ms. Sheetal Wader | | | | | |
| Work reviewed by | Mr. Praful Shinganapurkar | | | | | |

Summary:

SQAC Certification Pvt. Ltd. has performed verification of the "Renewable Biomass Based Thermal Energy Generation by SIIPL, Manjri, Pune, Maharashtra, India". The project activity is thermal energy generation using a biomass (bagasse and crop residues i.e., soya bean waste & groundnut shell) based boiler that displaces equivalent amount of thermal energy that would have been generated by a fossil fuel based boiler. Since the project activity utilises biomass for the generation of thermal energy by displacing fossil fuel (coal), it meets the primary applicability criteria of the methodology.

The project activity meets the following UN SDG's:



Verification for the period: **01/12/2018 to 31/12/2022**

The GHG emission reductions were calculated on the basis of UCR Protocols which draws reference from, UCR Protocol Standard Baseline, CDM UNFCCC Methodology, AMS-I.C.: Thermal energy production with or without electricity (Ver.21.0). The verification was done onsite by way of

Accredited by 5 Jupiter House, Callera Park, Aldermaston, Reading Berkshire RG7 8NN, United Kingdom (UK).





interviews, onsite document verification and submission of documents for verification through emails.

SQAC is able to certify that the emission reductions Renewable Biomass Based Thermal Energy Generation by SIIPL, Manjri, Pune, Maharashtra, India, (UCR ID – 279) for the period **01/12/2018 to 31/12/2022** amounts to **30,614 CoUs** (**30,614** tCO₂eq)

Detailed Verification Report:

Purpose:

The UCR project activity consists of the generation of thermal energy by utilizing renewable biomass (Briquettes) boilers of total installed capacity of 19 TPH at the Manjri campus site (Pune) biotechnology plant owned and operated by the Project Proponent. The project activity currently involves the installation of one biomass briquette fired steam boiler with a steam output capacity of 15 TPH.

| 15 TPH (Manjri) | 1.5 TPH (Manjri) | 1.5 TPH (Manjri) 1.5 TPH (Manjri) 1 | | | | | | |
|--------------------|------------------|-------------------------------------|------------|--|--|--|--|--|
| Туре | | | | | | | | |
| Combipac | | | | | | | | |
| (Water + | Smoke Tube | Smoke Tube | Smoke Tube | | | | | |
| Smoke Tube) | | | | | | | | |
| Commissioning Date | | | | | | | | |
| 14/06/2021 | 01/12/2018 | 01/02/2019 | 01/12/2018 | | | | | |
| In Operation | | | | | | | | |
| since | Not in-ope | eration Since August-21 | | | | | | |
| installation | | | | | | | | |

The start date of the project activity is 01/12/2018. This project activity uses renewable biomass briquettes as fuel and supplies the process steam throughout the plant for an important process of sterilization and clean steam generation for advanced procedures within the project boundary at the Manjri campus. The one boiler installed is "Combipac Reciprocating" grate type that ensures 100% firing of biomass briquettes. Thus, the project activity helps in reduction of GHG emissions. The primary technology for the project activity involves direct combustion of biomass in the boiler to generate thermal energy. During combustion chemical energy contained in the biomass is converted into thermal energy, which is utilized for steam/hot air generation.







The briquettes, used in all the installed boilers within the project activity, are composed of mainly agro based industrial residues (bagasse) and crop residues (soya bean waste and groundnut shells) based on their availability from the surrounding region outside the project boundary (the PP is not the producer of the processed solid biomass fuel as specified in the requirements of the UCR CoU Standard for inclusion in the updated eligibility conditions specified in the UCR biomass program).

The project activity is thus the thermal energy production using renewable energy sources that displaces fossil fuel use and avoids GHG emissions (CO₂). In the pre-project scenario, the process demand of steam would have been met by a coal fired boiler. The project results in reductions of CO_2 emissions that are real, measurable and give long-term benefits to the mitigation of climate change.

Location of project activity:

| Country | : India |
|-----------|---------------------------------|
| Village | : Manjri |
| District | : Pune |
| State | : Maharashtra (Pin code 412307) |
| Latitude | : 18°30'56.1"N |
| Longitude | : 73° 57'47.2"E |









Scope:

The scope covers verification of emission reductions from the project - Renewable Biomass Based Thermal Energy Generation by SIIPL, Manjri, Pune, Maharashtra, India, (UCR ID – 279).

Criteria:

Verification criteria is as per the requirements of UCR Standard.

Description of project:

The project activity is the installation of biomass fired boilers for steam generation. The generated steam is utilized for meeting the process requirement. The project activity has replaced coal based boiler with biomass based boiler for steam generation thus the project activity is environment friendly and leads to GHG emission reduction. The CO₂ emission due to the combustion of biomass is neutralized by the photosynthesis process of agricultural crops. Hence, it "recycles" atmospheric carbon and does not add to the greenhouse effect. And also the biomasses contains negligible quantities of nitrogen and sulphur, hence the other green house gas from the combustion of biomass can be neglected. The coal being a carbon intensive fuel leads to GHG emissions hence implementation of the project activity leads to GHG emission reductions.

No transfer of technology is involved to host country because biomass boiler technology is available within India from reputed manufacturers.



| Description | Data |
|---------------------------------------------------|--------------------------------------------------|
| Capacity of Current Boilers | 15 TPH (4.1 kg/sec) |
| Number of Boilers | 1 |
| Pressure | 10.5 kg/cm ² |
| Model | CPRG 150/12.5/1001 |
| Enthalpy of Steam (Boiler outlet temp 280 °C)* | 3.00 MJ/kg |
| Operation days/annum | 330 days/yr (24hrs/day) |
| Enthalpy of water @100 °C | 0.418 MJ/kg |
| Boiler Rating | 15*(3.0-0.418)/3.6 = 10.75 MW _{thermal} |
| NCV of Biomass | 4000 kcal/kg |

| Sr | | | SPECIFICATION | | | | | | | |
|-----|------------------------------------------------------------------------------------------|--------|----------------------------------------------------------------|----------------------------------------------------------|----------------------------------------------------------|----------------------------------------------------------|--|--|--|--|
| No. | Description | UOM | 15 TPH (Manjri) | 1.5 TPH (Manjri) | 1.5 TPH (Manjri) | 1.0 TPH (Manjri) | | | | |
| 1 | Туре | - | Combipac (Water + Smoke Tube) | Smoke Tube | Smoke Tube | Smoke Tube | | | | |
| 2 | Boiler Design Capacity - F & A 100 Deg C, Maximum continuous rating (MCR) | Kg/hr | 15000 @ F&A 100⁰C | 1500 @ F&A 100⁰C | 1500 @ F&A 100⁰C | 1000 @ F&A 100ºC | | | | |
| 3 | Design Pressure | KG/CM2 | 10.54 bar (g) | 10.54 bar (g) | 10.54 bar (g) | 10.54 bar (g) | | | | |
| 4 | Operating Pressure | KG/CM2 | 9 bar (g) | 9 bar (g) | 9 bar (g) | 9 bar (g) | | | | |
| 5 | Codes & Standards for Boiler Design | - | IBR 1950 with Latest Ammendments | IBR 1950 with Latest Ammendments | IBR 1950 with Latest Ammendments | IBR 1950 with Latest Ammendments | | | | |
| 6 | Overall Boiler Efficiency on NCV at Full Load | % | Briquette: 84 +/- 2% measured as per BS 845 Part-I | Pallet: 84 +/- 2% measured as per BS 845 Part-I | Pallet: 84 +/- 2% measured as per BS 845 Part-I | Pallet: 84 +/- 2% measured as per BS 845 Part-I | | | | |
| 7 | Method of efficiency measurement / Performance Test | - | As Per BS 845 Part I: 1987 | As Per BS 845 Part I: 1987 | As Per BS 845 Part I: 1987 | As Per BS 845 Part I: 1987 | | | | |
| 8 | Type of Steam | - | Dry Saturated | Dry Saturated | Dry Saturated | Dry Saturated | | | | |
| 9 | Dryness Fraction | % | 98 | 98 | 98 | 98 | | | | |
| 10 | Boiler Test Pressure (HYDRO TEST) | KG/CM2 | 15.9 | 15.9 | 15.9 | 15.9 | | | | |
| 11 | Feed water temperature to Boiler (From Deaerator) | °C | 102 - 105 | 102 - 105 | 102 - 105 | 102 - 105 | | | | |



| Description | Data |
|---------------------------------------------------|------------------------------------------------|
| Total Capacity of Replaced Boiler/s | 4 TPH (1.1 kg/sec) |
| Number of Boilers | 3 (Discontinued) |
| Pressure | 10.5 kg/cm ² |
| Enthalpy of Steam (Boiler outlet temp 280 °C)* | 3.00 MJ/kg |
| Operation days/annum | 330days/yr (2018-2021) |
| Enthalpy of water @100 °C | 0.418 MJ/kg |
| Boiler Rating | 4*(3.0-0.418)/3.6 = 2.86 MW _{thermal} |

*https://www.spiraxsarco.com/resources-and-design-tools/steam-tables/superheated-steam-region

| Veer | Year wise Boiler Operating Days | | | | | | | | |
|------|---------------------------------|---------|---------|---------|--|--|--|--|--|
| Year | 15 TPH | 1.5 TPH | 1.5 TPH | 1.0 TPH | | | | | |
| 2013 | 0 | 0 | 0 | 0 | | | | | |
| 2014 | 0 | 0 | | | | | | | |
| 2015 | 0 | 0 | 0 | 0 | | | | | |
| 2016 | 0 | 0 | 0 | 0 | | | | | |
| 2017 | 0 | 0 | 0 0 | | | | | | |
| 2018 | 0 | 15 | 0 | 13 | | | | | |
| 2019 | 0 | 285 | 265 | 162 | | | | | |
| 2020 | 0 | 323 | 316 | 186 | | | | | |
| 2021 | 167 | 192 | 192 | 191 | | | | | |
| 2022 | 269 | 0 | 0 | 0 | | | | | |

Level of Assurance:

The verification report is based on the information collected through interviews conducted onsite, 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 Lead Verifier, Mr. Santosh Nair and Verifier Ms. Sheetal Wader, who are experienced in such projects.



- Project Concept Note (PCN)
- Monitoring Report (MR)
- Commissioning Report
- Calibration report
- Data provided upon request of all the documents of the related projects

Sampling:

Not applicable

Persons interviewed:

- 1. Mr. Santosh Arankalle : Sr. General Manager, M/s Serum Institute of India Pvt Ltd.
- 2. Mr. Baban Chaudhari : Sr. Manager Engineering, M/s Serum Institute of India Pvt Ltd.
- 3. Mr. Saurabh Sainger : Sr. Project Manager, M/s. Egis India Consulting Engineers Pvt Ltd.

Documentation Verified:

- Project Concept Note (PCN)
- Monitoring Report (MR)
- Calibration Reports
- Commissioning Certificate
- Monthly steam chart records
- Boiler Log Book
- Biomass Briquette Tax Invoice



| Form V Form V [Regulation 381 (c)] Provisional Order under section 9 of the Boilers Act of 1923 | | COMMISSIONING REPORT |
|-----------------------------------------------------------------------------------------------------------------|-------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | | Date: 09/0 |
| No.:249PUN2021 | Make | : M/s Thermax Limited, Chinchwad, Pune. |
| SEZ BIOTECH SERVICES PRIVATE LIMITED, SEZ UNIT NO PBP I , POONAWALA BIOTECHNOLOGY PARK , MANJARI | | India411019. |
| BUDRUK, IN FROM TO BHARAT PETROL PUMP, Haveli, Pune, MANJARI Bk Maharashtra-41220 fare hereby | Model | : CPRG 150/12.5/1001 |
| permitted to use the Boiler MR-18087 Boiler Rating650 Made by THERMAX LIMITEBnd bearing Makers number | Year | : 2016 |
| CPRG150/12-5/1001 at a maximum pressure of 12.5 kg, per square cm pending the issue or refusal of a certificate | Capacity | : 15,000 kg/hr |
| within six months from the date hereof after which period this order will become void. | Voltage | : 415 V. 3 Phase |
| | Frequency | : 50 Hz |
| Period from 23/09/2020 to 22/03/2021 | Customer | : M/s Serum Institute of India |
| | Address | : Manjari, Pune Maharashtra |
| Yours fattMully. | The above Thermax Lin commercial us | mentioned "Reciprocating Grate Type" is commission nited on 14 th June 2021 and handed over for op e of steam has been started. |
| | | |
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| | For, M/s Serui | pit - of 2.2221 Por an and a second s |
| UMESH SHARKARAO MADANE | | |
| Joint Director, | System | 1 Kept under observation |
| Mighar SDRDe), Uma 2004 una Mataria (Covernment of Manazamp) Date (6-4-2021 112-4/21 161 | | |
| N.8. This order must be produced on demand by any authorised person and surrendered to the Director | | |
| of orders. | CPRG-150/12.5/1 | 1001 Pag |
| | 15704 | Pailor Commissioning Cortificate from Thormas |







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| Offic | e Email ID:- Testcaloune | differential even 2 TownsheatDecoult cover 2 | |
| Tosaer | vice@gmail.com Texputchan | n(Pernall com / Teshcomer: Premail com | |
| | Website-we | ww.testcal.com | |
| Job Number: 221220 | | Certificate Number: TCC537/22- | 23/19-07-2021 |
| Customer Name and Address | M/3. | SERUM INSTITUTE OF INDIA MANIARI , Pune 411028 | |
| Customer Reference | Verbal Order | | |
| Details of the Instrument | | | |
| locatino | BRIQUITTE | DILERMR-18087 FLOW METER | |
| Devrinting | FLOW Meter | | |
| Mate | ENDRESS HAT | USER | |
| Hada The | -40°C TO 85' | e | |
| Carini number | M301272000 | 0 | |
| Line . | DN 65 | | |
| Resolution | 0.01 108/41 | (ICOMS | |
| Accuracy | 1 2% | | |
| Condition of the equipment on receipt | Good | | |
| Date of calibration | 19.07.2022 | | |
| Date of next calibration suggested | 18.07.2025 | | |
| Calibration environments | | | |
| Temperature | 25.5°C | | |
| Relative humidity | SBN RH | | |
| Standard Instrument Details | Master - I | | |
| Description | Digital Therms | onieter | |
| Make | Mextech | | |
| Tune / Model | ST-9264 | | |
| dentification number | TCCS/EQ-T-04 | 6 | |
| Report Number | CC-2071-L-02 | 01/005 | |
| Calibration valid till | 30.12.2022 | | |
| Standard Instrument Details | Master - II | The second s | |
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| Make | Manas | | |
| Ivor / Model | UF-HH-10/TS | -1 | |
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WB BY ROCKWAY WEIGHBRIDGE TECHNO.PUNE PH N0:9623442382/84/86/87/9626.

Sample Copy of Biomass Quantity Weigh Bridge Computer Receipts on File

STORE OFFICER SIGN:



| FE8-2023 | Thermax Onsite Energy Solutions Limited STE NME: SEZ BOTECHSERVICES P/IT LTD, WARE PARE FUEL, INWARD AND CHAILTY DATA MONTH | ⁴ 777(2)(1) 4 | Conner and | Argust | - 22 | T | hermax O | INSITE EN | ERVICES PUT LTD | ITIONS LIM | ited 1 | | | 2 | "hann" | THERMA |
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Applied methodologies and standardized baselines:

UCR Protocol Standard Baseline

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

TYPE I - Renewable Energy Projects



CATEGORY - AMS-I.C.: Thermal energy production with or without electricity (Ver.21.0)

This methodology comprises renewable energy technologies that supply users i.e., residential, industrial or commercial facilities with thermal energy that displaces fossil fuel use. These units include technologies such as energy derived from renewable biomass and other technologies that provide thermal energy that displaces fossil fuel.

Applicability of methodologies and standardized baselines

- The project activity is thermal energy generation project using a biomass (bagasse and crop residues i.e. soya bean waste, groundnut shell etc) based boiler that displaces equivalent amount of thermal energy that would have been generated by a fossil fuel based boiler. Since the project activity utilises biomass for the generation of thermal energy by displacing fossil fuel (coal), it meets the primary applicability criteria of the methodology.
- The thermal generation capacity of project activity is currently 10.75 MW_{thermal} which is less than the threshold of 45MW_{thermal} as per the applied methodology. The capacity limits specified in the methodologies apply to both discontinued/existing and additional units within the project activity. In the present case of the project activity, a 15 TPH boiler was added to the already 4 TPH (combined capacities) boilers, however, the total capacity of the units added within the project activity (since 2021), is 19 TPH, and this results in a thermal capacity generation of 13.61 MW_{thermal} which also complies with capacity limits of the methodology. All boilers were physically distinct from each other prior to discontinuation
- The biomass used by the project plant is not stored for more than one year.
- The project activity does not involve recovery and utilization of biogas for power/heat production.
- The project activity is neither a co-generation nor co-firing system, therefore this condition is not applicable in the case of current project activity.
- Biomass generated steam is used for captive use. The steam produced in the project activity is utilized in the process of SIIL. It is not delivered to any third party.
- The project activity does not involve the use of any refrigerant within its boundaries and hence the given applicability clause in the methodology is not fulfilled here.
- The Project Proponent is not the producer of the processed solid biomass fuel. The Project Proponent has a contract with the biomass briquette supplier for the supply of the same which will ensure that there is no double counting of emission reductions by the supplier.
- Thermal energy generation capacity are determined by taking the difference between



enthalpy of total output leaving the project equipment and the total enthalpy of input entering the project equipment.

The installed biomass boiler generates steam to meet the demand of steam recipient plant and displace fully the use of fossil fuel-based boilers. The project technology utilizes appropriate treatment systems to ensure exhaust gas and discharged water in compliance with national environmental regulations. Note that fossil fuel (i.e., furnace oil, coal, gas, etc) cannot be used for biomass fired boilers due to its specialized design of combustion chamber. The service level (e.g., temperature, pressure) of supplied steam in case of utilizing different types of renewable biomass residues is ensured by qualified boiler operators and is monitored by steam flow meter at recipient plant. The project activity will thus reduce Greenhouse gas (GHG) emissions associated with the combustion of fuel oil in baseline boilers. The project activity claims emission reduction for the thermal energy production by renewable energy technologies (biomass boilers) that displace the use of fossil fuel-based boilers. This is in line with the applied methodology AMS I.C requirements.

Applicability of double counting emission reductions

The biomass boiler is constructed by the PP within the boundary. The biomass boiler has a unique ID (MR/18087), which is visible on the unit. The project is not registered with any other voluntary market (National or International).



The project activity has never applied for registration under any GHG mechanism for carbon credits. Hence there is no double counting of the credits anticipated for the current project activity

Agreement for Double Counting Avoidance from Proponent has been provided duly signed on 28/02/2023.



Project boundary, sources and greenhouse gases (GHGs)

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

- Site of the renewable energy generation.
- Biomass based boiler, which starts from the biomass storage to the point of steam supply
- Biomass storage facility



| | Source | GHG | Included? | Justification/Explanation | |
|---------------------|----------------------------------------------------------------------|------------------|----------------------------------------|-------------------------------------------------------|--|
| Baseline | CO ₂ emissions from fossil fuel in boilers for heat | CO2 | Included | Major source of GHG emissions | |
| | | CH4 | Excluded | Excluded for simplification. This is conservative. | |
| | | N ₂ O | Excluded | Excluded for simplification. This is conservative. | |
| Project Activity | | CO ₂ | Excluded | Excluded for simplification. This is conservative. | |
| | Emissions from Biomass Project Activity | CH4 | Excluded for sim This is conservative. | Excluded for simplification. This is conservative. | |
| | | N ₂ O | Excluded | Excluded for simplification. This is conservative. | |

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

There is no registered or an application to register another small-scale carbon project activity with



the same project participants in the same project category within 1 km of the project boundary, hence the project activity is not a debundled component of a large-scale project.

By using locally sourced GHG-neutral biomass, the Project Proponent is successfully able to avoid the fossil fuel emissions and thereby GHG emissions due to in-house cogeneration energy requirements and also vehicular emissions avoiding sourcing of biomass fuel from a large distance.

Establishment and description of baseline scenario

The baseline scenario identified 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.

Project Activity Emissions

Emission Reductions (ERy) 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 = BEy - (PEy + LEy)

BEy = Baseline emissions in year y (t CO₂e)

As mentioned in the methodology AMS I.C, for steam produced using fossil fuels the baseline emissions are calculated as follows:

BEy = (HGy * EF_{CO2}) / η_{th}

Where:

HGy = The net quantity of heat supplied by the project activity during the year in TJ. It is calculated as product of quantity of steam generated and net enthalpy of steam. The net enthalpy of steam is calculated as difference of enthalpy of steam and enthalpy of feedwater. The enthalpy of steam is calculated from steam pressure and steam temperature.



 EF_{CO2} = The CO₂ emission factor per unit of energy of the fuel that would have been used in the baseline plant in (tCO₂/TJ), obtained from reliable local or national data if available, otherwise, IPCC default emission factors are used.

 η_{th} – The efficiency of the boiler using fossil fuel that would have been used in the absence of the project activity.

PEy = Project activity emissions. The GHG emissions due to the combustion of biomass is neutralized by the sequestration done during the growth of the biomass, thereby making it a carbon neutral fuel. Further the rice husk and bagasse contains negligible quantities of nitrogen and sulphur, the other green house gas from the combustion of biomass can be considered as negligible. Therefore essentially there would not be any GHG emissions due to the project activity within the project boundary.

However, as per paragraph 31 under Section 5.2 of the given methodology, the Project Proponent must "For microscale and small-scale project activities, apply a default emission factor of 0.0142 tCO2/tonne of biomass".

LEy = Leakage emissions. Leakages is to be considered if the energy generating equipment is transferred from another activity or if the existing is transferred to another activity. There is no transfer of energy generating equipment or existing equipment to another activity. Further, emissions arising during the transportation of husk and biomass to the site, is negligible since the biomass is sourced locally within a radius of less than 200 kms, hence considered as negligible.

| STEAM GENERATION DETAILS (1.5 + 1.5 + 1.0) TPH PALLET BOILER (Manjri) | | | | | | |
|-----------------------------------------------------------------------|--------|---------------------------------------|----------------------------------|-----------------------------------------|----------------------------------|--|
| Sr. No. | Month | Briquette Consumption (in Tons) | Steam Generation (in Tons) | Yearly Steam Generation (in Tons) | Boiler Operating Days in Year | |
| 1 | Dec-18 | 72 | 284 | 284 | 15 | |
| 2 | Jan-19 | 210 | 979 | | | |
| 3 | Feb-19 | 227 | 767 | | | |
| 4 | Mar-19 | 243 | 873 | | | |
| 5 | Apr-19 | 231 | 952 | | | |
| 6 | May-19 | 212 | 933 | 11138 | 285 | |
| 7 | Jun-19 | 222 | 1027 | | | |
| 8 | Jul-19 | 282 | 1037 | | | |
| 9 | Aug-19 | 255 | 912 |] | | |
| 10 | Sep-19 | 262 | 967 | | | |

Hence LEy = 0

| | | | | | * * |
|----|--------|-----|------|--------|-----|
| 11 | Oct-19 | 248 | 1021 | | |
| 12 | Nov-19 | 230 | 857 | | |
| 13 | Dec-19 | 183 | 813 | | |
| 14 | Jan-20 | 263 | 1258 | | |
| 15 | Feb-20 | 265 | 1307 | | |
| 16 | Mar-20 | 263 | 1424 | | |
| 17 | Apr-20 | 251 | 1163 | | |
| 18 | May-20 | 304 | 1404 | | |
| 19 | Jun-20 | 256 | 1221 | 16220 | 272 |
| 20 | Jul-20 | 293 | 1364 | 10239 | 323 |
| 21 | Aug-20 | 290 | 1258 | | |
| 22 | Sep-20 | 311 | 1411 | | |
| 23 | Oct-20 | 343 | 1562 | | |
| 24 | Nov-20 | 275 | 1162 | | |
| 25 | Dec-20 | 399 | 1704 | | |
| 26 | Jan-21 | 463 | 2091 | | |
| 27 | Feb-21 | 449 | 2007 | | |
| 28 | Mar-21 | 527 | 2233 | | 101 |
| 29 | Apr-21 | 501 | 2109 | 12506 | |
| 30 | May-21 | 513 | 2122 | 12,390 | 191 |
| 31 | Jun-21 | 378 | 1490 | | |
| 32 | Jul-21 | 148 | 507 | | |
| 33 | Aug-21 | 14 | 37 | | |

SQAC

| Steam Generated | Tons | 40257 | 814 |
|-----------------|------|-------|-----|

| Monthly Data of 15 TPH Boiler (MR-18087) at Manjri | | | | | | | |
|----------------------------------------------------|------|--------|------------------------------------|-------------------------------|-----------------------------------------|----------------------------------------|--|
| Sr. No | Year | Month | Briquette Consumption (Tons) | Steam Generation (Tons) | Yearly Steam Generation (Tons) | Boiler Operating Days in Year | |
| 1 | 2021 | Jun-21 | 163.2802564 | 636.793 | | | |
| | | Jul-21 | 649.1477329 | 2674.35 | | | |
| | | Aug-21 | 3947.12028 | 3654.741 | | | |
| | | Sep-21 | 710.385 | 3239.351 | 21103.98 | 167 | |
| | | Oct-21 | 839.124 | 3356.367 |] | | |
| | | Nov-21 | 793.322 | 3746.664 |] | | |
| | | Dec-21 | 831.912 | 3795.714 | | | |



| 2 | 2022 | Jan-22 | 710.453 | 3303.835 | | |
|-----------------|------|--------|----------|----------|-----------|-----|
| 2 | 2022 | Feb-22 | 712.676 | 3436.764 | | |
| | | Mar-22 | 707.635 | 3446.306 | | |
| | | Apr-22 | 689.057 | 3350.296 | | |
| | | May-22 | 730.731 | 3385.561 | | 269 |
| | | Jun-22 | 876.737 | 4216.317 | 51348.935 | |
| | | Jul-22 | 959.357 | 4640.486 | | |
| | | Aug-22 | 1045.101 | 5043.903 | | |
| | | Sep-22 | 833.399 | 4002.207 | | |
| | | Oct-22 | 1159.816 | 5566.343 | | |
| | | Nov-22 | 1071.226 | 5159.797 | | |
| | | Dec-22 | 1202.239 | 5797.12 | | |
| Steam Generated | | | | Tons | 72452.915 | 436 |

Default baseline efficiency values for different technologies as per AMS IC Methodology

| Technology of the energy generation system | Default efficiency |
|----------------------------------------------|--------------------|
| New natural gas fired boiler (w/o condenser) | 92% |
| New oil fired boiler | 90% |
| Old natural gas fired boiler (w/o condenser) | 87% |
| New coal fired boiler | 85% |
| Old oil fired boiler | 85% |
| Old coal fired boiler | 80% |

Issuance Period: 01/12/2018 to 31/12/2022

| | Baseline Emissions | Project Emissions | Emission Reductions |
|------|-----------------------|----------------------|------------------------|
| Year | (tCO2eq) | (tCO2eq) | (tCO2eq) |
| 2018 | 76 | 1 | 75 |
| 2019 | 2970 | 40 | 2930 |
| 2020 | 4330 | 50 | 4280 |
| 2021 | 9953 | 155 | 9798 |
| 2022 | 13683 | 152 | 13531 |
| | | TOTAL | 30614 |

Total Emission Reductions for the current crediting period = **30,614** tCO₂eq (**30,614** CoUs)



Conclusions:

Based on the audit conducted on the basis of UCR Protocol, which draws reference from UCR Protocol Standard Baseline, AMS-I.C.: Thermal energy production with or without electricity (Ver.21.0), the audit conducted onsite and the documents verified and 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 - Renewable Biomass Based Thermal Energy Generation By SIIPL, Manjri, Pune, Maharashtra - (UCR ID – 279) for the period **01/12/2018 to 31/12/2022** amounts to <u>**30,614 COUs (30,614 tCO₂eq)**</u>



Santosh Nair Lead Verifier (Signature)

Date: 16/03/2023



Sheetal Wader Verifier (Signature)

Praful Shinganapurkar Senior Internal Reviewer (Signature)