



**Monitoring report form for CDM project activity**  
(Version 08.0)

**MONITORING REPORT**

<b>Title of the project activity</b>	Biomass based power plant in Mahendargarh, Haryana		
<b>UNFCCC reference number of the project activity</b>	9973 <sup>1</sup>		
<b>Version number of the PDD applicable to this monitoring report</b>	14		
<b>Version number of this monitoring report</b>	02		
<b>Completion date of this monitoring report</b>	06/08/2021		
<b>Monitoring period number</b>	02		
<b>Duration of this monitoring period</b>	01/04/2016 to 31/10/2020 (Inclusive of both the dates)		
<b>Monitoring report number for this monitoring period</b>	01		
<b>Project participants</b>	India: M/s Star Wire (India) Vidyut Pvt. Ltd. (SWIVPL) Australia: EKI Energy Services Limited		
<b>Host Party</b>	India		
<b>Applied methodologies and standardized baselines</b>	Applied methodology: AMS I.D. "Grid connected renewable electricity generation" (version 17/ scope 1/EB 61). <sup>2</sup> Standardized Baselines: Not Applicable		
<b>Sectoral scopes</b>	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>	Amount achieved before 1 January 2013	Amount achieved from 1 January 2013 until 31 December 2020	Amount achieved from 1 January 2021
	0 tCO <sub>2</sub> e	249,471 tCO <sub>2</sub> e	0 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>	240,709 tCO <sub>2</sub> e		

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

<sup>2</sup> <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<sup>3</sup> grid. For technical description of equipment's, please refer section B.1.

As the project activity involves the use of biomass for the electricity generation which is a carbon neutral fuel thus the resulting electricity is a clean electricity which is being fed to NEWNE grid and thereby displacing an equivalent amount of electricity which otherwise would have been supplied by fossil fuel dominant NEWNE Grid. The main purpose of the project activity is electricity generation by the mean of clean fuel available in the nearby area like mustard crop residue, Julia Flora and paddy waste. The electricity thus produced is being exported to fossil fuel dominant NEWNE grid which helps in bridging the GHG emissions reduction of Grid mix.

Relevant dates for the project activity:

Date of Purchase Order: 18/03/2011

Date of Civil Work Order: 17/03/2011

Start date of construction: 02/05/2011

Date of Commercial Operation: 03/05/2013

Project activity is in operation since its commissioning and operating satisfactorily during the reported monitoring period.

The present monitoring period is from 01/04/2016 to 31/10/2020 (Inclusive of both the dates) and the project resulted in 249,471 tCO<sub>2</sub>e 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:

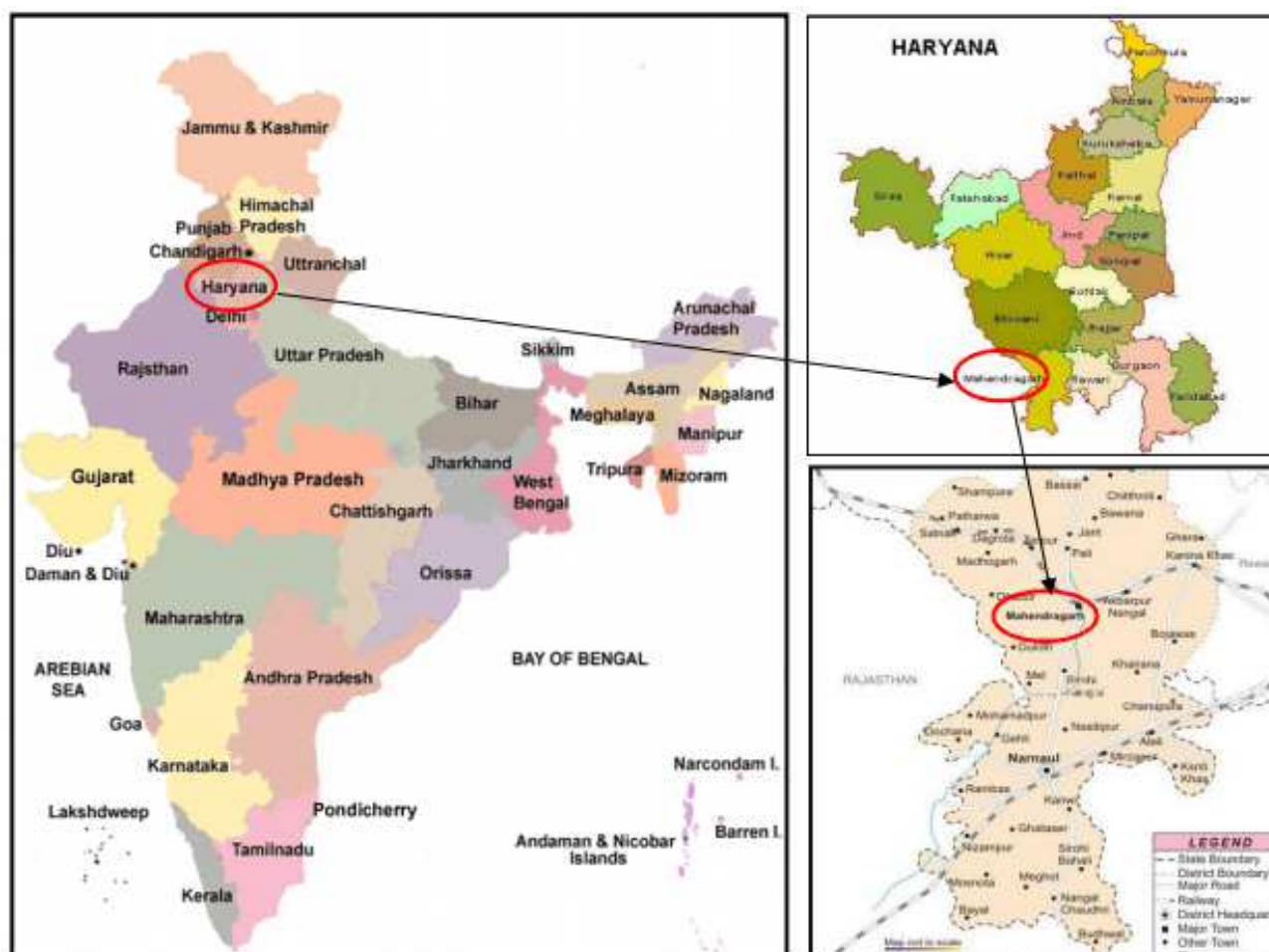
Latitude: 28° 18' 39" N

Longitude: 76° 05' 23" E

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

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<sup>3</sup> Now a part of unified Indian grid



### 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 Star Wire (India) Vidyut Pvt. Ltd. (SWIVPL) (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)<sup>4</sup> 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”.

<sup>4</sup> <https://cdm.unfccc.int/methodologies/DB/W3TINZ7KKWCK7L8WTFQOQFQQH4SBK>

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/cm<sup>2</sup> and 465°C which in turn drives the turbo-generator set with a capacity of 9.9 MW to produce electricity.

Further the project got commissioned and officially got synchronization with Indian grid on 03/05/2013. Also the PPA was signed for the project activity on 22/06/2012.

The list of major equipments installed at site is given below.

#### Technical Description of the equipments:

The project activity involves the installation of 47.5 TPH biomass fired travelling grate type boiler with outlet steam parameter at 67 kg/cm<sup>2</sup> and 4650 C and 9.9 MW extraction cum condensing steam turbine. The brief technical specification is provided below for major equipments.

Equipment	Capacity	Make
TG Set	9.9 MW	Siemens
Alternator	12500 KVA	TDPS
Boiler	47.5 TPH at 66 kg ,465±5 deg C.	ISGEC
ID Fan	42.50 m <sup>3</sup> /sec H 230MM	TLT engineering
FD Fan	14.70 m <sup>3</sup> /sec H 170 MM	TLT engineering
SA Fan	7.5 m <sup>3</sup> /sec H 760MM	TLT engineering
Boiler Feed Pumps	64.56 m <sup>3</sup> /hrs	KSB
ESP	Two fields operational	Thermax Ltd.
RO Plant	6 M3 in Signal Stage	Thermax Ltd.
D M Plant.	10 m <sup>3</sup> / hr (20 hr at day)	Wipro
Fuel Storage	328 MT (35*25*7 MTRS)	Interach Ltd.
Fuel Handling	18 TPH Roller Belt conveyor	OSM Engineering Pneumatic Conveying Pvt. Ltd.

<b>Ash Handling</b>	1.5 TPH	OSM Engineering
<b>Chimney</b>	46 m high	ISGEC
<b>Fire Fighting System</b>	120 m <sup>3</sup> /hr	KSB
<b>D.C.S.</b>	Allen Bradley	ABB
<b>Cooling Tower</b>	3000 m <sup>3</sup> /hr	North street
<b>Air Compressors</b>	127 CFM	IR & Chicago compressor

**Boiler:**

Installed boiler is of 47.5 TPH capacity, capable of generating steam with 67 kgf/cm<sup>2</sup> pressure at 4650C temperature. The boiler is travelling grate/Moving Grate type semi outdoor unit with bi-drum, natural circulation, balanced draft, membrane wall radiant furnace designed with two stage super heaters and inter-stage de-super heater.

**Steam Turbine:**

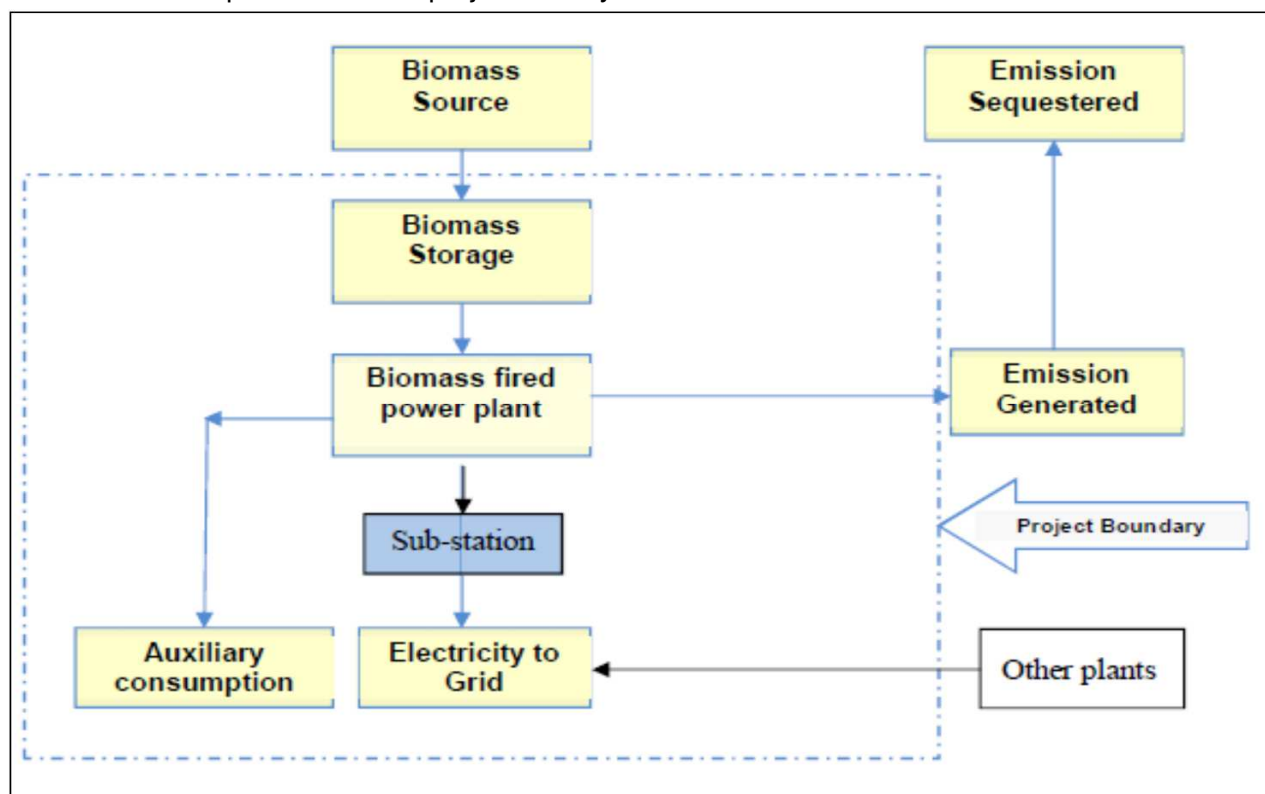
The steam generated in the boiler is being fed to 9.9 MW, extraction cum condensing steam turbine operating at inlet steam temperature of around 4600C at a pressure of around 64 kgf/cm<sup>2</sup>

**Power Evacuation Infrastructure:**

The generation voltage is being stepped up from 11 kV to 132 kV. The transmission line has been erected for the smoother supply of electricity from plant to 132 kV Mahendranagar sub-station, Mahendergarh through solid tap arrangement with 132 KV Mahendergarh - Satnali S/C transmission line.

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.

The schematic representation of project activity is as below



**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

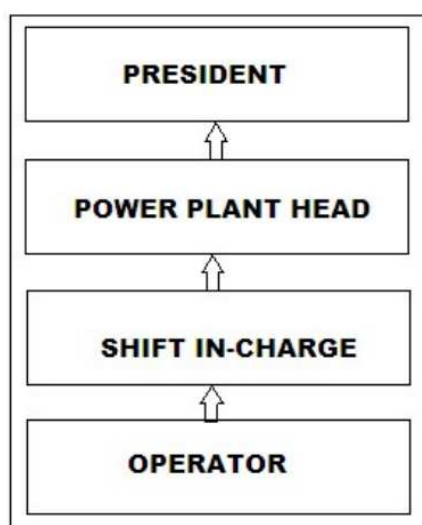
**SECTION C. Description of monitoring system**

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 <sub>2</sub> /MWh								
Description	Ex-ante CO <sub>2</sub> emission factor for the NEWNE regional grid								
Source of data	CO <sub>2</sub> 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 (<math>W_{OM} = 0.5</math> &amp; <math>W_{BM} = 0.5</math>) 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 (<math>EF_{grid,OM,y}</math>)</td><td>1.0049 tCO<sub>2</sub>/MWh</td></tr> <tr> <td>Build Margin, 2008-09 (<math>EF_{grid,BM,y}</math>)</td><td>0.6752 tCO<sub>2</sub>/MWh</td></tr> <tr> <td>Combined Margin (<math>EF_{grid,CM,y}</math>)</td><td>0.8401 tCO<sub>2</sub>/MWh</td></tr> </tbody> </table>	Combined Margin Estimation for NEWNE Grid		Average OM ( $EF_{grid,OM,y}$ )	1.0049 tCO <sub>2</sub> /MWh	Build Margin, 2008-09 ( $EF_{grid,BM,y}$ )	0.6752 tCO <sub>2</sub> /MWh	Combined Margin ( $EF_{grid,CM,y}$ )	0.8401 tCO <sub>2</sub> /MWh
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Combined Margin ( $EF_{grid,CM,y}$ )	0.8401 tCO <sub>2</sub> /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 Hatyana State
Source of data	Biomass Assessment study
Value(s) applied	207,109
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	$M_{\text{biomass}}$
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	$EG_{\text{gross},y}$												
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><math>EG_{\text{gross},y}</math></th></tr> </thead> <tbody> <tr> <td>01/04/2016 to 31/12/2016</td><td>50,393.476</td></tr> <tr> <td>01/01/2017 to 31/12/2017</td><td>68,723.671</td></tr> <tr> <td>01/01/2018 to 31/12/2018</td><td>75,341.678</td></tr> <tr> <td>01/01/2019 to 31/12/2019</td><td>70,276.010</td></tr> <tr> <td>01/01/2020 to 31/10/2020</td><td>61,042.420</td></tr> </tbody> </table>	Year	$EG_{\text{gross},y}$	01/04/2016 to 31/12/2016	50,393.476	01/01/2017 to 31/12/2017	68,723.671	01/01/2018 to 31/12/2018	75,341.678	01/01/2019 to 31/12/2019	70,276.010	01/01/2020 to 31/10/2020	61,042.420
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Monitoring equipment	<p>Energy Meter. Two Energy Meters i.e. One Main and one check meter has been installed to monitor the parameter. The details of the both meters are as given below.</p> <p><b>Main Meter</b> Type: Sentron PAC3200 Make: Siemens Accuracy Class: 0.5 % Serial Number: OAE321100079</p> <p><b>Check Meter</b> Type: 7UM6221-5EB99-3CE0-0D2K Make: Siemens Accuracy Class: 0.5 % Serial Number: 1111157544</p> <p>The schedule of calibration being performed during current monitoring period is as follows:</p> <table border="1"> <thead> <tr> <th>Meter Sr No &amp; Type</th><th>Calibration Date</th><th>Validity</th><th>Calibration Date</th><th>Validity</th></tr> </thead> <tbody> <tr> <td rowspan="3">OAE321100079 (Main Meter)</td><td>27/03/2016</td><td>26/03/2017</td><td>27/03/2017</td><td>26/03/2018</td></tr> <tr> <td>27/03/2018</td><td>26/03/2019</td><td>27/03/2019</td><td>26/03/2020</td></tr> <tr> <td>27/03/2020</td><td>26/03/2021</td><td></td><td></td></tr> <tr> <td rowspan="3">1111157544 (Check Meter)</td><td>27/03/2016</td><td>26/03/2017</td><td>27/03/2017</td><td>26/03/2018</td></tr> <tr> <td>27/03/2018</td><td>26/03/2019</td><td>27/03/2019</td><td>26/03/2020</td></tr> <tr> <td>27/03/2020</td><td>26/03/2021</td><td></td><td></td></tr> </tbody> </table>	Meter Sr No & Type	Calibration Date	Validity	Calibration Date	Validity	OAE321100079 (Main Meter)	27/03/2016	26/03/2017	27/03/2017	26/03/2018	27/03/2018	26/03/2019	27/03/2019	26/03/2020	27/03/2020	26/03/2021			1111157544 (Check Meter)	27/03/2016	26/03/2017	27/03/2017	26/03/2018	27/03/2018	26/03/2019	27/03/2019	26/03/2020	27/03/2020	26/03/2021		
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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																															

<b>Data/Parameter</b>	<b>EG<sub>gross,export,y</sub></b>												
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<sub>gross,exporty</sub></th></tr> </thead> <tbody> <tr> <td>01/04/2016 to 31/12/2016</td><td>45,484.92</td></tr> <tr> <td>01/01/2017 to 31/12/2017</td><td>62,502.97</td></tr> <tr> <td>01/01/2018 to 31/12/2018</td><td>69,349.8</td></tr> <tr> <td>01/01/2019 to 31/12/2019</td><td>64,502.88</td></tr> <tr> <td>01/01/2020 to 31/10/2020</td><td>56,070.02</td></tr> </tbody> </table>	Year	EG <sub>gross,exporty</sub>	01/04/2016 to 31/12/2016	45,484.92	01/01/2017 to 31/12/2017	62,502.97	01/01/2018 to 31/12/2018	69,349.8	01/01/2019 to 31/12/2019	64,502.88	01/01/2020 to 31/10/2020	56,070.02
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Monitoring equipment	<p>Energy Meter Two Energy Meters i.e. One Main and one check meter has been installed to monitor the parameter. The details of the both meters are as given below.</p> <p><b>Main Meter</b> Type: E3M021 (3Ph 4 Wire) Make: Secure Meters Limited Accuracy Class: 0.2s Serial Number: HRT55955</p> <p><b>Check Meter</b> Type: E3M021 (3Ph 4 Wire) Make: Secure Meters Limited Accuracy Class: Class: 0.2s Serial Number:HVPN2344 The schedule of calibration being performed during current monitoring period is as follows:</p> <table border="1"> <thead> <tr> <th>Meter Sr No &amp; Type</th><th>Calibration Date</th><th>Validity</th><th>Calibration Date</th><th>Validity</th></tr> </thead> <tbody> <tr> <td rowspan="3">HRT 55955 (Main Meter)</td><td>08/05/2015</td><td>07/05/2016</td><td>25/05/2016</td><td>24/05/2017</td></tr> <tr> <td>13/06/2017</td><td>12/06/2018</td><td>20/06/2018</td><td>19/06/2019</td></tr> <tr> <td>03/07/2019</td><td>02/07/2020</td><td>25/07/2020</td><td>24/07/2021</td></tr> <tr> <td rowspan="3">HVPN2344 (Check Meter)</td><td>08/05/2015</td><td>07/05/2016</td><td>25/05/2016</td><td>24/05/2017</td></tr> <tr> <td>13/06/2017</td><td>12/06/2018</td><td>20/06/2018</td><td>19/06/2019</td></tr> <tr> <td>03/07/2019</td><td>02/07/2020</td><td>25/07/2020</td><td>24/07/2021</td></tr> </tbody> </table>	Meter Sr No & Type	Calibration Date	Validity	Calibration Date	Validity	HRT 55955 (Main Meter)	08/05/2015	07/05/2016	25/05/2016	24/05/2017	13/06/2017	12/06/2018	20/06/2018	19/06/2019	03/07/2019	02/07/2020	25/07/2020	24/07/2021	HVPN2344 (Check Meter)	08/05/2015	07/05/2016	25/05/2016	24/05/2017	13/06/2017	12/06/2018	20/06/2018	19/06/2019	03/07/2019	02/07/2020	25/07/2020	24/07/2021
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<b>Data/Parameter</b>	<b>EG<sub>gross,import,y</sub></b>												
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<sub>gross,import,y</sub></th></tr> </thead> <tbody> <tr> <td>01/04/2016 to 31/12/2016</td><td>263.4</td></tr> <tr> <td>01/01/2017 to 31/12/2017</td><td>228.6</td></tr> <tr> <td>01/01/2018 to 31/12/2018</td><td>150.6</td></tr> <tr> <td>01/01/2019 to 31/12/2019</td><td>163.8</td></tr> <tr> <td>01/01/2020 to 31/10/2020</td><td>108.4</td></tr> </tbody> </table>	Year	EG <sub>gross,import,y</sub>	01/04/2016 to 31/12/2016	263.4	01/01/2017 to 31/12/2017	228.6	01/01/2018 to 31/12/2018	150.6	01/01/2019 to 31/12/2019	163.8	01/01/2020 to 31/10/2020	108.4
Year	EG <sub>gross,import,y</sub>												
01/04/2016 to 31/12/2016	263.4												
01/01/2017 to 31/12/2017	228.6												
01/01/2018 to 31/12/2018	150.6												
01/01/2019 to 31/12/2019	163.8												
01/01/2020 to 31/10/2020	108.4												

Monitoring equipment	Energy Meter Two Energy Meters i.e. One Main and one check meter has been installed to monitor the parameter. The details of the both meters are as given below. Main Meter Type: E3M021 (3Ph 4 Wire) Make: Secure Meters Limited Accuracy Class: 0.2s Serial Number: HRT55955 Check Meter Type: E3M021 (3Ph 4 Wire) Make: Secure Meters Limited Accuracy Class: Class: 0.2s Serial Number:HVPN2344 The schedule of calibration being performed during current monitoring period is as follows:				
	Meter Sr No & Type	Calibration Date	Validity	Calibration Date	Validity
	HRT 55955 (Main Meter)	08/05/2015	07/05/2016	25/05/2016	24/05/2017
		13/06/2017	12/06/2018	20/06/2018	19/06/2019
		03/07/2019	02/07/2020	25/07/2020	24/07/2021
	HVPN2344 (Check Meter)	08/05/2015	07/05/2016	25/05/2016	24/05/2017
		13/06/2017	12/06/2018	20/06/2018	19/06/2019
03/07/2019		02/07/2020	25/07/2020	24/07/2021	
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				

<b>Data/Parameter</b>	<b>EG<sub>facility,y</sub></b>												
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 border="1"> <thead> <tr> <th>Year</th><th>EG<sub>facility,y</sub></th></tr> </thead> <tbody> <tr> <td>01/04/2016 to 31/12/2016</td><td>45,221.429</td></tr> <tr> <td>01/01/2017 to 31/12/2017</td><td>62,274.3</td></tr> <tr> <td>01/01/2018 to 31/12/2018</td><td>69,192.187</td></tr> <tr> <td>01/01/2019 to 31/12/2019</td><td>64,317.753</td></tr> <tr> <td>01/01/2020 to 31/10/2020</td><td>55,950.828</td></tr> </tbody> </table>	Year	EG <sub>facility,y</sub>	01/04/2016 to 31/12/2016	45,221.429	01/01/2017 to 31/12/2017	62,274.3	01/01/2018 to 31/12/2018	69,192.187	01/01/2019 to 31/12/2019	64,317.753	01/01/2020 to 31/10/2020	55,950.828
Year	EG <sub>facility,y</sub>												
01/04/2016 to 31/12/2016	45,221.429												
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01/01/2018 to 31/12/2018	69,192.187												
01/01/2019 to 31/12/2019	64,317.753												
01/01/2020 to 31/10/2020	55,950.828												
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 <sub>biomass,PJ,y</sub>				
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	Year		FC <sub>biomass,PJ,y</sub>		
	01/04/2016 to 31/12/2016		66,885		
	01/01/2017 to 31/12/2017		94,246		
	01/01/2018 to 31/12/2018		92,734		
	01/01/2019 to 31/12/2019		100,350		
	01/01/2020 to 31/10/2020		87,215		
Monitoring equipment	The quantity of Biomass fed into the boiler is measured using a conveyer belt equipped with load cells. Conveyer Belt System for weighing Biomass Fired Type: BCW51L2 Make: IPA Pvt. Ltd. Accuracy Class: 0.5 % Serial Number: 1712/13				
	Sr No	Calibration Date	Validity	Calibration Date	Validity
	1712/13	03/02/2016	02/02/2017	06/02/2017	05/02/2018
		05/02/2018	04/02/2019	06/02/2019	05/02/2020
		07/02/2020	06/02/2021		
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				

<b>Data/Parameter</b>	<b>NCV<sub>biomass,y</sub></b>
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	2,558

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 is being performed by third party NABL accredited laboratory as per best industry practices.
QA/QC procedures	The measurement is being 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

Data/Parameter	FC <sub>FF,y</sub>				
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. Conveyer Belt System for weighing Fuel Fired Type: BCW51L2 Make: IPA Pvt. Ltd. Accuracy Class: 0.5 % Serial Number: 1712/13				
	Sr No	Calibration Date	Validity	Calibration Date	Validity
	1712/13	03/02/2016	02/02/2017	06/02/2017	05/02/2018
		05/02/2018	04/02/2019	06/02/2019	05/02/2020
	07/02/2020	06/02/2021			
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				

<b>Data/Parameter</b>	<b>NCV<sub>FF,i,y</sub></b>
Unit	KCal/kg
Description	Net Calorific Value of fossil fuel type i combusted during year y

Measured/calculated/default	Measured
Source of data	Information provided by supplier. In case of non availability of data from supplier the value shall be referred from IPCC
Value(s) of monitored parameter	Not Applicable as no fossil fuel is consumed during the current monitoring period.
Monitoring equipment	-
Measuring/reading/recording frequency	Recording frequency: Annual Monitoring frequency: Annual
Calculation method (if applicable)	The value shall be sourced from the supplier on annual basis. In case the supplier is not able to provide the data, PP shall refer the same from IPCC.
QA/QC procedures	The value shall be crosschecked with publically available data.
Purpose of data/parameter	Calculation of project emissions
Additional comments	Data will be kept for two years after the end of crediting period or the last issuance of CERs, whichever occurs later

<b>Data/Parameter</b>	<b>EF<sub>Fossil Fuel,i,y</sub></b>
Unit	tCO <sub>2</sub> /GJ
Description	Weighted average CO <sub>2</sub> emission factor of fuel type i in year y
Measured/calculated/default	Default
Source of data	IPCC default values at the upper limit of the uncertainty at a 95% confidence interval as provided in table 1.4 of Chapter 1 of Vol. 2 (Energy) of the 2006 IPCC Guidelines on National GHG Inventories
Value(s) of monitored parameter	Not Applicable as no fossil fuel is consumed during the current monitoring period.
Monitoring equipment	-
Measuring/reading/recording frequency	-
Calculation method (if applicable)	-
QA/QC procedures	The latest available versions of the guidelines would be used.
Purpose of data/parameter	Calculation of project emissions
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<sub>facility,y</sub>) in MWh multiplied by the baseline emission factor (EF<sub>grid,CM,y</sub>) in tCO<sub>2</sub>/MWh.

$$BE_y = EG_{\text{facility},y} \times EF_{\text{grid,CM},y} \text{-----} 1$$

Baseline emission factor (EF<sub>grid,CM,y</sub>)

The Baseline emission factor ( $EF_{grid,CM,y}$ ) is 0.8401 tCO<sub>2</sub> /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.

Emission is calculated as below:

Year	Net power supplied  (MWh)	Grid emission factor-SR  (tCO <sub>2</sub> e/ MWh)	Emission Reduction (Round Down)  (tCO <sub>2</sub> e)
01/04/2016 to 31/12/2016	45,221.429	0.8401	37,990
01/01/2017 to 31/12/2017	62,274.3		52,316
01/01/2018 to 31/12/2018	69,192.19		58,128
01/01/2019 to 31/12/2019	64,317.75		54,033
01/01/2020 to 31/10/2020	55,950.83		47,004
Total			249,471

## 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 <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 until 31/12/2020	From 01/01/2021	Total amount
<b>Total</b>	249,471	0	0	0	249,471	0	249,471

## 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)
249,471	240,709

### 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 = 1,675

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

$$= (52,453 \times 1,675) / 365$$

$$= 240,709 \text{ tCO}_2\text{e}$$

**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 3.64% 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. Also even with this increase in PLF, the equity IRR of the project is well below the benchmark and hence deemed acceptable.

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

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

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**Annexure- I Plant Shutdown details**

Month	Minutes
Apr-16	308:22:00
May-16	192:52:00
Jun-16	161:35:00
Jul-16	106:42:00
Aug-16	131:35:00
Sep-16	41:23:00
Oct-16	351:41:00
Nov-16	51:08:00
Dec-16	66:13:00
Jan-17	86:31:00
Feb-17	49:45:00
Mar-17	714:19:00
Apr-17	276:45:00
May-17	72:22:00
Jun-17	33:51:00
Jul-17	89:22:00
Aug-17	59:36:00
Sep-17	51:39:00
Oct-17	29:30:00
Nov-17	67:08:00
Dec-17	42:08:00
Jan-18	46:32:00
Feb-18	52:07:00
Mar-18	3:01:00
Apr-18	74:10:00
May-18	64:51:00
Jun-18	323:04:00
Jul-18	134:49:00
Aug-18	77:22:00
Sep-18	71:04:00
Oct-18	51:42:00
Nov-18	82:25:00
Dec-18	66:18:00
Jan-19	56:33:00
Feb-19	74:07:00
Mar-19	157:44:00
Apr-19	260:19:00
May-19	71:22:00
Jun-19	65:23:00
Jul-19	45:59:00
Aug-19	87:07:00
Sep-19	92:30:00

Oct-19	54:22:00
Nov-19	56:33:00
Dec-19	77:02:00
Jan-20	74:49:00
Feb-20	61:46:00
Mar-20	76:26:00
Apr-20	75:13:00
May-20	102:21:00
Jun-20	56:06:00
Jul-20	49:43:00
Aug-20	58:23:00
Sep-20	49:18:00
Oct-20	59:06:00

### Document information

<i>Version</i>	<i>Date</i>	<i>Description</i>
08.0	6 April 2021	Revision to: <ul style="list-style-type: none"> <li>• Reflect the “Clarification: Regulatory requirements under temporary measures for post-2020 cases” (CDM-EB109-A01-CLAR).</li> </ul>
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>

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