

**MONITORING REPORT FORM (F-CDM-MR)**  
**Version 02.0**

**MONITORING REPORT**

<b>Title of the project activity</b>	The TIMARPUR-OKHLA Waste Management Company Pvt Ltd's (TOWMCL) integrated waste to energy project in Delhi
<b>Reference number of the project activity</b>	1254
<b>Version number of the monitoring report</b>	1
<b>Completion date of the monitoring report</b>	17/10/2012
<b>Registration date of the project activity</b>	10/11/2007
<b>Monitoring period number and duration of this monitoring period</b>	Monitoring period number: 1 Monitoring period: 30/03/2011 – 31/08/2012 (17 months 2 days)
<b>Project participant(s)</b>	M/s Timarpur Okhla Waste Management Company Pvt Ltd
<b>Host Party(ies)</b>	India
<b>Sectoral scope(s) and applied methodology(ies)</b>	Sectoral scope 13 and 1 Applied methodology: AM0025 (version 06) “Avoided emissions from organic waste through alternative waste treatment process”
<b>Estimated amount of GHG emission reductions or net anthropogenic GHG removals by sinks for this monitoring period in the registered PDD</b>	= 73202 *218/365 = 43720
<b>Actual GHG emission reductions or net anthropogenic GHG removals by sinks achieved in this monitoring period</b>	24975

## SECTION A. Description of project activity

### A.1. Purpose and general description of project activity

The purpose of the project activity is to address a critical environmental problem faced in solid waste management by both MCD and NDMC. This will contribute in significant reduction of green house gas emissions, which otherwise would have taken place in form of methane emission from solid waste being dumped in the open landfill (dump) sites. In addition, the project activity will also address to some extent the acute energy crisis faced by northern India by producing 20.9 MW of clean electricity that will be supplied to the state electricity grid. By displacing carbon intensive grid energy with a renewable, carbon neutral energy source, the project activity further reduces carbon dioxide emissions over the project life. Replicable technology, environmental, and sustainable development benefits also result from the project activity. These include: introducing efficient municipal waste management technology; reducing power shortages in the state of Delhi India; and, fostering sustainable economic growth through promoting energy self sufficiency and proper waste management in Delhi, India.

The Project activity has been successfully commissioned on 27/01/2012 by TOWMCL at Okhla, Delhi, and is operational since the day of commissioning. The major equipments deployed for the project activity are as follows:

#### Boiler Details

Description	
No of boilers	4
Steam generating capacity of each boiler (tons per hour)	26
Steam pressure at super heated outlet (kg/cm <sup>2</sup> )	41
Steam temperature at super heated outlet (° C)	400 ± 5
Feed water temperature at economizer inlet (° C)	130

#### Turbine details:

Description	
Capacity of Turbine (MW)	20.9
Capacity of Turbo generator (MW)	21
Steam pressure at the inlet (kg/cm <sup>2</sup> )	38
Steam temperature at the inlet (° C)	395

#### Trommel details:

Description	
Size of sieve (mm)	15

The turbo generator will be a bleeding cum condensing type and of high efficiency. The technology for the boilers and turbines is well established and the project activity does not involve any transfer of technology. The technology being used is environmentally safe and sound.

This is the first monitoring report associated with TOWMCL project activity. The period covered in this monitoring report is from 30/03/2011 to 31/08/2012 (Both days included). The CERs generated in the monitoring period are 24,975 CERs.

### A.2. Location of project activity

The project activity is located in the complex at Okhla in Delhi, India. The nearest international airport is Indira Gandhi International airport. The location detail of the project activity along with the map is given below:

Location	Latitude	Longitude
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Okhla	28° 33'	77° 17'
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### 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 if the Party involved wishes to be considered as project participant (Yes/No)
India (Host country)	M/s TIMARPUR-OKHLA Waste Management Company Pvt Ltd	No

### A.4. Reference of applied methodology

**Title:** Approved baseline methodology AM0025 (version 06); “Avoided emissions from organic waste through alternative waste treatment process.”

**Reference:**

- “Consolidated baseline methodology for grid-connected electricity generation from renewable sources” (ACM0002),
- Small-scale methodologies 1.D “Renewable electricity generation for a grid”
- The latest version of the “tool for the demonstration and assessment of additionality”

### A.5. Crediting period of project activity

A fixed crediting period of 10 years has been chosen and the start date of crediting period is 30/03/2011 – 29/03/2021

## SECTION B. Implementation of project activity

### B.1. Description of implemented registered project activity

The project activity by TOWMCL will process 2050 TPD of municipal solid waste generated in the region of Delhi to produce RDF. The RDF will be further utilized to produce electricity which will be fed into the state electricity grid. The Project activity has been successfully commissioned on 27/01/2012 and is operational since then. However, the operation was shutdown at certain instances and the details of these outages and the associated reasons are provided below:

#### Details of Outages

Date	Detail of reason	Time (from)	Time(to)	Hrs
27/01/2012	Turbine trip due to low temperature	18:18	18:55	0:37
27/01/2012	Turbine trip due to high pressure	19:51	20:07	0:16
28/01/2012	Turbine trip due to mechanical problem	2:57	7:36	4:39
30/01/2012	Turbine trip due to low Temperature	3:58	7:00	3:02
31/01/2012	Turbine trip due to high temperature	12:40	12:57	0:17
16/02/2012	33KV VCB Trip due to heavy dip in BSES power supply, REF operated	6:36	6:53	0:17
16/02/2012	33KV VCB Trip due to heavy dip in BSES power	6:55	6:59	0:04

	supply, REF operated			
17/02/2012	Turbine trip due to low temperature and low pressure due to lack of fuel so shut down taken by mech.	10:41		130:44
22/02/2012			21:25	
23/02/2012	Turbine trip due to turbine steam flow	13:33	13:57	0:24
24/02/2012	Turbine trip due to steam low temperature	9:40	10:29	0:43
29/02/2012	High voltage occurred from BSES O/V operated	4:10	4:51	0:41
03/03/2012	TG Unload manually due to low temperature	16:25	22:50	6:25
05/03/2012	33KV Breaker Trip due to heavy dip in BSES power supply, REF operated	23:12	23:18	0:06
07/03/2012	TG Unload manually due to low temperature	14:36	15:11	0:35
13/03/2012	Turbine Trip due to over speed	17:47	17:54	0:07
14/03/2012	33KV Breaker Trip due to vector shift fault operated due to failure of BSES power	13:00	13:03	0:03
17/03/2012	TG Unload manually due to low temperature	10:43	13:50	3:07
17/03/2012	Turbine Trip due to lubricant oil pressure low	15:30	15:40	0:10
28/03/2012	TG Unload manually due to low temperature	21:15	21:42	0:27
29/03/2012	33KV VCB Trip is due to heavy dip in BSES power supply, REF is operated	13:21	13:31	0:10
01/04/2012	33KV VCB Trip is due to heavy dip in BSES power supply, REF is operated	13:38	13:40	0:02
02/04/2012	Turbine Trip due to Grab crane II not working	13:12	16:30	3:18
03/04/2012	Turbine Trip due to DCS problem	10:39	11:30	0:51
03/04/2012	Turbine Trip due to turbine bearing temperature high	11:56	12:03	0:07
06/04/2012	Turbine Trip due to DCS signal missing	16:05	16:15	0:10
08/04/2012	33KV VCB Trip is due to heavy dip in BSES power supply, REF is operated	17:11	17:25	0:14
10/04/2012	33KV VCB Trip is due to heavy dip in BSES power supply, REF is operated	17:21	17:39	0:18
13/04/2012	TG Unload manually due to low temperature	11:11	19:53	0:05
15/04/2012	TG Unload manually due to process problem	20:07	20:17	0:10
15/04/2012	Turbine Trip due to vibrations in turbine	13:45	13:56	0:11
19/04/2012	TG Unload manually due to low temperature	8:54	9:20	0:26
23/04/2012	TG Unload manually due to low temperature	6:30	6:57	0:27
23/04/2012	TG Unload manually due to low temperature shut down taken for BC3 Belt replacement.	7:05		20:02
24/04/2012			4:58	
01/05/2012	Turbine Trip due to lubricant oil pressure low	11:09	14:25	3:16
01/05/2012	33KV Breaker at Jasola grid Tripped by Jasola grid	12:20	12:55	0:35
02/05/2012	High voltage & low frequency occurred from BSES, over fluxing operated.	2:05	4:18	2:13
10/05/2012	TG Unload manually due to low temperature	18:05	18:19	0:14
10/05/2012	TG Unload manually due to low steam	22:04	1:51	3:47
11/05/2012	TG Unload manually due to process problem	2:01	2:19	0:18
11/05/2012	TG Unload manually due to high temperature	16:29	16:55	0:26
11/05/2012	Turbine Trip due to BSES grid fails	17:00	19:55	2:55
13/05/2012	BSES Manually Tripped due to BSES Shut down	17:00	17:46	0:46
13/05/2012	Plant was stopped as per BSES instructions (not to take power due to internal maintenance)	17:49		26:14
14/05/2012			20:03	
15/05/2012	BSES 33 KV transformer tripped.	4:30	4:37	0:07
15/05/2012	BSES 33 KV transformer tripped.	4:43	4:56	0:13

17/05/2012	Trip in HV REF due to grid fail.	5:22	5:29	0:07
22-05-2012	BSES Tripped	23:20	23:40	0:20
23-05-2012	BSES Tripped	10:35	10:40	0:05
23-05-2012	Turbine Trip due to BSES Grid fails	15:12	15:21	0:09
26-05-2012	TG Unload manually due to low temperature	14:51	15:03	0:12
26-05-2012	BSES Tripped	14:24	16:42	2:18
27-05-2012	BSES Breaker cut due to fluctuation	1:21	1:30	0:09
27-05-2012	Turbine trip due to DCS Fail	3:18	3:29	0:11
28-05-2012	Turbine Trip due to Grid fails	5:58	6:12	0:14
30-05-2012	33KV Breaker tripped	15:50	17:40	1:50
31-05-2012	33KV Breaker tripped	18:40	18:50	0:10
06/01/2012	Turbine Trip due to Grid fails	15:27	18:48	3:21
06/02/2012	BSES Tripped	6:26	6:40	0:14
06/03/2012	Load Fluctuation Occurred	18:27	18:56	0:29
06/05/2012	33KV Breaker tripped	15:35	15:45	0:10
06/05/2012	33KV Breaker tripped	15:59	16:04	0:05
06/08/2012	BSES Tripped	4:21	4:40	0:19
06/11/2012	33KV VCB Breaker tripped	15:27	15:36	0:09
14-06-2012	33KV VCB Breaker tripped	6:44	6:55	0:11
15-06-2012	33KV VCB Breaker tripped	8:22	8:30	0:08
19-06-2012	BSES Tripped	7:43	7:49	0:06
19-06-2012	33KV VCB Breaker tripped due to Dip in BSES Supply	14:24	14:29	0:05
19-06-2012	33KV VCB Breaker tripped due to change over at BSES	16:07	16:14	0:07
19-06-2012	33KV VCB Breaker tripped due to change over at BSES	16:28	16:40	0:12
20-06-2012	33KV VCB Breaker tripped due to change over at BSES	12:41	12:48	0:07
20-06-2012	33KV VCB Breaker tripped due to Voltage Dip at BSES	14:49	15:07	0:18
21-06-2012	33KV VCB Breaker tripped due to Voltage Dip at BSES	12:48	12:55	0:07
21-06-2012	33KV VCB Breaker tripped	20:43	20:58	0:15
22-06-2012	33KV VCB Breaker tripped due to Heavy Dip at BSES	6:29	6:34	0:05
22-06-2012	33KV VCB Breaker tripped due to change over at BSES	12:34	12:37	0:03
23-06-2012	Turbine stopped due to Mechanical Problem	0:07	10:38	10:31
23-06-2012	Turbine Tripped due to Low Vacuum	10:40	11:09	0:29
23-06-2012	33KV VCB Breaker Tripped due to change over at BSES	11:25	11:40	0:15
23-06-2012	Turbine Tripped due to Low Vacuum	11:49	12:20	0:31
26-06-2012	BSES Tripped	8:45	9:00	0:15
26-06-2012	33KV Supply Fails	13:13	13:55	0:42
28-06-2012	33KV VCB Breaker tripped	20:50	21:00	0:10
30-06-2012	33KV VCB Breaker tripped	9:31	9:40	0:09
30-06-2012	33KV VCB Breaker tripped	11:12	11:32	0:20
30-06-2012	33KV VCB Breaker tripped	12:03	12:15	0:12
30-06-2012	33KV VCB Breaker tripped	16:10	16:14	0:04
30-06-2012	33KV VCB Breaker tripped	23:26	23:34	0:08

02/07/2012	33KV VCB Breaker tripped	9:18	9:23	0:05
02/07/2012	33KV VCB Breaker tripped	1:09	1:18	0:09
02/07/2012	33KV VCB Breaker tripped	2:10	2:15	0:05
06/07/2012	33KV VCB Breaker tripped	18:13	18:19	0:06
06/07/2012	33KV VCB Breaker tripped	18:56	19:17	0:21
06/07/2012	33KV VCB Breaker tripped	20:09	20:20	0:11
12/07/2012	TG Unload due Process Problem	1:17	2:15	0:58
13-07-2012	33KV VCB Breaker tripped due to change over at BSES	6:42	6:48	0:06
13-07-2012	33KV VCB Breaker tripped due to change over at BSES	11:58	12:10	0:12
14-07-2012	TG Unload manually due to low temperature	20:34	21:49	1:15
14-07-2012	TG Unload manually due to low temperature	23:55	1:07	1:12
17-07-2012	33KV VCB Breaker tripped	21:46	21:54	0:08
18-07-2012	33KV VCB Breaker tripped	1:11	1:24	0:13
20-07-2012	33KV Transformer Tripped	0:42	0:48	0:06
20-07-2012	33KV Transformer Tripped	3:41	3:47	0:06
22-07-2012	TG Tripped due to High Pressure	11:34	11:44	0:10
23-07-2012	33KV VCB Breaker tripped	15:28	15:36	0:08
27-07-2012	TG Tripped due to DCS Problem	13:05	14:28	1:23
27-07-2012	33KV Transformer Tripped	15:47	15:55	0:08
28-07-2012	33KV VCB Breaker tripped	16:44	18:01	1:17
29-07-2012	BSES Tripped	2:44	13:25	10:41
30-07-2012	33KV VCB Breaker tripped	17:40	17:43	0:03
30-07-2012	33KV VCB Breaker tripped	0:20	6:27	6:07
31-07-2012	33KV VCB Breaker tripped	13:11	20:27	7:16
31-07-2012	TG Tripped due to Line Steam Flow	21:45	22:38	0:53
02/08/2012	33KV Transformer Tripped	14:19	14:27	0:08
07/08/2012	TG Tripped due to Grab Crane	15:10	1:08	9:17
10/08/2012	TG Tripped due to Low Steam Pressure	8:34	9:52	1:18
10/08/2012	TG Tripped due to Low Temperature	21:53	22:32	0:39
15-08-2012	TG Tripped due to Low Steam Pressure	3:35	4:05	0:30
15-08-2012	33KV Transformer Tripped	16:15	16:20	0:05
15-08-2012	33KV Transformer Tripped	17:49	17:54	0:05
24-08-2012	33KV VCB Breaker tripped	5:25	5:27	0:02
24-08-2012	33KV VCB Breaker tripped	17:36	17:40	0:04
25-08-2012	BSES Tripped	11:45	12:10	0:25
26-08-2012	TG Unload due to low Pressure	10:32	10:58	0:26
26-08-2012	TG Unload due to BSES taken change over	11:07	11:43	0:36
27-08-2012	TG Unload due to low Pressure	22:58	23:14	0:16
28-08-2012	TG Unload due to low Pressure & Temperature	5:02	5:27	0:25

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

### **B.2.1. Temporary deviations from registered monitoring plan or applied methodology**

There is no temporary deviation from registered monitoring plan or the applied methodology.

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

There are no corrections.

### B.2.3. Permanent changes from registered monitoring plan or applied methodology

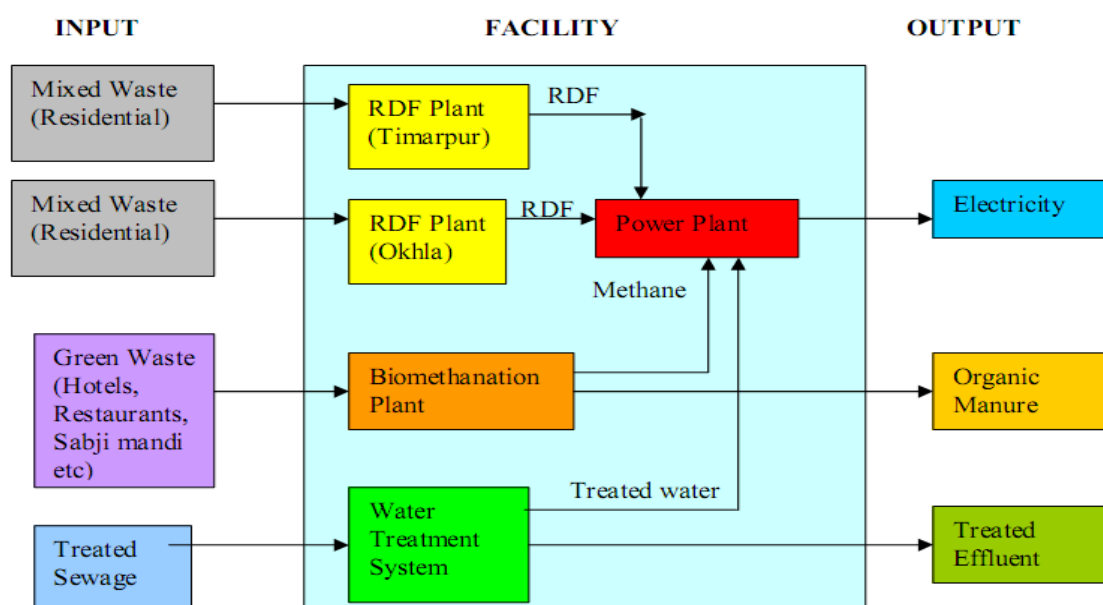
There is no temporary deviation from registered monitoring plan or the applied methodology.

### B.2.4. Changes to project design of registered project activity

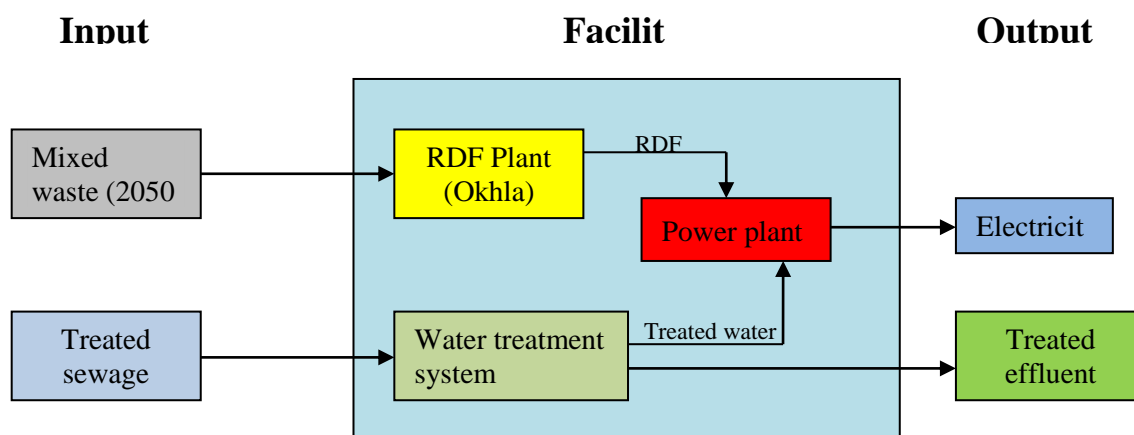
There are certain permanent changes in the project activity from the registered PDD as highlighted below:

- The project activity will process 686750 MT of waste per year @ 2050 TPD of MSW<sup>1</sup> at the Okhla site<sup>2</sup> to produce power after segregation, screening, sorting and magnetic separation whereas earlier the waste was envisaged to be processed at Okhla (1300 TPD) as well as Timarpur site (650 TPD) with processing of 100 TPD of green waste for compost preparation;

#### Pre-project scenario



#### Project scenario



<sup>1</sup> As per concession agreement with NDMC and MCD dated .....

<sup>2</sup> Approval letter from MCD for transfer of waste from Timarpur to Okhla site

- A turbo generator of 20.9 MW<sup>3</sup> shall be installed in the project activity to generate power whereas the capacity was envisaged as 16 MW in the registered PDD;
- Annually, the project will sell 121.59 GWh of electricity out of which 60 GWh shall be sold to the local grid (otherwise being fed by Northern Grid) as per the PPA with tariff of 2.49 INR/KWh and 61.59 GWh is envisaged to be sold in the open access at a tariff of approx. 3.50 INR/KWh. However, in the registered PDD the project activity was envisaged to sell 101GWh to the grid at a tariff of 4.00 INR/KWh;

#### **B.2.5. Changes to start date of crediting period**

A request for change in crediting period was submitted with UNFCCC. The same was approved by UNFCCC and the crediting period is now modified from 01/04/2009 – 31/03/2019 to 30/03/2011 – 29/03/2021. The change is reflected on the UNFCCC website.

#### **B.2.6. Types of changes specific to afforestation or reforestation project activity**

Not Applicable

### **SECTION C. Description of monitoring system**

#### **Measures to ensure the Results / uncertainty analysis**

All the monitoring equipments shall be calibrated by an independent agency, which is accredited with National Accreditation Board for Testing & Calibration Laboratories (NABL), Department of Science & Technology, Government of India on an annual basis. If during the yearly test check, any meter is found to be beyond permissible limits of error, it would be calibrated immediately.

As per the Power Purchase Agreement (PPA), the energy exported to the state Grid is recorded from two independent meters viz., Main Meter and Check Meter and reading of main meter is used for billing. In the event of main meter not in operation / fails, the reading of the check meter shall be used for billing. Power Generation, Export & Auxiliary Consumption, fuel consumption are being recorded on regular interval, as defined in section D.7.2, and the same is being verified and approved by Manager (O&M).

#### **Emergency Procedure**

Though, all the measures are taken to avoid erroneous recording of the monitoring parameters, there might be certain situations which may include failure of various metering devices. To minimize the risk of data discrepancy a set of spare for different meters are maintained at the plant site. Further, regular checking and maintenance of all metering devices is carried out by plant personals at TOWMCL to maintain highest level of accuracy.

#### **Roles and responsibilities**

Different operators are responsible for monitoring of daily data of the waste received, RDF produced, RDF combusted, steam generated from boiler, steam fed to turbine, electricity generated, etc. The report is then sent to the Shift in-charge for the review.

Shift Electrician (Electrical) is responsible for taking meter readings for electricity generation daily.

Shift Incharge is responsible for compilation of data which is then sent to GM for preliminary review.

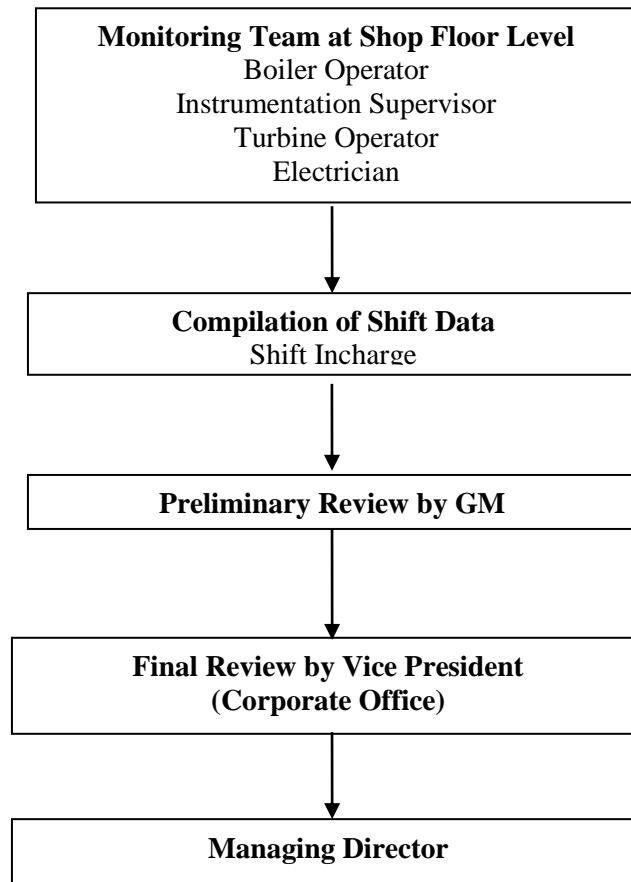
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<sup>3</sup> As per the purchase order placed for the turbo generator



GM is responsible for reviewing the monitored parameters report on a daily basis and presenting a daily executive summary report to the Vice President Corporate office which is finally reported to Managing Director (MD), TOWMCL.

Organization structure responsible for monitoring and reporting of parameters involved in CDM project activity has been presented in the following flow chart.



**SECTION D. Data and parameters****D.1. Data and parameters fixed ex ante or at renewal of crediting period**

<b>Data/Parameter</b>	CEF <sub>elec</sub>
<b>Unit</b>	tonnes of CO <sub>2</sub> e / MWh
<b>Description</b>	Electricity emission factor
<b>Source of data</b>	
<b>Value(s) applied</b>	0.75
<b>Purpose of data</b>	Baseline emissions
<b>Additional comment</b>	-

<b>Data/Parameter</b>	NCV <sub>fuel</sub>
<b>Unit</b>	Kcal/ kg
<b>Description</b>	Net Calorific Value of Fuel
<b>Source of data</b>	ex ante as fixed in registered PDD
<b>Value(s) applied</b>	10317
<b>Purpose of data</b>	Estimation of baseline emissions
<b>Additional comment</b>	-

<b>Data/Parameter</b>	EF <sub>fuel</sub>
<b>Unit</b>	tCO <sub>2</sub> / TJ
<b>Description</b>	CO <sub>2</sub> emission factor of fuel
<b>Source of data</b>	ex ante as fixed in registered PDD
<b>Value(s) applied</b>	74.1
<b>Purpose of data</b>	Estimation of project emissions
<b>Additional comment</b>	-



Data/Parameter	CCW <sub>i</sub>	
Unit	%	
Description	Fraction of carbon content in waste type i	
Source of data	ex ante as fixed in registered PDD	
Value(s) applied		
	Waste type	Fraction of carbon content
	Paper/cardboard	0.46
	Textiles	0.5
	Food Waste	0.38
	Wood	0.5
	Garden and park waste	0.49
	Nappies	0.7
	Rubber and leather	0.67
	Plastics	0.75
other, inert waste	0.03	
Purpose of data	Estimation of project emissions	
Additional comment	-	

Data/Parameter	FCF <sub>i</sub>	
Unit	%	
Description	Fraction of fossil carbon content in waste type i	
Source of data	ex ante as fixed in registered PDD	
Value(s) applied		
	Waste type	Fraction of fossil carbon
	Paper/cardboard	0.01
	Textiles	0.2
	Food Waste	0
	Wood	0
	Garden and park waste	0
	Nappies	0.1
	Rubber and leather	0.2
	Plastics	1
other, inert waste	1	
Purpose of data	Estimation of project emissions	
Additional comment	-	

<b>Data/Parameter</b>	$EF_i$
<b>Unit</b>	Fraction
<b>Description</b>	Combustion efficiency for waste type i
<b>Source of data</b>	ex ante as fixed in registered PDD
<b>Value(s) applied</b>	1
<b>Purpose of data</b>	Estimation of project emissions
<b>Additional comment</b>	-

<b>Data/Parameter</b>	$D_{fuel}$
<b>Unit</b>	Kg/l
<b>Description</b>	Density of fuel
<b>Source of data</b>	CEA database version 7
<b>Value(s) applied</b>	0.86
<b>Purpose of data</b>	Estimation of project emissions
<b>Additional comment</b>	If the rate exceeds 50%, no CERs can be claimed

## D.2. Data and parameters monitored

<b>Data/Parameter</b>	$MWh_e$												
<b>Unit</b>	MWh												
<b>Description</b>	Electricity consumption												
<b>Measured/Calculated/Default</b>	Measured												
<b>Source of data</b>	Electricity meter												
<b>Value(s) of monitored parameter</b>	451												
<b>Monitoring equipment</b>	<table border="1"> <thead> <tr> <th>Description</th><th>Meter details</th></tr> </thead> <tbody> <tr> <td>Sr. No.</td><td>05252045</td></tr> <tr> <td>Class</td><td>0.2</td></tr> <tr> <td>Make</td><td></td></tr> <tr> <td>Date of calibration</td><td>06/01/2012</td></tr> <tr> <td>Next date of calibration</td><td>05/01/2013</td></tr> </tbody> </table>	Description	Meter details	Sr. No.	05252045	Class	0.2	Make		Date of calibration	06/01/2012	Next date of calibration	05/01/2013
Description	Meter details												
Sr. No.	05252045												
Class	0.2												
Make													
Date of calibration	06/01/2012												
Next date of calibration	05/01/2013												
<b>Measuring/Reading/Recording frequency</b>	Measuring Frequency- Daily basis Recording Frequency- Daily basis, consolidated on monthly basis Reporting Frequency- Monthly basis in ER spread sheet												
<b>Calculation method (if applicable)</b>	Not applicable												
<b>QA/QC procedures</b>	All Meters are calibrated by accredited external third party, as per standard procedures, on annual basis.												
<b>Purpose of data</b>	For estimation of project emissions												
<b>Additional comment</b>	-												



<b>Data/Parameter</b>	<b>F<sub>cons</sub></b>												
<b>Unit</b>	Litres												
<b>Description</b>	Fuel consumption												
<b>Measured/Calculated/Default</b>	Measured												
<b>Source of data</b>	Logbook data												
<b>Value(s) of monitored parameter</b>	512069												
<b>Monitoring equipment</b>	<table border="1"> <thead> <tr> <th>Description</th><th>Meter details</th></tr> </thead> <tbody> <tr> <td>Sr. No.</td><td>110517</td></tr> <tr> <td>Class</td><td>0.5</td></tr> <tr> <td>Make</td><td>Kent oil meter</td></tr> <tr> <td>Date of calibration</td><td>05/01/2012</td></tr> <tr> <td>Next date of calibration</td><td>04/01/2013</td></tr> </tbody> </table>	Description	Meter details	Sr. No.	110517	Class	0.5	Make	Kent oil meter	Date of calibration	05/01/2012	Next date of calibration	04/01/2013
Description	Meter details												
Sr. No.	110517												
Class	0.5												
Make	Kent oil meter												
Date of calibration	05/01/2012												
Next date of calibration	04/01/2013												
<b>Measuring/Reading/Recording frequency</b>	Measuring Frequency- Daily basis Recording Frequency- Daily basis, consolidated on monthly basis Reporting Frequency- Monthly basis in ER spread sheet												
<b>Calculation method (if applicable)</b>	Not applicable												
<b>QA/QC procedures</b>	All Meters are calibrated by accredited external third party, as per standard procedures, on annual basis. The quantity consumed shall be cross checked with inventory and purchase during the monitoring period.												
<b>Purpose of data</b>	For estimation of project emissions												
<b>Additional comment</b>	-												



<b>Data/Parameter</b>	$A_i$																				
<b>Unit</b>	ton/ year																				
<b>Description</b>	Amount of waste type i																				
<b>Measured/Calculated /Default</b>	Calculated using measured values																				
<b>Source of data</b>	Logbook data for incoming waste and third party report for physical characterization of waste																				
<b>Value(s) of monitored parameter</b>	<table border="1"> <thead> <tr> <th>Waste type</th><th>Quantity (MT)</th></tr> </thead> <tbody> <tr> <td>Paper/cardboard</td><td>16831</td></tr> <tr> <td>Textiles</td><td>5438</td></tr> <tr> <td>Food Waste</td><td>74732</td></tr> <tr> <td>Wood</td><td>5179</td></tr> <tr> <td>Garden and park waste</td><td>95857</td></tr> <tr> <td>Nappies</td><td>0.00</td></tr> <tr> <td>Rubber and leather</td><td>2846.12</td></tr> <tr> <td>Plastics</td><td>3794.83</td></tr> <tr> <td>other, inert waste</td><td>7871.71</td></tr> </tbody> </table>	Waste type	Quantity (MT)	Paper/cardboard	16831	Textiles	5438	Food Waste	74732	Wood	5179	Garden and park waste	95857	Nappies	0.00	Rubber and leather	2846.12	Plastics	3794.83	other, inert waste	7871.71
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<b>Monitoring equipment</b>	-																				
<b>Measuring/Reading/ Recording frequency</b>	Measuring Frequency- Daily basis Recording Frequency- Daily basis, consolidated on monthly basis Reporting Frequency- Monthly basis in ER spread sheet																				
<b>Calculation method (if applicable)</b>	Physical characterization analysis shall be carried out on annual basis. Based on this analysis, the quantity of different type of waste present in the MSW received shall be calculated. (The incoming MSW shall be measured on daily basis and consolidated on annual basis)																				
<b>QA/QC procedures</b>	All weighbridge/load cells are calibrated by accredited external third party, as per standard procedures, on annual basis.																				
<b>Purpose of data</b>	For estimation of baseline as well as project emissions																				
<b>Additional comment</b>	-																				



Data/Parameter	Q <sub>biomass</sub>	
Unit	ton/ year	
Description	Amount of RDF combusted	
Measured/Calculated /Default	Measured	
Source of data	Logbooks prepared using Load cell data	
Value(s) of monitored parameter	220858	
Monitoring equipment		
	Description	Meter details
	Sr. No.	1024
	Class	1
	Make	Cell sensor
	Date of calibration	06/01/2012
	Next date of calibration	05/01/2013
	Description	Meter details
	Sr. No.	1025
	Class	1
	Make	Cell sensor
	Date of calibration	06/01/2012
	Next date of calibration	05/01/2013
	Description	Meter details
	Sr. No.	1026
	Class	1
	Make	Cell sensor
	Date of calibration	06/01/2012
	Next date of calibration	05/01/2013
	Description	Meter details
	Sr. No.	1027
	Class	1
	Make	Cell sensor
	Date of calibration	06/01/2012
	Next date of calibration	05/01/2013
	Description	Meter details
Sr. No.	1028	
Class	1	
Make	Cell sensor	
Date of calibration	06/01/2012	
Next date of calibration	05/01/2013	
Description	Meter details	
Sr. No.	1029	
Class	1	
Make	Cell sensor	
Date of calibration	06/01/2012	
Next date of calibration	05/01/2013	
Description	Meter details	



	<b>Sr. No.</b>	1030
	<b>Class</b>	1
	<b>Make</b>	Cell sensor
	<b>Date of calibration</b>	06/01/2012
	<b>Next date of calibration</b>	05/01/2013
	<b>Description</b>	<b>Meter details</b>
	<b>Sr. No.</b>	1031
	<b>Class</b>	1
	<b>Make</b>	Cell sensor
	<b>Date of calibration</b>	06/01/2012
	<b>Next date of calibration</b>	05/01/2013
<b>Measuring/Reading/Recording frequency</b>	Measuring Frequency- Daily basis Recording Frequency- Daily basis, consolidated on monthly basis Reporting Frequency- Monthly basis in ER spread sheet	
<b>Calculation method (if applicable)</b>	Not applicable	
<b>QA/QC procedures</b>	The load cells of the grab crane are calibrated by accredited external third party, as per standard procedures, on annual basis.	
<b>Purpose of data</b>	For estimation of project emissions	
<b>Additional comment</b>	-	

<b>Data/Parameter</b>	$R_t$
<b>Unit</b>	ton/ year
<b>Description</b>	Total weight of RDF produced
<b>Measured/Calculated/Default</b>	Measured
<b>Source of data</b>	Logbooks prepared using Load cell data
<b>Value(s) of monitored parameter</b>	229437
<b>Monitoring equipment</b>	
<b>Measuring/Reading/Recording frequency</b>	Measuring Frequency- Daily basis Recording Frequency- Daily basis, consolidated on monthly basis Reporting Frequency- Monthly basis in ER spread sheet
<b>Calculation method (if applicable)</b>	Not applicable
<b>QA/QC procedures</b>	The load cells of the grab crane are calibrated by accredited external third party, as per standard procedures, on annual basis.
<b>Purpose of data</b>	-
<b>Additional comment</b>	-





<b>Data/Parameter</b>	EG <sub>d</sub>																																																												
<b>Unit</b>	MWh																																																												
<b>Description</b>	Amount of electricity generated and exported to grid from the project using RDF																																																												
<b>Measured/Calculated/Default</b>	Measured																																																												
<b>Source of data</b>	Metering Records																																																												
<b>Value(s) of monitored parameter</b>	36238																																																												
<b>Monitoring equipment</b>	<p><b><u>Gross generation meters:</u></b></p> <table border="1"> <thead> <tr> <th>Description</th><th>Meter details</th></tr> </thead> <tbody> <tr> <td>Sr. No.</td><td>GJU61733</td></tr> <tr> <td>Class</td><td>0.2</td></tr> <tr> <td>Make</td><td>Siemens</td></tr> <tr> <td>Date of calibration</td><td>25/04/2011</td></tr> <tr> <td>Next date of calibration</td><td>24/04/2012</td></tr> </tbody> </table> <p><b><u>Import/Export meter:</u></b></p> <table border="1"> <thead> <tr> <th>Description</th><th>Meter details</th></tr> </thead> <tbody> <tr> <td>Sr. No.</td><td>05252046</td></tr> <tr> <td>Class</td><td>0.2</td></tr> <tr> <td>Make</td><td>Elster</td></tr> <tr> <td>Date of calibration</td><td>01/02/2012</td></tr> <tr> <td>Next date of calibration</td><td>31/01/2013</td></tr> </tbody> </table> <p><b><u>Auxiliary consumption meters:</u></b></p> <table border="1"> <thead> <tr> <th>Description</th><th>Meter details</th></tr> </thead> <tbody> <tr> <td>Sr. No.</td><td>203987/8967-2810</td></tr> <tr> <td>Class</td><td>0.5</td></tr> <tr> <td>Make</td><td>Conzerv</td></tr> <tr> <td>Date of calibration</td><td>06/01/2012</td></tr> <tr> <td>Next date of calibration</td><td>05/01/2013</td></tr> </tbody> </table> <table border="1"> <thead> <tr> <th>Description</th><th>Meter details</th></tr> </thead> <tbody> <tr> <td>Sr. No.</td><td>205056/9635-3310</td></tr> <tr> <td>Class</td><td>0.5</td></tr> <tr> <td>Make</td><td>Conzerv</td></tr> <tr> <td>Date of calibration</td><td>06/01/2012</td></tr> <tr> <td>Next date of calibration</td><td>05/01/2013</td></tr> </tbody> </table> <table border="1"> <thead> <tr> <th>Description</th><th>Meter details</th></tr> </thead> <tbody> <tr> <td>Sr. No.</td><td>205503/10130-3410</td></tr> <tr> <td>Class</td><td>0.5</td></tr> <tr> <td>Make</td><td>Conzerv</td></tr> <tr> <td>Date of calibration</td><td>06/01/2012</td></tr> <tr> <td>Next date of calibration</td><td>05/01/2013</td></tr> </tbody> </table>	Description	Meter details	Sr. No.	GJU61733	Class	0.2	Make	Siemens	Date of calibration	25/04/2011	Next date of calibration	24/04/2012	Description	Meter details	Sr. No.	05252046	Class	0.2	Make	Elster	Date of calibration	01/02/2012	Next date of calibration	31/01/2013	Description	Meter details	Sr. No.	203987/8967-2810	Class	0.5	Make	Conzerv	Date of calibration	06/01/2012	Next date of calibration	05/01/2013	Description	Meter details	Sr. No.	205056/9635-3310	Class	0.5	Make	Conzerv	Date of calibration	06/01/2012	Next date of calibration	05/01/2013	Description	Meter details	Sr. No.	205503/10130-3410	Class	0.5	Make	Conzerv	Date of calibration	06/01/2012	Next date of calibration	05/01/2013
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<b>Recording frequency</b>	Recording Frequency- Daily basis, consolidated on monthly basis Reporting Frequency- Monthly basis in ER spread sheet
<b>Calculation method (if applicable)</b>	Not applicable
<b>QA/QC procedures</b>	The electricity exported to the state grid may be cross checked from the invoices raised by electricity board.
<b>Purpose of data</b>	For estimation of baseline emissions
<b>Additional comment</b>	-

<b>Data/Parameter</b>	$A_{j, x}$
<b>Unit</b>	tonnes/year
<b>Description</b>	Amount of organic waste type j prevented from disposal in the landfill in the year x (tonnes/year)
<b>Measured/Calculated /Default</b>	calculated using measured values
<b>Source of data</b>	Records of incoming waste and physical characterization certificate from third party
<b>Value(s) of monitored parameter</b>	368626
<b>Monitoring equipment</b>	-
<b>Measuring/Reading/ Recording frequency</b>	Measuring Frequency- Quarterly basis Recording Frequency- Quarterly basis, consolidated on annual basis
<b>Calculation method (if applicable)</b>	The total amount of the waste received in the plant shall be segregated according to the physical characterization, carried out by the third party on a quarterly basis.
<b>QA/QC procedures</b>	The composition of waste shall be determined quarterly by a third party
<b>Purpose of data</b>	For estimation of baseline emissions
<b>Additional comment</b>	-

<b>Data/Parameter</b>	$MB_y$
<b>Unit</b>	t CH <sub>4</sub>
<b>Description</b>	Methane produced in the landfill in the absence of the project activity in year 'y'.
<b>Measured/Calculated /Default</b>	Calculated
<b>Source of data</b>	Logbook records
<b>Value(s) of monitored parameter</b>	706
<b>Monitoring equipment</b>	-
<b>Measuring/Reading/ Recording frequency</b>	Measuring Frequency- Daily basis Recording Frequency- Daily basis Reporting Frequency- Daily basis in ER spread sheet
<b>Calculation method (if applicable)</b>	Calculated as per the tool "Emission from solid waste disposal site"
<b>QA/QC procedures</b>	-
<b>Purpose of data</b>	For estimation of baseline emissions
<b>Additional comment</b>	-



<b>Data/Parameter</b>	NO <sub>vehicles</sub>
<b>Unit</b>	Number
<b>Description</b>	Vehicles per carrying capacity per year
<b>Measured/Calculated /Default</b>	Monitored
<b>Source of data</b>	Logbook records
<b>Value(s) of monitored parameter</b>	4681
<b>Monitoring equipment</b>	-
<b>Measuring/Reading/ Recording frequency</b>	Measuring Frequency- Daily basis Recording Frequency- Daily basis, consolidated on monthly basis Reporting Frequency- Monthly basis in ER spread sheet
<b>Calculation method (if applicable)</b>	-
<b>QA/QC procedures</b>	Data shall be archived till 2 years after the end of crediting period
<b>Purpose of data</b>	For estimation of leakage emissions
<b>Additional comment</b>	-

<b>Data/Parameter</b>	km <sub>y</sub>
<b>Unit</b>	Km
<b>Description</b>	Average additional distance travelled by vehicle type ‘i’ compared the baseline in year y
<b>Measured/Calculated /Default</b>	Monitored
<b>Source of data</b>	Logbook records
<b>Value(s) of monitored parameter</b>	20
<b>Monitoring equipment</b>	-
<b>Measuring/Reading/ Recording frequency</b>	Measuring Frequency- Daily basis Recording Frequency- Daily basis Reporting Frequency- Daily basis in ER spread sheet
<b>Calculation method (if applicable)</b>	-
<b>QA/QC procedures</b>	Data shall be archived till 2 years after the end of crediting period
<b>Purpose of data</b>	For estimation of leakage emissions
<b>Additional comment</b>	-



<b>Data/Parameter</b>	$VF_{cons}$
<b>Unit</b>	Litre/Km
<b>Description</b>	Vehicle fuel consumption in litres per kilometer of vehicle type i
<b>Measured/Calculated/Default</b>	Default
<b>Source of data</b>	
<b>Value(s) of monitored parameter</b>	0.25
<b>Monitoring equipment</b>	-
<b>Measuring/Reading/Recording frequency</b>	-
<b>Calculation method (if applicable)</b>	-
<b>QA/QC procedures</b>	-
<b>Purpose of data</b>	For estimation of leakage emissions
<b>Additional comment</b>	-

<b>Data/Parameter</b>	$A_{ci}$
<b>Unit</b>	Tones/year
<b>Description</b>	Amount of waste type ci for residual waste from combustion of RDF
<b>Measured/Calculated/Default</b>	Measured
<b>Source of data</b>	weighbridge records
<b>Value(s) of monitored parameter</b>	0
<b>Monitoring equipment</b>	-
<b>Measuring/Reading/Recording frequency</b>	Measuring Frequency- Daily basis Recording Frequency- Daily basis, consolidated on monthly basis Reporting Frequency- Monthly basis in ER spread sheet
<b>Calculation method (if applicable)</b>	-
<b>QA/QC procedures</b>	The weighbridge shall be calibrated on annual basis. Data will be archived till 2 years after the end of crediting period
<b>Purpose of data</b>	For estimation of leakage emissions
<b>Additional comment</b>	-



<b>Data/Parameter</b>	$A_{ci}$
<b>Unit</b>	Tones/year
<b>Description</b>	Amount of waste type ci for residual waste from combustion of RDF
<b>Measured/Calculated/Default</b>	Measured
<b>Source of data</b>	weighbridge records
<b>Value(s) of monitored parameter</b>	0
<b>Monitoring equipment</b>	-
<b>Measuring/Reading/Recording frequency</b>	Measuring Frequency- Daily basis Recording Frequency- Daily basis, consolidated on monthly basis Reporting Frequency- Monthly basis in ER spread sheet
<b>Calculation method (if applicable)</b>	-
<b>QA/QC procedures</b>	The weighbridge shall be calibrated on annual basis. Data will be archived till 2 years after the end of crediting period
<b>Purpose of data</b>	For estimation of leakage emissions
<b>Additional comment</b>	-



<b>Data/Parameter</b>	SG <sub>r,y</sub>																														
<b>Unit</b>	Nm <sup>3</sup> /hr																														
<b>Description</b>	Total volume of stack gas from RDF combustion																														
<b>Measured/Calculated/Default</b>	Measured																														
<b>Source of data</b>	Online monitoring records																														
<b>Value(s) of monitored parameter</b>	27669805																														
<b>Monitoring equipment</b>	<p><b><u>Steam flow meter</u></b></p> <table border="1"> <thead> <tr> <th>Description</th><th>Meter details</th></tr> </thead> <tbody> <tr> <td>Sr. No.</td><td>05243-1</td></tr> <tr> <td>Model</td><td>ANB0.6-1800C</td></tr> <tr> <td>Date of calibration</td><td>17/01/2012</td></tr> <tr> <td>Next date of calibration</td><td>16/01/2013</td></tr> </tbody> </table> <table border="1"> <thead> <tr> <th>Description</th><th>Meter details</th></tr> </thead> <tbody> <tr> <td>Sr. No.</td><td>05243-2</td></tr> <tr> <td>Model</td><td>ANB0.6-1800C</td></tr> <tr> <td>Date of calibration</td><td>17/01/2012</td></tr> <tr> <td>Next date of calibration</td><td>16/01/2013</td></tr> </tbody> </table> <table border="1"> <thead> <tr> <th>Description</th><th>Meter details</th></tr> </thead> <tbody> <tr> <td>Sr. No.</td><td>05243-3</td></tr> <tr> <td>Model</td><td>ANB0.6-1800C</td></tr> <tr> <td>Date of calibration</td><td>17/01/2012</td></tr> <tr> <td>Next date of calibration</td><td>16/01/2013</td></tr> </tbody> </table>	Description	Meter details	Sr. No.	05243-1	Model	ANB0.6-1800C	Date of calibration	17/01/2012	Next date of calibration	16/01/2013	Description	Meter details	Sr. No.	05243-2	Model	ANB0.6-1800C	Date of calibration	17/01/2012	Next date of calibration	16/01/2013	Description	Meter details	Sr. No.	05243-3	Model	ANB0.6-1800C	Date of calibration	17/01/2012	Next date of calibration	16/01/2013
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Model	ANB0.6-1800C																														
Date of calibration	17/01/2012																														
Next date of calibration	16/01/2013																														
<b>Measuring/Reading/Recording frequency</b>	Measuring Frequency- Quarterly basis Recording Frequency- Quarterly basis																														
<b>Calculation method (if applicable)</b>	-																														
<b>QA/QC procedures</b>	Data will be archived till 2 years after the end of crediting period																														
<b>Purpose of data</b>	For estimation of project emissions																														
<b>Additional comment</b>	-																														



<b>Data/Parameter</b>	EF <sub>N2O</sub>
<b>Unit</b>	mg/Nm <sup>3</sup>
<b>Description</b>	Aggregate N <sub>2</sub> O emission factor for waste incineration.
<b>Measured/Calculated/Default</b>	Measured
<b>Source of data</b>	Third party certificates
<b>Value(s) of monitored parameter</b>	2.94
<b>Monitoring equipment</b>	Third party monitoring
<b>Measuring/Reading/Recording frequency</b>	Measuring Frequency- Quarterly basis Recording Frequency- Quarterly basis
<b>Calculation method (if applicable)</b>	-
<b>QA/QC procedures</b>	Data will be archived till 2 years after the end of crediting period
<b>Purpose of data</b>	For estimation of project emissions
<b>Additional comment</b>	-

<b>Data/Parameter</b>	EF <sub>CH<sub>4</sub></sub>
<b>Unit</b>	mg/Nm <sup>3</sup>
<b>Description</b>	Aggregate CH <sub>4</sub> emission factor for waste incineration.
<b>Measured/Calculated/Default</b>	Measured
<b>Source of data</b>	Third party certificates
<b>Value(s) of monitored parameter</b>	0.61
<b>Monitoring equipment</b>	Third party monitoring
<b>Measuring/Reading/Recording frequency</b>	Measuring Frequency- Quarterly basis Recording Frequency- Quarterly basis
<b>Calculation method (if applicable)</b>	-
<b>QA/QC procedures</b>	Data will be archived till 2 years after the end of crediting period
<b>Purpose of data</b>	For estimation of project emissions
<b>Additional comment</b>	-

<b>Data/Parameter</b>	RATE <sub>y</sub> Compliance
<b>Unit</b>	%
<b>Description</b>	Rate of Compliance
<b>Measured/Calculated/Default</b>	Default as per publically available information
<b>Source of data</b>	ex ante as fixed in registered PDD
<b>Value(s) of monitored parameter</b>	10
<b>Monitoring equipment</b>	Third party monitoring
<b>Measuring/Reading/Recording frequency</b>	Monitoring Frequency- Annually Recording Frequency- Annually
<b>Calculation method (if applicable)</b>	-
<b>QA/QC procedures</b>	The source of the information is an authentic government source
<b>Purpose of data</b>	Estimation of baseline emissions
<b>Additional comment</b>	If the rate exceeds 50%, no CERs can be claimed

### D.3. Implementation of sampling plan

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

Baseline emissions are calculated as follows:

$$BE_y = MB_y \cdot GWP_{CH_4} + EG_{d,y} \cdot CEF_d$$

Where,

$MB_y$  = Methane produced in landfill in absence of the project activity in year y

$GWP_{CH_4}$  = Global warming potential of methane

$EG_{d,y}$  = Amount of electricity generated using RDF produced and exported to grid in year y

$CEF_d$  = Carbon emission factor for the displaced electricity source in project activity

As per the registered PDD,

$$MB_y = BE_{CH_4,SWDS,y}$$

Where  $BE_{CH_4,SWDS,y}$  is calculated in accordance of the methodological tool “Emissions from solid waste disposal sites” as follows:

$$BE_{CH_4,SWDS,y} = \phi_y \cdot (1 - f_y) \cdot GWP_{CH_4} \cdot (1 - OX) \cdot \frac{16}{12} \cdot F \cdot DOC_{f,y} \cdot MCF_y \cdot \sum_{x=1}^y \sum_j W_{j,x} \cdot DOC_j \cdot e^{-k_j(y-x)} \cdot (1 - e^{-k_j})$$

$$\begin{aligned} BE_{CH_4,SWDS,y} &= BE_{CH_4,food\ waste,y} + BE_{CH_4,garden\ waste,y} + BE_{CH_4,paper\ waste,y} + BE_{CH_4,textile\ waste,y} + BE_{CH_4,wooden\ waste,y} \\ &= 11663 + 845 + 1642 + 345 + 338 \\ &= 14833\ tCO_2e \end{aligned}$$

Also, as per the registered PDD the baseline emissions should be adjusted as per the compliance rate of the existing MSW rules 2000 that mandates MSW treatment. Since, the compliance of the MSW rules is still



not achieved and there is no latest publically available data regarding the same, PP has conservatively decided to consider the rate of compliance as 10% as depicted in registered PDD. Therefore, the adjusted baseline emission due to methane production in landfill site in absence of project activity is calculated as follows:

$$\begin{aligned} BE_{y,a} &= BE_{CH_4,SWDS,y} * (1 - RATE_{y,compliance}) \\ &= 14833 * (1 - 10\%) \\ &= 13350 \text{ tCO}_2\text{e} \end{aligned}$$

$$\begin{aligned} \text{Baseline emissions (BE}_y) &= MB_y * GWP_{CH_4} + EG_{d,y} * CEF_d \\ &= 13350 + 36238 * 0.75 \\ &= 6221 + 27178.43 \\ &= 40529 \text{ tCO}_2\text{e} \end{aligned}$$

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

The project emissions are calculated as follows:

$$PE_y = PE_{elec,y} + PE_{fuel,onsite,y} + PE_{r,y}$$

Where,

$$\begin{aligned} PE_{elec,y} &= \text{Emissions from electricity consumption on-site due to project activity in year y} \\ PE_{fuel,onsite,y} &= \text{Emissions due to fossil fuel consumption on-site in year y} \\ PE_{r,y} &= \text{Emissions from combustion of RDF in year y} \end{aligned}$$

### Project emissions from electricity usage:

$$\begin{aligned} PE_{elec,y} &= MWH_{e,y} * CEF_{elec} \\ &= 451 * 0.895 \\ &= 404 \text{ tCO}_2\text{e} \end{aligned}$$

### Project emissions from fuel usage:

$$\begin{aligned} PE_{fuel,onsite,y} &= F_{cons,y} * NCV_{fuel} * EF_{fuel} \\ &= (((512069/1000) * 0.86) * 43 * 74.1)/1000 \\ &= 1403 \text{ tCO}_2\text{e} \end{aligned}$$

### Project emissions from combustion of RDF:

$$PE_{r,y} = PE_{r,f,y} + PE_{r,s,y}$$

Where,

$$\begin{aligned} PE_{r,f,y} &= \text{Fossil based waste CO}_2 \text{ emissions from RDF combustion in year y} \\ PE_{r,s,y} &= \text{Emissions from final stacks from RDF combustion in year y} \end{aligned}$$

#### *Emissions from fossil based waste*

$$PE_{r,f,y} = \sum A_i * CCW_i * FCF_i * EF_i * (44/12)$$

The value for the different waste types is calculated as follows:

Waste type	Quantity of waste	Fraction of carbon content	Fraction of fossil carbon	Combustion efficiency for	Fossil based emissions
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				waste	
Paper/cardboard	14355.78	0.46	0.01	1.00	242.13
Textiles	4638.02	0.5	0.2	1.00	1700.61
Food Waste	63739.64	0.38	0	1.00	0.00
Wood	4417.16	0.5	0	1.00	0.00
Garden and park waste	81761.66	0.49	0	1.00	0.00
Nappies	0.00	0.7	0.1	1.00	0.00
Rubber and leather	2451.52	0.67	0.2	1.00	1204.52
Plastics	3268.70	0.75	1	1.00	8988.92
other, inert waste	6780.34	0.03	1	1.00	745.84

Therefore,  $PE_{r,f,y} = 12882$

#### *Emissions from stack of RDF combustor*

For the calculation of the project emissions from stack gases of the RDF combustor Option 1 of the registered PDD has been chosen by the PP and the calculation is done as follows:

$$\begin{aligned}
 PE_{r,s,y} &= SG_{r,y} * MC_{N2O,r,y} * GWP_{N2O} + SG_{r,y} * MC_{CH4,r,y} * GWP_{CH4} \\
 &= 27669805.11 * 2.94 * 310 + 27669805.11 * 0.61 * 21 \\
 &= 615 \text{ tCO}_2\text{e}
 \end{aligned}$$

Hence,

$$\begin{aligned}
 PE_{r,y} &= 12882 + 615 \\
 &= 6674 \text{ tCO}_2\text{e}
 \end{aligned}$$

The total project emission due to project activity is thus calculated as:

$$\begin{aligned}
 PE_y &= 404 + 1403 + 13497 \\
 &= 15428 \text{ tCO}_2\text{e}
 \end{aligned}$$

### **E.3. Calculation of leakage**

The leakage emissions from the project activity are calculated as follows:

$$L_y = L_{t,y} + L_{r,y}$$

Where,

- $L_{t,y}$  = Leakage emissions from increased transport in year y
- $L_{r,y}$  = Leakage emission from residual waste from the combustion of RDF in year y  
(Since there is no residual waste from the processing activity in project activity, the value of this parameter is zero)

#### Leakage emission from increased transport:

There is no increase in the distance travelled for disposal of the collected waste from the collection points. This is because of the reason that the waste processing unit is being established at the landfill sites only where the waste was being dumped earlier also. However, there is transport of ash to the disposal site developed at a distance of 10 km from the project site. Project emissions for the same are accounted as leakage emissions for the project activity as follows:

$$L_{t,y} = \sum NO_{\text{vehicles},i,y} * km_{i,y} * VF_{\text{cons},i} * CV_{\text{fuel}} * D_{\text{fuel}} * EF_{\text{fuel}}$$

Where,

$NO_{\text{vehicles},i,y}$	=	No of vehicles for transport in year y
$km_{i,y}$	=	average additional distance travelled by vehicle compared to baseline in year y
$VF_{\text{cons},i}$	=	Vehicle fuel consumption in litres per kilometer
$CV_{\text{fuel}}$	=	Calorific value of fuel
$D_{\text{fuel}}$	=	Fuel density
$EF_{\text{fuel}}$	=	Emission factor of the fuel

Therefore,

$$L_{t,y} = (4681 * 20 * 0.25 * 43 * 0.86 * 74.1)/1000$$

$$= 125 \text{ tCO}_2\text{e}$$

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

Time Period	Baseline emissions or baseline net GHG removals by sinks (tCO <sub>2</sub> e)	Project emissions or actual net GHG removals by sinks (tCO <sub>2</sub> e)	Leakage (tCO <sub>2</sub> e)	Emission reductions or net anthropogenic GHG removals by sinks (tCO <sub>2</sub> e)
<b>Total</b>	40529	15428	125	24975

#### E.5. Comparison of actual emission reductions or net anthropogenic 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
<b>Emission reductions or GHG removals by sinks (tCO<sub>2</sub>e)</b>	73202* (218/365) = 43720	24975

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

The baseline emission from the methane production in absence of project activity is dependent on the physical characterization of the waste collected in year y. Since, the composition of waste is dynamic the emission reduction may vary from the registered PDD and from one year to another.

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#### History of the document

Version	Date	Nature of revision
02.0	EB 66 13 March 2012	Revision required to ensure consistency with the "Guidelines for completing the monitoring report form" (EB 66, Annex 20).
01	EB 54, Annex 34 28 May 2010	Initial adoption.
<b>Decision Class:</b> Regulatory <b>Document Type:</b> Form <b>Business Function:</b> Issuance		