



Monitoring report form for CDM project activity
(Version 07.0)

MONITORING REPORT

Title of the project activity	Biomass based power plant in Mahendargarh, Haryana	
UNFCCC reference number of the project activity	9973 ¹	
Version number of the PDD applicable to this monitoring report	14	
Version number of this monitoring report	01	
Completion date of this monitoring report	03/09/2019	
Monitoring period number	02	
Duration of this monitoring period	01-04-2016 to 31-08-2019 (Inclusive of both the dates)	
Monitoring report number for this monitoring period	01	
Project participants	India: M/s Star Wire (India) Vidyut Pvt. Ltd. (SWIVPL) Australia: EKI Energy Services Limited	
Host Party	India	
Applied methodologies and standardized baselines	Applied methodology: AMS I.D. "Grid connected renewable electricity generation" (version 17/ scope 1/EB 61). ² Standardized Baselines: Not Applicable	
Sectoral scopes	1 : Energy industries (renewable - / non-renewable sources)	
Amount of GHG emission reductions or net anthropogenic GHG removals achieved by the project activity in this monitoring period	Amount achieved before 1 January 2013	Amount achieved from 1 January 2013
	0 tCO ₂ e	188,164 tCO ₂ e
Amount of GHG emission reductions or net anthropogenic GHG removals estimated ex ante for this monitoring period in the PDD	179,214 tCO ₂ e	

¹ <https://cdm.unfccc.int/Projects/DB/SGS-UKL1403254354.2/view>

² <https://cdm.unfccc.int/methodologies/DB/W3TINZ7KKWCK7L8WTXFQQOFQQH4SBK>

SECTION A. Description of project activity

A.1. General description of project activity

The project activity was envisaged for the installation of a greenfield 10 MW biomass based power plant in village Khurawata of Mahendargarh District in Haryana, India by Star Wire (India) Vidyut Pvt. Ltd. (SWIVPL). The consent to establish was also awarded for 10 MW by the State Pollution Control Board (SPCB). However, Haryana Renewable Energy Development Authority (HAREDA) has provided an approval of 9.9 MW based on the assessment of biomass available in the area for the project activity. Therefore, a turbine of 9.9 MW is installed in the project activity. The project activity generates clean power for export to the NEWNE grid (India has two national grids, i.e. NEWNE grid for Northeast, West and North-east and the southern grid). The generated electricity displace fossil fuel dominated grid based electricity with a renewable source of electricity thereby reducing GHG emissions. The project activity involves generation of steam from the firing of renewable biomass in a 47.5 TPH capacity boiler, with outlet steam parameters at 67 kg/cm² (a) and 465 °C which in turn will drive the turbo-generator set with a capacity of 9.9 MW to produce electricity. The complete description of project technology is provided in the section A.4.2 and metering aspect is delineated in section B.7.2. The project construction is complete and the plant was synchronized with the grid for power supply in May 2013.

Purpose of the Project Activity

The purpose of the project activity is to utilize biomass fuel (Mustard crop residue (85%), Julia Flora (13%) and paddy waste (2%)), which is an agriculture waste, to generate electricity. The electricity thus produced is being exported to the NEWNE Grid and contributes towards bridging the gap between demand and supply in the power-deficit electricity system from a renewable source which in turn will reduce the GHG emissions and conserve fossil fuels.

Project's contribution to Sustainable Development

The Designated National Authority (DNA) for India is Ministry of Environment and Forests (MoEF), called the National CDM Authority (NCDMA), and has stipulated four indicators 1 for sustainable development in the interim approval guidelines for CDM projects. The contributions of project activity towards sustainable development are explained with indicators like contributions to socio-economic, environmental and technological aspects as follows:

Social wellbeing:

- The project activity contributes towards the local employment by employing skilled and unskilled personnel for operation and maintenance of the equipment.
- During civil works, a lot of construction work is to be taken place, which will generate employment for local people around the plant site. This will result in the enhanced employment of the people.
- The project activity shall also generate employment opportunities for transporters who shall be engaged in transportation of biomass from nearby collection centre to the project site.
- Procurement of biomass shall open up an additional stream of revenue for the local farmers.

Economic wellbeing:

- The project will create a business opportunity during construction phase for local stakeholders such as suppliers, contractors, bankers etc. contributing to economic well-being aspects.
- The project generates employment in the local area, hence leading to the economic prosperity of the local people.
- Procurement of biomass shall provide an additional revenue stream for the local farmers.

Environmental wellbeing:

- The project activity will displace use of fossil fuel based power by renewable energy (biomass based power) and thereby result in reduction of greenhouse gas (GHG) emissions.
- It will also lead to conservation of non-renewable natural resources.
- The project also reduce pollution in general such as NOX and SOX emissions that might have taken place in the baseline.

Technological wellbeing:

- The project activity utilizes biomass as fuel to generate steam, which further drives a solidly forged and machined turbine to generate power. The exhaust gas shall be treated with appropriate environmental control equipment in order to remove particulate matter before sending out to the atmosphere. The project activity utilizes environmentally safe technology for meeting the power and process steam requirements at the unit.

The present monitoring period if from 01-04-2016 to 31-08-2019 (Inclusive of both the dates) and the project resulted in 188,164 tCO₂e also the project underwent continued operation except scheduled maintenance or breakdowns.

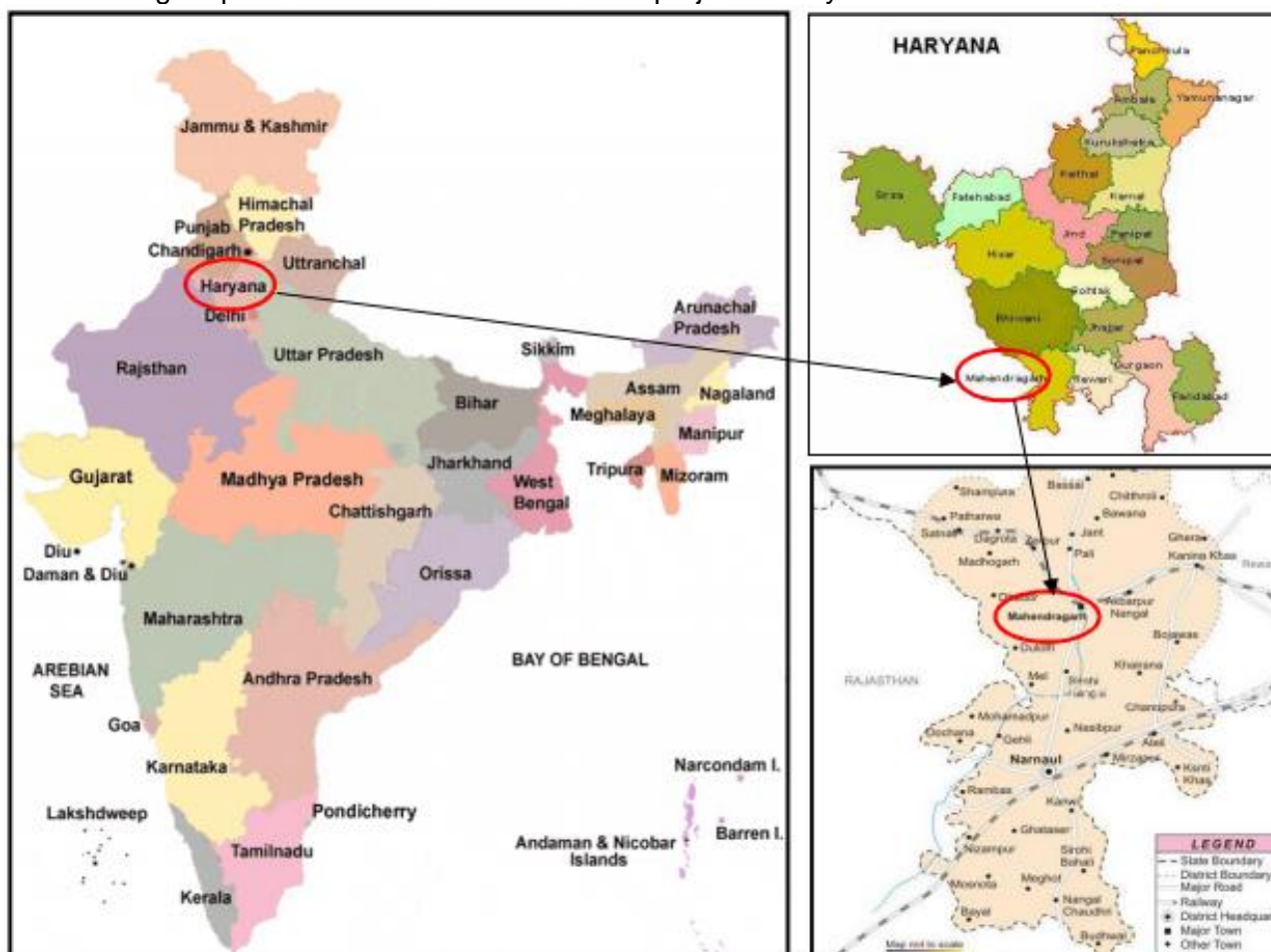
A.2. Location of project activity

The project activity is located at village Khurawata in Block-Mahendargarh on Mahendargarh – Zerpur Road in the District of Mahendargarh, Haryana, India. The nearest railway station is Mahendargarh and airport is New Delhi. The exact geographical coordinates of the project site are as follows:

Latitude: 28° 18' 39" N

Longitude: 76° 5' 23" E

The following map shows the exact location of the project activity:



A.3. Parties and project participants

Parties involved	Project participants	Indicate if the Party involved wishes to be considered as project participant (Yes/No)
India	M/s Star Wire (India) Vidyut Pvt. Ltd. (Private entity)	No
Australia	EKI Energy Services Limited	No

A.4. References to applied methodologies and standardized baselines

As per the Indicative simplified baseline and monitoring methodologies for selected small-scale CDM project activity categories, methodology AMS I.D. (Version 17)³ has been used.

Type : Renewable energy projects
Category : I.D.
Title : Grid connected renewable electricity generation

Reference:

The approved methodology uses the “Tool to calculate the emission factor for an electricity system” Version 02.2.1 for determination of the baseline scenario and also draws upon Appendix B of the simplified modalities and procedures for small-scale CDM project activities “Indicative simplified baseline and monitoring methodologies for selected small-scale CDM project activity categories”.

It has been referred from the list of approved methodologies for CDM project activities in the UNFCCC/CDM (<http://cdm.unfccc.int/methodologies/SSCmethodologies/approved.html>) website.

A.5. Crediting period type and duration

The PP has opted for a fixed crediting period of 10 years i.e. a period of ten years from 10/07/2014 to 09/07/2024 has been chosen.

SECTION B. Implementation of project activity**B.1. Description of implemented project activity**

The project activity is the installation of a 10 MW biomass based greenfield power plant in village Khurawata of Mahendargarh District Haryana. The consent to establish was also awarded for 10 MW by the State Pollution Control Board (SPCB), however Haryana Renewable Energy Development Authority (HAREDA) has given consent for the establishment of 9.9 MW only therefore a turbine of capacity 9.9 MW is installed in the project activity. The generated electricity is being exported to grid for sale. The project activity involves the generation of steam from the firing of renewable biomass in a 47.5 TPH boiler, with outlet steam parameters at 67 kg/cm² and 465 °C which in turn will drive the turbo-generator set with a capacity of 9.9 MW to produce electricity. The plant is running successfully during the reported monitoring period. All the physical and technical features as stated in the registered PDD are in place and project has been operated as described in the registered PDD. No special events occurred during reported monitoring period. No events or situations happened during the reported monitoring period which can alter the applicability of the applied methodology.

³ <https://cdm.unfccc.int/methodologies/DB/W3TINZ7KKWCK7L8WTXFQQOFQQH4SBK>

B.2. Post-registration changes**B.2.1. Temporary deviations from the registered monitoring plan, applied methodologies, standardized baselines or other methodological regulatory documents**

As there are no post registration temporary changes in the project activity therefore there are no deviations in baseline as well as in monitoring plan.

B.2.2. Corrections

Not Applicable

B.2.3. Changes to the start date of the crediting period

Not Applicable

B.2.4. Inclusion of monitoring plan

Not Applicable

B.2.5. Permanent changes to the registered monitoring plan, or permanent deviation of monitoring from the applied methodologies, standardized baselines, or other methodological regulatory documents

Not Applicable

B.2.6. Changes to project design

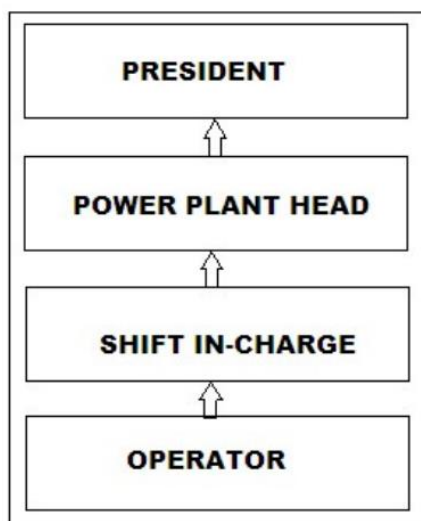
Not Applicable

B.2.7. Changes specific to afforestation or reforestation project activity

Not Applicable

SECTION C. Description of monitoring system

The electricity Generation and the auxiliary consumption is being monitored using energy meters and for cross check a spare meter is also provided for insuring the quality of the data being monitored. The Energy exported can be cross checked with the difference of gross electricity generated and the auxiliary consumption. Further there are two energy meters (Main and Check) installed at the interconnection point to record the energy exported to and imported from the grid by project activity. The difference of electricity export and import from the grid serves the basis of net electricity exported by the project activity and is being used to calculate the emission reductions by the project activity. The energy meters are being calibrated annually as a quality control measure. The quantity of biomass being fed into the boiler is being monitored on real time basis using conveyer system/Load cells. To ascertain the Quality Control and Quality Assurance of the monitoring parameters, the following operational and management structure has been adopted and is in place during this monitoring period and till date. The electricity generation and auxiliary consumption of the plant is being recorded by shift – in – charges on a daily basis after taking reading from the energy meters. The quantity of biomass consumed is also being monitored on continuous basis. Monthly joint meter reading (JMR) for the import and export units is carried out by the grid officials and the representative of PP, based on JMR the invoice is raised by PP. This is the responsibility of power plant head to ensure that the data is properly collected and maintained electronically/on paper. Shift Engineer prepares the monthly report by aggregating the daily readings and the same is verified by the power plant head. The power plant personnel are qualified technical professionals. All the shift in-charges are trained and experienced diploma holders. The operational and management hierarchy is as given below.



SECTION D. Data and parameters

D.1. Data and parameters fixed ex ante

Data/Parameter	$EF_{CO_2,y}$								
Unit	tCO ₂ /MWh								
Description	Ex-ante CO ₂ emission factor for the NEWNE regional grid								
Source of data	CO ₂ Baseline Database for the Indian Power Sector version 5.0 Published by Central Electricity Authority (CEA)								
Value(s) applied	0.8401								
Choice of data or measurement methods and procedures	<p>CEA is a statutory organization under the Ministry of Power which collects and records the data concerning the generation, transmission, trading, distribution and utilization of electricity. Combined margin has been calculated giving equal weightage ($W_{OM} = 0.5$ & $W_{BM} = 0.5$) to operating and build margin in accordance with the "Tool to calculate Emission Factor for an Electricity System", Version 2.2.1 by UNFCCC</p> <table border="1"> <thead> <tr> <th colspan="2">Combined Margin Estimation for NEWNE Grid</th></tr> </thead> <tbody> <tr> <td>Average OM ($EF_{grid,OM,y}$)</td><td>1.0049 tCO₂/MWh</td></tr> <tr> <td>Build Margin, 2008-09 ($EF_{grid,BM,y}$)</td><td>0.6752 tCO₂/MWh</td></tr> <tr> <td>Combined Margin ($EF_{grid,CM,y}$)</td><td>0.8401 tCO₂/MWh</td></tr> </tbody> </table>	Combined Margin Estimation for NEWNE Grid		Average OM ($EF_{grid,OM,y}$)	1.0049 tCO ₂ /MWh	Build Margin, 2008-09 ($EF_{grid,BM,y}$)	0.6752 tCO ₂ /MWh	Combined Margin ($EF_{grid,CM,y}$)	0.8401 tCO ₂ /MWh
Combined Margin Estimation for NEWNE Grid									
Average OM ($EF_{grid,OM,y}$)	1.0049 tCO ₂ /MWh								
Build Margin, 2008-09 ($EF_{grid,BM,y}$)	0.6752 tCO ₂ /MWh								
Combined Margin ($EF_{grid,CM,y}$)	0.8401 tCO ₂ /MWh								
Purpose of data/parameter	Calculation of baseline emissions or baseline net GHG removals by sinks								
Additional comments	This value is determined ex-ante and will be fixed for the crediting period								

Data/Parameter	$SFC_{biomass,i}$
Unit	ton/MWh
Description	Biomass consumption per unit of electricity generated by the power plant
Source of data	DPR
Value(s) applied	1.36
Choice of data or measurement methods and procedures	This is specific fuel consumption of biomass considered by the Haryana Electricity Regulatory Commission (HERC) in its order for the determination of tariff for the biomass based power plants.
Purpose of data/parameter	Calculation of project emissions or actual net GHG removals by sinks
Additional comments	This value is determined ex-ante and will be fixed for the crediting period

Data/Parameter	Demonstration of Surplus Biomass
Unit	MT

Description	Surplus biomass in District Mahendergarh Block Ateli Nangal, Kanina, Mahendragarh, Nangal, Nangal Chaudhary of Haryana State
Source of data	Biomass Assessment study
Value(s) applied	2,07,109
Choice of data or measurement methods and procedures	Biomass surplus has been determined based on the analysis carried out by third party competent entity. The report demonstrates more than 25% surplus availability of biomass even considering the biomass utilization of the project activity also. Therefore the leakage emission considered to be zero for the project activity.
Purpose of data/parameter	Calculation of leakage
Additional comments	Data will be kept for two years after the end of crediting period or the last issuance of CERs, whichever occurs later.

Data/Parameter	M_{biomass}
Unit	%
Description	Moisture content of biomass
Source of data	Internal records of the monitoring
Value(s) applied	11.91
Choice of data or measurement methods and procedures	The value has been provided by a third party (NABL accredited laboratory) that carried out an independent assessment of the available biomass.
Purpose of data/parameter	Calculation of baseline emissions or baseline net GHG removals by sinks
Additional comments	This value is determined ex-ante and will be fixed for the crediting period. Data will be kept for two years after the end of crediting period or the last issuance of CERs, whichever occurs later.

D.2. Data and parameters monitored

Data/Parameter	EG_{gross,y}										
Unit	MWh										
Description	Gross electricity generated by project activity in year y										
Measured/calculated/default	Measured										
Source of data	Electronic Log Sheets										
Value(s) of monitored parameter	<table border="1"> <thead> <tr> <th>Year</th><th>EG_{gross,y}</th></tr> </thead> <tbody> <tr> <td>1st April 2016 to 31st Dec 2016</td><td>50,393</td></tr> <tr> <td>1st Jan 2017 to 31st Dec 2017</td><td>69,723</td></tr> <tr> <td>1st Jan 2018 to 31st Dec 2018</td><td>75,341</td></tr> <tr> <td>1st Jan 2019 to 31st Aug 2019</td><td>50,226</td></tr> </tbody> </table>	Year	EG _{gross,y}	1st April 2016 to 31st Dec 2016	50,393	1st Jan 2017 to 31st Dec 2017	69,723	1st Jan 2018 to 31st Dec 2018	75,341	1st Jan 2019 to 31st Aug 2019	50,226
Year	EG _{gross,y}										
1st April 2016 to 31st Dec 2016	50,393										
1st Jan 2017 to 31st Dec 2017	69,723										
1st Jan 2018 to 31st Dec 2018	75,341										
1st Jan 2019 to 31st Aug 2019	50,226										
Monitoring equipment	Energy Meter.										
Measuring/reading/recording frequency	Continuous monitoring and hourly recording is being carried out.										
Calculation method (if applicable)	Data is Monitored and recorded from Energy Meter Directly which involves no calculation methods.										
QA/QC procedures	For emergency preparedness a Check meter is installed along with main meter. Also the energy meters are being calibrated by NABL accredited lab once in a year.										
Purpose of data/parameter	Calculation of baseline emissions or baseline net GHG removals by sinks										
Additional comments	Data will be kept for two years after the end of crediting period or the last issuance of CERs, whichever occurs later										

Data/Parameter	EG _{gross,export,y}										
Unit	MWh										
Description	Gross electricity exported by project activity in year y										
Measured/calculated/default	Measured										
Source of data	Joint Meter Reading (JMR)										
Value(s) of monitored parameter	<table border="1"> <thead> <tr> <th>Year</th><th>EG_{gross,export,y}</th></tr> </thead> <tbody> <tr> <td>1st April 2016 to 31st Dec 2016</td><td>45,465</td></tr> <tr> <td>1st Jan 2017 to 31st Dec 2017</td><td>63,564</td></tr> <tr> <td>1st Jan 2018 to 31st Dec 2018</td><td>69,363</td></tr> <tr> <td>1st Jan 2019 to 31st Aug 2019</td><td>46,322</td></tr> </tbody> </table>	Year	EG _{gross,export,y}	1st April 2016 to 31st Dec 2016	45,465	1st Jan 2017 to 31st Dec 2017	63,564	1st Jan 2018 to 31st Dec 2018	69,363	1st Jan 2019 to 31st Aug 2019	46,322
Year	EG _{gross,export,y}										
1st April 2016 to 31st Dec 2016	45,465										
1st Jan 2017 to 31st Dec 2017	63,564										
1st Jan 2018 to 31st Dec 2018	69,363										
1st Jan 2019 to 31st Aug 2019	46,322										
Monitoring equipment	Energy Meter										
Measuring/reading/recording frequency	Continuous monitoring and hourly recording is being carried out.										
Calculation method (if applicable)	Data is Monitored and recorded from Energy Meter Directly which involves no calculation methods however for cross check measure the parameter can be compared with the difference of Gross Electricity Generated and Auxiliary Consumption.										
QA/QC procedures	For emergency preparedness a Check meter is installed along with main meter. Also the energy meters are being calibrated by NABL accredited lab once in a year. For cross check measure the parameter can be compared with the difference of Gross Electricity Generated and Auxiliary Consumption.										
Purpose of data/parameter	Calculation of baseline emissions or baseline net GHG removals by sinks										
Additional comments	Data will be kept for two years after the end of crediting period or the last issuance of CERs, whichever occurs later										

Data/Parameter	EG _{gross,import,y}										
Unit	MWh										
Description	Gross electricity imported by project activity in year y										
Measured/calculated/default	Measured										
Source of data	Joint Meter Reading (JMR)										
Value(s) of monitored parameter	<table border="1"> <thead> <tr> <th>Year</th><th>EG_{gross,import,y}</th></tr> </thead> <tbody> <tr> <td>1st April 2016 to 31st Dec 2016</td><td>246</td></tr> <tr> <td>1st Jan 2017 to 31st Dec 2017</td><td>219</td></tr> <tr> <td>1st Jan 2018 to 31st Dec 2018</td><td>145</td></tr> <tr> <td>1st Jan 2019 to 31st Aug 2019</td><td>124</td></tr> </tbody> </table>	Year	EG _{gross,import,y}	1st April 2016 to 31st Dec 2016	246	1st Jan 2017 to 31st Dec 2017	219	1st Jan 2018 to 31st Dec 2018	145	1st Jan 2019 to 31st Aug 2019	124
Year	EG _{gross,import,y}										
1st April 2016 to 31st Dec 2016	246										
1st Jan 2017 to 31st Dec 2017	219										
1st Jan 2018 to 31st Dec 2018	145										
1st Jan 2019 to 31st Aug 2019	124										
Monitoring equipment	Energy Meter										
Measuring/reading/recording frequency	Continuous monitoring and hourly recording is being carried out.										
Calculation method (if applicable)	Data is Monitored and recorded from Energy Meter Directly which involves no calculation methods.										
QA/QC procedures	For emergency preparedness a Check meter is installed along with main meter. Also the energy meters are being calibrated by NABL accredited lab once in a year. The value of gross electricity imported by the project activity can be cross checked with the values obtained by electricity invoice.										
Purpose of data/parameter	Calculation of baseline emissions or baseline net GHG removals by sinks										

Additional comments	Data will be kept for two years after the end of crediting period or the last issuance of CERs, whichever occurs later
---------------------	--

Data/Parameter	EG_{facility,y}										
Unit	MWh										
Description	Net Electricity exported by project activity in year y										
Measured/calculated/default	Calculated										
Source of data	Joint Meter Reading (JMR)										
Value(s) of monitored parameter	<table> <tr> <th>Year</th><th>EG_{facility,y}</th></tr> <tr> <td>1st April 2016 to 31st Dec 2016</td><td>45,218</td></tr> <tr> <td>1st Jan 2017 to 31st Dec 2017</td><td>63,344</td></tr> <tr> <td>1st Jan 2018 to 31st Dec 2018</td><td>69,217</td></tr> <tr> <td>1st Jan 2019 to 31st Aug 2019</td><td>46,197</td></tr> </table>	Year	EG _{facility,y}	1st April 2016 to 31st Dec 2016	45,218	1st Jan 2017 to 31st Dec 2017	63,344	1st Jan 2018 to 31st Dec 2018	69,217	1st Jan 2019 to 31st Aug 2019	46,197
Year	EG _{facility,y}										
1st April 2016 to 31st Dec 2016	45,218										
1st Jan 2017 to 31st Dec 2017	63,344										
1st Jan 2018 to 31st Dec 2018	69,217										
1st Jan 2019 to 31st Aug 2019	46,197										
Monitoring equipment	Parameter is Calculated by measured values taken from Energy Meters										
Measuring/reading/recording frequency	Continuous monitoring and hourly recording is being carried out.										
Calculation method (if applicable)	The Gross electricity imported from the grid is subtracted from the gross electricity exported to the grid to obtain the net electricity exported. Gross Electricity Exported and imported is being monitored by Energy Meter (bi directional tri-vector) of 0.2s accuracy class installed at the interconnection point.										
QA/QC procedures	For emergency preparedness a Check meter is installed along with main meter. Also the energy meters are being calibrated by NABL accredited lab once in a year. The value of net electricity exported by the project activity can be cross checked with the values obtained by electricity invoices.										
Purpose of data/parameter	Calculation of baseline emissions or baseline net GHG removals by sinks										
Additional comments	Data will be kept for two years after the end of crediting period or the last issuance of CERs, whichever occurs later										

Data/Parameter	FC_{biomass,PJ,y}										
Unit	MT										
Description	The quantity of biomass consumed in the project activity during the year y.										
Measured/calculated/default	Measured										
Source of data	Plant Records										
Value(s) of monitored parameter	<table> <tr> <th>Year</th><th>FC_{biomass,PJ,y}</th></tr> <tr> <td>1st April 2016 to 31st Dec 2016</td><td>66,885</td></tr> <tr> <td>1st Jan 2017 to 31st Dec 2017</td><td>94,246</td></tr> <tr> <td>1st Jan 2018 to 31st Dec 2018</td><td>92,734</td></tr> <tr> <td>1st Jan 2019 to 31st Aug 2019</td><td>55,330</td></tr> </table>	Year	FC _{biomass,PJ,y}	1st April 2016 to 31st Dec 2016	66,885	1st Jan 2017 to 31st Dec 2017	94,246	1st Jan 2018 to 31st Dec 2018	92,734	1st Jan 2019 to 31st Aug 2019	55,330
Year	FC _{biomass,PJ,y}										
1st April 2016 to 31st Dec 2016	66,885										
1st Jan 2017 to 31st Dec 2017	94,246										
1st Jan 2018 to 31st Dec 2018	92,734										
1st Jan 2019 to 31st Aug 2019	55,330										
Monitoring equipment	The quantity of Biomass fed into the boiler is measured using a conveyer belt equipped with load cells.										
Measuring/reading/recording frequency	Continuous Monitoring (Electronic data of load cell is available for the record purpose) and Hourly recording is being carried out										
Calculation method (if applicable)	Not applicable as the parameter is being measured directly without any calculation										
QA/QC procedures	The conveyer belt system is being calibrated by NABL accredited lab										

	once in a year. The amount of biomass consumed is being cross checked with an annual energy balance that is based on purchased quantities (sales/receipts) and stock inventory changes.
Purpose of data/parameter	Calculation of baseline emissions or baseline net GHG removals by sinks
Additional comments	Data will be kept for two years after the end of crediting period or the last issuance of CERs, whichever occurs later

Data/Parameter	FC_{FF,y}
Unit	MT
Description	The quantity of fossil fuel consumed in year y.
Measured/calculated/default	Measured
Source of data	Plant Records
Value(s) of monitored parameter	0
Monitoring equipment	The quantity of fossil fuel fed into the boiler can be measured using a Weighbridge and recorded accordingly.
Measuring/reading/recording frequency	Provision of Continuous Monitoring and Hourly recording is in place
Calculation method (if applicable)	Not applicable as the parameter can be measured directly without any calculation
QA/QC procedures	The weighing system is being calibrated by NABL accredited lab once in a year. The amount of Fossil fuel consumed will be cross checked with an annual energy balance that is based on purchased quantities (sales/receipts) and stock inventory changes.
Purpose of data/parameter	Calculation of baseline emissions or baseline net GHG removals by sinks
Additional comments	Data will be kept for two years after the end of crediting period or the last issuance of CERs, whichever occurs later

Data/Parameter	NCV_{biomass,y}
Unit	KCal/kg
Description	Net Calorific Value of biomass type k combusted during year y
Measured/calculated/default	Measured
Source of data	Lab test reports
Value(s) of monitored parameter	-
Monitoring equipment	NCV of the biomass used in project activity is being tested by a NABL accredited lab on dry basis. NCV is tested once in quarter, by taking three samples, for the first year. The average value from the quarterly assessment of first year shall be used for the entire crediting period.
Measuring/reading/recording frequency	Determined once in the first year for the entire crediting period
Calculation method (if applicable)	The measurement and calculation procedure will be performed by third party NABL accredited laboratory as per best industry practices.
QA/QC procedures	The measurement will be carried out by NABL accredited lab quarterly, by taking three samples, for the first year. The average value from the quarterly assessment of first year shall be used for the entire crediting period.
Purpose of data/parameter	Calculation of baseline emissions or baseline net GHG removals by sinks
Additional comments	Data will be kept for two years after the end of crediting period or the last

issuance of CERs, whichever occurs later

D.3. Implementation of sampling plan

No sampling of data is required as all the parameters are being monitored individually

SECTION E. Calculation of emission reductions or net anthropogenic removals**E.1. Calculation of baseline emissions or baseline net removals**

The procedures and formulas used for estimation of the baseline emission factor and the assumptions made have been detailed below. The emission reduction of the small scale project activity is the net electricity exported to the grid ($EG_{BL,y}$) in MWh multiplied by the baseline emission factor ($EF_{CO_2,grid,y}$) in tCO_2/MWh .

$$BE_y = EG_{BL,y} \times EF_{CO_2,grid,y} \text{-----} 1$$

Baseline emission factor ($EF_{CO_2,GRID}$)

The Baseline emission factor ($EF_{CO_2,grid,y}$) is 0.8401 tCO_2 / MWh has been estimated and validated for NEWNE grid (now a part of unified Indian grid) of India, the applicable grid for the project activity. This is fixed ex-ante for the crediting period as per the registered PDD. The Baseline Emission is calculated as below.

Year	Net power supplied ($EG_{BL,y}$) (MWh)	Grid emission factor ($EF_{CO_2,grid,y}$) (tCO_2e/ MWh)	BE_y (tCO_2e)
2016	45,218	0.8401	37,988
2017	63,344		53,216
2018	69,217		58,150
2019	46,197		38,810
Total			188,164

E.2. Calculation of project emissions or actual net removals

In accordance with para B.6.1 of the registered PDD the project emissions have been considered zero

E.3. Calculation of leakage emissions

In accordance with para B.6.1 of the registered PDD the Leakage emissions have been considered zero.

E.4. Calculation of emission reductions or net anthropogenic removals

	Baseline GHG emissions or baseline net GHG removals ($t CO_2e$)	Project GHG emissions or actual net GHG removals ($t CO_2e$)	Leakage GHG emissions ($t CO_2e$)	GHG emission reductions or net anthropogenic GHG removals ($t CO_2e$)		
				Before 01/01/2013	From 01/01/2013	Total amount
Total	188,164	0	0	0	188,164	188,164

E.5. Comparison of emission reductions or net anthropogenic removals achieved with estimates in the registered PDD

Amount achieved during this monitoring period (t CO ₂ e)	Amount estimated ex ante for this monitoring period in the PDD (t CO ₂ e)
188,164	179,214

E.5.1. Explanation of calculation of “amount estimated ex ante for this monitoring period in the PDD”

Estimated ER according to PDD = 52,453 per annum

Total number of days in this monitoring period = 1248

So accordingly by applying unitary method the estimated ER for the whole monitoring period becomes

$$= (52453 \times 1248) / 365$$

$$= 179,214 \text{ tCO}_2\text{e}$$
E.6. Remarks on increase in achieved emission reductions

There is no considerable difference in the emission reductions during the current monitoring period relative to the estimation in the registered CDM-PDD. There is an increase of around 5% emission reduction relative to estimation in the registered CDM- PDD for the equivalent duration of the monitoring period which is an acceptable difference for such kind of project.

E.7. Remarks on scale of small-scale project activity

The project remained within the boundary of small scale activity throughout the monitoring period.

Document information

<i>Version</i>	<i>Date</i>	<i>Description</i>
07.0	31 May 2019	Revision to: <ul style="list-style-type: none"> • Ensure consistency with version 02.0 of the “CDM project standard for project activities” (CDM-EB93-A04-STAN); • Add a section on remarks on the observance of the scale limit of small-scale project activity during the crediting period; • Add "changes specific to afforestation or reforestation project activity" as a possible post-registration changes; • Clarify the reporting of net anthropogenic GHG removals for A/R project activities between two commitment periods; • Make editorial improvements.
06.0	7 June 2017	Revision to: <ul style="list-style-type: none"> • Ensure consistency with version 01.0 of the “CDM project standard for project activities” (CDM-EB93-A04-STAN); • Make editorial improvements.
05.1	4 May 2015	Editorial revision to correct version numbering.
05.0	1 April 2015	Revisions to: <ul style="list-style-type: none"> • Include provisions related to delayed submission of a monitoring plan; • Provisions related to the Host Party; • Remove reference to programme of activities; • Overall editorial improvement.
04.0	25 June 2014	Revisions to: <ul style="list-style-type: none"> • Include the Attachment: Instructions for filling out the monitoring report form (these instructions supersede the "Guideline: Completing the monitoring report form" (Version 04.0)); • Include provisions related to standardized baselines; • Add contact information on a responsible person(s)/ entity(ies) for completing the CDM-MR-FORM in A.6 and Appendix 1; • Change the reference number from <i>F-CDM-MR</i> to <i>CDM-MR-FORM</i>; • Editorial improvement.
03.2	5 November 2013	Editorial revision to correct table in page 1.
03.1	2 January 2013	Editorial revision to correct table in section E.5.
03.0	3 December 2012	Revision required to introduce a provision on reporting actual emission reductions or net GHG removals by sinks for the period up to 31 December 2012 and the period from 1 January 2013 onwards (EB 70, Annex 11).
02.0	13 March 2012	Revision required to ensure consistency with the "Guidelines for completing the monitoring report form" (EB 66, Annex 20).
01.0	28 May 2010	EB 54, Annex 34. Initial adoption.

<i>Version</i>	<i>Date</i>	<i>Description</i>
Decision Class: Regulatory Document Type: Form Business Function: Issuance Keywords: monitoring report		