



**Monitoring report form for CDM project activity**  
**(Version 07.0)**

**MONITORING REPORT**

<b>Title of the project activity</b>	Biomass based power generation project in Maharashtra, India	
<b>UNFCCC reference number of the project activity</b>	4078	
<b>Version number of the PDD applicable to this monitoring report</b>	5.5	
<b>Version number of this monitoring report</b>	1.0	
<b>Completion date of this monitoring report</b>	10/07/2019	
<b>Monitoring period number</b>	08	
<b>Duration of this monitoring period</b>	01/04/2018 – 31/03/2019 (First and last day included)	
<b>Monitoring report number for this monitoring period</b>	N/A	
<b>Project participants</b>	M/s. A.A. Energy Limited (Private Entity) Eneco Energy Trade B.V.	
<b>Host Party</b>	India	
<b>Applied methodologies and standardized baselines</b>	Applied Methodology: AMS-I.D. ver. 15 – “Grid connected renewable electricity generation”  Standardized baselines: N/A	
<b>Sectoral scopes</b>	Sectoral scope 1 : Energy industries (renewable - / non-renewable sources)	
<b>Amount of GHG emission reductions or net anthropogenic GHG removals achieved by the project activity in this monitoring period</b>	<b>Amount achieved before 1 January 2013</b>	<b>Amount achieved from 1 January 2013</b>
	Nil	15,758 tCO <sub>2</sub> e
<b>Amount of GHG emission reductions or net anthropogenic GHG removals estimated ex ante for this monitoring period in the PDD</b>	49,766 tCO <sub>2</sub> e	

## SECTION A. Description of project activity

### A.1. General description of project activity

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The project proponent M/s. A.A. Energy Limited (AAEL) has set up an eco-friendly 10 MW biomass based power generation project at Desaiganj Wadsa in Gadchiroli district of Maharashtra. The proposed small scale project utilise the surplus biomass residues primarily from rice husk available locally to generate power through sustainable means without causing any negative impacts on the environment. The project activity hence replaces an equivalent amount of power that would have been generated from fossil fuel based thermal power generation plant and thereby reducing the greenhouse gas emissions.

The process of power generation is based on Rankine cycle using boiler and turbine. Steam generated at a high pressure of 66 kg/cm<sup>2</sup> and temperature of 490°C is supplied to an extraction cum condensing turbine generator (TG) set at around 64 kg/cm<sup>2</sup> and 480°C. Fuel is supplied to boiler and entire steam generated is passed through the 10 MW steam turbine generator (STG) for generating of power. The details on the technology used have been provided in section B.1 of the report. Auxiliaries of the biomass power plant are supplied by in-house generated power & balance of power generated is synchronized and exported to the grid. The generated power, after meeting the auxiliary power requirements, is sold to Tata Power Trading Company Limited (TPTCL).

The purchase order for the project activity was placed on 20/08/2008 and the project was commissioned on 30/04/2010.

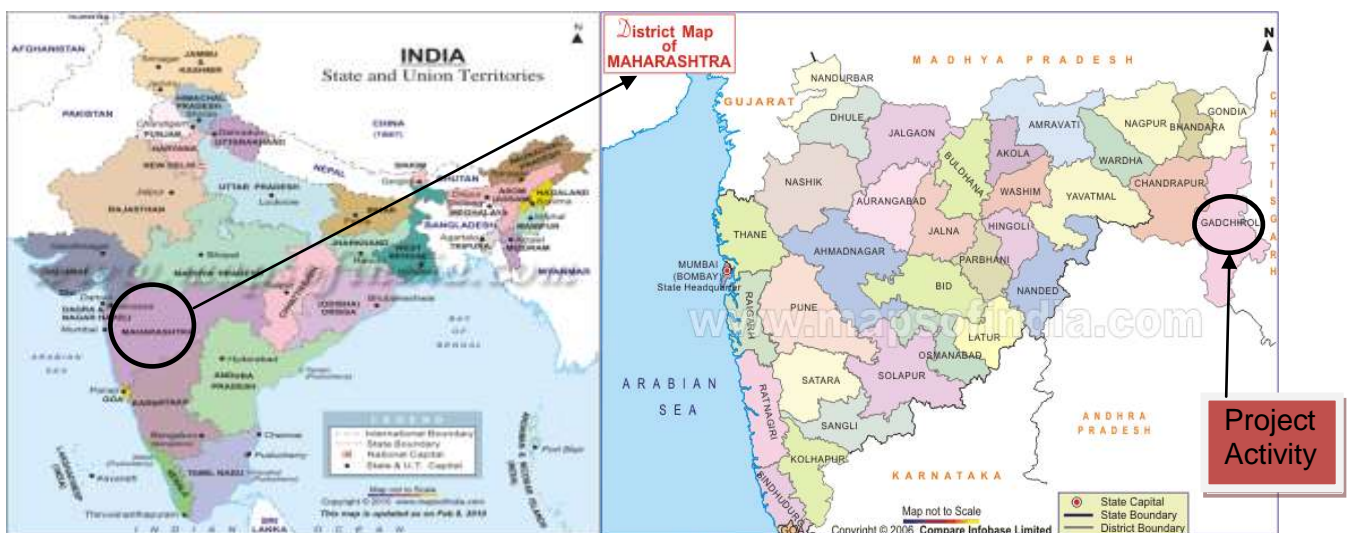
Plant Outage details are mentioned in Emission Reduction Spread Sheet.

The monitored electricity generation (EG<sub>BL,y</sub>) is compared with its corresponding value of SFC of fuel used and the lowest of two is considered for the calculation of emission reduction. The total emission reductions achieved in this monitoring period accounts to 15,758 tCO<sub>2</sub>e.

### A.2. Location of project activity

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The project is located at Desaiganj Wadsa in Gadchiroli district. The nearest town Desaiganj Wadsa is 7 km from the project site, the nearest railway station is at Desaiganj Wadsa. The nearest airport is at Nagpur, which is 160 km from the project site is accessible from NH-6 Nagpur – Raipur National Highway. The geographical co-ordinates of the project activity are 20°37'22" North to 79°57'32" East.



(The district map of Maharashtra indicating the 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 (Host)	M/s. A.A. Energy Limited (Private Entity)	No
United Kingdom of Great Britain and Northern Ireland (other party)	Eneco Energy Trade B.V. (Private Entity)	No

**A.4. References to applied methodologies and standardized baselines**

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AMS ID – Grid connected renewable electricity generation, Version 15<sup>1</sup>Tool to calculate the emission factor for an electricity system' version 01.1 Annex 12 EB 35<sup>2</sup>Tool to calculate project or leakage CO<sub>2</sub> emissions from fossil fuel combustion", version-02, EB41,annex 11<sup>3</sup>**A.5. Crediting period type and duration**

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Start date of crediting period: 26/01/2011

Choice of crediting period: 10 years (Fixed)

Crediting period: 26/01/2011 – 25/01/2021

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

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The plant was successfully commissioned and handed over to PP on 30/04/2010. The plant has been in operation continuously since commissioning.

**Technical description of the project activity**

The process of power generation is by Rankine cycle. Steam generated at high a pressure of 66 kg/cm<sup>2</sup> and 490°C is supplied to an extraction cum condensing turbine generator (TG) set at around 64 kg/cm<sup>2</sup> and 480°C. Fuel is supplied to boiler and entire steam generated is passed through the 10 MW steam turbine generator (STG) for generating of power. Auxiliaries of the biomass power plant are supplied in-house generated power & balance of power generated is synchronized and exported to the grid.(The generated power, after meeting the auxiliary power requirements, is sold to Tata Power Trading Company Limited (TPTCL) through grid.)

The biomass power plant STG has been designed with a bleed at 4 kg/cm<sup>2</sup> for supplying steam to de-aerator. Balance steam for maximizing power generation is condensed in the surface condenser. The high pressure steam in small quantities, required for steam jet air

<sup>1</sup> <http://cdm.unfccc.int/UserManagement/FileStorage/7QXAZ5036WN8BEYKUDFRPJGL21V4I9>

<sup>2</sup> <http://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-07-v1.1.pdf>

<sup>3</sup> [http://cdm.unfccc.int/EB/041/eb41\\_repan11.pdf](http://cdm.unfccc.int/EB/041/eb41_repan11.pdf)

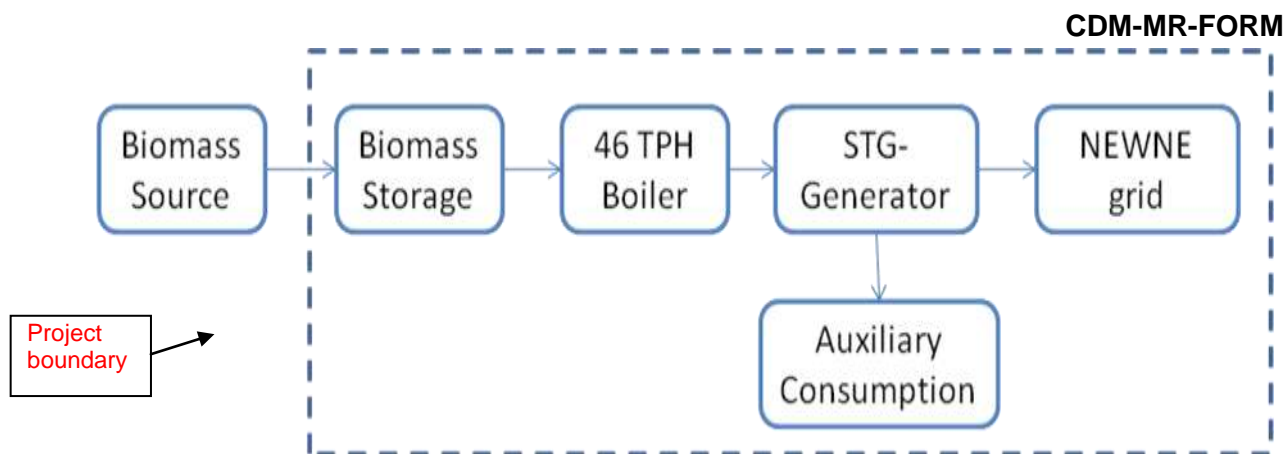
ejector and gland sealing is tapped from the main steam line through Pressure Reducing & De-Super Heating (PRDSH) station.

The power generated at 11 KV from the 10 MW STG set is stepped down to 415 V for meeting all power requirements of auxiliaries. The balance of power generated is synchronized with MSEDCL grid stepped up to 132 KV level and transported to a substation of MSEDCL at 16 km distance, for export purposes.

The boiler of 46 TPH has been designed for multi fuel operations and has a travelling grate design. However the primary fuel source used would be rice husk and the plant operates during the current monitoring period with rice husk and fossil fuel. The electro static precipitator (ESP) has been installed as a part of the boiler, along with reinforced cement concrete (RCC) chimney, to limit the emissions well below 100 mg/Nm<sup>3</sup>, stipulated norm by the Pollution Control Board. The plant controls are digital control system (DCS) based to ensure most efficient operations & monitoring of operating parameters. The Technical details of the power plant are as tabulated below –

<b>Boiler</b>	
Type	Travelling Grate
Boiler capacity (100 % load) / Steam Flow rate	46 TPH
Steam pressure at super heater outlet	66 kg/cm <sup>2</sup>
Steam temperature at super heater outlet	490°C
<b>Turbo Generator</b>	
Type	Extraction cum Condensing
Steam pressure at the TG inlet	64 kg/cm <sup>2</sup>
Steam temperature at the TG inlet	480°C
Frequency	50 Hz
<b>Power Evacuation</b>	
Grid Voltage	132 kV
MSEDCL substation	11/132 kV in Brahmapuri
<b>Energy Production (For Optimum year)</b>	
Gross Energy	10 MW
Auxiliary Consumption (10%)	1 MW
Voltage level	415 V (for auxiliary consumption)
Net Energy Export to Grid	9 MW

The project boundary includes the entire power plant site including all machinery & equipments required for power generation in this plant and biomass storage area. Project boundary is illustrated in the following diagram.



No major equipment has been replaced or exchanged since commissioning. However there are regular maintenance schedule that was recorded during current monitoring period.

## **B.2. Post-registration changes**

### **B.2.1. Temporary deviations from the registered monitoring plan, applied methodologies, standardized baselines or other methodological regulatory documents**

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This section is left blank intentionally as not applicable.

### **B.2.2. Corrections**

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Corrections in revised PDD version 05.5 dated 06/05/2014 has been approved by UNFCCC on 14/08/2014.

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

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This section is left blank intentionally as not applicable.

### **B.2.4. Inclusion of monitoring plan**

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This section is left blank intentionally as 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**

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Monitoring plan of the project activity has been revised and revised PDD version 05.5 was approved by UNFCCC on 14/08/2014.

<http://cdm.unfccc.int/Projects/DB/SGS-UKL1288172340.56/view>

### **B.2.6. Changes to project design**

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This section is left blank intentionally as not applicable.

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

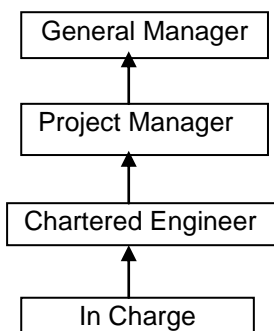
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This section is left blank intentionally as not applicable.

**SECTION C. Description of monitoring system**

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AAEL has implemented the following structure for data monitoring, collection, data archiving and calibration of equipments for this project activity.

**Organization chart:-**

The General Manager oversees the overall functioning and maintenance of the project activity, the dedicated team formed under his supervision will work on specified tasks.

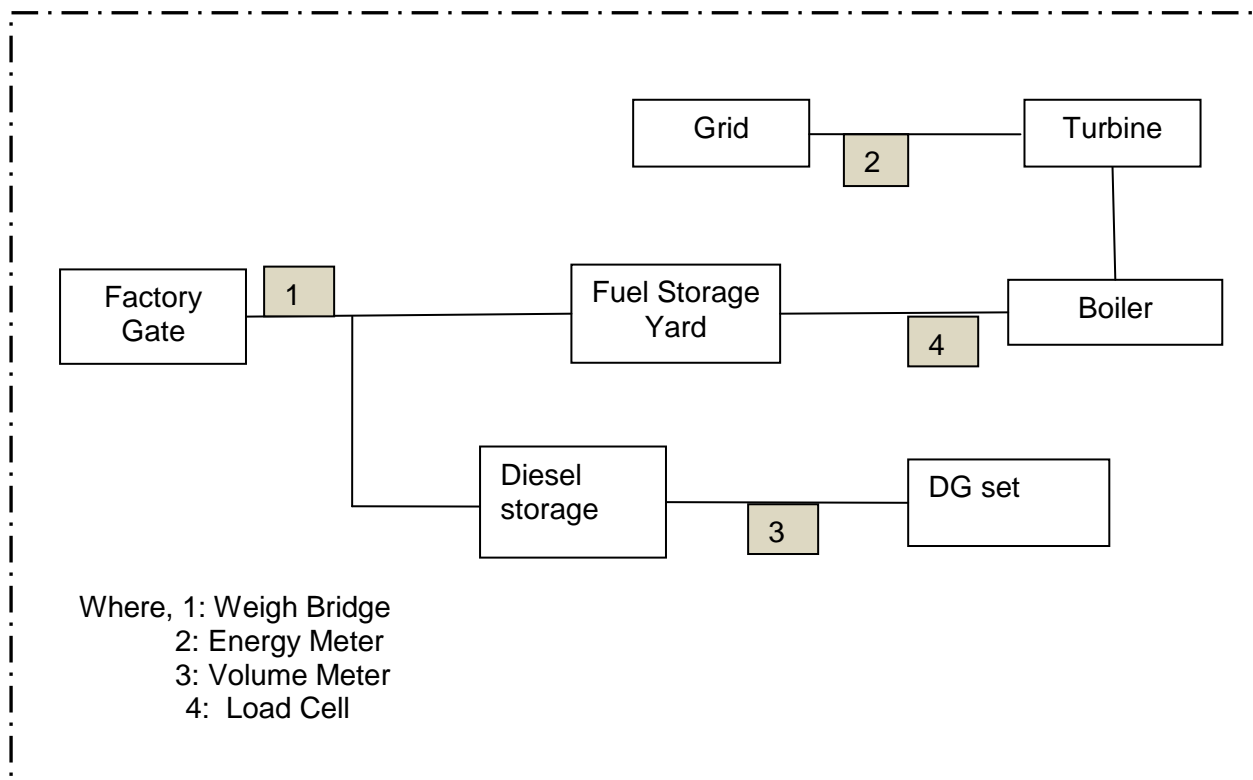
At the project site the in-charge maintains the data records, ensures completeness of data, and reliability of data (calibration of equipments). Wherein even day to day data of electricity generation is collected and maintained through a log book for data to be monitored. These reports are checked periodically by the Chartered Engineer and discussed thoroughly with the data monitoring personnel. A separate log will also be maintained for the biomass supply on the site, its storage and usage in the project activity. Similarly the usage of coal during contingency would be recorded along with biomass usage data. To ensure reliability of the measuring equipments via energy meter (used to measure net saleable power), weighbridge; will be calibrated annually by external agencies. Documents pertaining to annual calibration of equipments (energy meter, weighbridge) shall be maintained at the plant site.

All data collected as part of monitoring should be archived in paper and will be kept at least for 2 years after the end of the crediting period.

The Chartered Engineer ensures the proper functioning of all the equipments/ instruments and shall take a corrective action if found not operating as and when required. Further the project activity will not result in any unidentified activity that can result in substantial emissions from the project activity.

Emission reduction calculations and monitoring report will be done based on the data collected. The monitoring report and the emission reduction calculation will be maintained at the plant site/head office for annual verification purposes.

Line diagrams showing all relevant monitoring points can be referred as below:



## SECTION D. Data and parameters

### D.1. Data and parameters fixed ex ante

Data/Parameter	EF <sub>CO2</sub>
Unit	tCO <sub>2</sub> /MWh
Description	Fixed ex-ante combined margin emission factor of NEWNE grid derived from the OM and BM values
Source of data	CO <sub>2</sub> Baseline Database Version 4.0 dated October 2008 published by CEA
Value(s) applied	0.805
Choice of data or measurement methods and procedures	The fixed ex-ante combined margin emission factor is used in the calculation of emission reductions.
Purpose of data/parameter	Calculation of baseline emissions
Additional comments	As per revised approved PDD.

Data/parameter	SFC <sub>rice husk</sub>
Unit	Tonne of rice husk/MWh
Description	Specific fuel consumption of rice husk
Source of data	Calculated based on NCV of rice husk and design data of the boiler and turbine
Value(s) applied)	1.1089

Choice of data or measurement methods and procedures	The calculation is based on specific fuel consumption in boiler for steam generation and specific steam consumption in turbine for electricity generation.		
	<b>Parameter</b>	<b>Value</b>	<b>Unit</b>
	Specific fuel consumption in boiler	0.27	Tonne of Rice husk/Tonne of steam
	Specific steam consumption	4.07	Tonne of steam/MWh
	Specific fuel consumption of power plant	1.1089	Tonne of Rice husk/MWh
Purpose of data	To cross check the calculation of baseline emissions		
Additional comments	As per revised approved PDD.		

<b>Data/parameter</b>	<b>SFC<sub>FF</sub></b>		
Unit	Tonnes of fossil fuel/MWh		
Description	Specific fuel consumption of fossil fuel		
Source of data	Calculated based on NCV of coal and design data of the boiler and turbine		
Value(s) applied)	0.839		
Choice of data or measurement methods and procedures	The calculation is based on specific fuel consumption in boiler for steam generation and specific steam consumption in turbine for electricity generation.		
	<b>Parameter</b>	<b>Value</b>	<b>Unit</b>
	Specific fuel consumption in boiler	0.21	Tonne of coal/Tonne of steam
	Specific steam consumption	4.07	Tonne of steam/MWh
	Specific fuel consumption of power plant	0.839	Tonne of coal/MWh
Purpose of data	Calculation of Baseline emissions		
Additional comments	Specific fuel consumption has been specified ex ante based on designed data and this will be ex ante fixed for the crediting period.		

## D.2. Data and parameters monitored

<b>Data/parameter</b>	<b>EG<sub>BL,y</sub></b>
Unit	MWh
Description	Net electricity exported to the grid from this project activity
Measured/calculated/default	Measured & calculated
Source of data	Monthly energy meter reading records issued by the TPTCL/sales invoice raised by AAEL.



Value(s) of monitored parameter	<b>Month</b>	<b>Option 1 (MWh)</b>	<b>Option 2 (MWh)</b>
	01/04/2018 - 30/04/2018	3,369.40	2,883.60
	01/05/2018 - 31/05/2018	3,589.20	2,979.80
	01/06/2018 - 30/06/2018	2,588.95	2,201.70
	01/07/2018 - 31/07/2018	4,425.50	3,906.50
	01/08/2018 - 31/08/2018	3,960.90	3,497.90
	01/09/2018 - 30/09/2018	-1,098.23	1,696.08
	01/10/2018 - 31/10/2018	-766.11	1,929.80
	01/11/2018 - 30/11/2018	2,623.87	3,076.00
	01/12/2018 - 31/12/2018	3,279.05	4,098.80
	01/01/2019 - 31/01/2019	2,866.41	3,737.20
	01/02/2019 - 28/02/2019	2,490.73	2,997.40
	01/03/2019 - 31/03/2019	2,842.48	3,532.15
	<b>Total</b>	<b>30,172.14</b>	<b>36,536.93</b>
Monitoring equipment	<p>Monitoring Equipment: Energy meter</p> <p><b>Main Meter:</b></p> <p>Accuracy class: 0.2 S Main meter: Serial number: MSB09097 Make: Secure Calibration frequency: annually Date of calibration: 08/03/2018 Validity: one year</p> <p><b>Check Meter:</b></p> <p>Make: Secure Check meter: Serial number: MSB09096 Accuracy class: 0.2 S Calibration frequency: annually Date of calibration: 08/03/2018 Validity: one year</p>		
Measuring/reading/recording frequency	<p>Measuring: Continuously Reading: Hourly Recording: Monthly</p>		
Calculation method (if applicable)	<p>The energy meter installed at the site is a two-way metering system, which <b>directly measures</b> the exported and imported electricity. <math>EG_{BL,y}</math>, net electricity exported to the grid, is the <b>simple difference</b> of these two directly measured values with no other data/ value/ procedure being involved.</p> <p><math>EG_{BL,y} = (\text{Electricity exported to the grid} - \text{Electricity imported from grid})</math></p> <p>Option 1: Net electricity exported to the grid is calculated as per Para 22 of applicable methodology (AMS-I.D. ver. 15 )</p> <p>Option 2: Considering project emissions from coal</p>		
QA/QC procedures	<p>The meter is calibrated annually.</p> <p>Measurement results can be cross-checked with records for sold electricity - Invoices raised by AAEL.</p>		
Purpose of data/parameter	Calculation of baseline emissions		
Additional comments:	-		
Data/parameter	Qbiomassy		
Unit	Tonnes/annum		

Description	Quantity of biomass (including rice husk and bamboo dust) used for power generation process in year y																																										
Measured/calculated/default	Measured.																																										
Source of data	On site measurement using weighing scales and the same was recorded in the log book. For the purpose of continuous measurement of actual quantity of biomass, PP has also installed an online load cell in the conveyor for the measurement of the quantity of biomass.																																										
Value(s) of monitored parameter	<table border="1"> <thead> <tr> <th>Month</th><th>Q<sub>biomass</sub> (Procured) (Tonnes)</th><th>Q<sub>biomass</sub> (Consumed) (Tonnes)*</th></tr> </thead> <tbody> <tr> <td>01/04/2018 - 30/04/2018</td><td>4,558.39</td><td>5,671.06</td></tr> <tr> <td>01/05/2018 - 31/05/2018</td><td>5,860.79</td><td>6,010.06</td></tr> <tr> <td>01/06/2018 - 30/06/2018</td><td>6,941.98</td><td>4,204.34</td></tr> <tr> <td>01/07/2018 - 31/07/2018</td><td>4,370.28</td><td>6,829.53</td></tr> <tr> <td>01/08/2018 - 31/08/2018</td><td>5,161.31</td><td>6,108.69</td></tr> <tr> <td>01/09/2018 - 30/09/2018</td><td>3,499.26</td><td>-</td></tr> <tr> <td>01/10/2018 - 31/10/2018</td><td>4,796.24</td><td>489.74</td></tr> <tr> <td>01/11/2018 - 30/11/2018</td><td>7,390.58</td><td>4,529.78</td></tr> <tr> <td>01/12/2018 - 31/12/2018</td><td>6,365.35</td><td>5,822.34</td></tr> <tr> <td>01/01/2019 - 31/01/2019</td><td>6,975.42</td><td>5,536.19</td></tr> <tr> <td>01/02/2019 - 28/02/2019</td><td>6,165.79</td><td>4,673.00</td></tr> <tr> <td>01/03/2019 - 31/03/2019</td><td>2,283.60</td><td>5,407.66</td></tr> <tr> <td><b>Total</b></td><td><b>64,368.99</b></td><td><b>55,282.39</b></td></tr> </tbody> </table> <p>* Actual quantity of biomass used in boiler measured through load cell on the conveyor.</p>	Month	Q <sub>biomass</sub> (Procured) (Tonnes)	Q <sub>biomass</sub> (Consumed) (Tonnes)*	01/04/2018 - 30/04/2018	4,558.39	5,671.06	01/05/2018 - 31/05/2018	5,860.79	6,010.06	01/06/2018 - 30/06/2018	6,941.98	4,204.34	01/07/2018 - 31/07/2018	4,370.28	6,829.53	01/08/2018 - 31/08/2018	5,161.31	6,108.69	01/09/2018 - 30/09/2018	3,499.26	-	01/10/2018 - 31/10/2018	4,796.24	489.74	01/11/2018 - 30/11/2018	7,390.58	4,529.78	01/12/2018 - 31/12/2018	6,365.35	5,822.34	01/01/2019 - 31/01/2019	6,975.42	5,536.19	01/02/2019 - 28/02/2019	6,165.79	4,673.00	01/03/2019 - 31/03/2019	2,283.60	5,407.66	<b>Total</b>	<b>64,368.99</b>	<b>55,282.39</b>
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<b>Total</b>	<b>64,368.99</b>	<b>55,282.39</b>																																									
Monitoring equipment	<p>Monitoring Equipment: Weigh Bridge Accuracy class: Class III Serial number: 149/08 Total capacity: 60 T Least count: 10 kg Calibration frequency: annually Date of last calibration: 26/03/2018 Validity: one year</p> <p>Monitoring equipment: Load cell Type: Belt mounted Nominal load: 6.33 kg IC Number: 6111000597-2-2-001-01 Serial number: 6111-597-001 Load cell Type: S Calibration frequency: annually Date of calibration: 13/06/2018 Validity: one year</p>																																										
Measuring/reading/recording frequency	<p>Measuring: Continuously Reading: Daily Recording: Daily</p>																																										
Calculation method (if applicable)	NA																																										

QA/QC procedures	The weigh scale used for measuring fuels is calibrated annually. The data can be cross checked with the biomass procurement data.
Purpose of data/parameter	Calculation of baseline emissions
Additional comments	-

<b>Data/parameter</b>	<b>FC<sub>Coal,j,y</sub></b>		
Unit	Tonnes/annum		
Description	Quantity of coal used for the project activity in year y.		
Measured/calculated/default	Measured.		
Source of data	On site measurement using weighbridge and the same was recorded in the log book. For the purpose of continuous measurement of actual consumption of coal, PP has also installed an online load cell in the conveyor for the measurement of the quantity of coal.		
Value(s) of monitored parameter	<b>Month</b>	<b>FC<sub>Coal,j,y</sub> (procured ) (Tonnes)</b>	<b>FC<sub>Coal,j,y</sub> (consumed)* (Tonnes)</b>
	01/04/2018 - 30/04/2018	-	-
	01/05/2018 - 31/05/2018	2,000.00	-
	01/06/2018 - 30/06/2018	-	-
	01/07/2018 - 31/07/2018	2,214.55	-
	01/08/2018 - 31/08/2018	2,518.27	-
	01/09/2018 - 30/09/2018	1,267.18	2,530.65
	01/10/2018 - 31/10/2018	-	2,478.75
	01/11/2018 - 30/11/2018	-	720.64
	01/12/2018 - 31/12/2018	-	1,142.26
	01/01/2019 - 31/01/2019	1,638.50	1,138.18
	01/02/2019 - 28/02/2019	2,102.93	764.22
	01/03/2019 - 31/03/2019	2,051.68	980.56
	<b>Total</b>	<b>13,793.11</b>	<b>9,755.26</b>
	* Actual quantity of coal combusted in the power plant measured through load cell on the conveyor.		

Monitoring equipment	<p>Monitoring Equipment: Weigh Bridge  Accuracy class: Class III  Serial number: 149/08  Total capacity: 60 T  Least count: 10 kg.  Calibration frequency: annually</p> <p>Date of last calibration: 26/03/2018</p> <p>Validity: one year  Monitoring equipment: Load cell  Type: Belt mounted  Nominal load: 6.33 kg  IC number : 6111000597-2-2-001-01  Serial Number: 6111-597-001  Load cell Type: S  Calibration frequency: annually  Date of last calibration: 13/06/2018  Validity: one year</p>
Measuring/reading/recording frequency	<p>Measuring: Continuously  Reading: Daily  Recording: Daily</p>
Calculation method (if applicable)	NA
QA/QC procedures	The weigh scale used for measuring fuels is calibrated annually. The quantity of fossil fuel (coal) weighed on the weighbridge is crossed checked with fuel bills also.
Purpose of data/parameter	Calculation of baseline emissions & project emissions
Additional comments:	In option 1 , coal data is used for baseline emissions but in option 2, it is used for project emissions,

<b>Data/parameter</b>	<b>FC<sub>Diesel,j,y</sub></b>
Unit	volume/annum
Description	Quantity of diesel used for the project activity in year y.
Measured/calculated/default	Measured.
Source of data	On site measurement using volume meter and the same was recorded in the log book.

Value(s) of monitored parameter	Month	FC <sub>diesel,j,y</sub> (Procured) Litres	FC <sub>diesel,j,y</sub> (Consumed) Litres
	01/04/2018 - 30/04/2018	0	0
	01/05/2018 - 31/05/2018	0	0
	01/06/2018 - 30/06/2018	0	0
	01/07/2018 - 31/07/2018	0	0
	01/08/2018 - 31/08/2018	0	0
	01/09/2018 - 30/09/2018	0	0
	01/10/2018 - 31/10/2018	0	0
	01/11/2018 - 30/11/2018	0	0
	01/12/2018 - 31/12/2018	0	0
	01/01/2019 - 31/01/2019	0	0
	01/02/2019 - 28/02/2019	0	0
	01/03/2019 - 31/03/2019	0	0
	<b>Total</b>	<b>0</b>	<b>0</b>
Monitoring equipment	Monitoring Equipment: Volume meter Type: Jar (neck type) Capacity: 01, 02, 03, 05 & 10 litres Date of Calibration :09/06/2017 Validity :09/06/2019		
Measuring/reading/recording frequency	Measuring: Continuously Reading: Daily Recording: Daily		
Calculation method (if applicable)	NA		
QA/QC procedures	Volume meters (cans) are approved by the Weights & Measures Department and replaced on annually basis with new volume meters (cans). The quantity of fossil fuel (Diesel) measured by volume meters is crossed checked with fuel bills.		
Purpose of data/parameter	Calculation of project emissions		
Additional comments	-		

Data/parameter	NCV <sub>coal,y</sub>
Unit	TJ/tonne
Description	Net calorific value of coal in year y
Measured/calculated/default	Measured
Source of data	NCV values provided by the fuel supplier in invoices.  The maximum value of NCV of coal provided by the supplier is considered for the project emission calculation. This is conservative.
Value(s) of monitored parameter	0.013992
Monitoring equipment	Not applicable as the NCV values provided by the fuel supplier are being considered.
Measuring/reading/recording frequency	Measuring: NCV is obtained for each fuel delivery (from fuel supplier) Recording: Monthly
Calculation method (if applicable)	Not applicable since the NCV values supplied by the fuel supplier are considered for the emission reduction calculation.

QA/QC procedures	<p>If the values under NCVs are within the uncertainty range of the IPCC default values as provided in Table 1.2, Vol. 2 of the 2006 IPCC Guidelines. If the values fall below this range collect additional information from the testing laboratory to justify the outcome or conduct additional measurements.</p> <table><tr><td>Lower range (on 95 % confidence level) TJ/Gg</td><td>NCV (TJ/Gg)</td><td>Upper range (on 95 % confidence level) TJ/Gg</td></tr><tr><td>11.5</td><td>18.9</td><td>26</td></tr></table> <p>The average Value of NCV during the monitoring period =3,347 kcal/kg =(3,347 *4.18)*10<sup>6</sup>/10<sup>9</sup> =13.992 TJ/Gg = 0.013992TJ/tonne</p> <p>Conversion factor: 1 kCal/kg= 4.18 kJ/kg Since the monitored value is within the uncertainty range of the IPCC values so no additional information is required to be collected .</p>	Lower range (on 95 % confidence level) TJ/Gg	NCV (TJ/Gg)	Upper range (on 95 % confidence level) TJ/Gg	11.5	18.9	26
Lower range (on 95 % confidence level) TJ/Gg	NCV (TJ/Gg)	Upper range (on 95 % confidence level) TJ/Gg					
11.5	18.9	26					
Purpose of data/parameter	Data is used for Project emission calculation.						
Additional comments	-						

Data/parameter	NCV <sub>diesel,y</sub>						
Unit	TJ/litre						
Description	Net calorific value of diesel in year y						
Measured/calculated/default	Monitored/Recorded value  The Average value of NCV of diesel provided by the supplier is considered for the project emission calculation. This is conservative.						
Source of data	Values provided by the fuel supplier in invoices.						
Value(s) of monitored parameter	0.00003551						
Monitoring equipment	Not applicable						
Measuring/reading/recording frequency	NCV is obtained for each fuel delivery (from fuel supplier)						
Calculation method (if applicable)	NA						
QA/QC procedures	<p>Verify if the values under NCVs are within the uncertainty range of the IPCC default values as provided in Table 1.2, Vol. 2 of the 2006 IPCC Guidelines. If the values fall below this range collect additional information from the testing laboratory to justify the outcome or conduct additional measurements.</p> <table><tr><th>Lower range (on 95 % confidence level) TJ/Gg</th><th>NCV (TJ/Gg)</th><th>Upper range (on 95 % confidence level) TJ/Gg</th></tr><tr><td>41.4</td><td>43</td><td>43.3</td></tr></table> <p>The average Value of NCV during the monitoring period =10,360 kcal/kg =(10,360*0.82*4.18*10<sup>-9</sup>) = 0.00003551TJ/lt</p> <p>Since the monitored value is within the uncertainty range of the IPCC values so no additional information is required to be collected .</p>	Lower range (on 95 % confidence level) TJ/Gg	NCV (TJ/Gg)	Upper range (on 95 % confidence level) TJ/Gg	41.4	43	43.3
Lower range (on 95 % confidence level) TJ/Gg	NCV (TJ/Gg)	Upper range (on 95 % confidence level) TJ/Gg					
41.4	43	43.3					
Purpose of data/parameter	Data is used for Project emission calculation.						
Additional comments	-						

<b>Data/parameter</b>	<b>N<sub>truck,y</sub></b>																												
Unit	-																												
Description	Number of truck/vehicle trips from the biomass source to the power plant in year y																												
Measured/calculated/default	Measured.																												
Source of data	The number of deliveries/vehicles recorded in log book at the factory gate.																												
Value(s) of monitored parameter	<table border="1"> <thead> <tr> <th>Month</th><th>Numbers of Trucks</th></tr> </thead> <tbody> <tr> <td>01/04/2018 - 30/04/2018</td><td>157</td></tr> <tr> <td>01/05/2018 - 31/05/2018</td><td>68</td></tr> <tr> <td>01/06/2018 - 30/06/2018</td><td>46</td></tr> <tr> <td>01/07/2018 - 31/07/2018</td><td>41</td></tr> <tr> <td>01/08/2018 - 31/08/2018</td><td>37</td></tr> <tr> <td>01/09/2018 - 30/09/2018</td><td>69</td></tr> <tr> <td>01/10/2018 - 31/10/2018</td><td>74</td></tr> <tr> <td>01/11/2018 - 30/11/2018</td><td>87</td></tr> <tr> <td>01/12/2018 - 31/12/2018</td><td>72</td></tr> <tr> <td>01/01/2019 - 31/01/2019</td><td>64</td></tr> <tr> <td>01/02/2019 - 28/02/2019</td><td>87</td></tr> <tr> <td>01/03/2019 - 31/03/2019</td><td>67</td></tr> <tr> <td><b>Total</b></td><td><b>869</b></td></tr> </tbody> </table>	Month	Numbers of Trucks	01/04/2018 - 30/04/2018	157	01/05/2018 - 31/05/2018	68	01/06/2018 - 30/06/2018	46	01/07/2018 - 31/07/2018	41	01/08/2018 - 31/08/2018	37	01/09/2018 - 30/09/2018	69	01/10/2018 - 31/10/2018	74	01/11/2018 - 30/11/2018	87	01/12/2018 - 31/12/2018	72	01/01/2019 - 31/01/2019	64	01/02/2019 - 28/02/2019	87	01/03/2019 - 31/03/2019	67	<b>Total</b>	<b>869</b>
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01/01/2019 - 31/01/2019	64																												
01/02/2019 - 28/02/2019	87																												
01/03/2019 - 31/03/2019	67																												
<b>Total</b>	<b>869</b>																												
Monitoring equipment	Not applicable																												
Measuring/reading/recording frequency	Measuring: Daily Reading: Daily Recording: monthly																												
Calculation method (if applicable)	NA																												
QA/QC procedures	<p>This can be cross-checked with average carrying capacity of vehicle and quantity of rice husk and bamboo dust consumed in that period.</p> <p>Quantity of rice husk and bamboo dust = 74,458.37 tonne  Average load /trip = 85.68 tonne  No. of trucks = 74,458 /85.68  = 869.02</p>																												
Purpose of data/parameter	Data is used for leakage emission calculation.																												
Additional comments	-																												

<b>Data/parameter</b>	<b>AVD<sub>max,y</sub></b>
Unit	km
Description	Max distance of the Power plant from the Biomass (Rice husk and bamboo dust) source in year y
Measured/calculated/default	Estimated
Source of data	Log book at the factory gate

Value(s) of monitored parameter	<b>Month</b>	<b>Maximum distance in km</b>
	01/04/2018 - 30/04/2018	48.00
	01/05/2018 - 31/05/2018	40.00
	01/06/2018 - 30/06/2018	50.00
	01/07/2018 - 31/07/2018	50.00
	01/08/2018 - 31/08/2018	50.00
	01/09/2018 - 30/09/2018	50.00
	01/10/2018 - 31/10/2018	48.00
	01/11/2018 - 30/11/2018	47.00
	01/12/2018 - 31/12/2018	48.00
	01/01/2019 - 31/01/2019	46.00
	01/02/2019 - 28/02/2019	49.00
	01/03/2019 - 31/03/2019	44.00
Monitoring equipment	Not applicable	
Measuring/reading/recording frequency	Measuring: At each delivery Reading: At each delivery Recording: At each delivery	
Calculation method (if applicable)	NA	
QA/QC procedures	No QA/QC is required as the maximum distance is considered for calculation of leakage due to transportation.  Maximum distance is 50 km for the current monitoring period.	
Purpose of data/parameter	Data is used for leakage emission calculation.	
Additional comments	-	

### D.3. Implementation of sampling plan

&gt;&gt;

This section is left blank intentionally as not applicable.

## SECTION E. Calculation of emission reductions or net anthropogenic removals

### E.1. Calculation of baseline emissions or baseline net removals

&gt;&gt;

Sample calculation for the baseline emissions calculation for the month of **Jan 2019**:

#### **Option 1: As per the paragraph 20 of the applicable methodology AMS.I.D version 15:**

*“if fossil fuel is used, the electricity generation metered should be adjusted by deducting the electricity generation from fossil fuels using the specific fuel consumption and the quantity of the fossil fuel consumed”*

Metered electricity generation for the month of **Jan 2019** = 5,194.60 MWh

Power Gen using coal SFC based estimation =  $FC_{\text{coal},j,y} / SFC_{\text{coal}}$   
= 1,138.18 tonne/0.839 tonnes of coal/ MWh  
= 1,356.59 MWh



Power Gen using rice husk - estimated based on SFC coal = 5,194.60 – 1,356.59  
= 3,838.01 MWh

**Paragraph 22 of the applicable methodology AMS.I.D version 15:**

*“The amount of electricity generated using biomass fuels calculated as per paragraph 20 shall be compared with the amount of electricity generated calculated using specific fuel consumption and amount of each type of biomass fuel used. The lower of the two values should be used to calculate emission reductions.”*

Power Gen using rice husk (based on SFC rice husk) =  $Q_{\text{biomass},y} / \text{SFC}_{\text{rice husk}}$   
= 5,536.19 tonne / 1.1089 tonnes of rice  
husk/MWh  
= 4,992.51 MWh

**Baseline emission reduction calculation:**

Gross electricity generated = Min [Power Gen using rice husk: estimated based on SFC coal (MWh), Power Gen using rice husk: based on SFC rice husk (MWh)]  
= Min [3,838.01, 4,992.51 MWh]  
= 3,838.01 MWh

Aux electricity = Gross electricity generated – electricity exported to grid + electricity imported from grid  
= 5,194.60 – 1,356.59 + 3,838.01  
= 971.60 MWh

$EG_{BL,y}$  = Gross electricity exported to the grid – Aux electricity  
= 3,838.01 MWh – 971.60 MWh  
= 2,866.41 MWh

$$BE_y = EG_{BL,y} * EF_y$$

Where,

$BE_y$ : Baseline emissions due to displacement of electricity during the year y in tons of CO<sub>2</sub>  
 $EG_{BL,y}$ : Net electricity exported to the grid by the project activity during the year y in MWh,  
 $EF_y$ : The emission factor of the grid to which the project activity exports electricity.

Grid Emission Factor = 0.805 tCO<sub>2</sub>/MWh

$BE_y$  = 2,866.41 MWh \* 0.805 tCO<sub>2</sub>/MWh  
= 2,307.46 tCO<sub>2</sub>e

**Option 2: Considering project emissions from coal**

$EG_{BL,y}$  = Gross electricity generated – Aux electricity - Imported electricity  
= 5,194.60 – 971.60 – 485.80  
= 3,737.20 MWh

$BE_y = EG_{BL,y} * EF_y$   
= 3,737.20 \* 0.805 tCO<sub>2</sub>/MWh  
= 3,008.45 tCO<sub>2</sub>e

Baseline emission calculations for the complete monitoring period, 01/04/2018 – 31/03/2019 can be referred from Emission Reduction sheet.

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

&gt;&gt;

Project Emissions due to Auxiliary Fuel (e.g. Diesel etc) consumption is estimated as per the following equation:

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

Where

$PE_{FC,j,y}$  = Are the CO<sub>2</sub> emissions from fossil fuel combustion in process j during the year y (tCO<sub>2</sub>/yr);

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

$COEF_{i,y}$  = Is the CO<sub>2</sub> emission coefficient of fuel type i in year y (tCO<sub>2</sub>/mass or volume unit)

i = Are the fuel type (diesel) combusted in process j during the year y

The CO<sub>2</sub> emission coefficient  $COEF_{i,y}$  can be calculated using Option B (Option A is not followed as the chemical composition of fossil fuel type i is not available with PP) as follows:

Option B: The CO<sub>2</sub> emission coefficient  $COEF_{i,y}$  is calculated based on net calorific value and CO<sub>2</sub> emission factor of the fuel type i, as follows:

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

Where:

$COEF_{i,y}$	=	Is the CO <sub>2</sub> emission coefficient of fuel type i in year y (tCO <sub>2</sub> /mass or volume unit)
$NCV_{i,y}$	=	Is the weighted average net calorific value of the fuel type i in year y (GJ/mass or volume unit)
$EF_{CO2,i,y}$	=	Is the weighted average CO <sub>2</sub> emission factor of fuel type i in year y (tCO <sub>2</sub> /GJ)
i	=	Are the fuel types combusted in process j during the year y

Net calorific value of diesel = 0.00003551 TJ/litre (Monitored Value: Average of the NCV values supplied by the fuel supplier)

Net calorific value of coal = 0.013992 TJ/tonne (The maximum value of NCV of coal provided by the supplier is considered for the project emission calculation)

Emission factor of diesel = 74.8 tCO<sub>2</sub>/TJ (2006 IPCC maximum value)

Emission factor of coal = 100 tCO<sub>2</sub>/TJ (2006 IPCC maximum value)

**Project emission due to Diesel:**

Month	Quantity of diesel used in the plant (litres)	Project emissions (tCO <sub>2</sub> e)
01/04/2018 - 30/04/2018	0	0
01/05/2018 - 31/05/2018	0	0
01/06/2018 - 30/06/2018	0	0
01/07/2018 - 31/07/2018	0	0
01/08/2018 - 31/08/2018	0	0
01/09/2018 - 30/09/2018	0	0
01/10/2018 - 31/10/2018	0	0
01/11/2018 - 30/11/2018	0	0
01/12/2018 - 31/12/2018	0	0

01/01/2019 - 31/01/2019	0	0
01/02/2019 - 28/02/2019	0	0
01/03/2019 - 31/03/2019	0	0
<b>Total</b>	<b>0</b>	<b>0</b>

**Project emission due to Coal:**

Month	Quantity of coal used in the plant (tonnes)	Project emissions (tCO <sub>2</sub> e)
01/04/2018 - 30/04/2018	0	-
01/05/2018 - 31/05/2018	0	-
01/06/2018 - 30/06/2018	0	-
01/07/2018 - 31/07/2018	0	-
01/08/2018 - 31/08/2018	0	-
01/09/2018 - 30/09/2018	2,530.65	3,540.79
01/10/2018 - 31/10/2018	2,478.75	3,468.18
01/11/2018 - 30/11/2018	720.64	1,008.29
01/12/2018 - 31/12/2018	1,142.26	1,598.21
01/01/2019 - 31/01/2019	1,138.18	1,592.50
01/02/2019 - 28/02/2019	764.22	1,069.27
01/03/2019 - 31/03/2019	980.56	1,371.96
<b>Total</b>	<b>9,755.26</b>	<b>13,650</b>

**E.3. Calculation of leakage emissions**

&gt;&gt;

The biomass assessment study carried out for the project activity revealed that:

- The Biomass (rice husk and bamboo dust) used for the project activity is available within 50 km radial distance from the project site and the Biomass (rice husk and bamboo dust) is transported within a distance of 50 km from the project site. Biomass (Rice husk and Bamboo Dust) doesn't require any processing which results in significant emission.
- The quantity of biomass available in the region is more than 25% of the biomass utilized in the project activity.

Hence leakage has been neglected.

Therefore, **Leakage, LE<sub>y</sub> = 0.**

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

	Baseline GHG emissions or baseline net GHG removals (t CO <sub>2</sub> e)	Project GHG emissions or actual net GHG removals (t CO <sub>2</sub> e)	Leakage GHG emissions (t CO <sub>2</sub> e)	GHG emission reductions or net anthropogenic GHG removals (t CO <sub>2</sub> e)		
				Before 01/01/2013	From 01/01/2013	Total amount
<b>Option 1: As per Para 22 of the applicable methodology AMS I.D. Version 15:</b>	24286	0	0	0	24286	24286

	Baseline GHG emissions or baseline net GHG removals (t CO <sub>2</sub> e)	Project GHG emissions or actual net GHG removals (t CO <sub>2</sub> e)	Leakage GHG emissions (t CO <sub>2</sub> e)	GHG emission reductions or net anthropogenic GHG removals (t CO <sub>2</sub> e)		
				Before 01/01/2013	From 01/01/2013	Total amount
<b>Option 2: Considering project emissions from coal:</b>	29,412	13,650	0	0	15,758	15,758

**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 <sub>2</sub> e)	Amount estimated ex ante for this monitoring period in the PDD (t CO <sub>2</sub> e)
15,758	49,766

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

>>

Emission reductions for the considered period (366 days) as per estimates in the PDD(tCO <sub>2</sub> e)	Actual Emission Reduction for the monitoring period (tCO <sub>2</sub> e)	Variation
49,766	15,758	-68.34%

There is decrease of 68.34 % in the actual emission reductions achieved during the current monitoring period from that stated in the revised approved CDM-PDD because of breakdown and outage of the plant.

**E.6. Remarks on increase in achieved emission reductions**

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Actual Emission Reduction for the monitoring period decrease of 68.34 %.

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

>>

Project is still small –scale project activity.

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## Document information

<i>Version</i>	<i>Date</i>	<i>Description</i>
07.0	31 May 2019	Revision to: <ul style="list-style-type: none"> <li>• Ensure consistency with version 02.0 of the “CDM project standard for project activities” (CDM-EB93-A04-STAN);</li> <li>• Add a section on remarks on the observance of the scale limit of small-scale project activity during the crediting period;</li> <li>• Add "changes specific to afforestation or reforestation project activity" as a possible post-registration changes;</li> <li>• Clarify the reporting of net anthropogenic GHG removals for A/R project activities between two commitment periods;</li> <li>• Make editorial improvements.</li> </ul>
06.0	7 June 2017	Revision to: <ul style="list-style-type: none"> <li>• Ensure consistency with version 01.0 of the “CDM project standard for project activities” (CDM-EB93-A04-STAN);</li> <li>• Make editorial improvements.</li> </ul>
05.1	4 May 2015	Editorial revision to correct version numbering.
05.0	1 April 2015	Revisions to: <ul style="list-style-type: none"> <li>• Include provisions related to delayed submission of a monitoring plan;</li> <li>• Provisions related to the Host Party;</li> <li>• Remove reference to programme of activities;</li> <li>• Overall editorial improvement.</li> </ul>
04.0	25 June 2014	Revisions to: <ul style="list-style-type: none"> <li>• Include the Attachment: Instructions for filling out the monitoring report form (these instructions supersede the "Guideline: Completing the monitoring report form" (Version 04.0));</li> <li>• Include provisions related to standardized baselines;</li> <li>• Add contact information on a responsible person(s)/ entity(ies) for completing the CDM-MR-FORM in A.6 and Appendix 1;</li> <li>• Change the reference number from <i>F-CDM-MR</i> to <i>CDM-MR-FORM</i>;</li> <li>• Editorial improvement.</li> </ul>
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).

<i>Version</i>	<i>Date</i>	<i>Description</i>
01.0	28 May 2010	EB 54, Annex 34. Initial adoption.
Decision Class: Regulatory Document Type: Form Business Function: Issuance Keywords: monitoring report		