Monitoring report form
(Version 05.1)

Complete this form in accordance with the Attachment "Instructions for filling out the monitoring report form" at the end of this form.

MONITORING REPORT

Title of the project activity	LFG flaring project at Dubai, UAE		
UNFCCC reference number of the project activity	Project Ref # 8269		
Version number of the monitoring report	Version #05		
Completion date of the monitoring report	23/08/2016		
Monitoring period number and duration of this monitoring period	Monitoring Period Number # 03 Duration of this Monitoring Period: 01/06/2015 to 31/12/2015 (both days inclusive)		
Project participant(s)	Green Energy Solutions & Sustainability LLC Dubai Municipality First Climate (India) Private Limited		
Host Party	**United Arab Emirates**		
Sectoral scope(s)	Sectoral Scope: 13: Waste Handling & Disposal		
Selected methodology(ies)	Applied Methodology: ACM0001 (Version 12)- Flaring or use of landfill gas		
Selected standardized baseline(s)	Not Applicable		
Estimated amount of GHG emission reductions or net GHG removals by sinks for this monitoring period in the registered PDD	Year	Days	t CO_2e
	2015 (01/06/2015 to 31/12/2015)	214	167,309
	01/06/2015 to 31/12/2015	**214**	**167,309**[1]
Total amount of GHG emission reductions or net GHG removals by sinks achieved in this monitoring period	GHG emission reductions or net GHG removals by sinks reported up to 31 December 2012	GHG emission reductions or net GHG removals by sinks reported from 1 January 2013 onwards	
	-	164,015[2]	

[1] *This figure has been calculated based on the number of days in the present claim period i.e. 214 The estimated emission reduction for as per CDM PDD for the year 2015 has been mentioned as 285,365 tCO_2e. Hence estimated emission reductions for the said claim period would be (285,365/365)*214=167,309*

[2] ***The CER's are being claimed for the period from 01/06/2015 to 31/12/2015***

SECTION A. Description of project activity

A.1. Purpose and general description of project activity

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General description of the project activity

Green Energy Solutions and Sustainability LLC has installed a landfill gas (LFG) recovery system at the Al Qusais Landfill site in Dubai. This active Al Qusais landfill site has been in operation since 1989. No hazardous waste is being deposited at the Al-Qusais landfill site.

Purpose of the Project Activity

The purpose of the project activity is to replace the existing passive venting system (where the landfill gas is released into the atmosphere without any collection, recovery or combustion) with a landfill gas recovery system in order to collect and destroy the landfill gas generated at the Al Qusais Landfill site. The captured landfill gas is being flared by closed type flaring systems and part of the same is used onsite for generation of power for captive use. The purpose of landfill gas flaring is to safely dispose of the flammable constituents (particularly methane) and to control odour nuisance, health risks and adverse environmental impacts. This includes installation of an efficient gas collection system and requisite flaring equipment. The electricity requirement of the proposed project activity is being met by DG sets installed at the project site as part of the project activity. Post project implementation part of the gas is being used onsite for power generation to the tune that is needed to run the plant. The project has been commissioned by Hofstetter Umwelttechnik AG (which is one of the leading companies in the world in flaring and degassing technologies).

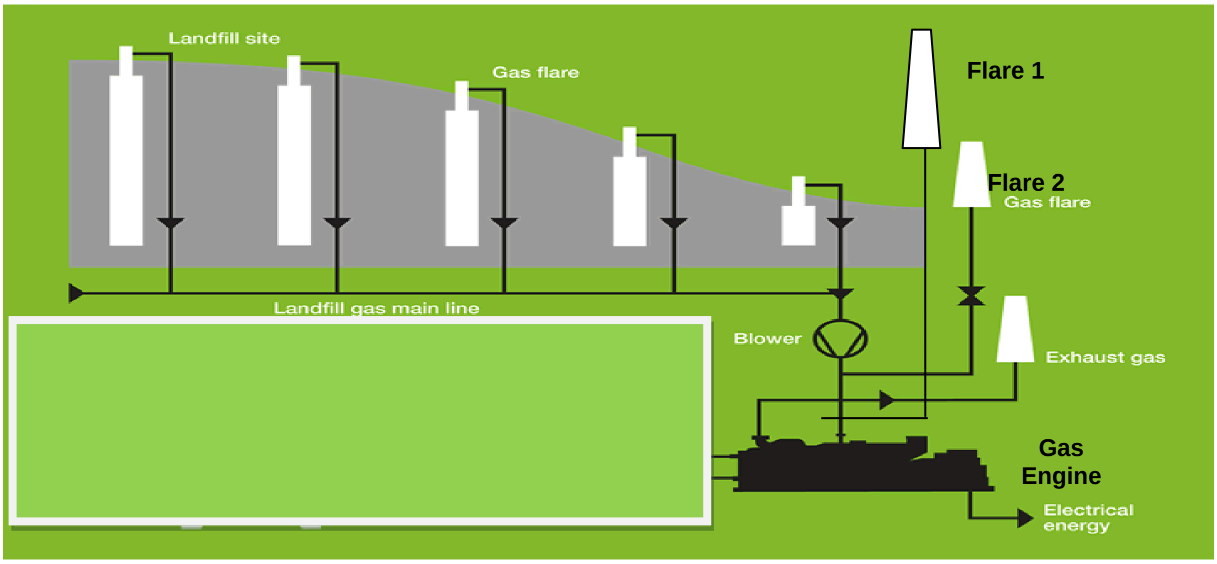
The commissioning details of the project activity have been provided below:

Serial #	*Milestone*	*Date*
1.	Site Construction Activity	From Jan-12 to Sept-12
2.	Project Commissioning	18th November-2012
3.	Commissioning of onsite landfill gas based Genset.	21st January 2013

Technology Used:

The project activity involves installation of an efficient gas collection system and requisite flaring equipment along with an onsite landfill gas power generation system for captive consumption. The technology is clean as compared to the conventional passive venting system (where the landfill gas is released into the atmosphere without any collection, recovery or combustion) and environmentally sustainable. Further details of the technology employed has been provided in section B.1. The total GHG emission reductions or net anthropogenic GHG removals by the project achieved during the period. from 01-June-2015 to 31-Dec-2015 amount to **164,015** tCO_2e.

The project flow diagram has been provided below:



The current monitoring period is from 01/06/2015 to 31/12/2015. This is due to contractual agreement to source emission reductions from the period 01-June-2015 onwards.

The implementation of the aforesaid technology (flaring of landfill gas) helps to safely dispose of the flammable constituents (particularly methane) and to control odour nuisance, health risks and adverse environmental impacts. The project has resulted in avoidance of methane. The avoidance of landfill gas emissions has also prevented the escape of volatile organic compounds (VOC) from the gas. Hence the technology is safe and environmentally sustainable.

A.2. Location of project activity

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Location: Al Qusais landfill

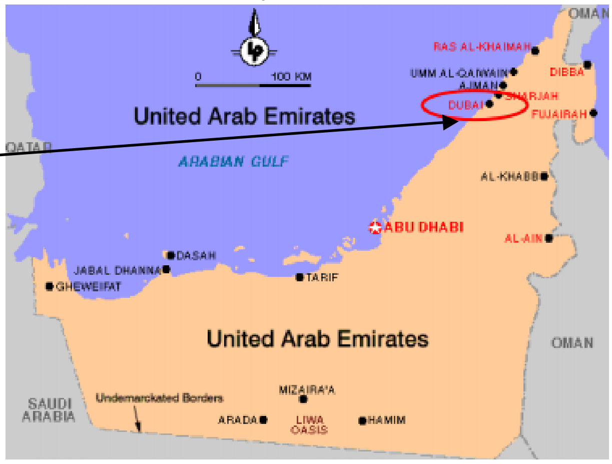
City: Dubai

Country: UAE (United Arab Emirates)

Longitude: 55^{0}26’14” East

Latitude: 25^{0}16’47” North

The Arial view of the landfill and an indicative map of the landfill site are provided below:



Map of the United Arab Emirates, highlighting the location of Dubai

A.3. Parties and project participant(s)

Party involved ((host) indicates a host Party)	Private and/or public entity(ies) project participants (as applicable)	Indicate whether the Party involved wishes to be considered as project participant (yes/no)
United Arab Emirates	Public Entity: Dubai Municipality Private Entity: Green Energy Solutions & Sustainability LLC Private Entity: First Climate (India) Private Limited	No

A.4. Reference of applied methodology and standardized baseline

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The approved baseline and monitoring methodology applied to the aforesaid project activity is Approved Consolidated Methodology ACM0001 “Flaring or use of landfill gas” (Version 12.0.0, EB 65). The same is provided in tabular format below:

Methodology	***Approved Consolidated Methodology***
Title	ACM0001- Flaring or use of Landfill gas
Version	12.0.0
EB#	65
Weblink	https://cdm.unfccc.int/methodologies/DB/RNAKK7JRFWIKCFT3YSNKGPC1FR2DVA

Following tools were also referred by the applied methodology and by the project activity:

Tool	***Tool to determine project emissions from flaring gases containing methane***
Annex	13
Version	1
EB#	28
Weblink	http://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-06-v1.pdf

Tool	***Tool to calculate baseline, project and/or leakage emissions from electricity consumption***
Annex	7
Version	01
EB#	39
Weblink	http://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-05-v1.pdf

Tool	**Tool to calculate project or leakage CO_2 emissions from fossil fuel combustion**
Annex	11
Version	2
EB#	41
Weblink	http://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-03-v2.pdf

Tool	**Combined tool to identify the baseline scenario and demonstrate additionality**
Annex	48
Version	4.0.0
EB#	66

Weblink	http://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-02-v4.0.0.pdf

Tool	**Emissions from solid waste disposal sites**
Annex	46
Version	06.0.1
EB#	66
Weblink	http://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-04-v6.0.1.pdf

Tool	**Tool to determine the remaining lifetime of equipment**
Annex	15
Version	1
EB#	50
Weblink	http://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-10-v1.pdf/history_view

Tool	**Tool to determine the baseline efficiency of thermal or electric energy generation systems**
Annex	12
Version	1
EB#	48
Weblink	http://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-09-v1.pdf

Tool	**Tool to determine the mass flow of a greenhouse gas in a gaseous stream**
Annex	11
Version	02.0.0
EB#	61
Weblink	http://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-08-v2.0.0.pdf

Standardized Baseline selected for the project activity:

Not Applicable

A.5. Crediting period of project activity

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Type of Crediting Period	Start Date of the crediting period	Length of the crediting period	End Date of the crediting period
Renewable	19/11/2012	7 years (1st crediting period)	18/11/2019

A.6. Contact information of responsible persons/entities

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Project participant and/or responsible person/ entity	☒ Project participant ☒ Person/entity responsible for completing the CDM-MR-FORM
Organization name	First Climate (India) Private Limited
Street/P.O. Box	3C, Camac Street
Building	Camac Tower, 9th Floor
City	Kolkata
State/region	West Bengal

Postcode	700 016
Country	India
Telephone	+91 33 4005 6786
Fax	+91-33-4064 9199
E-mail	
Website	www.firstclimate.com
Contact person	Mr. Subhendu Biswas
Title	Director
Salutation	Mr.
Last name	Biswas
Middle name	
First name	Subhendu
Department	
Mobile	+91 9836423008
Direct fax	
Direct tel.	+91 33 4005 6786 (Extension: 22)
Personal e-mail	subhendu.biswas@firstclimate.co.in

SECTION B. Implementation of project activity

B.1. Description of implemented registered project activity

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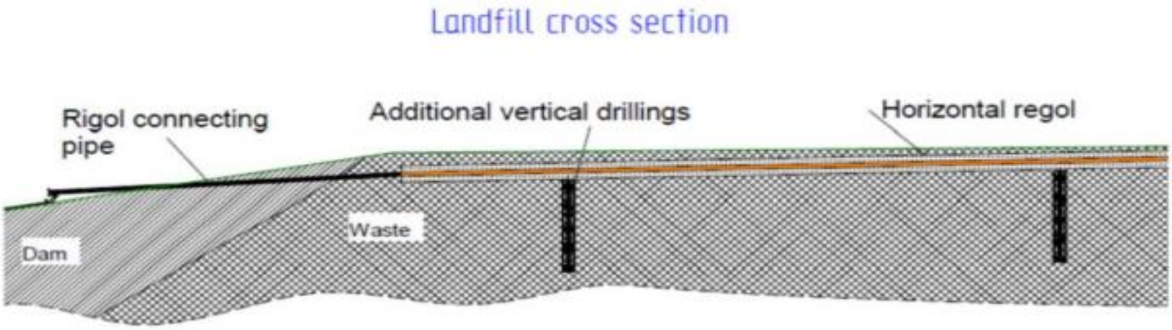
The project activity involves replacement of existing passive venting system with a landfill gas based recovery system in order to collect and destroy landfill gas generated at the Al-Qusais landfill site. The captured gas is being flared using closed type flares, part of the gas is use onsite for power generation as well. The intention of LFG flaring is disposal of flammable constituents (mainly methane) and to control odour, nuisance, health risks and adverse environmental impacts.

The equipments include efficient gas collection system,requisite flaring equipment and a landfill gas based power generation system for captive consumption. The gas collection and flaring equipment has been supplied by Hofstetter Umwelttechnik AG which is one of the world's leading companies in flaring technology and degassing systems.

As a part of project activity there are 2 parallel trains of blowers and flare systems. Each of the trains constitute of chiller, blower, gas analysers, flare systems and control panels.

Description of Gas Collection System

The gas collection system is a combination of horizontal and vertical wells. The horizontal gas collection system in combination with verticals wells consist of gas trenches and implemented with a defined gradient from the centre of the landfill towards the sides. Vertical wells have been drilled at adequate distance. The vertical gas wells have been directly interconnected with the gas trenches and are underground and not piercing the surface in order to facilitate movement of waste dumping machinery on the landfill. The pictorial depiction of the setup is given below



Description of Compact Degassing Plant

The gas collection network consists of pipes that connect groups of gas wells to manifolds. These manifolds are connected to a main pipe and then to the main header pipe, which delivers the gas to the extraction plant and the flare. The system operates at pressure slightly lower than atmospheric, as blowers draw the gas from the wells through the collection system and delivers it to the flare.

Gas Collection System

Specifications of Major components

1. Blower Units

Gas flow rate of flare (Nm^3/hour)	*Max: 1500 Min: 300*
Number of blowers per flare	*2*
Rating of motors (KW)	*2x30*
No. of skids	*02*

2. High Temperature Flare

Type	*Closed*
Number of flares	*2*
Gas flow rate of flare (Nm^3/hour)	*Max:3000 Min: 300*

Flare temperature (^0C)	*1000-1200*
Residence time (second)	*0.3*

3. Pre-Dewatering Chamber

The LFG from the landfill is hot and saturated with moisture. A pre-dewatering unit capable of separating larger quantities of “splash water” has been installed at the entry of the gas pumping stations.

4. Gas Filter Unit

During De-gassing small amount of sand, pieces of plastics and debris get transported through the piping into the gas pumping unit. These impurities might get in to the gas blowers and thus detrimental to the project. Gas filter units of around 200 μm has been installed at the inlet of gas pumping station to prevent the same.

5. Onsite Gas Based power generation system :

The project has installed an on site 1 MW power generation unit which includes installation of a 1 MW GE- Jenbacher (JFC-320-GS-B.I) whose technical parameters are given below.:

		Full Load	Part Load (50%)
Energy Input	KW	2655	1436
Gas volume	NM^3/hr	279	151
Electrical output	kW	1063	529
Electrical efficiency		40%	36.8%

This power is used to run the blowers and the flares of the gas capture project. In case of breakdown of the generation system a diesel generator is kept as backup and the same provides power for running the unit.

6. Electrical load

Electrical Load	Unit	Value
2 gas blowers	kW	60
Flare	kW	1
Container	kW	10
Cooling Unit	kW	180
Ancillaries (Water Pump, Air Conditioner)	kW	9
Total electrical load for 1 degassing unit	kW	260
Total electrical load for 2 Nos.degassing units (Unit 1 +Unit 2)	kW	520
Electrical load of office, lighting	kW	20
Total load for the project activity	kW	540

The other major components of the project include:

- Suction piping and discharge piping for blower system
- Gas collection stations

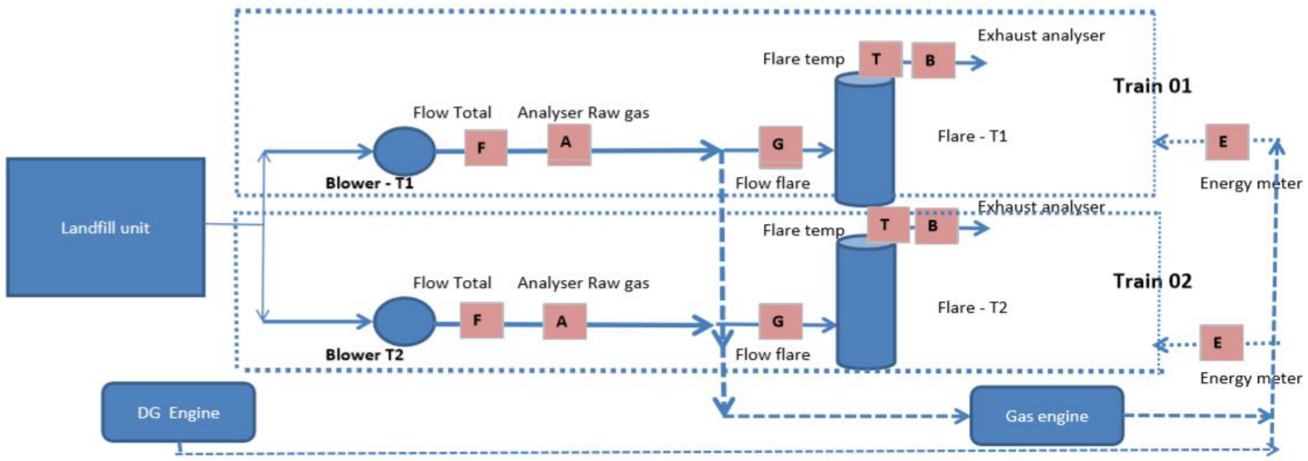
- High temperature flare unit
- Blower skid for conveying gas from landfill to flare
- Dewatering Unit
- Electrical Control Cabinet
- Instrumentation systems for blower and flare operations
- Monitoring equipment for landfill gas capture and utilization systems
- Onsite DG for Auxiliary power
- Landfill Gas based Energy Generation System of capacity 1MW

Changes from Registered PDD

In the registered project activity the power consumed onsite was being generated from Diesel based generator sets. There were 2 Nos. Gensets (one with each line of blower and flare assembly) for the entire plant. Post project implementation PP decided to install a 1 MW landfill gas based power generation unit. For conservativeness no change in the monitoring plan is done and the entire amount of power consumed onsite (both from the landfill gas based generation system as well as the DG set) is used to calculate the project emissions and credits for gas based generation are not claimed in the project.

The amount of methane destroyed by way of power generation is not claimed in the project due to conservative approach and thus claims are solely on the amount of methane destroyed by way of flaring and the same is monitored as per original monitoring plan. Thus no change is required in the monitoring plan**.**

The block diagram with monitoring points showing the project boundary has been depicted below:



Parameters	Notation	Instrument
$FV_{RG,h}$	**G**	Gas Flow Meter. The data is then transferred to software based monitoring system (The software used is “readwin 2000version”, an Endress+Hauser proprietory software for data conversion.) (as implemented in the site).
$F_{CH4,h,}$, $fv_{CO2,h,}$, $fv_{O2,h}$	**A**	Methane content , Co2 content and O2 content of raw gas, measured by online raw gas analyser- data logged in memograph.
T_{flare}	**T**	Temperature of combustion chamber in flare by Thermocouple. The data is then transferred to software based monitoring system (as implemented in the site).
$fv_{CH4,FG,h}$, $T_{o2,h}$	**B**	Methane and oxygen concentration in the exhaust gas measured online by exhaust analyser logged in memograph
$EC_{PJ,j,y}$	**E**	Energy supplied by the DG set and onsite Gas based Gensets. This is measured by Energy meters. The data is then transferred to software based monitoring system (as implemented in the site).

The above table, indicates the monitoring parameters and the instruments used to measure the same.

B.2 Post-registration changes

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

>>
There have been no temporary deviations from registered monitoring plan, applied methodology or applied standardized baseline

B.2.2. Corrections

>>
No corrections have been envisaged in the current monitoring period.

B.2.3. Changes to start date of crediting period

>>
There has been no changes in the start date of the crediting period

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

>>
Not Applicable

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

>>
Not Applicable

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

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Summary of Post Registration Changes has been provided below:

In the registered project activity the power consumed onsite was being generated from Diesel based generator sets. There were 2 Nos. Gensets (one with each line of blower and flare assembly) for the entire plant. Post project implementation PP decided to install a 1 MW landfill gas based power generation unit as.

The project got recognised as the largest and the best environmental project in the Entire Middle east[3] *and received several awards from different authorities. Being s show case project they decided to take the risk of installing a landfill gas based power unit for self-consumption only.*

In case of failure of the gas based power unit a backup diesel based generator system is kept onsite for power generation.

For conservativeness no change in the monitoring plan is done and the entire amount of power consumed onsite (both from the landfill gas based generation system as well as the DG set) is used to calculate the project emissions and credits for gas based generation are not claimed in the project.

In line with paragraph 292 of Project Standard, version 09.0 guidelines, the effect of the changes are evaluated below.:

a) The applicability and application of the applied methodology and, where applicable, the applied standardized baseline under which the project activity or PoA has been registered: The change does not affect the applicability of the applied methodology.

(b) Compliance of the monitoring plan with the applied methodology and, where applicable, the applied standardized baseline: there is no change to the monitoring plan, the amount of energy generated from the onsite gas based generation system is accounted under the energy meter which also measures the amount of power generated from DG sets, the entire amount of power consumed is taken for Project emissions calculations for conservativeness. Methane destroyed by way of energy generation is not being claimed under baseline emissions for conservative estimates and thus no change is required in the monitoring plan. The amount of methane being flared is monitored separately in line with the original monitoring plan.

(c) The level of accuracy and completeness in the monitoring of the project activity or PoA; As there is no change in the monitoring plan and the existing instrumentation system accounts for the power generated on site so there is no change in the level of accuracy as well.

(d) The additionality of the project activity, PoA or CPA; The energy generated from the 1 MW machine is used onsite and it is not sold to any third party resulting in revenue generation, moreover any savings in diesel resulting in lower operating cost does not have a bearing on the additionality as no operation cost has been included in the initial additionality assessment and thus no notional savings are to be accounted for.

Thus the additonality of the project remains unchanged except that the project cost increases. During additionality evaluation no cost of operations was included and thus savings due to diesel avoidance (notional) does not affect the same.

(e) The scale of the project activity or CPA: The project remains in the large scale category. .

(f) The eligibility criteria of PoA.: This is not a POA but a standalone project.

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[3] *http://www.constructionweekonline.com/article-27820-dms-al-qusais-landfill-gas-project-wins-award/ Green Energy Solutions & Sustainability LLC was awarded the Bronze Award for Small Energy Project of the Year from the Supreme Council of Energy for 2015. GESS has also been recognized and awarded "Green Initiative of the Year 2014" and "Sustainable Project of the Year" 2015 for two consecutive years at the Big Project Middle East Construction and Sustainability Awards for the Al Qusais Landfill.*

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

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This project is not a afforestation/reforestation based project. Hence this is not applicable

SECTION C. Description of monitoring system

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The project activity involves monitoring of the following parameters:

Parameters	Notation	Instrument
Volumetric flow of the gaseous stream per hour on a wet basis at normal conditions	$V_{t,wb,n}$	Gas Flow Meter
Amount of methane in the LFG which is sent to the flare in year y	$F_{CH4, sent\_flare,y}$	N.A (Calculated based on the above mentioned parameter)
Project emissions from flaring of the residual gas stream in year y	$PE_{flare, y}$	N.A (Calculated as per "Tool to determine project emissions from flaring gases containing methane")
Volumetric fraction of component i (i represents CH_4, CO_2, O_2, N_2) in the residual gas in the hour h	$fv_{i,h}$	Continuous Gas Quality Analyser
Volumetric fraction of O_2 in the exhaust gas of the flare in the hour h	$t_{O2,h}$	Continuous Gas Quality Analyser
Concentration of methane in the exhaust gas of the flare in dry basis at normal conditions in the hour h	$fv_{CH4,FG,h}$	Continuous Gas Quality Analyser
Temperature in the exhaust gas of the flare	T_{flare}	Thermocouple
Flare efficiency in hour h	$\eta_{flare,h}$	N.A (Calculated as per "Tool to determine project emissions from flaring gases containing methane")
Project emissions from electricity consumption by the project activity during the year y	$PE_{EC,y}$	N.A (Calculated as per the "Tool to calculate baseline, project and/or leakage emissions from electricity consumption")
Quantity of electricity consumed by the project electricity consumption source j in year y	$EC_{PJ,j,y}$	This is measure by Energy meters. The data is then transferred to software based monitoring system (as implemented in the site)

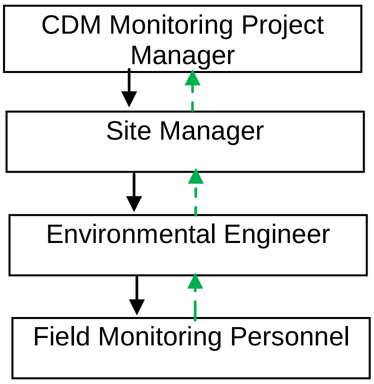
The data monitoring involves all the parameters mentioned in the section B.7.1 of the registered PDD. Due care has been taken for the measurement of all these parameters and maintenance of records. Proper training has been imparted to concerned personnel for accurate measurement and collection of data for each parameter. The monitoring plan addresses the following aspects

The roles and responsibilities have been tabulated as below:

Designation	Role

Field Monitoring Personnel	Responsible for performing the monitoring activity (viz. Recording of monitored data)
Environmental Engineer	Specific responsibilities include: • Verification of monitored data (consistency & completeness) • Ensuring adequate maintenance • Ensuring timely calibration of monitoring instruments • Taking actions related to emergency preparedness
Site Manager	Responsible for the overall QA/QC of the monitoring activity. Specific responsibilities include: • Training of the staff involved in the monitoring of the project activity • Ensuring proper data archiving & adequate storage of data monitored (integrity and backup) • Identification of non-conformance and corrective/preventive actions and monitoring plan improvement • Also responsible for the management review (internal audit) of the monitoring report
CDM Monitoring Report Project Manager	Responsible for entire monitoring of the project activity.

The hierarchy and data flow has been provided below:



Emergency Preparedness and Instrument Failure

In the event of instrument failure, the same would be reported by Field Monitoring Personnel to Site Manager. The instrument would be sent for repaired/calibrated. In case, calibration of the concerned instrument is not possible, the instrument would be repaired and the same would be replaced. In case the replacement is not available the emission reductions (for the period of unavailability of the instrument) will not be considered.

In order to prevent error in computation and thus over estimation of ERs, a standardized spreadsheet with defined input cells and locked calculation blocks is made wherein only inputs in the form of data as collected from site is to be entered and the output will be readily calculated and will not need to be computed each time thereby avoiding any error.

List of Instruments:

Instrument	**Range**	**Location**	**Supplier**	**Accuracy Class**
Flue gas temperature (Thermocouple)- S Type	0-1600 Deg C	Flare Unit (1 &2)	JUMO	+/-1.5^0 C
Gas Flow Meter	0-3300 Nm^3/hour	Flare Units (1& 2)	Endress & Hauser	max+/-1.5%
Landfill gas Analyser (for raw gas)	CH_4-0-100 vol.% CO_2-0-100vol.% O_2-0-25vol.%	Flare Units (1& 2)	NUK NUK NUK	+/-1.0% +/-2.0% +/-1.0%
Flue gas Analyser (for analysis of flare flue stream)	CH_{4}-0-2.vol% O_2-0-21vol.%	Flare Units (1& 2)	NUK NUK	+/-2.0 +/-2.0

SECTION D. Data and parameters

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

Data/parameter:	**$OX_{top\ layer}$**
Unit	Dimensionless
Description	Fraction of methane that would be oxidized in the top layer of the SWDS in the baseline
Source of data	Consistent with how oxidation is accounted for in the methodological tool “Emissions from solid waste disposal sites”
Value(s) applied)	0.1 Default value as per the tool “(“Emissions from solid waste disposal sites”)[4]
Choice of data or measurement methods and procedures	This value has been sourced from the methodological tool “Emissions from solid waste disposal sites”.
Purpose of data	This data has been used to determine baseline emissions
Additional comments	-

Data/parameter:	**GWP_{CH4}**
Unit	tCO_2e/tCH_4
Description	Global warming potential of CH_4
Source of data	IPCC

[4] http://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-04-v6.0.0.pdf

Value(s) applied)	25 for the second commitment period[5]. Shall be updated according to any future COP/MOP decisions.
Choice of data or measurement methods and procedures	This data is has been considered from https://www.ipcc.ch/publications_and_data/ar4/wg1/en/ch2s2-10-2.html and is considered as an authentic source of data
Purpose of data	This data has been used to determine baseline emissions
Additional comments	-

Data/parameter:	$\rho_{i,n}$
Unit	kg/Nm^3
Description	Density of greenhouse gas i (i.e. CH_4) in the gaseous stream at normal Conditions
Source of data	“Tool to determine the mass flow of a greenhouse gas in a gaseous stream”
Value(s) applied)	0.716 (Methane density at normal temperature and pressure (273.15 K and 101325 Pa))
Choice of data or measurement methods and procedures	The data has been sourced from “Tool to determine the mass flow of a greenhouse gas in a gaseous stream” and is considered as an authentic source of data
Purpose of data	This data has been used to determine baseline emissions
Additional comments	-

Data/parameter:	$EF_{EL,j,y}$
Unit	tCO_2/MWh
Description	Emission factor for electricity generation for source j in year y
Source of data	“Tool to calculate baseline, project and/or leakage emission from electricity consumption”, version 1
Value(s) applied)	1.3 (Default value as per Option B2 of “Tool to calculate baseline, project and/or leakage emissions from electricity consumption”, version 1).
Choice of data or measurement methods and procedures	This data has been considered sourced from Tool to calculate baseline, project and/or leakage emission from electricity consumption”, version 1 and is considered as an authentic source of data.
Purpose of data	This data has been used to determine project emissions
Additional comments	This data is fixed *ex-ante*

D.2. Data and parameters monitored

Data/parameter:	$V_{t,wb,n}$**(same as** $FV_{RG,h}$**)**
Unit	Nm^3 LFG/hour
Description	Volumetric flow of the gaseous stream per hour on a wet basis at normal conditions
Measured/calculated/default	Measured
Source of data	On site measurement (This data has been taken from excel based spreadsheets as provided by the software installed on site)

5 *The First Commitment Period under Kyoto Protocol started in 2008 and ended in 2012 and the GWP value of methane (value taken as 21), was valid till 31/12/2012. For the second commitment period starting from 01/01/2013 upto 31/12/2020, the GWP value for methane has been revised to 25 as per decision.4 CMP.7. More details on the applicability of latest GWP's can be found at: http://cdm.unfccc.int/Reference/Standards/meth/reg_stan02.pdf*

<table>
<tr><td>Value(s) of monitored parameter</td><td>The aforesaid parameter has been measured continuously and has been recorded on hourly basis. The values (for the monitoring period from 01/06/2015 to 31/12/2015 are provided below),
Hourly average values of gas
<table>
<tr><th>Months</th><th colspan="2">Hourly average gas flow (Nm^3 LFG/hour)</th></tr>
<tr><td></td><td>Train 01</td><td>Train 02</td></tr>
<tr><td>June’15</td><td>1913.74</td><td>2301.91</td></tr>
<tr><td>July’15</td><td>1945.22</td><td>2365.11</td></tr>
<tr><td>August ‘15</td><td>1897.29</td><td>2350.7</td></tr>
<tr><td>September’15</td><td>1949.62</td><td>2401.18</td></tr>
<tr><td>October ‘15</td><td>1949.98</td><td>2346.30</td></tr>
<tr><td>November ‘15</td><td>1918.03</td><td>2045</td></tr>
<tr><td>December ‘15</td><td>2015.41</td><td>1975.25</td></tr>
</table></td></tr>
<tr><td>Monitoring equipment</td><td>Flow has been measured by flow meter. The flow meter details have been provided below:
<table>
<tr><td>Instrument Name</td><td>Flow Transmitter</td></tr>
<tr><td>Manufacturer</td><td>Endress Hauser</td></tr>
<tr><td>Serial Number</td><td>EC07090109D</td></tr>
<tr><td>Range</td><td>0-3300Nm^3/hour</td></tr>
<tr><td>Location</td><td>Flare-1 Flow Flare Side</td></tr>
<tr><td>Accuracy Class</td><td>+/-1.2%</td></tr>
</table>
<table>
<tr><td>Instrument Name</td><td>Flow Transmitter</td></tr>
<tr><td>Manufacturer</td><td>Endress Hauser</td></tr>
<tr><td>Serial Number</td><td>EC070C0109D</td></tr>
<tr><td>Range</td><td>0-3300Nm^3/hour</td></tr>
<tr><td>Location</td><td>Flare-2 Flow Flare Side</td></tr>
<tr><td>Accuracy Class</td><td>+/-1.2%</td></tr>
</table></td></tr>
<tr><td>Measuring/reading/recording frequency:</td><td>Monitoring Frequency: Continous
Recording Frequency: Hourly</td></tr>
<tr><td>Calculation method (if applicable):</td><td>NA</td></tr>
<tr><td>QA/QC procedures:</td><td>The QA/QC has been ensured by yearly calibration of the flow meter. The calibration details have been provided below:
<table>
<tr><td>Calibration Entity</td><td>PROCAL</td></tr>
<tr><td>Calibration Date</td><td>23-12-2014 and 14-12-2015</td></tr>
<tr><td>Next Calibration Due</td><td>13-12-2016</td></tr>
<tr><td>Location</td><td>Flare-1 Flow Flare Side</td></tr>
</table>
<table>
<tr><td>Calibration Entity</td><td>PROCAL</td></tr>
<tr><td>Calibration Date</td><td>23-12-2014 and 14-12-2015</td></tr>
<tr><td>Next Calibration Due</td><td>13-12-2016</td></tr>
<tr><td>Location</td><td>Flare-2 Flow Flare Side</td></tr>
</table></td></tr>
<tr><td>Purpose of data:</td><td>This data has been used to calculate baseline emission</td></tr>
<tr><td>Additional comments:</td><td>Data Archiving Policy: Paper/ Electronic for crediting period + 2 years</td></tr>
</table>

Data/parameter:	$F_{CH4,sent\_flare,y}$
Unit	tCH_4
Description	Amount of methane in the LFG which is sent to the flare in year *y*

Measured/calculated/default	Calculated. This data have been Calculated based on the measured data of Volumetric flow of the gaseous stream per hour on a wet basis and totalised over the period under monitoring at normal conditions and methane concentration in the LFG.
Source of data	This parameter has been calculated based on volumetric flow of gaseous stream , methane concentration and the density of methane gas at normal conditions (0.716kg/Nm^3) in LFG. Both the parameters are measured on site.
Value(s) of monitored parameter	Amount of methane in the LFG which is sent to the flare has been provided in the spreadsheet format Total amount of methane sent to flare is provided on monthly basis (see table below)
Monitoring equipment	Not applicable
Measuring/reading/recording frequency:	Monitoring Frequency: Continuous Recording Frequency: Methane Concentration): Hourly and consolidated on a monthly basis.
Calculation method (if applicable):	The gas flow rate has been measured on continuous basis using gas flow meters and the total flow has been aggregated by totaliser integrated with flow meter on monthly basis. The methane concentration has been measured continuously through online analyser and recorded on monthly basis and average value used for determination of amount of methane gas sent to flare on annual basis
QA/QC procedures:	-
Purpose of data:	This data has been used to calculate baseline emissions
Additional comments:	Data Archiving Policy: Paper/ Electronic for crediting period + 2 years

Months	Methane sent to flare (tonnes)	
	Train-01	Train-02
June'15	408.687	514.483
July'15	562.268	689.05
August "15	524.10	649.15
September '15	396.06	503.5
October '15	523.23	655.53
November '15	335.28	404.80
December '15	616.95	556.9

Data/parameter:	**$PE_{flare,y}$**
Unit	tCO_2e
Description	Project emissions from flaring of the residual gas stream in year y. The period considered for monitoring is from 01/06/2015 to 31/12/2015
Measured/calculated/default	Calculated. This parameter has been calculated as per the "Tool to determine project emissions from flaring gases containing methane"[6]
Source of data	This is a calculated value.

[6] http://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-06-v1.pdf

Value(s) of monitored parameter	Project Emissions from flaring of the residual gas stream has been provided in spreadsheet form: Project emission month wise is provided below. <table><tr><th>Months</th><th colspan="2">Project emissions (tCO_2e)</th></tr><tr><td></td><td>Train 01</td><td>Train 02</td></tr><tr><td>June ‘15</td><td>0</td><td>24.457</td></tr><tr><td>July ‘15</td><td>0</td><td>0</td></tr><tr><td>August ‘15</td><td>190.62</td><td>2.846</td></tr><tr><td>Sep ‘15</td><td>0</td><td>0</td></tr><tr><td>Oct ‘15</td><td>0</td><td>26.82</td></tr><tr><td>Nov ‘15</td><td>280.78</td><td>266.91</td></tr><tr><td>Dec ‘ 15</td><td>23.45</td><td>319.225</td></tr></table>
Monitoring equipment	Not Applicable (The parameter has been calculated based on the Methodological “Tool to determine project emissions from flaring gases containing methane”)
Measuring/reading/recording frequency:	This is a calculated value.
Calculation method (if applicable):	Project Emission has been calculated using the following equation: $PE_{flare,y}=\sum TM_{RG,h}*(1-\eta_{flare,h})*(GWP_{CH4}/1000)$, where $\sum TM_{RG,h}$=Mass flow rate of methane in the residual gas in the hour h $\eta_{flare,h}$= Flare efficiency in hour h GWP_{CH4}= Global Warming potential of methane
QA/QC procedures:	-
Purpose of data:	This data has been used to calculate the project emission from flaring
Additional comments:	Data Archiving Policy: Paper/ Electronic for crediting period + 2 years

Data/parameter:	$fv_{i,h}$
Unit	-
Description	Volumetric fraction of component i (i represents CH_4, CO_2, O_2, N_2) in the residual gas in the hour h
Measured/calculated/default	This is a measured parameter
Source of data	On-site measurements (This data has been taken from excel based spreadsheets as provided by the software installed on site)
Value(s) of monitored parameter	The average volumetric fractions of the gas components for the monitoring period are provided in spreadsheet form. The average volume fractions is provided below <table><tr><th>Months</th><th colspan="6">Volume %</th></tr><tr><td></td><td colspan="3">Train 01</td><td colspan="3">Train 02</td></tr><tr><td></td><td>CH4</td><td>CO2</td><td>O2</td><td>CH4</td><td>CO2</td><td>O2</td></tr><tr><td>June ‘15</td><td>55.83</td><td>29.72</td><td>1.77</td><td>55.83</td><td>29.71</td><td>0</td></tr><tr><td>July ‘15</td><td>55.23</td><td>28.25</td><td>0.63</td><td>55.66</td><td>27.16</td><td>1.31</td></tr><tr><td>Aug ‘15</td><td>52.76</td><td>33.74</td><td>0.77</td><td>52.11</td><td>33.79</td><td>0.64</td></tr><tr><td>Sep ‘15</td><td>53.13</td><td>39.23</td><td>0.18</td><td>54.84</td><td>44.86</td><td>0</td></tr><tr><td>Oct ‘15</td><td>54.46</td><td>23.90</td><td>0.13</td><td>53.46</td><td>41.70</td><td>0.63</td></tr><tr><td>Nov ‘15</td><td>41.39</td><td>38.66</td><td>1.65</td><td>51.42</td><td>34.70</td><td>0.00</td></tr><tr><td>Dec ‘15</td><td>56.58</td><td>42.52</td><td>0.00</td><td>51.15</td><td>40.83</td><td>1.14</td></tr></table>

<table>
<tr><td>Monitoring equipment</td><td>The volumetric fraction of component i has been measured by continuous gas quality analyser. The instrument details have been provided below:
Flare Unit-1
<table>
<tr><td>Instrument Name</td><td>Continuous Gas Quality Analyzer-GAE CH_4</td></tr>
<tr><td>Manufacturer</td><td>NUK NENNING UND KRUMM GmbH</td></tr>
<tr><td>Measuring Range</td><td>0-100 Vol % CH_4</td></tr>
<tr><td>Serial Number</td><td>A1715</td></tr>
<tr><td>Accuracy Class</td><td>±1%</td></tr>
</table>
<table>
<tr><td>Instrument Name</td><td>Continuous Gas Quality Analyzer-GAE CO_2</td></tr>
<tr><td>Make</td><td>NUK NENNING UND KRUMM GmbH</td></tr>
<tr><td>Measuring Range</td><td>0-100 Vol % CO_2</td></tr>
<tr><td>Serial Number</td><td>A1757</td></tr>
<tr><td>Accuracy Class</td><td>±2%</td></tr>
</table>
<table>
<tr><td>Instrument Name</td><td>Continuous Gas Quality Analyzer-GAE O_2</td></tr>
<tr><td>Manufacturer</td><td>NUK NENNING UND KRUMM GmbH</td></tr>
<tr><td>Measuring Range</td><td>0-25 Vol % O_2</td></tr>
<tr><td>Serial Number</td><td>A1744</td></tr>
<tr><td>Accuracy Class</td><td>±1%</td></tr>
</table>
Flare Unit-2
<table>
<tr><td>Instrument Name</td><td>Continuous Gas Quality Analyzer-GAE CH_4</td></tr>
<tr><td>Manufacturer</td><td>NUK NENNING UND KRUMM GmbH</td></tr>
<tr><td>Measuring Range</td><td>0-100 Vol % CH_4</td></tr>
<tr><td>Serial Number</td><td>A1721</td></tr>
<tr><td>Accuracy Class</td><td>±1%</td></tr>
</table>
<table>
<tr><td>Instrument Name</td><td>Continuous Gas Quality Analyzer-GAE CO_2</td></tr>
<tr><td>Manufacturer</td><td>NUK NENNING UND KRUMM GmbH</td></tr>
<tr><td>Measuring Range</td><td>0-100 Vol % CO_2</td></tr>
<tr><td>Serial Number</td><td>A1705</td></tr>
<tr><td>Accuracy Class</td><td>±2%</td></tr>
</table>
<table>
<tr><td>Instrument Name</td><td>Continuous Gas Quality Analyzer-GAE O_2</td></tr>
<tr><td>Manufacturer</td><td>NUK NENNING UND KRUMM GmbH</td></tr>
<tr><td>Measuring Range</td><td>0-25 Vol % O_2</td></tr>
<tr><td>Serial Number</td><td>A1738</td></tr>
<tr><td>Accuracy Class</td><td>±1%</td></tr>
</table>
</td></tr>
<tr><td>Measuring/reading/recording frequency:</td><td>Monitoring Frequency: Continuous
Recording Frequency (Methane Concentration): recorded hourly and consolidated on Monthly Basis
Recording Frequency of CH_4%, O_2 % and CO_2 %: Hourly</td></tr>
<tr><td>Calculation method
(if applicable):</td><td>The values have been consolidated on a monthly basis and the same has been averaged annually.</td></tr>
<tr><td>QA/QC procedures:</td><td>The calibration has been carried in house by GESS/ The QA/QC has been ensured by weekly calibration of the gas quality analyser. The calibration certificates indicate the traceability of the calibration gas.</td></tr>
</table>

	Calibration Type: Weekly calibration done through standard sample Calibration Dates: **For June 2015:** May 30th and June 06, 13, 20, 27 **For July 2015:** 04,11,18,25 **For August 2015:** 01,08,15,22,29 **For September 2015:** 05,12,19,26 **For October 2015:**03,10,17, 24,31 **For November 2015:** 07,14,21,28 **For December 2015: 05,12,19,26** Next Calibration Due: 02-Jan-2016
Purpose of data:	This data has been used to determine baseline emissions from flaring
Additional comments:	Data Archiving Policy: Paper/ Electronic for crediting period + 2 years

Data/parameter:	$t_{O2,h}$
Unit	-
Description	Volumetric fraction of O_2 in the exhaust gas of the flare in the hour h
Measured/calculated/default	Measured
Source of data	On site measurement (This data has been taken from excel based spreadsheets as provided by the software installed on site)
Value(s) of monitored parameter	The average value for the monitoring period is provided in spreadsheet format. The average values for the months are given below

Months	**O2 in the exhaust gas stream (%)**	
	Train 01	Train 02
June’15	18.53	17.10
July ‘15	17.99	16.19
Aug ‘15	18.00	15.48
Sep ‘15	17.10	13.60
Oct ‘15	16.10	13.36
Nov ‘15	17.81	10.45
Dec’15	19.45	8.25

Monitoring equipment	The volumetric fraction of O_2 in the exhaust gas of the flare has been measured by continuous gas quality analyser. The instrument details has been provided below: **Flare 1** Instrument Name: Continuous Gas Quality Analyser Manufacturer: NUK NENNING UND KRUMM GmbH Measuring Range: 0-25 Vol% O_2 Serial Number: A1739 Accuracy Class: ±1% **Flare 2** Instrument Name: Continuous Gas Quality Analyser Manufacturer: NUK NENNING UND KRUMM GmbH Measuring Range: 0-25 Vol% O_2 Serial Number: A1732 Accuracy Class: ±1%
Measuring/reading/recording frequency:	Measuring Frequency: Continuous Recording Frequency: Daily
Calculation method (if applicable):	N.A (This parameter has been measured directly)
QA/QC procedures:	The QA/QC has been ensured by weekly calibration of the gas quality analyser. The calibration has been carried out in house by GESS. The calibration certificates indicate the traceability of the calibration gas. Calibration Type: Weekly calibration has been done through standard sample Calibration Dates: **For June 2015:** May 30th and June 06, 13, 20, 27 **For July 2015:** 04,11,18,25 **For August 2015:** 01,08,15,22,29 **For September 2015:** 05,12,19,26 **For October 2015:**03,10,17, 24,31 **For November 2015:** 07,14,21,28 **For December 2015: 05,12,19,26** Next Calibration Due: 02-Jan-2016
Purpose of data:	This data has been used to calculate project emissions
Additional comments:	Data Archiving Policy: Paper/ Electronic for crediting period + 2 years

Data/parameter:	**$fv_{CH4,FG,h}$**
Unit	mg/Nm^3
Description	Concentration of methane in the exhaust gas of the flare in dry basis at normal conditions in the hour h
Measured/calculated/default	Measured
Source of data	On site measurement (This data has been taken from excel based spreadsheets as provided by the software installed on site)

<table>
<tr><td>Value(s) of monitored parameter</td><td>The average value for the monitoring period is provided in the excel sheet format.
Monthly average concentration in the flare is given below

<table>
<tr><td>Months</td><td colspan="2">Conc of Methane (mg/Nm^3)</td></tr>
<tr><td></td><td>Train 01</td><td>Train 02</td></tr>
<tr><td>June ‘15</td><td>0</td><td>0</td></tr>
<tr><td>July ‘15</td><td>0</td><td>0</td></tr>
<tr><td>Aug ‘15</td><td>0</td><td>0</td></tr>
<tr><td>Sep ‘15</td><td>0</td><td>0</td></tr>
<tr><td>Oct ‘15</td><td>0</td><td>0</td></tr>
<tr><td>Nov ‘15</td><td>0</td><td>0</td></tr>
<tr><td>Dec ‘ 15</td><td>0</td><td>0</td></tr>
</table></td></tr>
<tr><td>Monitoring equipment</td><td>Concentration of methane in the exhaust gas of the flare in dry basis at normal conditions in the hour h has been measured by continuous gas quality analyser. The instrument details has been provided below:
Flare 1
<table>
<tr><td>Instrument Name</td><td>Continuous Gas Quality Analyser</td></tr>
<tr><td>Manufacturer</td><td>NUK NENNING UND KRUMM GmbH</td></tr>
<tr><td>Measuring Range</td><td>0-5 Vol% CH_4</td></tr>
<tr><td>Serial Number</td><td>A1731</td></tr>
<tr><td>Accuracy Class</td><td>±1%</td></tr>
</table>
Flare 2
<table>
<tr><td>Instrument Name</td><td>Continuous Gas Quality Analyser</td></tr>
<tr><td>Manufacturer</td><td>NUK NENNING UND KRUMM GmbH</td></tr>
<tr><td>Measuring Range</td><td>0-5 Vol% CH_4</td></tr>
<tr><td>Serial Number</td><td>A1729</td></tr>
<tr><td>Accuracy Class</td><td>±1%</td></tr>
</table></td></tr>
<tr><td>Measuring/reading/recording frequency:</td><td>Monitoring Frequency: Continuous
Recording Frequency: Hourly</td></tr>
<tr><td>Calculation method (if applicable):</td><td>N.A (This parameter has been measured directly)</td></tr>
<tr><td>QA/QC procedures:</td><td>The QA/QC has been ensured by weekly calibration of the gas quality analyser. The gas quality analyser has been calibrated in house by GESS. The calibration certificates indicate the traceability of the calibration gas. The calibration details have been provided below:

<table>
<tr><td>Calibration Type</td><td>Weekly calibration has been done through standard sample.</td></tr>
<tr><td>Calibration Dates</td><td>For June 2015: May 30th and June 06, 13, 20, 27
For July 2015: 04,11,18,25
For August 2015: 01,08,15,22,29
For September 2015: 05,12,19,26
For October 2015:03,10,17, 24,31
For November 2015: 07,14,21,28
For December 2015: 05,12,19,26</td></tr>
<tr><td>Next Calibration Due</td><td>02-Jan-2016</td></tr>
</table></td></tr>
<tr><td>Purpose of data:</td><td>This data has been used to determine project emissions from flaring</td></tr>
<tr><td>Additional comments:</td><td>Paper/ Electronic for crediting period + 2 years</td></tr>
</table>

Data/parameter:	**T_{flare}**
Unit	^0C
Description	Temperature in the exhaust gas of the flare
Measured/calculated/default	Measured
Source of data	On-site measurement (This data has been taken from excel based spreadsheets as provided by the software installed on site)
Value(s) of monitored parameter	The values have been monitored continuously. The detailed measured hourly values have been provided to the verifier. The range of monitored values for both locations are provided in excel format. The average flare temperatures are provided below

Months	**Flare temp (^0C)**	
	Train 01	**Train 02**
June '15	1026.62	1027.36
July '15	1058.91	1065.44
Aug '15	1021.94	1050.87
Sep '15	1015.99	872.64
Oct '15	948.68	979.36
Nov '15	888.19	956.42
Dec '15	996.38	843.64

Monitoring equipment	This parameter has been measured using S type thermocouples. The technical details of the thermocouple have been provided below:

Thermocouple (Flare 1)

Equipment Description	Thermocouple
Serial Number	21211-00
Manufacturer	JOMO
Range	0-1600^{0}C
Location	Flare-1- (At Combustion Tank)
Thermocouple type	Type S
Accuracy Class	±1.5%

Thermocouple (Flare 2)

Equipment Description	Thermocouple
Serial Number	21211-01
Manufacturer	JOMO
Range	0-1600^{0}C
Location	Flare-2- (At Combustion Tank)
Thermocouple type	Type S
Accuracy Class	±1.5%

Measuring/reading/recording frequency:	**Monitoring Frequency: Continuous** **Recording Frequency: Hourly**
Calculation method (if applicable):	This parameter has been directly measured
QA/QC procedures:	Thermocouple are changed on annual frequency as per registered PDD.
Purpose of data:	This parameter has been used to determine project emissions from flaring
Additional comments:	Data Archiving Policy: Paper/ Electronic for crediting period + 2 years

Data/parameter:	**$\eta_{flare,h}$**
Unit	%
Description	Flare efficiency in hour h

Measured/calculated/default	Calculated
Source of data	This parameter has been calculated based on steps mentioned in “Tool to determine project emissions from flaring gases containing methane”. Version 1[7]
Value(s) of monitored parameter	The average flare efficiency during this monitoring period for operational hours of the flares are provided in the spreadsheet form.
Monitoring equipment	-
Measuring/reading/recording frequency:	Flare efficiency is calculated on an hourly basis.
Calculation method (if applicable):	As per the tool, the efficiency has been calculated using the formula: $\boldsymbol{\eta_{flare,h} = 1-(TM_{FG,h}/TM_{RG,h})}$, where: $\boldsymbol{\eta_{flare,h}}$= Flare efficiency in hour h $\boldsymbol{TM_{FG,h}}$=Mass flow rate of methane in the exhaust gas of the flare in dry basis at normal conditions in the hour h $\boldsymbol{TM_{RG,h}}$= Mass flow rate of methane in the residual gas in the hour h The above mentioned formula has been used to calculate the efficiency, where the temperature of exhaust has been 500^{0}C or more for more than 40 minutes.
QA/QC procedures:	-
Purpose of data:	This data has been used to calculate project emissions from flaring
Additional comments:	Data Archiving Policy: Paper/ Electronic for crediting period + 2 years

Data/parameter:	$\boldsymbol{PE_{EC,y}}$
Unit	tCO_2
Description	Project emissions from electricity consumption by the project activity during the year *y.* The period considered for monitoring is (from 01/06/2015 to 31/12/2015)
Measured/calculated/default	Calculated
Source of data	“Tool to calculate baseline, project and/or leakage emissions from electricity consumption”[8]
Value(s) of monitored parameter	The calculated project emission value for this monitoring period is as provided spreadsheet format (see table below)
Monitoring equipment	Not Applicable.

Months	**Project emissions (tCO_2e)**	
	Train 01	Train 02
June ‘15	22.96	33.37
July ‘15	31.11	45.39
August ‘15	32.68	44.71
Sep ‘15	22.96	33.37
Oct ‘15	31.70	45.78
Nov ‘5	22.96	33.37
Dec ‘ 15	31.55	44.91

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[7] http://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-06-v1.pdf

[8] *http://cdm.unfccc.int/Reference/tools/ls/meth_tool05_v01.pdf*

Measuring/reading/recording frequency:	Not Applicable
Calculation method (if applicable):	The project emissions resulting from the electricity consumption has been calculated with the aid of "*Tool to calculate baseline, project and/or leakage emissions from electricity consumption".* The value has been calculated by multiplying the electricity consumption with the emission factor for electricity generation for source j in year y and the same has been aggregated for the entire monitoring period 01/06/2015 to 31/12/2015) A default value of 1.3tCO_2/MWh has been considered as the emission factor
QA/QC procedures:	-
Purpose of data:	This data has been used to calculate project emissions from electricity consumption.
Additional comments:	Data Archiving Policy: Paper/ Electronic for crediting period + 2 years

Data/parameter:	**$EC_{PJ,j,y}$**
Unit	MWh
Description	Quantity of electricity consumed by the project electricity consumption source *j* in year *y.* The period considered for monitoring is ((from 01/06/2015 to 31/12/2015))
Measured/calculated/default	Measured
Source of data	On-site measurement via Energy meter (This data has been taken from excel based spreadsheets as provided by the software installed on site).The energy meter transfers the data to the data acquisition system software (as provided by Hofstetter at site) and the readings are taken from the software.
Value(s) of monitored parameter	The calculated project emission value for this monitoring period is as provided spreadsheet format. The amount of energy consumed by the trains is given below :

Months	**Energy consumption (Mwh)**	
	Train 01	**Train 02**
June '15	17.66	25.67
July '15	23.93	34.91
Aug '15	25.08	34.43
Sep '15	17.66	25.67
Oct '15	24.39	35.26
Nov '15	17.66	25.67
Dec '15	24.28	34.55

Monitoring equipment	Energy meters has been used to measure the amount of electricity supplied by the DG set to the landfill gas recovery and flaring system. The electricity has also been supplied to the project activity by a 1MW Gas Engine. The details for the energy meters have been provided below for both the flare units: Equipment Description: Power Consumption Meter Serial Number: 68137 Manufacturer: EMU Location: **Flare Unit -1** Voltage: 3*230/440 V Counter Identification: EMU32X4, 5(6)A, 10 Imp/KWh, 120 msec Accuracy Class: 1 Equipment Description: Power Consumption Meter Serial Number: 68139 Manufacturer: EMU Location: **Flare Unit -2** Voltage: 3*230/440 V Counter Identification: EMU32X4, 5(6)A, 10 Imp/KWh, 120 msec Accuracy Class: 1
Measuring/reading/recording frequency:	**Monitoring Frequency: Continuous** **Recording Frequency: Hourly**
Calculation method (if applicable):	N.A (This is a measured parameter)
QA/QC procedures:	Calibrated Energy meter is used for monitoring purpose.
Purpose of data:	This data has been used to calculate project emission from electricity consumption.
Additional comments:	Data Archiving Policy: Paper/ Electronic for crediting period + 2 years

D.3. Implementation of sampling plan

>>

No sampling plan has been considered for the project activity.

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

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

>>

As per the steps and guidance provided in the approved methodology ACM0001 (Version 12.0.0) the baseline emissions have been calculated as follows[9]

$$BE_y = BE_{CH4,y} + BE_{ECy} + BE_{HGy} + BE_{NG,y} \qquad \textbf{Equation 1}$$

Where

BE_y	Baseline emissions in year y	tCO_2e
$BE_{CH4,y}$	Baseline emissions of methane from the SWDS in year y	tCO_2e
BE_{ECy}	Baseline emissions associated with electricity generation in year y	tCO_2e

[9] Calculations provided in section E.1 of Monitoring are sample calculations.

BE_{HGy}	Baseline emissions associated with heat generation in year y	tCO_2e
$BE_{NG,y}$	Baseline emissions associated with natural gas use in year y	tCO_2e

Sample Calculation for 01/06/2015 1500 Hours –Flare Unit 1

BE_y= $BE_{CH4,y}$**= 16.9413 tCO_2e**

Step (A) Baseline emissions of methane from SWDS ($BE_{CH4,y}$)

$BE_{CH4}=(1-OX_{top_layer})(F_{CH4,PJ,y}-F_{CH4,BL,y})GWP_{CH4}$____________Equation 2

Where

$BE_{CH4,y}$	Baseline emissions of methane from the SWDS in year y	tCO_2e
OX_{top_layer}	Fraction of methane in the LFG that would be oxidized in the top layer of the SWDS in the baseline	Dimensionless
$F_{CH4,PJ,y}$	Amount of methane in the LFG which is flared and/or used in the project activity in year *y*[10]	tCH_4
$F_{CH4,BL,y}$	Amount of methane in the LFG that would be flared in the baseline in year y	tCH_4
GWP_{CH4}	Global warming potential of CH_4	tCO_2e/ tCH_4

Sample Calculation for 01/06/2015 1500 Hours –Flare Unit 1

BE_{CH4}**=**(1-0.1)*0.753*25=**16.9413 tCO_2e**

Step A.1 Amount of methane in the LFG which is flared and/or used in the project activity in year y

$F_{CH4PJ,y}=F_{CH4,flared,y}+F_{CH4,EL,y}+F_{CH4,HG,y}+F_{CH4,NG,y}$[11] ____________Equation 3

Where

$F_{CH4PJ,y}$	Amount of methane in the LFG which is flared and/or used in the project activity in year *y*	tCH_4
$F_{CH4,flared,y}$	Amount of methane in the LFG which is destroyed by flaring in year y	tCH_4
$F_{CH4,EL,y}$	Amount of methane in the LFG which is used for electricity generation in year y	tCH_4
$F_{CH4,HG,y}$	Amount of methane in the LFG which is used for heat generation in year *y*	tCH_4
$F_{CH4,NG,y}$	Amount of methane in the LFG which is sent to the natural gas distribution network in year y	tCH_4

Sample Calculation for 01/06/2015-1500 hours - Flare Unit 1

$F_{CH4, PJ,y}$= $F_{CH4,flared,y}$**= 0.753 tCH_4**

Amount of methane destroyed by flaring ($F_{CH4,flared,y}$)

$F_{CH4, flared,y}=F_{CH4,sent_flare,y}-(PE_{flare,y}/GWP_{CH4})$______________Equation 4

Where

$F_{CH4,flared,y}$	Amount of methane in the LFG which is destroyed by flaring in year y	tCH_4
$F_{CH4,sent\_flare}$	Amount of methane in the LFG which is sent to the flare in year y	tCH_4
$PE_{flare,y}$	Project emissions from flaring of the residual gas stream in year y	tCH_4
GWP_{CH4}	Global warming potential of CH_4	$t CO_2e/t CH_4$

Sample Calculation for 01/06/2015-1500 hours - Flare Unit 1

$F_{CH4, flared,y}$=0.753-(0/25)=**0.753 tCH_4**

Mass flow of greenhouse gas i in the gaseous stream per hour $F_{i,t}$

[10] Methane destroyed by way of power generation is not being claimed in the project for conservative estimations. The amount of methane destroyed by way of flaring is solely claimed and monitored in the project.

[11] $F_{CH4,EL,y}+F_{CH4,HG,y}+F_{CH4,NG,y}$ does not apply to the project since methane is not used for electricity generation, heat generation and neither it is sent to the natural gas distribution network

$F_{i,t}=V_{t,wb,n}*v_{i,t,wb}*\rho_{i,n}$

With

$\rho_{i,n}=P_n*MM_i/R_u*T_n$___________________Equation 5

Where:

$F_{i,t}$	Mass flow of greenhouse gas i in the gaseous stream per hour	Kg gas/h
$V_{t,wb,n}$	Volumetric flow of the gaseous stream per hour on a wet basis at normal conditions	m^3 wet gas/h
$v_{i,t,wb}$	Volumetric fraction of greenhouse gas i (CH_4 in this case) in the gaseous stream per hour on a wet basis	m^3 gas i/m^3 wet gas
$\rho_{i,n}$	Density of greenhouse gas i (CH_4) in the gaseous stream at normal conditions	kg gas i/m^3 wet gas i
P_n	Absolute pressure at normal conditions	Pa
T_n	Temperature at normal conditions	K
MM_i	Molecular mass of greenhouse gas I (CH_4)	Kg/kmol
R_u	Universal ideal gas constant	Pa.m^3/kmol.K

Density of greenhouse gas (CH_4) $\rho_{i,n}$ has been calculated as follows:

$\rho_{i,n}$=101325*16.04/8314.47*273.15=**0.716 kg CH_4/Nm^3 CH_4**

Mass flow of greenhouse gas (CH_4) in the gaseous stream per hour has been calculated as follows:

Sample Calculation for 01/06/2015-1500 hours - Flare Unit 1

$F_{i,t}$= 1912*0.55*0.716 = 752.9 kg CH_4/hr = 0.753 tCH_4/hr

Volumetric flow of gaseous stream/hour on a wet basis at normal conditions

$V_{t,wb,n}=V_{t,wb}*[(T_n/T_t)*(P_n/P_t)]$__________________________Equation 6[12]

Where:

$V_{t,wb,n}$	Volumetric flow of the gaseous stream per hour on a wet basis at normal conditions	m^3 wet gas/h
$V_{t,wb}$	Volumetric flow of the gaseous stream per hour on a wet basis	m^3 wet gas/h
P_t	Pressure of the gaseous stream in time interval t	Pa
T_t	Temperature of the gaseous stream in time interval t	K
P_n	Absolute pressure at normal conditions	Pa
T_n	Temperature at normal conditions	K

Sample Calculation for 01/06/2015-1500 hours - Flare Unit 1

For this project activity since the flow meter installed gives normalized flows directly hence as per the registered PDD, $V_{t,wb,n}$ is same as $FV_{RG,h}$)

$V_{t,wb,n}$ = 1912 Nm^3/hr

Step 1: Determination of the mass flow rate of the residual gas that is flared

$FM_{RG,h}=\rho_{RG,n,h}*FV_{RG,h}$ _________________Equation 7

Where:

$FM_{RG,h}$	Mass flow rate of the residual gas in hour h	Kg/h
$\rho_{RG,n,h}$	Density of the residual gas at normal conditions in hour h	Kg/Nm^3
$FV_{RG,h}$	Volumetric flow rate of the residual gas in dry basis at normal conditions in the hour h	Nm^3/h

Sample Calculation for 01/06/2015-1500 hours - Flare Unit 1

$FM_{RG,h}$= 1.331*1912 = 2554.87 kg/h

Again **$\rho_{RG,n,h}=P_n/(R_u/MM_{RG,h})*T_n$___________________Equation 8**

Where:

$\rho_{RG,n,h}$	Density of the residual gas at normal conditions in hour h	Kg/Nm^3
P_n	Atmospheric pressure at normal conditions	Pa

[12] $V_{t,wb,n}$ is a measured parameter and hence values have been directly obtained.

R_u	Universal ideal gas constant	$Pa.Nm^3/kmol.K$
$MM_{RG,h}$	Molecular mass of the residual gas in hour h	Kg/kmol
T_n	Temperature at normal conditions	K

Sample Calculation for 01/06/2015-1500 hours - Flare Unit 1

$\rho_{RG,n,h}$= (29.827*101325/(8314.47*273.15)= 1.331 kg/Nm^3

Molecular mass of the residual gas in hour h

$MM_{RG,h}=\sum(fv_{i,h}*MM_i)$__________________________**Equation 9**

Where:

$MM_{RG,h}$	Molecular mass of the residual gas in hour h	Kg/kmol
$fv_{i,h}$	Volumetric fraction of component i in the residual gas in the hour h	-
MM_i	Molecular mass of residual gas component i	Kg/kmol
I	The components CH_4, CO, CO_2, O_2,H_2, N_2	-

Sample Calculation for 01/06/2015-1500 hours - Flare Unit 1

$MM_{RG,h}$=(0.55*16.04+0.37*44.01+0.01*32+0.17*28.02)=29.827 Kg/kmol

Step 2: Determination of the mass fraction of carbon, hydrogen, oxygen and nitrogen in the residual gas

$fm_{j,h}=\sum_I fv_{I,h}*AM_j*NA_{j,i}/ MM_{RG,h}$____________________**Equation 10**

Where:

$fm_{j,h}$	Mass fraction of element j in the residual gas in hour h	-
$fv_{I,h}$	Volumetric fraction of component i in the residual gas in the hour h	-
AM_j	Atomic mass of element j	kg/kmol
$NA_{j,i}$	Number of atoms of element j in component i	-
$MM_{RG,h}$	Molecular mass of the residual gas in hour h	Kg/kmol
j	The elements carbon, hydrogen, oxygen and nitrogen	-
i	The components CH_4, CO, CO_2, O_2,H_2, N_2	-

Sample Calculation for 01/06/2015-1500 hours - Flare Unit 1

$fm_{C,h}$ = (0.55*1+0.47*1+0.01*0+0.14*0)*12/28.265 = 0.41

$fm_{O,h}$ = (0.55*0+0.47*2+0.01*2+0.14*0)*16/28.265 = 0.515

$fm_{N,h}$ = (0.55*0+0.47*0+0.01*0+0.14*2)*14.01/28.265 = 0.0

$fm_{H,h}$ = (0.55*4+0.47*0+0.01*0+0.14*0)*1.01/28.265 = 0.074

Step 3 Determination of the volumetric flow rate of the exhaust gas on a dry basis

$TV_{n,FG,h}=V_{n,FG,h}*FM_{RG,h}$__________________________**Equation 11**

Where:

$TV_{n,FG,h}$	Volumetric flow rate of the exhaust gas in dry basis at normal conditions in hour h	Nm^3/hour
$V_{n,FG,h}$	Volume of the exhaust gas of the flare in dry basis at normal conditions per kg of residual gas in hour h	Nm^3/kg residual gas
$FM_{RG,h}$	Mass flow rate of the residual gas at normal conditions in the hour h	kg residual gas/h

Sample Calculation for 01/062015-1500 hours - Flare Unit 1

$TV_{n,FG,h}$= 39.877*2544.872 = 101481.9 Nm^3/hour

Volume of the exhaust gas of the flare in dry basis at normal conditions per kg of residual gas in the hour h

$V_{n,FG,h}= V_{n,CO2,h}+ V_{n,O2,h}+ V_{n,N2,h}$____________________**Equation 12**

Where:

$V_{n,FG,h}$	Volume of the exhaust gas of the flare in dry basis at normal conditions	Nm^3/kg of

	per kg of residual gas in the hour h	residual gas
$V_{n,CO2,h}$	Quantity of CO_2 volume free in the exhaust gas of the flare at normal conditions per kg of residual gas in the hour h	Nm^3/kg of residual gas
$V_{n,O2,h}$	Quantity of O_2 volume free in the exhaust gas of the flare at normal conditions per kg of residual gas in the hour h	Nm^3/kg of residual gas
$V_{n,N2,h}$	Quantity of N_2 volume free in the exhaust gas of the flare at normal conditions per kg of residual gas in the hour h	Nm^3/kg of residual gas

Sample Calculation for 01/06/2015-1500 hours - Flare Unit 1

$V_{n,FG,h}$= 0.766 + 31.535 + 7.576 = 39.877NM^3/kg RG

Quantity of O_2 volume free in the exhaust gas of the flare at normal conditions per kg of residual gas in the hour h

$V_{n,O2,h}=n_{O2,h} * MV_n$_________________________Equation 13

Where:

$V_{n,O2,h}$	Quantity of O2 volume free in the exhaust gas of the flare at normal conditions per kg of residual gas in the hour h	Nm^3/kg residual gas
$n_{O2,h}$	Quantity of moles O2 in the exhaust gas of the flare per kg residual gas flared in hour h	kmol/kg residual gas
MV_n	Volume of one mole of any ideal gas at normal temperature and pressure	Nm^3/kmol

Sample Calculation for 01/06/2015-1500 hours - Flare Unit 1

$V_{n,O2,h}$=0.338*22.414 = 7.576 Nm^3/kg residual gas

Quantity of N_2 volume free in the exhaust gas of the flare at normal conditions per kg of residual gas in the hour h

$V_{n,N2,h}=MV_n*\{fm_{N,h}/200AM_N +(1-MF_{O2}/ MF_{O2})*[F_h +n_{O2}]\}$____________________Equation 14

Where:

$V_{n,N2,h}$	Quantity of N2 volume free in the exhaust gas of the flare at normal conditions per kg of residual gas in the hour h	Nm^3/kg residual gas
MV_n	Volume of one mole of any ideal gas at normal temperature and pressure	Nm^3/kmol
$fm_{N,h}$	Mass fraction of nitrogen in the residual gas in the hour h	-
AM_N	Atomic mass of nitrogen	Kg/mol
MF_{O2}	O_2 volumetric fraction of air	-
F_h	Stoichiometric quantity of moles of O_2 required for a complete oxidation of one kg residual gas in hour h	kmol/kg residual gas
n_{O2}	Quantity of moles O_2 in the exhaust gas of the flare per kg residual gas flared in hour h	kmol/kg residual gas

Sample Calculation for 01/06/2015-1500 hours - Flare Unit 1

$V_{n,N2,h}$=22.414*{0.00/200*14.01+(1-0.21/0.21)*[{0.036+0.0338]} = 31.535 Nm^3/kg residual gas

Quantity of CO_2 volume free in the exhaust gas of the flare at normal conditions per kg of residual gas in the hour h.

$V_{n,CO2,h}=(f_{mC,h}/AM_c)*MV_n$____________________________Equation 15

Where:

$V_{n,CO2,h}$	Quantity of CO2 volume free in the exhaust gas of the flare at normal conditions per kg of residual gas in the hour h	Nm^3/kg residual gas
$f_{mC,h}$	Mass fraction of carbon in the residual gas in the hour h	-
AM_c	Atomic mass of carbon	kg/kmol
MV_n	Volume of one mole of any ideal gas at normal temperature and pressure	Nm^3/kmol

Sample Calculation for 01/06/2015-1500 hours - Flare Unit 1

$V_{n,CO2,h}$=(0.410)/12)*22.414= 0.766 Nm^3/kg residual gas

Quantity of moles O_2 in the exhaust gas of the flare per kg residual gas flared in hour h

$n_{02,h}=t_{O2,h}/(1-(t_{O2}/MF_{O2}))*[(f_{mc,h}/AM_c)+(fm_{N,h}/2AM_n)+((1-MF_{O2})/MF_{O2})*F_h]$____________Equation 16

Where:

$n_{02,h}$	Quantity of moles O2 in the exhaust gas of the flare per kg residual gas flared in hour h	kmol/kg residual gas
$t_{O2,h}$	Volumetric fraction of O2 in the exhaust gas in the hour h	-
MF_{O2}	Volumetric fraction of O_2 in the air	-
$fm_{N,h}$	Mass fraction of element N in the residual gas in hour h	-
AM_n	Atomic mass of carbon	Kg/kmol
F_h	Stoichiometric quantity of moles of O2 required for a complete oxidation of one kg residual gas in hour h	kmol/kg residual gas
j	The elements carbon(index C) and Nitrogen (index N)	=

Sample Calculation for 01/06/2015-1500 hours - Flare Unit 1
$n_{02,h}$= (0.12/(1-(0.1/0.21)))*[(0.415/12)+(0.02/(2*14.01))+((1-0.21)/0.21))*0.039= 0.338 kmol/kg residual gas

Stoichiometric quantity of moles of O_2 required for a complete oxidation of one kg residual gas in hour h

$F_h=(fm_{C,h}/AM_c)+(fm_{H,h}/4AM_H)-(fm_{O,h}/2AM_O)$____________________Equation 17

Where:

F_h	Stoichiometric quantity of moles of O2 required for a complete oxidation of one kg residual gas in hour h	kmol/kg residual gas
$Fm_{j,h}$	Mass fraction of element j in the residual gas in hour h	-
AM_j	Atomic mass of element j	Kg/kmol
J	The elements carbon (index C), hydrogen (index H) and oxygen (index O)	=

Sample Calculation for 01/06/2015-1500 hours - Flare Unit 1

F_h=(0.41/12)+(0.074/(4*1.01))-(0.515/(2*16))=0.036 kmol/kg residual gas

Step 4:Determination of methane mass flow rate in the exhaust gas on a dry basis

$TM_{FG,h}=(TV_{n,FG,h}*fv_{CH4,FG,h})/1000000$______________________Equation 18

Where:

$TM_{FG,h}$	Mass flow rate of methane in the exhaust gas of the flare in dry basis at normal conditions in the hour h	kg/h
$T_{Vn,FG,h}$	Volumetric flow rate of the exhaust gas in dry basis at normal conditions in hour h	Nm^3/h exhaust gas
$fv_{CH4,FG,h}$	Concentration of methane in the exhaust gas of the flare in dry basis at normal conditions in hour h	Mg/ Nm^3

Sample Calculation for 01/06/2015-1500 hours - Flare Unit 1
$TM_{FG,h}$= (101481.86*0)/10^6 = 0 kg/h

Step 5 : Determination of methane mass flow rate in the residual gas on a dry basis

$TM_{RG,h}= FV_{RG,h} *fv_{CH4, RG,h}*\rho_{CH4,n}$_________________________Equation 19

Where:

$TM_{RG,h}$	Mass flow rate of methane in the residual gas in the hour h	kg/hour
$FV_{RG,h}$	Volumetric flow rate of the residual gas at normal conditions in the hour *h*	Nm^3/hour
$fv_{CH4, RG,h}$	Volumetric fraction of methane in the residual gas in the hour h	-
$\rho_{CH4,n}$	Density of methane at normal conditions	Kg/NM^3

Sample Calculation for 01/06/2015-1500 hours - Flare Unit 1

$TM_{RG,h}$=1912*0.55*0.716 = 752.95 kg/hour

Step 6: Determination of the hourly flare efficiency

$\eta_{flare,h}=1-(TM_{FG,h}/TM_{RG,h})$[13]________________________Equation 20

Where:

$\eta_{flare,h}$	Flare efficiency in the hour h	-
$TM_{FG,h}$	Mass flow rate of methane in the residual gas in the hour h	Kg/hour
$TM_{RG,h}$	Mass flow rate of methane in the exhaust gas of the flare in dry basis at normal conditions in the hour h	Kg/hour

Sample Calculation 01/06/2015-1500 hours –Flare Unit 1
$\eta_{flare,h}$=1- (0/752.94)= 100%

Step 7: Annual Project Emissions from flaring

$PE_{flare,y}=\sum TM_{RG,h}*(1-\eta_{flare,h})*(GWP_{CH4}/1000)$___________________Equation 21

$PE_{flare,y}$	Project Emissions from flaring of the residual gas stream in the year y	tCO_2e
$\sum_{TMRG,h}$	Mass flow rate of methane in the residual gas in the hour h	Kg/hour
$\eta_{flare,h}$	Flare efficiency in hour h	%
GWP_{CH4}	Global Warming Potential value for methane	tCO_2e/tCH_4

Sample Calculation for 01/06/2015-1500 hours - Flare Unit 1

$PE_{flare,y}$= 752.94*(1-1)*(25/1000)=0 tCO_2e

Note: The $GWP_{methane}$ has been updated from 01/01/2013 to 25 instead of 21

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

>>

<u>Project Emissions from consumption of electricity:</u>

$PE_y=PE_{EC,y}+PE_{FC,y}$

Where:

PE_y	Project emissions in year y	tCO_2e
$PE_{EC,y}$	Emissions from consumption of electricity due to the project activity in year y	tCO_2e
$PE_{FC,y}$	Emissions from consumption of fossil fuels due to the project activity, for purpose other than electricity generation, in year y	tCO_2e

The emission in the project activity due to consumption of electricity has been determined as per *"Tool to calculate baseline, project and/or leakage emissions from electricity consumption"*

[13] The efficiency has been found out using the following condition:

- 0% if the temperature of the flare is below 500 Deg C for more than 20 minutes
- Efficiency has been calculated using Equation 20 if temperature of flare is found more than 500 Deg C for more than 40 minutes

The project activity consumes electricity from an onsite gas based generation system as well as Diesel Generator sets and hence the project emissions resulting from electricity consumptions has been calculated based on the following formula:

$$PE_{EC,y}=\sum EC_{PJ,j,y}*EF_{EL,j,y}*(1+TDL_{,j,y})$$

Where:

$PE_{EC,y}$	Emissions from consumption of electricity due to the project activity in year y	tCO_2e
$EC_{PJ,j,y}$	Quantity of electricity consumed by the project electricity consumption source j in year y	MWh
$EF_{EL,j,y}$	Emission factor for electricity generation for source j in year y	tCO_2e/MWh
$TDL_{,j,y}$	Average technical transmission and distribution losses for providing electricity to source j in year y	-
J	Sources of electricity consumption in the project	-

Determination of emission factor for electricity generation ($EF_{EL,j,y}$)

The emission factor for electricity generation has been determined by Option B2 mentioned in "Tool to calculate baseline, project and/or leakage emissions from electricity consumption".

As per the tool,

Option B2: Use the following conservative default values:

- *A value of 1.3 tCO_2/MWh if*

a. *The electricity consumption source is a project or leakage electricity consumption source; or*

b. *The electricity consumption source is a baseline electricity consumption source; and the electricity consumption of all baseline electricity consumptions sources at the site of the captive power plant(s) is less than the electricity consumption of all project electricity consumption sources at the site of the captive power plant(s).*

Since the electricity consumption source is a project electricity consumption source, the default value of 1.3 tCO_2/MWh has been applied in the project activity. Also as per scenario B, $TDL_{j,y}$ has been considered 0.

Sample Calculation from 01/06/2015 to 31/12/2015- Flare Unit-1

$$PE_{EC,y}=\sum EC_{PJ,j,y}*EF_{EL,j,y}*(1+TDL_{,j,y})$$

Where:

Notation	Unit	Value
$PE_{EC,y}$	tCO_2e	195.61
$\sum EC_{PJ,j,y}$	MWh	150.47
$EF_{EL,j,y}$	tCO_2e/MWh	1.3
$TDL_{,j,y}$	-	0

Hence as per formula

$$PE_{EC,y}= 150.47*1.3*(1+0)= 150.47*1.3*1=195.61\ tCO_2e$$

E.3. Calculation of leakage

>>

No leakage effects need to be accounted for under methodology ACM0001, version 12.0.0.

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

Item	Baseline emissions or baseline net GHG removals by sinks (t CO_2e)	Project emissions or actual net GHG removals by sinks (t CO_2e)	Leakage (t CO_2e)	GHG emission reductions or net GHG removals by sinks (t CO_2e) achieved in the monitoring period		
				Up to 31/12/2012	From 01/01/2013	Total amount
Total	164,489	474	0	-	164,015	164,015

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

Item	Values estimated in ex ante calculation of registered PDD	Actual values achieved during this monitoring period
Emission reductions or GHG removals by sinks (t CO_2e)	167,309[14]	164,015

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

>>

The estimated emission reduction as per registered PDD is 167,309 tonnes of CO_2e, while the actual emission reductions achieved during this period has been calculated to be 164,015 tonnes of CO_2e. Hence the actual emission reduction value as achieved during the monitoring period is marginally less and follows the prediction as given in the registered PDD.

[14] This corresponds to the period 1st June 2015 to 31st December 2015 for which the CER's are being claimed for during this verification..

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

Project participant and/or responsible person/ entity	☒ Project participant ☐ Person/entity responsible for completing the CDM-MR-FORM
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Document information

Version	*Date*	*Description*
05.1	4 May 2015	Editorial revision to correct version numbering.
05.0	1 April 2015	Revisions to: • Include provisions related to delayed submission of a monitoring plan; • Provisions related to the Host Party; • Remove reference to programme of activities; • Overall editorial improvement.
04.0	25 June 2014	Revisions to: • Include the Attachment: Instructions for filling out the monitoring report form (these instructions supersede the "Guideline: Completing the monitoring report form" (Version 04.0)); • Include provisions related to standardized baselines; • Add contact information on a responsible person(s)/ entity(ies) for completing the CDM-MR-FORM in A.6 and Appendix 1; • Change the reference number from *F-CDM-MR* to *CDM-MR-FORM*; • Editorial improvement.
03.2	5 November 2013	Editorial revision to correct table in page 1.
03.1	2 January 2013	Editorial revision to correct table in section E.5.
03.0	3 December 2012	Revision required to introduce a provision on reporting actual emission reductions or net GHG removals by sinks for the period up to 31 December 2012 and the period from 1 January 2013 onwards (EB70, Annex 11).
02.0	13 March 2012	Revision required to ensure consistency with the "Guidelines for completing the monitoring report form" (EB 66, Annex 20).
01	28 May 2010	EB 54, Annex 34. Initial adoption.

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