Monitoring report form
(Version 05.1)

MONITORING REPORT		
Title of the project activity	Biomass based power generation project in Maharashtra, India	
UNFCCC reference number of the project activity	4078	
Version number of the monitoring report	1	
Completion date of the monitoring report	0905/2016	
Monitoring period number and duration of this monitoring period	Monitoring period No:5 01/04/2015 – 31/03/2016 (First and last day included)	
Project participant(s)	A.A. Energy Limited (Private Entity) Eneco Energy Trade B.V.	
Host Party	India	
Sectoral scope(s)	Sectoral scope 1 : Energy industries (renewable - / non-renewable sources	
Selected methodology(ies)	Methodology: AMS-I.D. ver. 15 – "Grid connected renewable electricity generation"	
Selected standardized baseline(s)	N/A	
Estimated amount of GHG emission reductions or net GHG removals by sinks for this monitoring period in the registered PDD	49,766 tCO_2e	
Total amount of GHG emission reductions or net GHG removals by sinks achieved in this monitoring period	GHG emission reductions or net GHG removals by sinks reported up to 31 December 2012	GHG emission reductions or net GHG removals by sinks reported from 1 January 2013 onwards
	Nil	32,269 tCO_2e

SECTION A. Description of project activity

A.1. Purpose and 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^2 and temperature of 490^{o}C is supplied to an extraction cum condensing turbine generator (TG) set at around 64 kg/cm^2 and 480^{o}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.

Outage details are mentioned in section B.1 of the monitoring report.

The monitored electricity generation ($EG_{BL,y}$) is compared with its corresponding value of SFC and the lowest of two is considered for the calculation of emission reduction. The total emission reductions for the monitoring period accounts to 32,269 tCO_2e.

A.2. Location of project activity

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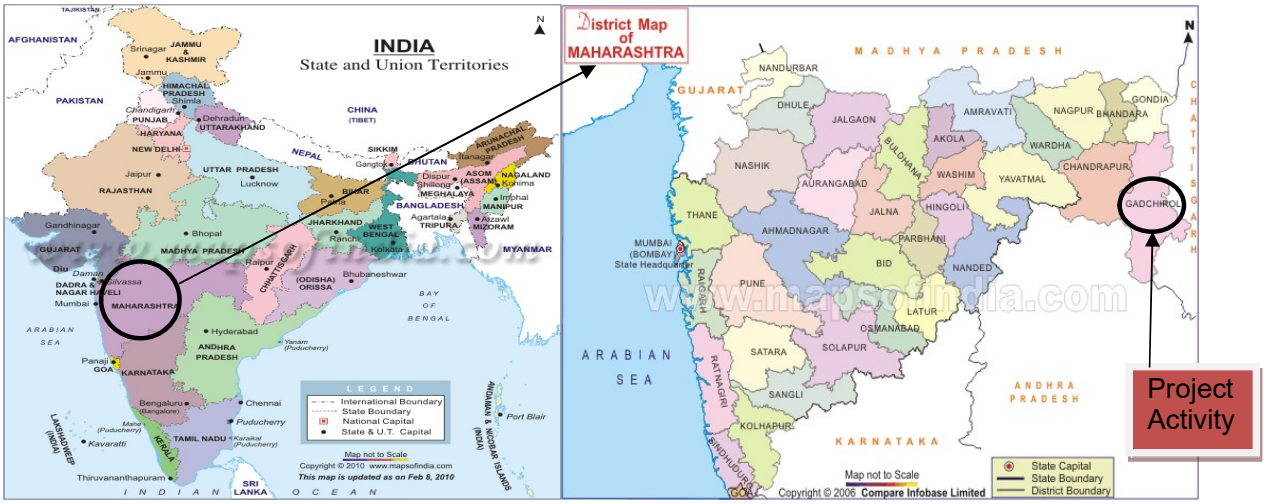
The project is located at Desaiganj Wadsa in Gadchiroli district. The nearest town Desaiganj Wadsa is 7 km from the project site, the nearest railway station is at Desaiganj Wadsa. The nearest airport is at Nagpur, which is 160 km from the project site is accessible from NH-6 Nagpur – Raipur National Highway. The geographical co-ordinates of the project activity are 20^{0}37'22'' North to 79^{0}57'32'' East.



(The district map of Maharashtra indicating the location of the project activity)

A.3. Parties and project participant(s)

Party involved ((host) indicates a host Party)	Private and/or public entity(ies) project participants (as applicable)	Indicate whether 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. Reference of applied methodology and standardized baseline

>>
AMS ID – Grid connected renewable electricity generation, Version 15[1]

Tool to calculate the emission factor for an electricity system' version 01.1 Annex 12 EB 35[2]

Tool to calculate project or leakage CO_2 emissions from fossil fuel combustion", version-02, EB41,annex 11[3]

A.5. Crediting period of project activity

>>
Start date of crediting period: 26/01/2011

Choice of crediting period: 10 years (Fixed)

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

A.6. Contact information of responsible persons/entities

>>
Mr. Swapnil Agrawal
Director
A.A. Energy Limited
No.101, Nikalas Tower, Central Bazaar Road, Ramdaspeth
Nagpur, Maharashtra- 44010
E-mail- aaenergyltd@yahoo.com
Mobile: +91-9822571145
Mr. Swapnil Agarwal is a project participant and there details are provided in appendix 1.

SECTION B. Implementation of project activity

B.1. Description of implemented registered 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

[1] http://cdm.unfccc.int/UserManagement/FileStorage/7QXAZ5036WN8BEYKUDFRPJGL21V4I9
[2] http://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-07-v1.1.pdf
[3] http://cdm.unfccc.int/EB/041/eb41_repan11.pdf

The process of power generation is by Rankine cycle. Steam generated at high a pressure of 66 kg/cm^2 and 490^{o}C is supplied to an extraction cum condensing turbine generator (TG) set at around 64 kg/cm^2 and 480^{o}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.)

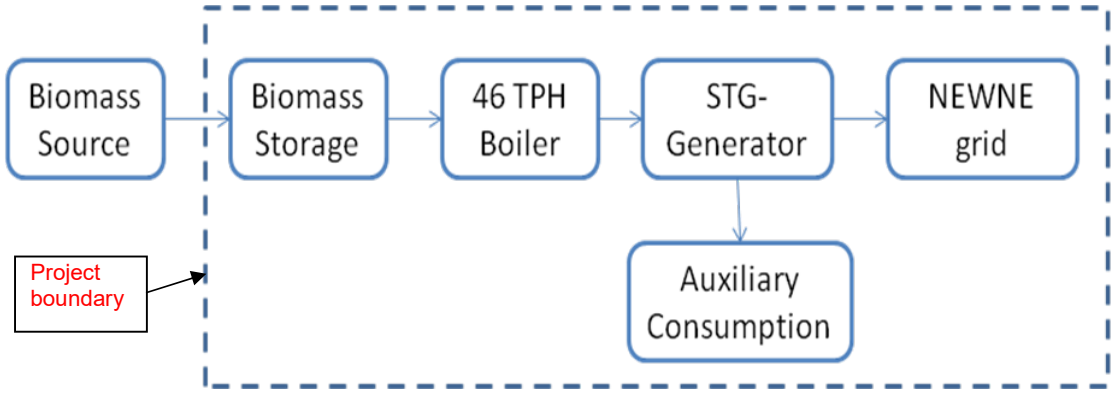
The biomass power plant STG has been designed with a bleed at 4 kg/cm² for supplying steam to de-aerator. Balance steam for maximizing power generation is condensed in the surface condenser. The high pressure steam in small quantities, required for steam jet air ejector and gland sealing is tapped from 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^3, 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 –

Boiler	
Type	Travelling Grate
Boiler capacity (100 % load) / Steam Flow rate	46 TPH
Steam pressure at super heater outlet	66 kg/cm^2
Steam temperature at super heater outlet	490^{o}C
Turbo Generator	
Type	Extraction cum Condensing
Steam pressure at the TG inlet	64 kg/cm^2
Steam temperature at the TG inlet	480^{o}C
Frequency	50 Hz
Power Evacuation	
Grid Voltage	132 kV
MSCDCL substation	11/132 kV in Brahmapuri
Energy Production (For Optimum year)	
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. Further no breakdown was observed in the boiler during the present monitoring period.

B.2. Post-registration changes

B.2.1. Temporary deviations from registered monitoring plan, applied methodology or applied standardized baseline

>>
This section is left blank intentionally as not applicable.

B.2.2. Corrections

>>
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 start date of crediting period

>>
Monitoring plan of the project activity has been revised and revised PDD version 05.5 is approved by UNFCCC on 14/08/2014.
http://cdm.unfccc.int/Projects/DB/SGS-UKL1288172340.56/view

B.2.4. Inclusion of a monitoring plan to the registered PDD that was not included at registration

>>

This section is left blank intentionally as not applicable.

B.2.5. Permanent changes from registered monitoring plan, applied methodology or applied standardized baseline

>>
This section is left blank intentionally as not applicable.

B.2.6. Changes to project design of registered project activity

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This section is left blank intentionally as not applicable.

B.2.7. Types of changes specific to afforestation or reforestation project activity

>>
This section is left blank intentionally as not applicable.

SECTION C. Description of monitoring system

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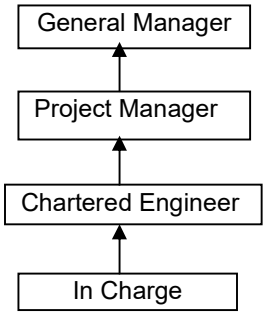
AAEL has implemented the following structure for data monitoring, collection, data archiving and calibration of equipments for this project activity.

Organization chart:-



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

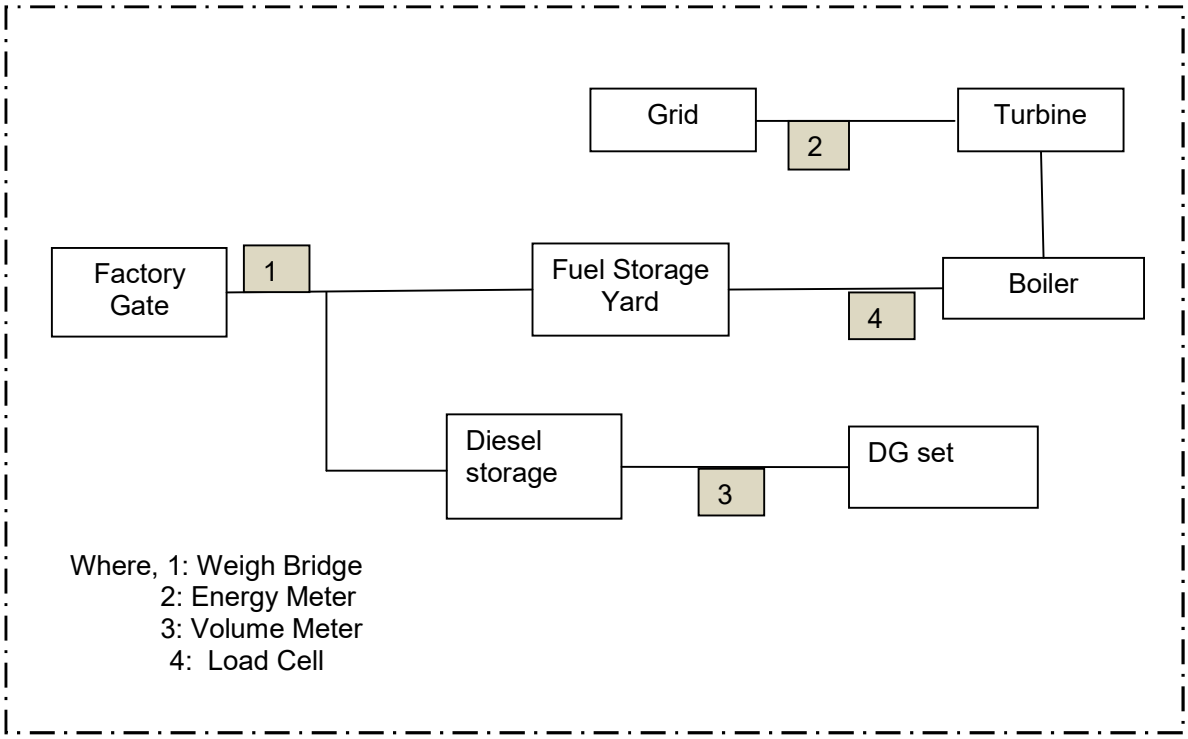
At the project site the in-charge maintains the data records, ensures completeness of data, and reliability of data (calibration of equipments). Wherein even day to day data of electricity generation is collected and maintained through a log book for data to be monitored. These reports are checked periodically 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 or at renewal of crediting period

Data/parameter:	**EF_{CO2}**
Unit	tCO_2/MWh
Description	Fixed ex-ante combined margin emission factor of NEWNE grid derived from the OM and BM values
Source of data	CO_2 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	Calculation of baseline emissions
Additional comments	As per revised approved PDD.

Data/parameter:	**$SFC_{rice\ husk}$**
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.

Parameter	Value	Unit
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.

Data/parameter:	**SFC_{FF}**
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.

Parameter	Value	Unit
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

Data/parameter:	$EG_{BL,y}$
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	

Month	Option 1 (MWh)	Option 2 (MWh)
01/04/2015 - 30/04/2015	2,827.10	2,826.99
01/05/2015 - 31/05/2015	5,297.38	5,297.30
01/06/2015 - 30/06/2015	5,162.62	5,162.56
01/07/2015 - 31/07/2015	4,699.47	4,699.45
01/08/2015 - 31/08/2015	3,293.47	6,279.50
01/09/2015 - 30/09/2015	6,012.96	6,012.68
01/10/2015 - 31/10/2015	5,761.97	5,761.80
01/11/2015 - 30/11/2015	2,620.62	5,970.89
01/12/2015 - 31/12/2015	2,253.33	6,046.32
01/01/2016 - 31/01/2016	6,136.82	6,136.80
01/02/2016 - 28/02/2016	5,310.42	5,310.39
01/03/2016 - 31/03/2016	685.97	5,443.70
Total	**50,062.12**	**64,948.38**

Monitoring equipment	Monitoring Equipment: Energy meter Accuracy class: 0.2 S Main meter: Serial number: MSB09097 Make: Secure Calibration frequency: annually Date of calibration: 20/02/2015 & 19/02/2016 Validity: one year Make: Secure Check meter: Serial number: MSB09096 Accuracy class: 0.2 S Calibration frequency: annually Date of calibration: 26/03/2013 Validity: one year
Measuring/reading/recording frequency:	Measuring: Continuously Reading: Hourly Recording: Monthly
Calculation method (if applicable):	The energy meter installed at the site is a two-way metering system, which **directly measures** the exported and imported electricity. $EG_{BL,y}$, net electricity exported to the grid, is the **simple difference** of these two directly measured values with no other data/ value/ procedure being involved. **$EG_{BL,y}$** = (Electricity exported to the grid – Electricity imported from grid) Option 1: Net electricity exported to the grid is calculated as per Para 22 of applicable methodology (AMS-I.D. ver. 15) Option 2: Considering project emissions from coal
QA/QC procedures:	The meter is calibrated annually. Measurement results can be cross-checked with records for sold electricity - Invoices raised by AAEL.
Purpose of data:	Calculation of baseline emissions
Additional comments:	-

Data/parameter:	**$Q_{biomassy}$**
Unit	Tonnes/annum

<table>
<tr><td>Description</td><td>Quantity of biomass (rice husk) used for power generation process in year y</td></tr>
<tr><td>Measured/calculated/default</td><td>Measured.</td></tr>
<tr><td>Source of data</td><td>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.</td></tr>
<tr><td>Value(s) of monitored parameter</td><td>
<table>
<tr><th>Month</th><th>$Q_{biomassy}$ (consumed) (Tonnes)</th><th>$Q_{biomassy}$ (Procured) (Tonnes)</th></tr>
<tr><td>01/04/2015 - 30/04/2015</td><td>3,730.17</td><td>4,534.22</td></tr>
<tr><td>01/05/2015 - 31/05/2015</td><td>7,009.20</td><td>3,705.16</td></tr>
<tr><td>01/06/2015 - 30/06/2015</td><td>6,715.10</td><td>8,094.88</td></tr>
<tr><td>01/07/2015 - 31/07/2015</td><td>6,182.18</td><td>5,088.31</td></tr>
<tr><td>01/08/2015 - 31/08/2015</td><td>5,334.23</td><td>5,135.97</td></tr>
<tr><td>01/09/2015 - 30/09/2015</td><td>7,600.30</td><td>6,190.92</td></tr>
<tr><td>01/10/2015 - 31/10/2015</td><td>7,537.37</td><td>8,102.93</td></tr>
<tr><td>01/11/2015 - 30/11/2015</td><td>4,525.03</td><td>5,434.20</td></tr>
<tr><td>01/12/2015 - 31/12/2015</td><td>4,208.86</td><td>7,352.30</td></tr>
<tr><td>01/01/2016 - 31/01/2016</td><td>8,032.37</td><td>7,260.44</td></tr>
<tr><td>01/02/2016 - 28/02/2016</td><td>7,485.82</td><td>5,510.58</td></tr>
<tr><td>01/03/2016 - 31/03/2016</td><td>3,711.18</td><td>3,244.97</td></tr>
<tr><td>Total</td><td>72,071.81</td><td>69,654.88</td></tr>
</table>
</td></tr>
<tr><td>Monitoring equipment</td><td>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:17/09/2014 & 16/09/2015

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 first calibration: 05/05/2015 & 04/05/2016

Validity: one year</td></tr>
<tr><td>Measuring/reading/recording frequency:</td><td>Measuring: Continuously
Reading: Daily
Recording: Daily</td></tr>
<tr><td>Calculation method (if applicable):</td><td>NA</td></tr>
<tr><td>QA/QC procedures:</td><td>The weigh scale used for measuring fuels is calibrated annually.
The data can be cross checked with the biomass procurement data.</td></tr>
<tr><td>Purpose of data:</td><td>Calculation of baseline emissions</td></tr>
<tr><td>Additional comments:</td><td>-</td></tr>
</table>

<table>
<tr><td>Data/parameter:</td><td>$FC_{Coal,j,y}$</td></tr>
<tr><td>Unit</td><td>Tonnes/annum</td></tr>
<tr><td>Description</td><td>Quantity of coal used for the project activity in year y.</td></tr>
<tr><td>Measured/calculated/default</td><td>Measured.</td></tr>
<tr><td>Source of data</td><td>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.</td></tr>
<tr><td>Value(s) of monitored parameter</td><td>
<table>
<tr><th>Month</th><th>$FC_{Coal,j,y}$ (consumed) * (Tonnes)</th><th>$FC_{Coal,j,y}$ (procured) (Tonnes)</th></tr>
<tr><td>01/04/2015 - 30/04/2015</td><td>-</td><td>1,005.76</td></tr>
<tr><td>01/05/2015 - 31/05/2015</td><td>-</td><td>-</td></tr>
<tr><td>01/06/2015 - 30/06/2015</td><td>-</td><td>1,048.67</td></tr>
<tr><td>01/07/2015 - 31/07/2015</td><td>-</td><td>1,025.55</td></tr>
<tr><td>01/08/2015 - 31/08/2015</td><td>2,505.30</td><td>-</td></tr>
<tr><td>01/09/2015 - 30/09/2015</td><td>-</td><td>2,578.31</td></tr>
<tr><td>01/10/2015 - 31/10/2015</td><td>-</td><td>998.78</td></tr>
<tr><td>01/11/2015 - 30/11/2015</td><td>2,810.90</td><td>1,990.10</td></tr>
<tr><td>01/12/2015 - 31/12/2015</td><td>3,182.40</td><td>1,004.29</td></tr>
<tr><td>01/01/2016 - 31/01/2016</td><td>-</td><td>2,000.20</td></tr>
<tr><td>01/02/2016 - 28/02/2016</td><td>-</td><td>3,939.69</td></tr>
<tr><td>01/03/2016 - 31/03/2016</td><td>3,991.79</td><td>1,898.25</td></tr>
<tr><td>Total</td><td>12,490.39</td><td>17,489.60</td></tr>
</table>
* Actual quantity of coal combusted in the power plant.
</td></tr>
<tr><td>Monitoring equipment</td><td>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: 17/09/2014 & 16/09/2015

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: 05/05/2015 & 04/05/2016
Validity: one year</td></tr>
<tr><td>Measuring/reading/recording frequency:</td><td>Measuring: Continuously
Reading: Daily
Recording: Daily</td></tr>
<tr><td>Calculation method (if applicable):</td><td>NA</td></tr>
</table>

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:	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,

Data/parameter:	**$FC_{Diesel,j,y}$**
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	$FC_{diesel,j,y}$ (Procured) Litres	$FC_{diesel,j,y}$ (Consumed) Litres
01/04/2015 - 30/04/2015	10,000	9,566
01/05/2015 - 31/05/2015	7,000	6,494
01/06/2015 - 30/06/2015	8,000	8,823
01/07/2015 - 31/07/2015	13,000	10,838
01/08/2015 - 31/08/2015	8,750	10,546
01/09/2015 - 30/09/2015	9,000	8,583
01/10/2015 - 31/10/2015	12,000	10,565
01/11/2015 - 30/11/2015	2,000	1,381
01/12/2015 - 31/12/2015	1,000	3,225
01/01/2016 - 31/01/2016	3,000	2,015
01/02/2016 - 28/02/2016	2,000	1,859
01/03/2016 - 31/03/2016	1,000	2,505
Total	**76,750**	**76,400**

Monitoring equipment	Monitoring Equipment: Volume meter Type: Jar (neck type) Capacity: 01, 02, 03, 05 & 10 litres
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:	Calculation of project emissions
Additional comments:	-

Data/parameter:	**$NCV_{coal,y}$**
Unit	TJ/tone
Description	Net calorific value of coal in year y
Measured/calculated/default	Measured

<table>
<tr><td>Source of data</td><td>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.</td></tr>
<tr><td>Value(s) of monitored parameter</td><td>0.0159</td></tr>
<tr><td>Monitoring equipment</td><td>Not applicable as the NCV values provided by the fuel supplier are being considered.</td></tr>
<tr><td>Measuring/reading/recording frequency:</td><td>Measuring: NCV is obtained for each fuel delivery (from fuel supplier)
Recording: Monthly</td></tr>
<tr><td>Calculation method (if applicable):</td><td>Not applicable since the NCV values supplied by the fuel supplier are considered for the emission reduction calculation.</td></tr>
<tr><td>QA/QC procedures:</td><td>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.

<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>

The max. Value of NCV during the monitoring period
=3,794 kcal/kg
=(3,794 *4.18)*10^6/10^9
=15.86 TJ/Gg
= 0.0159 TJ/tonne

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 .</td></tr>
<tr><td>Purpose of data:</td><td>Data is used for Project emission calculation.</td></tr>
<tr><td>Additional comments:</td><td>-</td></tr>
</table>

Data/parameter:	**$NCV_{diesel,y}$**
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	0.000035
Monitoring equipment	Not applicable
Measuring/reading/recording frequency:	NCV is obtained for each fuel delivery (from fuel supplier)
Calculation method (if applicable):	NA

<table>
<tr><td>QA/QC procedures:</td><td>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.

<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>41.4</td><td>43</td><td>43.3</td></tr>
</table>

The max. Value of NCV during the monitoring period
=10,324 kcal/kg
=(10,324*0.82*4.18*10^{-9})
= 0.000035TJ/lt
Since the monitored value is within the uncertainty range of the IPCC values so no additional information is required to be collected .</td></tr>
<tr><td>Purpose of data:</td><td>Data is used for Project emission calculation.</td></tr>
<tr><td>Additional comments:</td><td>-</td></tr>
</table>

<table>
<tr><td>Data/parameter:</td><td>$N_{truck,y}$</td></tr>
<tr><td>Unit</td><td>-</td></tr>
<tr><td>Description</td><td>Number of truck/vehicle trips from the biomass source to the power plant in year y</td></tr>
<tr><td>Measured/calculated/default</td><td>Measured.</td></tr>
<tr><td>Source of data</td><td>The no of deliveries/vehicles will be recorded in log book at the factory gate.</td></tr>
<tr><td>Value(s) of monitored parameter</td><td>
<table>
<tr><th>Month</th><th>Numbers of Trucks</th></tr>
<tr><td>01/04/2015 - 30/04/2015</td><td>667</td></tr>
<tr><td>01/05/2015 - 31/05/2015</td><td>877</td></tr>
<tr><td>01/06/2015 - 30/06/2015</td><td>763</td></tr>
<tr><td>01/07/2015 - 31/07/2015</td><td>229</td></tr>
<tr><td>01/08/2015 - 31/08/2015</td><td>140</td></tr>
<tr><td>01/09/2015 - 30/09/2015</td><td>111</td></tr>
<tr><td>01/10/2015 - 31/10/2015</td><td>260</td></tr>
<tr><td>01/11/2015 - 30/11/2015</td><td>648</td></tr>
<tr><td>01/12/2015 - 31/12/2015</td><td>998</td></tr>
<tr><td>01/01/2016 - 31/01/2016</td><td>1,087</td></tr>
<tr><td>01/02/2016 - 28/02/2016</td><td>839</td></tr>
<tr><td>01/03/2016 - 31/03/2016</td><td>722</td></tr>
<tr><td>Total</td><td>19,208</td></tr>
</table>
</td></tr>
<tr><td>Monitoring equipment</td><td>Not applicable</td></tr>
<tr><td>Measuring/reading/recording frequency:</td><td>Measuring: Daily
Reading: Daily
Recording: monthly</td></tr>
<tr><td>Calculation method (if applicable):</td><td>NA</td></tr>
</table>

QA/QC procedures:	This can be cross-checked with average carrying capacity of vehicle and quantity of rice husk consumed in that period. Quantity of rice husk = 13,8613.33 tonne Average load /trip = 7.2 tonne No. of trucks = 13,8613.33/7.2 = 19,251
Purpose of data:	Data is used for leakage emission calculation.
Additional comments:	-

Data/parameter:	**$AVD_{max,y}$**
Unit	km
Description	Max distance of the Power plant from the Rice husk source in year y
Measured/calculated/default	Estimated
Source of data	Log book at the factory gate
Value(s) of monitored parameter	**Month** / **Maximum distance in km** 01/04/2015 - 30/04/2015 : 18 01/05/2015 - 31/05/2015 : 14 01/06/2015 - 30/06/2015 : 23 01/07/2015 - 31/07/2015 : 26 01/08/2015 - 31/08/2015 : 26 01/09/2015 - 30/09/2015 : 26 01/10/2015 - 31/10/2015 : 25 01/11/2015 - 30/11/2015 : 24 01/12/2015 - 31/12/2015 : 23 01/01/2016 - 31/01/2016 : 22 01/02/2016 - 28/02/2016 : 21 01/03/2016 - 31/03/2016 : 17
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 will be considered for calculation of leakage due to transportation. Maximum distance is 39 km for the current monitoring period.
Purpose of data:	Data is used for leakage emission calculation.
Additional comments:	-

D.3. Implementation of sampling plan

>>

This section is left blank intentionally as not applicable.

SECTION E. Calculation of emission reductions or GHG removals by sinks

E.1. Calculation of baseline emissions or baseline net GHG removals by sinks

>>

Sample calculation for the baseline emissions calculation for the month of November 2015:

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 November 2015 = 6,689.50 MWh
Power Gen using coal SFC based estimation = $FC_{coal,j,y}$ / SFC_{coal}
= 2,810.90 tonne/0.839 tonnes of coal/ MWh
= 3350.30 MWh
Power Gen using rice husk - estimated based on SFC coal = 6,689.50 – 3350.30
= 3,339.20 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) = $Q_{biomass,y}$ / $SFC_{rice\ husk}$
= 4,525.03 tonne / 1.1089 tonnes of rice husk/MWh
= 4,080.65 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 [3,339.20, 4,080.65 MWh]
= 3,339.20 MWh

Aux electricity = Gross electricity generated – electricity exported to grid + electricity imported from grid
= 3,339.20 – 5,970.95 + 0.03
= 718.58 MWh

$EG_{BL,y}$ = Gross electricity exported to the grid – Aux electricity
= 3,339.20 MWh – 718.58 MWh
= 2,620.62 MWh

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

Where,

BE_y: Baseline emissions due to displacement of electricity during the year y in tons of CO_2
$EG_{BL,y}$: 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_2/MWh

BE_y = 2,620.62 MWh * 0.805 tCO_2/MWh
= 2,109.60 tCO_2e

Option 2: Considering project emissions from coal

$EG_{BL,y}$ = Gross electricity generated – Aux electricity - Imported electricity

= 6,689.50 – 718.58 – 0.03
= 5,970.89 MWh

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

= 5,970.89 * 0.805 tCO_2/MWh
= 4,806.57 tCO_2e

Baseline emission calculations for the complete monitoring period, 01/04/2015 – 31/03/2016 can be referred from Emission Reduction sheet.

E.2. Calculation of project emissions or actual net GHG removals by sinks

>>

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_2 emissions from fossil fuel combustion in process j during the year y (tCO_2/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_2 emission coefficient of fuel type i in year y (tCO_2/mass or volume unit)

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

The CO_2 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_2 emission coefficient $COEF_{i,y}$ is calculated based on net calorific value and CO_2 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_2 emission coefficient of fuel type i in year y (tCO_2/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_2 emission factor of fuel type i in year y (tCO_2/GJ)
i	=	Are the fuel types combusted in process j during the year y

Net calorific value of diesel = 0.000035 TJ/litre (Monitored Value: Average of the NCV values supplied by the fuel supplier)

Net calorific value of coal = 0.0159 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_2/TJ (2006 IPCC maximum value)
Emission factor of coal = 100 tCO_2/TJ (2006 IPCC maximum value)

Project emission due to Diesel:

Month	Quantity of diesel used in the plant[4] (litres)	Project emissions (tCO2e)
01/04/2015 - 30/04/2015	9,566	25.32
01/05/2015 - 31/05/2015	6,494	17.19
01/06/2015 - 30/06/2015	8,823	23.35
01/07/2015 - 31/07/2015	10,838	28.69
01/08/2015 - 31/08/2015	10,546	27.91
01/09/2015 - 30/09/2015	8,583	22.72
01/10/2015 - 31/10/2015	10,565	27.96
01/11/2015 - 30/11/2015	1,381	3.66
01/12/2015 - 31/12/2015	3,225	8.54
01/01/2016 - 31/01/2016	2,015	5.33
01/02/2016 - 28/02/2016	1,859	4.92
01/03/2016 - 31/03/2016	2,505	6.63
Total	**76,400**	**203 (Round up)**

Project emission due to Coal:

Month	Quantity of coal used in the plant (tonnes)	Project emissions (tCO2e)
01/04/2015 - 30/04/2015	-	-
01/05/2015 - 31/05/2015	-	-
01/06/2015 - 30/06/2015	-	-
01/07/2015 - 31/07/2015	-	-
01/08/2015 - 31/08/2015	2,505.30	3,973.14
01/09/2015 - 30/09/2015	-	-
01/10/2015 - 31/10/2015	-	-
01/11/2015 - 30/11/2015	2,810.90	4,457.78
01/12/2015 - 31/12/2015	3,182.40	5,046.94
01/01/2016 - 31/01/2016	-	-
01/02/2016 - 28/02/2016	-	-
01/03/2016 - 31/03/2016	3,991.79	6,330.55
Total	**12,490.39**	**19,809 (Round up)**

E.3. Calculation of leakage

>>

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

- The rice husk used for the project activity is available within 50 km radial distance from the project site and the rice husk is transported within a distance of 50 km from the project site. Rice husk 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_y =0.**

[4] Since the procured Diesel quantity is less than the combusted Diesel quantity so for project emission calculation combusted quantity is considered. This is conservative.

E.4. Summary of calculation of emission reductions or net GHG removals by sinks

Item	Baseline emissions or baseline net GHG removals by sinks (t CO_2e)	Project emissions or actual net GHG removals by sinks (t CO_2e)	Leakage (t CO_2e)	GHG emission reductions or net GHG removals by sinks (t CO_2e) achieved in the monitoring period		
				Up to 31/12/2012	From 01/01/2013	Total amount
Option 1: As per Para 22 of the applicable methodology AMS I.D. Version 15:	40,300	203	0	0	40,091	40,091[5]
Option 2: Considering project emissions from coal:	52,283	19,809 + 203 = 20,012	0	0	32,269	32,269[6]

E.5. Comparison of actual emission reductions or net GHG removals by sinks with estimates in registered PDD

Item	Values estimated in ex ante calculation of registered PDD	Actual values achieved during this monitoring period
Emission reductions or GHG removals by sinks (t CO_2e)	49,766	32,269

E.6. Remarks on difference from estimated value in registered PDD

>>

Emission reductions for the considered period (365 days) as per estimates in the PDD(tCO_2e)	Actual Emission Reduction for the monitoring period (tCO_2e)	Variation
49,766	32,269	-35.16%

There is decrease of 35.16 % 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.

[5] The ER value 40,091 derived from option 1, is not equal to the value 40,097 (Baseline Emission – Project Emissions 40,300 – 203 = 40,097) because PP has conservatively considered the rounded down value of emission reduction for each month for the complete monitoring period. This is the most conservative approach to estimate the emission reduction.

[6] The ER value 32,269 derived from option 2, is not equal to the value 32,271 (Baseline Emission – Project Emissions 52,283 – 20,012= 32,271) because PP has conservatively considered the rounded down value of emission reduction for each month for the complete monitoring period. This is the most conservative approach to estimate the emission reduction.

Appendix 1. Contact information of project participants and responsible persons/entities

Project participant and/or responsible person/ entity	☒ Project participant ☒ Person/entity responsible for completing the CDM-MR-FORM
Organization name	A.A. Energy Limited
Street/P.O. Box	No.101
Building	Nikalas Tower, Central Bazaar Road, Ramdaspeth,
City	Nagpur,
State/region	Maharashtra
Postcode	440 010
Country	India
Telephone	+91-712-6638432
Fax	+91-712-2420688
E-mail	aaenergyltd@yahoo.com
Website	
Contact person	Mr. Swapnil Agrawal
Title	Director
Salutation	Mr.
Last name	Agrawal
Middle name	
First name	Swapnil
Department	
Mobile	+919822571145
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Direct tel.	+91-712-6638432
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Document information

Version	*Date*	*Description*
05.1	4 May 2015	Editorial revision to correct version numbering.
05.0	1 April 2015	Revisions to: • 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: • 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 *F-CDM-MR* to *CDM-MR-FORM*; • 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 (EB70, 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	28 May 2010	EB 54, Annex 34. Initial adoption.

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