



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	Sudokwon Landfill Gas Electricity Generation Project (50MW)	
UNFCCC reference number of the project activity	0941	
Version number of the monitoring report	1.2	
Completion date of the monitoring report	22/06/2016	
Monitoring period number and duration of this monitoring period	10 th monitoring period (01/07/2014 – 30/06/2015)	
Project participant(s)	Sudokwon Landfill Site Management Corporation (SLC) - DASCO Partners LLP - Ecoeye Co.,Ltd.	
Host Party	Republic of Korea	
Sectoral scope(s)	1, 13	
Selected methodology(ies)	<ul style="list-style-type: none"> • ACM0001 "Consolidated baseline methodology for landfill gas project activities" (Version 04) and, • ACM0002 "Consolidated baseline methodology for grid-connected electricity generation from renewable sources", (Version 06) 	
Selected standardized baseline(s)	N/A	
Estimated amount of GHG emission reductions or net GHG removals by sinks for this monitoring period in the registered PDD	1,090,673	
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
	-	885,176

SECTION A. Description of project activity

A.1. Purpose and general description of project activity

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Sudokwon landfill is one of the largest landfill in the world, which area is 19.79 million m² with total capacity of 228 million m³, and consists of 4 landfills. The 1st landfill was reclaimed from 1992 to 2000 and 2nd landfill has been in use for waste reclamation since 2000. The 3rd and 4th landfill will be used one after another.

About 50% of landfill gas (LFG) is composed of methane (CH₄), which is one of major greenhouse gases and has 25 times higher global warming potential (GWP) compare to carbon dioxide (CO₂). Thus, Sudokwon Landfill Gas Electricity Generation Project (50MW) was designed to minimize greenhouse gas emission by enhancing capture efficiency of LFG and utilizing it as a fuel of 50MW power plant.

For enhancing capture efficiency, lots of capturing pipelines and several LFG suction blowers were installed. The blower installation works had been finalized in 11/2007. Pipeline extension works will be continued until 2015 or more, the expected reclamation lifetime of 2nd landfill.

In order to treat LFG and generate renewable energy, renewable energy generation facility (50MW power plant) was constructed. This power plant is mainly composed of 2 boilers which generate steam and 1 steam turbine. The construction of power plant was finished in 15/12/2006.

Ecoenergy, operator of 50MW power plant, planned to install the desulfurization system in 2010, due to government policy¹ which is regulation of total emission on SO_x. The desulfurization construction has begun in 2011 and it is operated on 08 October 2014.

This is the 10th monitoring period covering 12 months from 01/07/2014 to 30/06/2015 (365 days) and monitored emission reductions are 885,176 tCO₂e.

A.2. Location of project activity

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#58 Baekseok Dong, Seo Gu, Incheon, Republic of Korea

GPS Coordinate: Latitude 37.55000° ~ 61667°, Longitude 126.55000° ~ 666667°

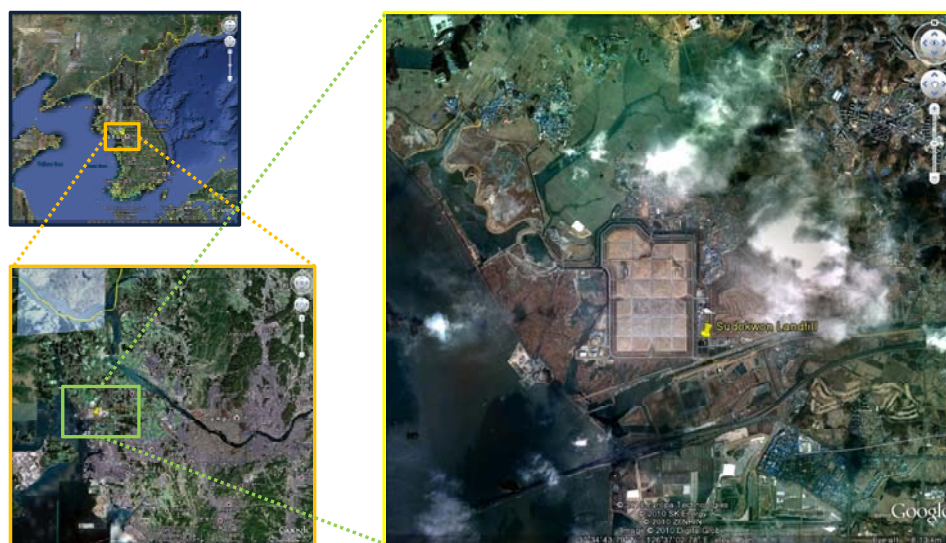


Figure 1 Location of the project activity (SLC)

¹ Enforcement ordinance of Special Act on Seoul Metropolitan Air Quality Improvement (No. 236, enforced as of 1 July. 2007)

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)
Republic of Korea (host)	Public entity Sudokwon Landfill Site Management Corporation (SLC)	No
United Kingdom of Great Britain and Northern Ireland	Private entity DASCO Partners LLP	No
Switzerland	Private entity Ecoeye Co.,Ltd. ²	No

A.4. Reference of applied methodology and standardized baseline

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ACM0001 “Consolidated baseline methodology for landfill gas project activities” (Version 04)

http://cdm.unfccc.int/UserManagement/FileStorage/CDMWF_AM_TX29WGSXE4781NKGQGCDPH2F3V3D

ACM0002 “Consolidated baseline methodology for grid-connected electricity generation from renewable sources” (Version 06)

http://cdm.unfccc.int/UserManagement/FileStorage/CDMWF_AM_BW759ID58ST5YEEV6WUCN5744MN763
A.5. Crediting period of project activity

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The start date of this project is 30/04/2007 and crediting period chosen is 10 years (fixed).

A.6. Contact information of responsible persons/entities

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Email: hlb2305@slc.or.krEmail: tercker@slc.or.kr**SECTION B. Implementation of project activity****B.1. Description of implemented registered project activity**

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The 50MW power plant has been under commercial run since 15/03/2007. Other facilities such as LFG blower and central flaring facility has been also under operational before the start date of crediting period (30/04/2007).

² Ecoeye Co.,Ltd. has joined as a project participant from 01/12/2014.



Figure 2 2nd landfill site and 50MW LFG power plant

As part of the enhancement (or expansion) of the LFG collection system, thorough inspection of LFG transferring pipes which installed in the midst of 2nd landfill were made. After the inspection, most of transferring pipes were re-installed at the top of 2nd landfill, intensively.

Detailed enhancement works are as follows;

Item	Number (ea)	Reasons for enhancement	Note
LFG transferring pipes re-installation	142	Installation of additional LFG transferring pipe for malfunctioning ones in accordance with the inspection. (from 01/07/2014 to 30/06/2015)	
Check point inspection in LFG transferring pipes	699	Check the operational status of LFG transferring pipes. (from 01/07/2014 to 30/06/2015)	
Flexible pipes replacement	15	Occurrence of pin-hole, which may cause possible influx of oxygen. (from 01/07/2014 to 30/06/2015)	
Dykes replacement in LFG collection system	1,323	Increase for LFG capture efficiency. (from 01/07/2014 to 30/06/2015)	

Table 1 Detailed enhancement of LFG collection system



Figure 3 Installation of check point and additional LFG transferring pipes (exposure type)

The information regarding the actual operation of the project activity in this monitoring period is as follows;

Date	Duration	Operation events	Note
11/07/2014	4 hours	Due to technical problem of boiler, 50MW power plant was temporally stopped.	
11/07/2014	64 hours	Due to technical problem of 50MW power plant, #1 boiler of 50MW power plant was stopped	
14/07/2014	23 hours	Due to technical problem of desulfurization system, 50MW power plant temporally stopped.	
15/07/2014	3 hours	Due to technical problem of turbine, 50MW power plant temporally stopped.	
16/07/2014	99 hours	Due to technical problem of desulfurization system, 50MW power plant temporally stopped.	
21/09/2014	138 hours	Due to general maintenance of 50MW power plant, it was stopped	
12/11/2014	78 hours	Due to technical problem of 50MW power plant, #1 boiler of 50MW power plant was stopped	
01/02/2015	260 hours	Due to maintenance of boiler, 50MW power plant operated its output from 33MW to 17MW.	
08/03/2015	592 hours	Due to periodic maintenance of 50MW power plant, it was stopped and temporally operated.	
10/04/2015	95 hours	Due to maintenance of desulfurization system, 50MW power plant was stopped.	
13/06/2015	8 hours	Due to power outage of LFG management center, 50MW power plant operated its output from 37MW to 17MW	
21/06/2015	138 hours	Due to general maintenance of 50MW power plant, it was stopped	
29/06/2015	6 hours	Due to technical problem of boiler, 50MW power plant was temporally stopped.	

Table 2 Operational events of 50MW power plant

Date	Duration	Operation events	Note
11/07/2014	9 hours	Due to technical problem of 50MW power plant, #1 and #3 flares were operated.	
11/07/2014	1 hour	Due to technical problem of 50MW power plant, #6 flare was ignited.	
21/09/2014	151 hours	Due to general maintenance of 50MW power plant, #2 and #4 flares were operated.	
21/09/2014	1 hour	Due to technical problem of 50MW power plant, #5 flare was ignited	
12/11/2014	81 hours	Due to technical problem of 50MW power plant, #6 flare was operated.	
	77 hours	Due to technical problem of 50MW power plant, #2 flare was operated.	
	26 hours	Due to technical problem of 50MW power plant, #1 flare was operated.	
01/02/2015	255 hours	Due to maintenance of 50MW power plant, #2 flare was operated.	
08/03/2015	599 hours	Due to periodic maintenance of 50MW power plant, #3 flare was operated.	
	600 hours	Due to periodic maintenance of 50MW power plant, #1 flare was operated.	
	601 hours	Due to periodic maintenance of 50MW power plant, #2 flare was operated.	
	605 hours	Due to periodic maintenance of 50MW power plant, #4 flare was operated.	
06/04/2015	9 hours	Due to decrease of output of 50MW power plant, #6 flare was temporally operation.	
10/04/2015	1 hour	Due to maintenance of desulfurization system, #6 flare was ignited	
	100 hours	Due to maintenance of desulfurization system, #1 flare was	

		operated	
	97 hours	Due to maintenance of desulfurization system, #2 and #3 flares were operated	
	103 hours	Due to maintenance of desulfurization system, #4 flare was operated	
14/04/2015	1 hour	Due to stabilization of 50MW power plant, #2 flare was temporally operation	
	5 hours	Due to stabilization of 50MW power plant, #3 flare was temporally operation	
21/06/2015	138 hours	Due to general maintenance of 50MW power plant, #1, #2, #3 and #4 flares were operation	
	1 hour	Due to maintenance of desulfurization system, #6 flare was ignited	
29/06/2015	11 hours	Due to technical problem of boiler, #1, #3 and #4 flares were operation	

Table 3 Operational events of central flaring facility

Date	Duration	Deviations and its reason	Corrective actions on data and its conservativeness
07/07/2014	18 hours	Due to maintenance of GA-01, methane fraction of LFG from 1 st landfill recorded extraordinary value.	Most conservative value in entire 10 th monitoring period (35.9%) applied.
11/07/2014	3 hours	Due to general maintenance of 50MW power plant, it was stopped.	Where the plant was in overhaul, 0 Nm ³ applied for LFG flow of 50MW power plant and 0% applied for methane fraction of LFG fed to 50MW power plant.
11/07/2014	83 hours	Due to conduct the 3rd party calibration of FT-09, flow of LFG fed to #6 flare recorded extraordinary value.	Most conservative value in entire 10 th monitoring period (0 Nm ³) applied.
14/07/2014	4 hours	Due to technical problem on monitoring system, TC-06 did not recorded.	Most conservative value in entire 10 th monitoring period (0 °C) applied.
14/07/2014	140 hours	Due to conduct the 3rd party calibration of FT-04 & FT-06, flow of LFG fed to #1 and #3 flare recorded extraordinary value.	Most conservative value in entire 10 th monitoring period (0 Nm ³) applied.
14/07/2014	22 hours	Due to general maintenance of 50MW power plant, it was stopped.	Where the plant was in overhaul, 0 Nm ³ applied for LFG flow of 50MW power plant and 0% applied for methane fraction of LFG fed to 50MW power plant.
15/07/2014	11 hours	Due to technical problem of FT-09, Flow of LFG fed to #6 flare recorded extraordinary value.	Most conservative value in entire 10 th monitoring period (0 Nm ³) applied.
15/07/2014	1 hour	Due to technical problem on monitoring system, GA-02, PT-02 and TT-02 recorded extraordinary value.	Most conservative value in entire 10 th monitoring period applied. - GA-02 : 41.4 % - PT-02 : -2,868 mmAq - TT-02 : 35.8 °C
15/07/2014	7 hours	Due to technical problem on monitoring system, TC-06 did not recorded.	Most conservative value in entire 10 th monitoring period (0 °C) applied.
15/07/2014	1 hour	Due to general maintenance of 50MW power plant, it was stopped.	Where the plant was in overhaul, 0 Nm ³ applied for LFG flow of 50MW power plant.
16/07/2014	99 hours		
18/07/2014	4 hours	Due to technical problem of FT-09, Flow of LFG fed to #6 flare recorded	Most conservative value in entire 10 th monitoring period (0 Nm ³) applied.

		extraordinary value.	
22/07/2014	1 hour	Due to technical problem on monitoring system, GA-02, PT-02 and TT-02 recorded extraordinary value.	Most conservative value in entire 10 th monitoring period applied. - GA-02 : 41.4 % - PT-02 : -2,868 mmAq - TT-02 : 35.8
23/07/2014	9 hours	Due to technical problem on monitoring system, GA-02 and TT-02 recorded extraordinary value.	Most conservative value in entire 10 th monitoring period applied. - GA-02 : 41.4 % - TT-02 : 35.8 °C
23/07/2014	10 hours	Due to technical problem on monitoring system, FT-02 recorded extraordinary value.	<p>○ Where CH₄ fraction of 2nd landfill LFG was lower than that of 1st landfill LFG during the monitoring period, following equation used to calculate LFG flow in order to keep conservative approach</p> <p>- LFG_1st = 0 Nm³ - LFG_2nd = LFG_50MW + LFG_Flare</p> <p>○ Where CH₄ fraction of 1st landfill LFG was lower than that of 2nd landfill LFG during the monitoring period, following equation used to calculate LFG flow in order to keep conservative approach;</p> <p>- LFG_1st = LFG_50MW + LFG_Flare - LFG_2nd = 0 Nm³</p>
24/07/2014	2 hours	Due to technical problem on monitoring system, GA-02 and TT-02 recorded extraordinary value.	<p>○ Most conservative value in entire 10th monitoring period applied.</p> <p>- GA-02 : 41.4 % - TT-02 : 35.8 °C</p>
24/07/2014	3 hours	Due to technical problem on monitoring system, FT-02 recorded extraordinary value.	<p>○ Where CH₄ fraction of 2nd landfill LFG was lower than that of 1st landfill LFG during the monitoring period, following equation used to calculate LFG flow in order to keep conservative approach</p> <p>- LFG_1st = 0 Nm³ - LFG_2nd = LFG_50MW + LFG_Flare</p> <p>○ Where CH₄ fraction of 1st landfill LFG was lower than that of 2nd landfill LFG during the monitoring period, following equation used to calculate LFG flow in order to keep conservative approach;</p> <p>- LFG_1st = LFG_50MW + LFG_Flare - LFG_2nd = 0 Nm³</p>
27/07/2014	49 hours	Due to technical problem on monitoring system, GA-02, FT-02, PT-02 and TT-02 recorded extraordinary value.	<p>○ Most conservative value in entire 10th monitoring period applied.</p> <p>- GA-02 : 41.4 % - TT-02 : 35.8 °C - PT-02 : -2868 mmAq</p> <p>○ Where CH₄ fraction of 2nd landfill LFG was lower than that of 1st landfill LFG during the monitoring period, following equation used to calculate LFG flow in order to keep conservative approach</p> <p>- LFG_1st = 0 Nm³ - LFG_2nd = LFG_50MW + LFG_Flare</p>
30/07/2014	4 hours	Due to technical problem on monitoring system, GA-02, FT-02	○ Most conservative value in entire 10 th monitoring period applied.

		and TT-02 recorded extraordinary value.	<ul style="list-style-type: none"> - GA-02 : 41.4 % - TT-02 : 35.8 °C ○ Where CH₄ fraction of 2nd landfill LFG was lower than that of 1st landfill LFG during the monitoring period, following equation used to calculate LFG flow in order to keep conservative approach - LFG_1st = 0 Nm³ - LFG_2nd = LFG_50MW + LFG_Flare
30/07/2014	3 hours	Due to technical problem on monitoring system, GA-02 and TT-02 recorded extraordinary value.	<ul style="list-style-type: none"> ○ Most conservative value in entire 10th monitoring period applied. - GA-02 : 41.4 % - TT-02 : 35.8 °C
30/07/2014	1 hour	Due to technical problem on monitoring system, FT-02 recorded extraordinary value.	<ul style="list-style-type: none"> ○ Where CH₄ fraction of 1st landfill LFG was lower than that of 2nd landfill LFG during the monitoring period, following equation used to calculate LFG flow in order to keep conservative approach; - LFG_1st = LFG_50MW + LFG_Flare - LFG_2nd = 0 Nm³
04/08/2014	1 hour	Due to technical problem on monitoring system, GA-02, PT-02 and TT-02 recorded extraordinary value.	<ul style="list-style-type: none"> Most conservative value in entire 10th monitoring period applied. - GA-02 : 41.4 % - PT-02 : -2,868 mmAq - TT-02 : 35.8 °C
05/08/2014	15 hours	Due to technical problem of GA-02, methane fraction of LFG from 2 nd landfill did not recorded.	Most conservative value in entire 10 th monitoring period (41.4%) applied.
06/08/2014	24 hours	Due to technical problem of PLC, FT-02 did not recorded.	<ul style="list-style-type: none"> ○ Where CH₄ fraction of 2nd landfill LFG was lower than that of 1st landfill LFG during the monitoring period, following equation used to calculate LFG flow in order to keep conservative approach - LFG_1st = 0 Nm³ - LFG_2nd = LFG_50MW + LFG_Flare ○ Where CH₄ fraction of 1st landfill LFG was lower than that of 2nd landfill LFG during the monitoring period, following equation used to calculate LFG flow in order to keep conservative approach; - LFG_1st = LFG_50MW + LFG_Flare - LFG_2nd = 0 Nm³
06/08/2014	23 hours	Due to technical problem of PLC, GA-02, TT-02 and PT-02 did not recorded.	<ul style="list-style-type: none"> Most conservative value in entire 10th monitoring period applied. - GA-02 : 41.4 % - PT-02 : -2,868 mmAq - TT-02 : 35.8 °C
14/08/2014	2 hours	Due to technical problem of GA-02, methane fraction of LFG from 2 nd landfill recorded extraordinary value.	Most conservative value in entire 10 th monitoring period (41.4%) applied.
25/08/2014	1 hour	Due to maintenance of GA-01, methane fraction of LFG from 1 st landfill did not recorded.	Most conservative value in entire 10 th monitoring period (35.9%) applied.
27/08/2014	1 hour	Due to maintenance of monitoring system, GA-01, GA-02, FT-01, FT-02, TT-02, PT-02, PT-05, TT-03, TC-02, TC-04, TC-05, FT-05, FT-07 and	<ul style="list-style-type: none"> ○ Most conservative value in entire 10th monitoring period applied. - GA-01 : 35.9 % - GA-02 : 41.4 %

		FT-08 did not recorded.	<ul style="list-style-type: none"> - PT-02 : -2868 mmAq - TT-02 : 35.8 °C - PT-05 : 88 mmAq - TT-03 : 60 °C - TC-02, TC-04, TC-05 : 0 °C - FT-05, FT-07, FT-08 : 0 Nm³ ○ Where CH₄ fraction of 1st landfill LFG was lower than that of 2nd landfill LFG during the monitoring period, following equation used to calculate LFG flow in order to keep conservative approach; - $LFG_{1^{st}} = LFG_{50MW} + LFG_{Flare}$ - $LFG_{2^{nd}} = 0 \text{ Nm}^3$
09/09/2014	645 hours	Due to technical problem of flow computer, FT-02 recorded extraordinary value.	<ul style="list-style-type: none"> ○ Where CH₄ fraction of 1st landfill LFG was lower than that of 2nd landfill LFG during the monitoring period, following equation used to calculate LFG flow in order to keep conservative approach; - $LFG_{1^{st}} = LFG_{50MW} + LFG_{Flare}$ - $LFG_{2^{nd}} = 0 \text{ Nm}^3$
09/09/2014	644 hours	Due to technical problem of flow computer, PT-02 recorded extraordinary value.	Most conservative value in entire 10 th monitoring period (-2,868 mmAq) applied.
12/09/2014	10 hours	Due to technical problem(valve short-circuit) of #4 flare, TC-02, TC-04, GA-01, TT-03 and PT-05 did not recorded.	Most conservative value in entire 10 th monitoring period applied. <ul style="list-style-type: none"> - GA-01 : 35.9 % - TC-02, TC-04 : 0 °C - PT-05 : 88mmAq - TT-03 : 60 °C
15/09/2014	501 hours	Due to technical problem of flow computer, TT-02 recorded extraordinary value.	Most conservative value in entire 10 th monitoring period (35.8 °C) applied.
21/09/2014	138 hours	Due to general maintenance of 50MW power plant, it was stopped.	Where the plant was in overhaul, 0 Nm ³ applied for LFG flow of 50MW power plant.
27/09/2014	768 hours	Due to delayed calibration of TT-10 and PT-10, flow of LFG fed to 50MW power plant did not stabilized pressure and temperature	Most conservative value in entire 10 th monitoring period applied. The minimum ratio(methane input per electricity generation in 50MW) in normal operation condition is calculated as 0.201 tCH ₄ /MWh. $LFG_{50MW} = EL_{exp} * 0.201 \text{ tCH}_4/\text{MWh} / \text{CH}_4 \text{ density} / w\text{CH}_4$
02/10/2014	100 hours	Due to technical problem of flow computer, PT-02 recorded extraordinary value.	Most conservative value in entire 10 th monitoring period (-2,868 mmAq) applied.
11/10/2014	1 hour	Due to technical problem of PLC, GA-02, TT-02 and PT-02 did not recorded.	Most conservative value in entire 10 th monitoring period applied. <ul style="list-style-type: none"> - GA-02 : 41.4 % - PT-02 : -2,868 mmAq - TT-02 : 35.8 °C
13/10/2014	1 hour	Due to technical problem of GA-01, methane fraction of LFG from 1 st landfill did not recorded.	Most conservative value in entire 10 th monitoring period (35.9%) applied.
15/10/2014	1 hour	Due to technical problem of GA-04, methane fraction of LFG fed to 50MW Power Plant did not recorded.	Most conservative value in entire 10 th monitoring period (40.0%) applied.
21/10/2014	1 hour	Due to technical problem of converter, TC-05 did not recorded.	Most conservative value in entire 10 th monitoring period (0 °C) applied.

22/10/2014	314 hours	Due to conduct the 3 rd party calibration of FT-02 & PT-02, flow of LFG fed to 50MW power plant did not recorded.	<p>○ Most conservative value in entire 10th monitoring period applied.</p> <p>- PT-05 : -2,868 mmAq</p> <p>○ Where CH₄ fraction of 1st landfill LFG was lower than that of 2nd landfill LFG during the monitoring period, following equation used to calculate LFG flow in order to keep conservative approach;</p> <p>- $LFG_1^{st} = LFG_50MW + LFG_Flare$</p> <p>- $LFG_2^{nd} = 0 \text{ Nm}^3$</p>
22/10/2014	169 hours	Due to conduct the 3 rd party calibration of TT-02, temperature of LFG fed to 50MW power plant did not recorded.	Most conservative value in entire 10 th monitoring period(35.8 °C) applied.
22/10/2014	170 hours	Due to conduct the 3 rd party calibration of PT-05 & TT-03, temperature and pressure of LFG fed to overall flares did not recorded.	<p>Most conservative value in entire 10th monitoring period applied.</p> <p>- PT-05 : 88mmAq</p> <p>- TT-03 : 60 °C</p>
29/10/2014	1 hour	Due to conduct the 3 rd party calibration of temperature meters, TC-05 did not recorded.	Most conservative value in entire 10 th monitoring period (0 °C) applied.
14/11/2014	1 hour	Due to technical problem of PLC, GA-02 did not recorded.	Most conservative value in entire 10 th monitoring period (41.4%) applied.
24/11/2014	2 hours	Due to technical problem of GA-01, methane fraction of LFG from 1 st landfill recorded extraordinary value.	Most conservative value in entire 10 th monitoring period (35.9%) applied.
24/11/2014	5 hours	Due to technical problem of PLC, GA-02 did not recorded.	Most conservative value in entire 10 th monitoring period (41.4%) applied.
24/11/2014	1 hour	Due to shut down of blower facilities, FT-02, PT-02 & TT-02 did not recorded.	<p>○ Most conservative value in entire 10th monitoring period applied.</p> <p>- PT-05 : -2868 mmAq</p> <p>- TT-02 : 35.8 °C</p> <p>○ Where CH₄ fraction of 1st landfill LFG was lower than that of 2nd landfill LFG during the monitoring period, following equation used to calculate LFG flow in order to keep conservative approach;</p> <p>- $LFG_1^{st} = LFG_50MW + LFG_Flare$</p> <p>- $LFG_2^{nd} = 0 \text{ Nm}^3$</p>
27/11/2014	1 hour	Due to maintenance of blower facilities, GA-02 recorded extraordinary value.	Most conservative value in entire 10 th monitoring period (41.4%) applied.
18/12/2014	1 hour	Due to technical problem on monitoring system, GA-04 recorded extraordinary value.	Most conservative value in entire 10 th monitoring period (40.0%) applied.
18/12/2014	7 hours	Due to maintenance of inlet-line of gas analyzer, GA-02 did not recorded.	Most conservative value in entire 10 th monitoring period (41.4%) applied.
18/12/2014	4 hours	Due to technical problem of FT-09, Flow of LFG fed to #6 flare recorded extraordinary value.	Most conservative value in entire 10 th monitoring period (0 Nm ³) applied.
18/12/2014	2 hours	Due to technical problem of FT-09, Flow of LFG fed to #6 flare recorded extraordinary value.	Most conservative value in entire 10 th monitoring period (0 Nm ³) applied.
19/12/2014	1 hour	Due to technical problem on monitoring system, GA-04 recorded extraordinary value.	Most conservative value in entire 10 th monitoring period (40.0%) applied.
21/12/2014	15 hours	Due to technical problem on monitoring system, GA-04 recorded	Most conservative value in entire 10 th monitoring period (40.0%) applied.

		extraordinary value.	
22/12/2014	1 hour	Due to technical problem on monitoring system, GA-04 recorded extraordinary value.	Most conservative value in entire 10 th monitoring period (40.0%) applied.
23/12/2014	1 hour	Due to maintenance of flow computer, FT-02 recorded extraordinary value.	○ Where CH ₄ fraction of 1 st landfill LFG was lower than that of 2 nd landfill LFG during the monitoring period, following equation used to calculate LFG flow in order to keep conservative approach; - LFG_1 st = LFG_50MW + LFG_Flare - LFG_2 nd = 0 Nm ³
03/01/2015	6 hours	Due to technical problem on monitoring system, TC-06 did not recorded.	Most conservative value in entire 10 th monitoring period (0 °C) applied.
03/01/2015	15 hours	Due to technical problem on monitoring system, GA-04 recorded extraordinary value.	Most conservative value in entire 10 th monitoring period (40.0%) applied.
05/01/2015	1 hour	Due to technical problem of electricity system, WH-05 and WH-06 recorded extraordinary value.	Most conservative value in entire 10 th monitoring period applied. - EL_imp_LFG_mgt_centre = 99.9kWh - EL_imp_2 nd _LF = 490.8 kWh
06/01/2015	29 hours	Due to technical problem on monitoring system, GA-04 recorded extraordinary value.	Most conservative value in entire 10 th monitoring period (40.0%) applied.
08/01/2015	1 hour	Due to technical problem of GA-04, methane fraction of LFG fed to 50MW Power Plant recorded extraordinary value.	Most conservative value in entire 10 th monitoring period (40.0%) applied.
09/01/2015	1 hour	Due to technical problem of GA-04, methane fraction of LFG fed to 50MW Power Plant recorded extraordinary value.	Most conservative value in entire 10 th monitoring period (40.0%) applied.
13/01/2015	1 hour	Due to technical problem of electricity system, WH-05 and WH-06 recorded extraordinary value.	Most conservative value in entire 10 th monitoring period applied. - EL_imp_LFG_mgt_centre = 99.9kWh - EL_imp_2 nd _LF = 490.8 kWh
26/01/2015	1 hour	Due to technical problem on monitoring system, GA-01 did not recorded.	Most conservative value in entire 10 th monitoring period (35.9%) applied.
09/02/2015	1 hour	Due to technical problem on monitoring system, GA-01 did not recorded.	Most conservative value in entire 10 th monitoring period (35.9%) applied.
17/02/2015	3 hours	Due to technical problem on monitoring system, GA-01, FT-01, PT-02, TT-02, GA-02, FT-02, TC-05, TC-06, FT-08, FT-09, PT-05 and TT-03 recorded extraordinary value.	○ Most conservative value in entire 10 th monitoring period applied. - GA-01 : 35.9 % - GA-02 : 41.4 % - PT-02 : -2,868 mmAq - TT-02 : 35.8 °C - PT-05 : 88 mmAq - TT-03 : 60 °C ○ Where CH ₄ fraction of 1 st landfill LFG was lower than that of 2 nd landfill LFG during the monitoring period, following equation used to calculate LFG flow in order to keep conservative approach; - LFG_1 st = LFG_50MW + LFG_Flare - LFG_2 nd = 0 Nm ³
23/02/2015	593 hours	Due to remodeling of LFG management centre, monitoring	Most conservative value in entire 10 th monitoring period (0 °C, 0 Nm ³)

		system was shut down(all facilities were operated). During this period, monitoring data(TC-01~06, FT-04~FT-09) did not recorded.	applied.
24/02/2015	11 hours	Due to technical problem of electricity system, WH-06 recorded extraordinary value.	Most conservative value in entire 10 th monitoring period applied. - EL_imp_LFG_mgt_centre = 99.9kWh
08/03/2015	550 hours	Due to periodic maintenance of 50MW power plant, it was stopped.	Where the plant was in overhaul, 0 Nm ³ applied for LFG flow of 50MW power plant and 0% applied for methane fraction of LFG fed to 50MW power plant.
08/03/2015	270 hours	Due to remodeling of LFG management centre, monitoring system was shut down(all facilities were operated). During this period, monitoring data(TC-01, TC-02, FT-04, FT-05) did not recorded.	Most conservative value in entire 10 th monitoring period (0 °C, 0 Nm ³) applied.
08/03/2015	271 hours	Due to remodeling of LFG management centre, monitoring system was shut down(all facilities were operated). During this period, monitoring data(TC-04, FT-07) did not recorded.	Most conservative value in entire 10 th monitoring period (0 °C, 0 Nm ³) applied.
08/03/2015	269 hours	Due to remodeling of LFG management centre, monitoring system was shut down(all facilities were operated). During this period, monitoring data(TC-03, FT-06) did not recorded.	Most conservative value in entire 10 th monitoring period (0 °C, 0 Nm ³) applied.
12/03/2015	3 hours	Due to technical problem of electricity system, WH-06 recorded extraordinary value.	Most conservative value in entire 10 th monitoring period applied. - EL_imp_LFG_mgt_centre = 99.9kWh
19/03/2015	19 hours	Due to technical problem of PLC, GA-02 did not recorded.	Most conservative value in entire 10 th monitoring period(41.4%) applied.
23/03/2015	26 hours	Due to technical problem of monitoring system server, FT-02, TT-02 & PT-02 recorded extraordinary value.	<ul style="list-style-type: none"> ○ Most conservative value in entire 10th monitoring period applied. - PT-02 : -2,868 mmAq - TT-02 : 35.8 °C ○ Where CH₄ fraction of 2nd landfill LFG was lower than that of 1st landfill LFG during the monitoring period, following equation used to calculate LFG flow in order to keep conservative approach - LFG_1st = 0 Nm³ - LFG_2nd = LFG_50MW + LFG_Flare ○ Where CH₄ fraction of 1st landfill LFG was lower than that of 2nd landfill LFG during the monitoring period, following equation used to calculate LFG flow in order to keep conservative approach; - LFG_1st = LFG_50MW + LFG_Flare - LFG_2nd = 0 Nm³
27/03/2015	3 hours	Due to change of PLC, FT-02 did not recorded.	<ul style="list-style-type: none"> ○ Where CH₄ fraction of 2nd landfill LFG was lower than that of 1st landfill LFG during the monitoring period, following equation used to calculate LFG flow in order to keep conservative approach - LFG_1st = 0 Nm³

			- LFG_2 nd = LFG_50MW + LFG_Flare
27/03/2015	1 hour	Due to change of PLC, PT-02 and TT-02 did not recorded.	Most conservative value in entire 10 th monitoring period (31.6 °C, -2,868 mmAq) applied.
27/03/2015	14 hours	Due to technical problem of electricity system, WH-05 and WH-06 recorded extraordinary value.	Most conservative value in entire 10 th monitoring period applied. - EL_imp_LFG_mgt_centre = 99.9kWh - EL-imp_2 nd _LF = 490.8 kWh
29/03/2015	1 hour	Due to technical problem of TC-03, temperature of LFG fed to #3 flare did not recorded.	Most conservative value in entire 10 th monitoring period (0 °C) applied.
30/03/2015	6 hours	Due to technical problem of TC-03, temperature of LFG fed to #3 flare did not recorded.	Most conservative value in entire 10 th monitoring period (0 °C) applied.
31/03/2015	36 hours	Due to periodic maintenance of 50MW power plant, it was stopped.	Where the plant was in overhaul, 0 Nm ³ applied for LFG flow of 50MW power plant and 0% applied for methane fraction of LFG fed to 50MW power plant.
02/04/2015	2 hours	Due to technical problem on monitoring system, GA-04 recorded extraordinary value.	Most conservative value in entire 10 th monitoring period (40.0%) applied.
04/04/2015	8 hours	Due to periodic safety check, all facilities were shut down(except LFG capture facilities of 2 nd landfill and 50MW power plant) and power plant reduced its output from 30MW to 20MW. During this period, only data from power plant related meter (FT-10, GA-04, & WH-01) recorded.	○ Most conservative value in entire 10 th monitoring period applied. - PT-02 : -2868 mmAq - TT-02 : 35.8 °C - GA-02 : 41.4% ○ Where CH ₄ fraction of 2 nd landfill LFG was lower than that of 1 st landfill LFG during the monitoring period, following equation used to calculate LFG flow in order to keep conservative approach - LFG_1 st = 0 Nm ³ - LFG_2 nd = LFG_50MW + LFG_Flare
04/04/2015	2 hours	Due to technical problem of GA-01, methane fraction of LFG fed to 1 st landfill recorded extraordinary value.	Most conservative value in entire 10 th monitoring period (35.9%) applied.
10/04/2015	94 hours	Due to general maintenance of 50MW power plant, it was stopped.	Where the plant was in overhaul, 0 Nm ³ applied for LFG flow of 50MW power plant and 0% applied for methane fraction of LFG fed to 50MW power plant.
10/04/2015	3 hours	Due to technical problem on monitoring system, TC-03 recorded extraordinary value.	Most conservative value in entire 10 th monitoring period (0 °C) applied.
12/04/2015	5 hours	Due to technical problem on monitoring system, TC-03 recorded extraordinary value.	Most conservative value in entire 10 th monitoring period (0 °C) applied.
13/04/2015	8 hours	Due to technical problem on monitoring system, TC-03 recorded extraordinary value.	Most conservative value in entire 10 th monitoring period (0 °C) applied.
14/04/2015	1 hour	Due to technical problem on monitoring system, GA-04 recorded extraordinary value.	Most conservative value in entire 10 th monitoring period (40.0%) applied.
17/04/2015	15 hours	Due to technical problem of electricity system, WH-05 and WH-06 recorded extraordinary value.	Most conservative value in entire 10 th monitoring period applied. - EL_imp_LFG_mgt_centre = 99.9kWh - EL-imp_2 nd _LF = 490.8 kWh
23/04/2015	32 hours	Due to technical problem of GA-01, methane fraction of LFG fed to 1 st landfill recorded extraordinary value.	Most conservative value in entire 10 th monitoring period (35.9%) applied.

06/05/2015	1 hour	Due to technical problem on monitoring system, GA-04 recorded extraordinary value.	Most conservative value in entire 10 th monitoring period (40.0%) applied.
15/05/2015	63 hours	Due to technical problem of GA-01, methane fraction of LFG fed to 1 st landfill recorded extraordinary value.	Most conservative value in entire 10 th monitoring period (35.9%) applied.
28/05/2015	1 hour	Due to conduct the 3rd party calibration of FT-01, LFG flow from 1st landfill did not recorded.	<p>○ Where CH₄ fraction of 1st landfill LFG was lower than that of 2nd landfill LFG during the monitoring period, following equation used to calculate LFG flow in order to keep conservative approach;</p> <p>- LFG_1st = LFG_50MW + LFG_Flare</p> <p>- LFG_2nd = 0 Nm³</p>
11/06/2015	9 hours	Due to technical problem of PLC, FT-02 did not recorded.	<p>○ Where CH₄ fraction of 1st landfill LFG was lower than that of 2nd landfill LFG during the monitoring period, following equation used to calculate LFG flow in order to keep conservative approach;</p> <p>- LFG_1st = LFG_50MW + LFG_Flare</p> <p>- LFG_2nd = 0 Nm³</p>
11/06/2015	8 hours	Due to technical problem of PLC, GA-02, TT-02 and PT-02 did not recorded.	<p>○ Most conservative value in entire 10th monitoring period applied.</p> <p>- PT-02 : -2868 mmAq</p> <p>- TT-02 : 35.8 °C</p> <p>- GA-02 : 41.4%</p>
13/06/2015	8 hours	Due to maintenance of AISS(Air Insulated fault section switch), monitoring system was shut down(all facilities were operated). During this period, monitoring data(FT-01, FT-02, WH-05, WH-06) did not recorded.	<p>○ Most conservative value in entire 10th monitoring period applied.</p> <p>- EL_imp_LFG_mgt_centre = 99.9kWh</p> <p>- EL_imp_2nd_LF = 490.8 kWh</p> <p>○ Where CH₄ fraction of 2nd landfill LFG was lower than that of 1st landfill LFG during the monitoring period, following equation used to calculate LFG flow in order to keep conservative approach</p> <p>- LFG_1st = 0 Nm³</p> <p>- LFG_2nd = LFG_50MW + LFG_Flare</p> <p>○ Where CH₄ fraction of 1st landfill LFG was lower than that of 2nd landfill LFG during the monitoring period, following equation used to calculate LFG flow in order to keep conservative approach;</p> <p>- LFG_1st = LFG_50MW + LFG_Flare</p> <p>- LFG_2nd = 0 Nm³</p>
13/06/2015	5 hours	Due to maintenance of AISS(Air Insulated fault section switch), monitoring system was shut down(all facilities were operated). During this period, monitoring data(GA-01, GA-02, TT-02, PT-02, PT-05, TT-03) did not recorded.	<p>○ Most conservative value in entire 10th monitoring period applied.</p> <p>- GA-01 : 35.9%</p> <p>- GA-02 : 41.4%</p> <p>- PT-02 : -2,868 mmAq</p> <p>- TT-02 : 35.8 °C</p> <p>- PT-05 : 88 mmAq</p> <p>- TT-03 : 60.0 °C</p>
13/06/2015	6 hours	Due to maintenance of AISS(Air Insulated fault section switch), monitoring system was shut down(all facilities were operated). During this period, monitoring data(TC-05, FT-08) did not recorded.	Most conservative value in entire 10 th monitoring period (0 °C, 0 Nm ³) applied.

14/06/2015	32 hours	Due to technical problem of sensor, TC-05 did not recorded.	Most conservative value in entire 10 th monitoring period (0 °C) applied.
16/06/2015	4 hours	Due to maintenance of PLC, FT-02, TT-02, PT-02 and GA-02 did not recorded.	<p>○ Most conservative value in entire 10th monitoring period applied.</p> <p>- PT-02 : -2,868 mmAq</p> <p>- TT-02 : 35.8 °C</p> <p>- GA-02 : 41.4%</p> <p>○ Where CH₄ fraction of 1st landfill LFG was lower than that of 2nd landfill LFG during the monitoring period, following equation used to calculate LFG flow in order to keep conservative approach;</p> <p>- LFG_1st = LFG_50MW + LFG_Flare</p> <p>- LFG_2nd = 0 Nm₃</p>
17/06/2015	1 hour	Due to technical problem of PLC, TT-02 did not recorded.	○ Most conservative value in entire 10 th monitoring period (35.8 °C) applied.
17/06/2015	7 hours	Due to maintenance of PLC, FT-02, TT-02 and PT-02 did not recorded.	<p>○ Most conservative value in entire 10th monitoring period applied.</p> <p>- PT-02 : -2,868 mmAq</p> <p>- TT-02 : 35.8 °C</p> <p>○ Where CH₄ fraction of 1st landfill LFG was lower than that of 2nd landfill LFG during the monitoring period, following equation used to calculate LFG flow in order to keep conservative approach;</p> <p>- LFG_1st = LFG_50MW + LFG_Flare</p> <p>- LFG_2nd = 0 Nm₃</p>
18/06/2015	1 hour	Due to technical problem on monitoring system, GA-01 did not recorded.	Most conservative value in entire 10 th monitoring period (35.9%) applied.
19/06/2015	108 hours	Due to maintenance of monitoring system, GA-01, GA-02, FT-01, FT-02, TT-02, PT-02, PT-05, TT-03, TC-05 and FT-08 did not recorded.	<p>○ Most conservative value in entire 10th monitoring period applied.</p> <p>- GA-01 : 35.9%</p> <p>- GA-02 : 41.4%</p> <p>- PT-02 : -2868 mmAq</p> <p>- TT-02 : 35.8 °C</p> <p>- PT-05 : 88 mmAq</p> <p>- TT-03 : 60.0 °C</p> <p>- TC-05 : 0 °C</p> <p>- FT-08 : 0 Nm₃</p> <p>○ Where CH₄ fraction of 1st landfill LFG was lower than that of 2nd landfill LFG during the monitoring period, following equation used to calculate LFG flow in order to keep conservative approach;</p> <p>- LFG_1st = LFG_50MW + LFG_Flare</p> <p>- LFG_2nd = 0 Nm₃</p>
21/06/2015	138 hours	Due to general maintenance of 50MW power plant, it was stopped.	Where the plant was in overhaul, 0 Nm ₃ applied for LFG flow of 50MW power plant and 0% applied for methane fraction of LFG fed to 50MW power plant.
21/06/2015	50 hours	Due to maintenance of monitoring system, some data (TC-01~TC-04, TC-06, FT-04~FT-07 and FT-09) did not recorded.	Most conservative value in entire 10 th monitoring period (0 °C, 0 Nm ₃) applied.

23/06/2015	5 hours	Due to maintenance of PLC, FT-02, TT-02, PT-02 and GA-02 did not recorded.	<p>○ Most conservative value in entire 10th monitoring period applied.</p> <p>- Ga-02 : 41.4%</p> <p>- TT-02 : 35.8 °C</p> <p>- PT-02 : -2,868 mmAq</p> <p>○ Where CH₄ fraction of 1st landfill LFG was lower than that of 2nd landfill LFG during the monitoring period, following equation used to calculate LFG flow in order to keep conservative approach;</p> <p>- LFG_1st = LFG_50MW + LFG_Flare</p> <p>- LFG_2nd = 0 Nm³</p>
23/06/2015	100 hours	Due to conduct the 3 rd party calibration of flow meters, FT-04, FT-06 and FT-07 did not recorded.	Most conservative value in entire 10 th monitoring period (0 Nm ³) applied.
29/06/2015	6 hours	Due to general maintenance of 50MW power plant, it was stopped.	Where the plant was in overhaul, 0 Nm ³ applied for LFG flow of 50MW power plant and 0% applied for methane fraction of LFG fed to 50MW power plant.
30/06/2015	4 hours	Due to technical problem of electricity system, WH-05 recorded extraordinary value.	Most conservative value in entire 10 th monitoring period(490.8 kWh) applied.
30/06/2015	3 hours	Due to technical problem of electricity system, WH-06 recorded extraordinary value.	Most conservative value in entire 10 th monitoring period(99.9kWh) applied.

Table 4 Operational events of monitoring system and corrective actions

B.2. Post-registration changes**B.2.1. Temporary deviations from registered monitoring plan, applied methodology or applied standardized baseline**

>> Not applicable

B.2.2. Corrections

>> Not applicable

B.2.3. Changes to start date of crediting period

>> Not applicable

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

>> Not applicable

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

>> Not applicable

SECTION C. Description of monitoring system

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Data Collection Procedures

Monitoring and emission reductions calculation are made in accordance with monitoring plan in PDD, internal data handling procedure as well as approved methodologies.

All continuously measured parameters (flow and CH₄ fraction of LFG, flaring temperature, amount of exported & imported electricity, etc.) were recorded electronically via a data logger such as Citect MMI and Honeywell Hyperion DCS, which have the capacity to aggregate and print collected data at fixed frequencies.

The data are measured and collected at each control system of the 50MW power plant, central flaring facility and internal electricity monitoring system. Data aggregation and emission reductions calculation has been made on a daily basis. The result of calculation is reported monthly and raw data are archived every two months. In order to inspect the status of capturing facility, composition, flow, pressure and temperature of each capturing facility checked on daily basis. Gas flow and other related parameters are recorded electronically on hourly basis. Every recorded electronic data are also recorded in handwritten form.



Figure 4 The control room of 50MW power plant

LFG flow

Total of 9 continuous flow meters were installed for monitoring LFG flow. Captured LFG is monitored by FT-01 & FT-02, which installed at the end of the 1st and 2nd landfill gas recovery line respectively. Combusted LFG is checked by FT-04 ~ 10, where FT-04 ~ 09 is for each flare (total of 6) and FT-10 is for 50MW power plant. Several temperature and pressure meters were also installed in order to check the system stability and (or) to convert unit from ACM (Actual Cubic Meter) to NCM (Normal Cubic Meter).

Related meters

ID	Serial Number	Manufacturer	Description	Remarks
FT-01	27051601	EPI	1 st landfill	Thermal mass type
FT-02	9C03490109D	Endress Hauser	2 nd landfill	V-cone type
FT-04	28031701	EPI	#1 flare	Thermal mass type
FT-05	28012903	EPI	#2 flare	
FT-06	28042402	EPI	#3 flare	
FT-07	28042401	EPI	#4 flare	
FT-08	28012904	EPI	#5 flare	
FT-09	28031702	EPI	#6 flare	
FT-10	1378	GE Panametrics	50MW power plant	Ultrasonic type
700A	28031703	EPI	Reserve meter for all EPI meters	Thermal mass type
900A	26050201	EPI	Reserve meter for all EPI meters	
FT-03	28012905	EPI	Reserve meter for all EPI meters	
TT-02	WS1025016	Wise	Temperature of LFG captured from 2 nd landfill	For system stability check and (or) unit conversion from ACM(Actual Cubic Meter) to NCM(Normal Cubic Meter), if needed
TT-03	A6B3331T	Fuji Electronics	Temperature of LFG which fed to overall flaring facility.	
TT-10	WS1025017	WISE	Temperature of LFG which fed to 50MW power plant	
PT-02	3940244	AUTROL	Pressure of LFG captured from 2 nd landfill	
PT-05	A4J4159T	Fuji Electronics	Pressure of LFG which fed to overall flaring facility	
PT-10	WS1025015	WISE	Pressure of LFG which fed to 50MW power plant	

CH₄ fraction

The fraction of CH₄ in LFG was measured by using continuous NDIR type infrared gas analyzers (total of 2). Data were recorded every hour in electronic method. Only CH₄ is considered as GHG emission in the CDM monitoring procedure.

Related meters

ID	Serial Number	Manufacturer	Description	Remarks
GA-01	A2B4359T	Fuji Electronics	1 st landfill	
GA-02	A4J0063T	Fuji Electronics	2 nd landfill	

Electricity exported & imported

The amount of imported electricity which used for LFG capturing and flaring was recorded electronically by internal electricity surveillance system of SLC. Imported electricity for 50MW power plant was monitored by watt-hour meter which managed and monthly invoiced by Korea Electric Power Corporation (KEPCO).

EL_{EX,LPG}, mentioned in PDD B.7.1 as total amount of electricity exported out of the project boundary, is a typing error of EL_{EX,LFG}. The amount of exported electricity was recorded electronically by watt-hour meter which is connected to Korea Power Exchange (KPX) and cross-checked by relative documents from KPX.

Related meters

ID	Serial Number	Manufacturer	Description	Remarks
WH-01	PR-0411A055-02	Seochang Electric Communication	Exported electricity (50MW power plant)	Cross-checked with KPX document
WH-05	1104001	NEOPIS	Imported electricity (2 nd landfill blower facility)	
WH-06	10JAJ073(24)	DIK	Imported electricity (LFG mgt. centre)	

Flare efficiency

Applied methodology ACM0001 (Version 04) stipulates that efficiency of flare (FE) shall be measured in a yearly basis if enclosed flare is used and in case the yearly measurement of FE is not performed, default value of 90% should be used.

Considering the operational condition, the content analysis of each flare's exhaust gas was conducted by 3rd party (Institute of Industrial Pollution Co. Ltd) in 01/08/2014, 17/08/2014, 29/12/2014, 02/04/2015 and 06/07/2015.

	Date of analysis	Result of analysis(ppm CH ₄)	FE application over 600°C
#1 Flare	01/08/2014 (at 600°C)	38.03	99.9%
	29/12/2014 (at 600°C)	5.17	
	02/04/2015 (at 600°C)	15.16	
	06/07/2015 (at 600°C)	6.76	
#2 Flare	17/08/2014 (at 600°C)	3.99	99.9%
	29/12/2014 (at 600°C)	33.76	
	02/04/2015 (at 600°C)	5.17	
	06/07/2015 (at 600°C)	2.44	
#3 Flare	17/08/2014 (at 600°C)	7.12	99.9%
	29/12/2014 (at 600°C)	2.83	
	02/04/2015 (at 600°C)	17.74	
	06/07/2015 (at 600°C)	12.44	
#4 Flare	01/08/2014 (at 600°C)	60.26	99.9%
	29/12/2014 (at 600°C)	10.21	
	02/04/2015 (at 600°C)	20.10	
	06/07/2015 (at 600°C)	6.92	
#5 Flare	01/08/2014 (at 600°C)	21.33	99.9%
	29/12/2014 (at 600°C)	179.66	
	02/04/2015 (at 600°C)	17.43	
	06/07/2015 (at 600°C)	37.00	
#6 Flare	01/08/2014 (at 600°C)	44.67	99.9%
	29/12/2014 (at 600°C)	14.19	
	02/04/2015 (at 600°C)	14.49	
	06/07/2015 (at 600°C)	50.80	

Table 5 Summary of flare exhaust gas analysis results

In ACM0001 (Version 04), FE should be calculated by analyzing methane contents of the flare emissions at least on a yearly basis for enclosed flares. Considering the frequency stipulated in methodology, above FEs are appropriately applied. Furthermore, as explained earlier, FE of 0% applied when the temperature is below 600°C even the above results provide that there were no methane at 600°C of flaring temperature and this is conservative approach.

Related meters

ID	Serial Number	Manufacturer	Description	Remarks
TC-01	012902	WOO JIN	Flaring temperature of #1 flare	
TC-02	012905	WOO JIN	Flaring temperature of #2 flare	
TC-03	012908	WOO JIN	Flaring temperature of #3 flare	

TC-04	012910	WOO JIN	Flaring temperature of #4 flare	
TC-05	012912	WOO JIN	Flaring temperature of #5 flare	
TC-06	012915	WOO JIN	Flaring temperature of #6 flare	

Calibration of meters

All meters were calibrated by authorized 3rd party or manufacturer. In case the calibration was made after the required calibration frequency, paragraph 395 of "Clean Development Mechanism Validation and Verification Standard (Version 09.0)" was applied during the corresponding period. Detailed information is as follows;

ID	Date of Last Calibration	Calibration Due Date	Date of Calibration	Remarks
FT-01	13/05/2013	12/05/2014	03/07/2014	P 395 (a) applied from "calibration due date" to "date of calibration".
FT-02	01/10/2013	30/09/2014	14/10/2014	P 395 (a) applied from "calibration due date" to "date of calibration".
FT-04	16/08/2013	15/08/2014	03/07/2014	
FT-05	16/08/2013	15/08/2014	20/08/2014	P 395 (a) applied from "calibration due date" to "date of calibration".
FT-06	13/05/2013	12/05/2014	03/07/2014	P 395 (a) applied from "calibration due date" to "date of calibration".
FT-07	15/10/2013	14/10/2014	06/10/2014	
FT-08	16/08/2013	15/08/2014	03/07/2014	
FT-09	15/10/2013	14/10/2014	08/10/2014	
FT-10	19/07/2013	18/07/2014	15/10/2014	P 395 (a) applied from "calibration due date" to "date of calibration".
700A	15/10/2013	14/10/2014	20/08/2014	
900A	16/08/2013	15/08/2014	03/07/2014	
FT-03	15/10/2013	14/10/2014	20/08/2014	
GA-01	30/09/2013	29/09/2014	15/10/2014	P 395 (a) applied from "calibration due date" to "date of calibration".
GA-02	30/09/2013	29/09/2014	15/10/2014	
TT-02	26/09/2013	25/09/2014	24/10/2014	
TT-03	26/09/2013	25/09/2014	24/10/2014	
TT-10	26/09/2013	25/09/2014	24/10/2014	
PT-02	26/09/2013	25/09/2014	31/10/2014	
PT-05	11/10/2013	10/10/2014	23/10/2014	
PT-10	26/09/2013	25/09/2014	23/10/2014	
WH-01	09/04/2014	08/04/2018		
WH-05	14/02/2011	12/02/2018		
WH-06	05/04/2011	03/04/2018		
TC-01	27/11/2013	26/11/2014	31/10/2014	
TC-02	27/11/2013	26/11/2014	31/10/2014	
TC-03	27/11/2013	26/11/2014	31/10/2014	
TC-04	27/11/2013	26/11/2014	31/10/2014	
TC-05	27/11/2013	26/11/2014	06/11/2014	
TC-06	27/11/2013	26/11/2014	06/11/2014	

Fossil fuel usage

The purchased amount of LPG, which evidenced by invoices from 2011 to 2015, was regarded as LPG usage.

Data Management

The accumulated data from control station was analyzed for the verification of this project. All required guides were stated in SLC's internal procedure. These include data handling protocol and monitoring procedure, etc.

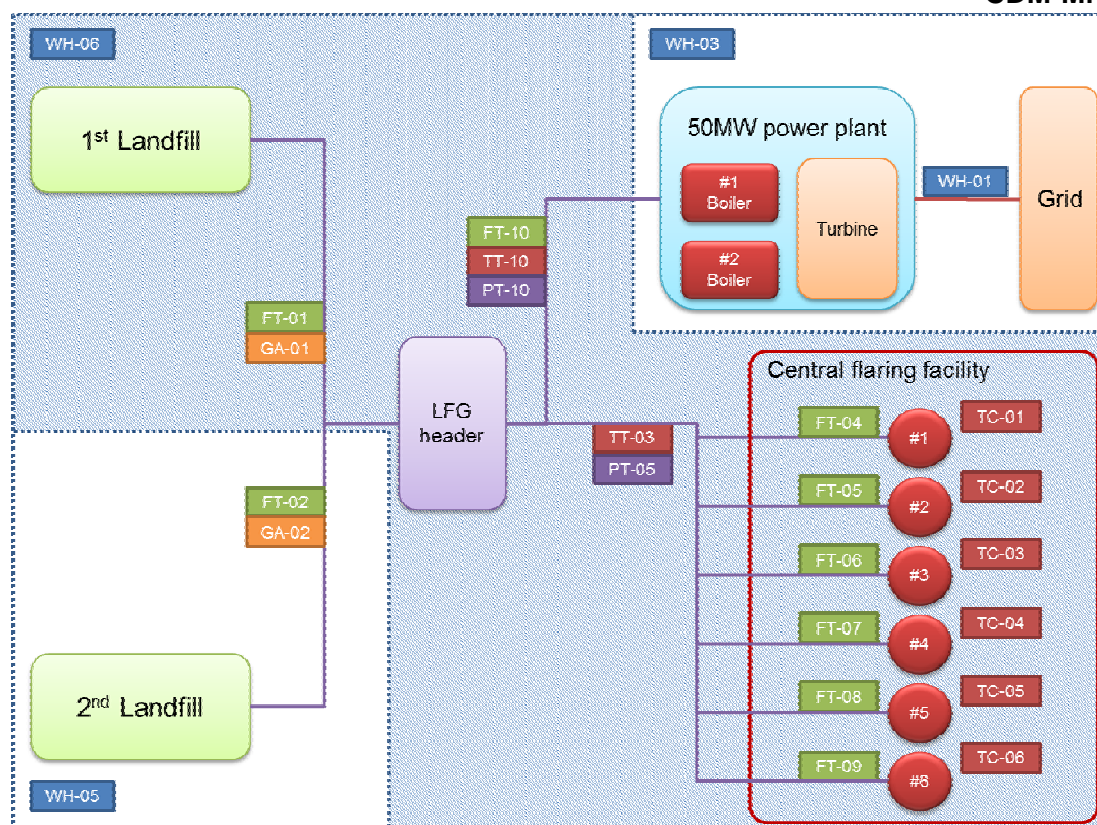


Figure 5 Line Diagram of Monitoring Points

Organizational Structure

SLC is responsible for all CDM monitoring related works. It supervises the private operator of 50MW power plant, Ecoenergy, which also commissioned to operate central flaring facility and LFG capturing system of 1st and 2nd landfill from SLC.

Ecoenergy is responsible for operation of 50MW power plant, central flaring facility and LFG capturing system of 1st and 2nd landfill.

Roles and Responsibilities of Personnel

Organization	Department	Position	Name	Roles
SLC	President		Jae Yong Song	Approval of monthly calculation result & monitoring report (01/07/2014~17/03/2015)
			Yong Jae Lee	Approval of monthly calculation result & monitoring report (18/03/2015~21/04/2015)
			Jae Hyun Lee	Approval of monthly calculation result & monitoring report (22/04/2015~)
	Executive Director (Project Development)		Nak Bin Kim	Approval calculation result & monitoring report
	Climate Change Business Division	General Manager	Hyeon Ju Kim	Approval calculation result & monitoring report (13/01/2014~13/08/2014)
			Lae Bong Han	Approval calculation result & monitoring report (14/08/2014~05/05/2015)

			Neng Jae Lee	Approval calculation result & monitoring report (06/05/2015~30/06/2015)
		Staff	WonGu Hwang	Data analysis, calculation & arrangement of monitoring report
			ByungChul Shin	Data aggregation & facility management (13/01/2014~06/05/2015)
Ecoenergy	CEO		DongIl Cho	Management & operation of 50MW power plant & central flaring facility
	Power Generation Div.	Team manager	KyungYong Song	Management & operation of 50MW power plant
	Facility Management Centre	Part manager	YongMin Kim	Management & operation of central flaring facility

Table 6 Major responsible personnel and its rules

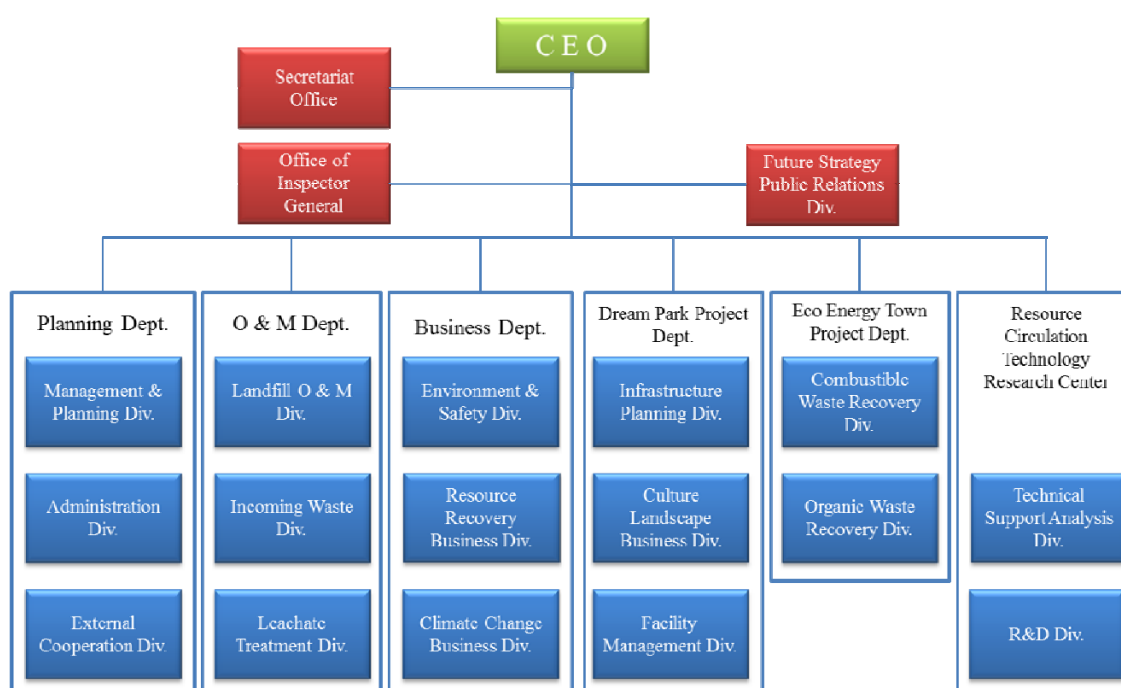


Figure 6 Organization Chart of SLC

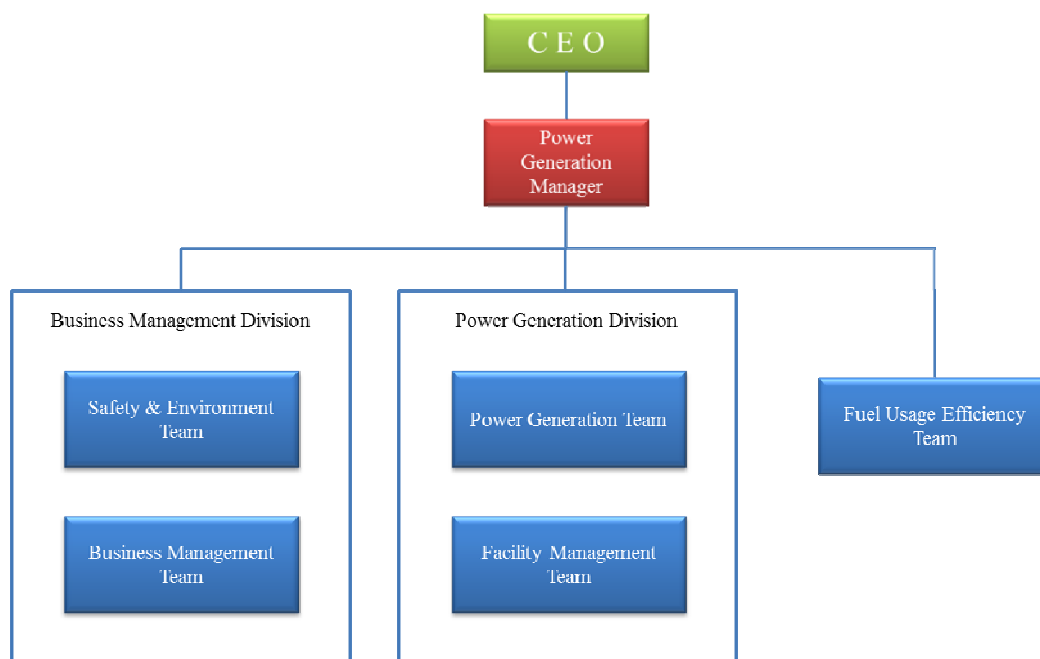


Figure 7 Organization Chart of Ecoenergy

Emergency Procedures

In order to handle emergency situations, SLC prepares internal 'Emergency Procedures', which updated every year to compensate changes of site conditions.

For emergency in 50MW power plant, Ecoenergy includes emergency plan in its 'Maintenance & Operational Plan' which also updated and reported to SLC on a yearly basis

	Fire	LFG leakage
Duty	Prevent fire expansion and extinguishing	Prevent fire and (or) explosion
Report system	Discoverer -> Managing partner -> General manager -> President	Discoverer -> General manager -> Executive Director -> President
Countermeasures	<ul style="list-style-type: none"> - Use fire extinguisher located nearby road - Stop LFG capture - Use watering cart - Use soil to prevent O₂ supply - Contact neighbouring fire station (Geom am 032-568-7119, Seo bu 032-565-8119) 	<ul style="list-style-type: none"> - Stop LFG capture - Isolate leaking part from other capturing pipeline - Isolate leaking part from flammable things - Contact neighbouring fire station (Geom am 032-568-7119, Seo bu 032-565-8119) if needed
Check frequency	Per day	Per month

Table 7 Typical emergency cases and its countermeasures

SECTION D. Data and parameters**D.1. Data and parameters fixed ex ante or at renewal of crediting period***(Copy this table for each piece of data and parameter)*

Data/parameter:	GWP_{CH₄}
Unit	tCO₂/tCH₄
Description	Global warming potential for methane (CH ₄)
Source of data	Default value in IPCC & ACM0001 (Version 04)
Value(s) applied)	25
Choice of data or measurement methods and procedures	From IPCC GWP data
Purpose of data	Calculation of emission reductions
Additional comments	25 for the second commitment period.

Data/parameter:	AF
Unit	%
Description	Adjustment factor for calculating baseline emission.
Source of data	PDD
Value(s) applied)	61.15
Choice of data or measurement methods and procedures	This value was calculated in PDD and fixed during entire crediting period.
Purpose of data	Calculation of emission reductions
Additional comments	Ex-ante calculation in accordance with ACM0001 (Version 04) for entire crediting period

Data/parameter:	EF
Unit	tCO₂/MWh
Description	Grid CO ₂ emission factor
Source of data	PDD
Value(s) applied)	0.5666
Choice of data or measurement methods and procedures	This value was calculated in PDD and fixed during entire crediting period.
Purpose of data	Calculation of baseline emissions
Additional comments	Ex-ante calculation in accordance with ACM0002 (Version 06) for entire crediting period.

Data/parameter:	D_{CH₄}
Unit	tCH₄/Nm³
Description	Density of methane
Source of data	Default value in ACM0001 (Version 04)
Value(s) applied)	0.0007168
Choice of data or measurement methods and procedures	CH ₄ density at 0°C, 1 atmospheric pressure.
Purpose of data	Calculation of baseline emissions
Additional comments	N/A

D.2. Data and parameters monitored

(Copy this table for each piece of data and parameter)

Data / Parameter:	LFG_{total,y}																																																								
Unit:	Nm³																																																								
Description:	Total amount of landfill gas captured in year y																																																								
Measured/calculated/default:	Measured by flow meters (total of 2)																																																								
Source of data:	MMI data; The two flow meters, FT-01 and FT-02 are continuously measure the captured LFG from 1 st and 2 nd landfill.																																																								
Value(s) of monitored parameter:	<table border="1"> <thead> <tr> <th></th><th>Measured Value</th><th>Applied Value</th><th>Remarks</th></tr> </thead> <tbody> <tr><td>Jul 2014</td><td>22,773,052.0</td><td>22,223,826.3</td><td></td></tr> <tr><td>Aug</td><td>24,703,563.0</td><td>23,760,534.1</td><td></td></tr> <tr><td>Sep</td><td>13,434,247.0</td><td>23,143,204.0</td><td></td></tr> <tr><td>Oct</td><td>15,771,534.0</td><td>21,303,564.2</td><td></td></tr> <tr><td>Nov</td><td>21,423,559.0</td><td>22,749,704.3</td><td></td></tr> <tr><td>Dec</td><td>24,055,135.0</td><td>22,680,017.3</td><td></td></tr> <tr><td>Jan 2015</td><td>23,862,695.0</td><td>22,928,508.3</td><td></td></tr> <tr><td>Feb</td><td>21,721,126.0</td><td>19,050,892.5</td><td></td></tr> <tr><td>Mar</td><td>23,790,867.0</td><td>12,999,921.9</td><td></td></tr> <tr><td>Apr</td><td>22,760,100.0</td><td>21,518,554.8</td><td></td></tr> <tr><td>May</td><td>24,463,047.0</td><td>23,309,584.4</td><td></td></tr> <tr><td>Jun</td><td>18,403,460.0</td><td>19,326,116.4</td><td></td></tr> <tr><td>Total</td><td>257,162,385.0</td><td>254,994,428.5</td><td></td></tr> </tbody> </table> <p>For applied value, please refer to the worksheet of '04_LFG' of 'SLC CDM Data Workbook Phase 10'.</p> <p>For measured value, please refer to the worksheet of '04_0_LFG(Raw data)' of 'SLC CDM Data Workbook Phase 10'</p>		Measured Value	Applied Value	Remarks	Jul 2014	22,773,052.0	22,223,826.3		Aug	24,703,563.0	23,760,534.1		Sep	13,434,247.0	23,143,204.0		Oct	15,771,534.0	21,303,564.2		Nov	21,423,559.0	22,749,704.3		Dec	24,055,135.0	22,680,017.3		Jan 2015	23,862,695.0	22,928,508.3		Feb	21,721,126.0	19,050,892.5		Mar	23,790,867.0	12,999,921.9		Apr	22,760,100.0	21,518,554.8		May	24,463,047.0	23,309,584.4		Jun	18,403,460.0	19,326,116.4		Total	257,162,385.0	254,994,428.5	
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Coverage	LFG flow of 1 st landfill from 10/07/2014 to 28/05/2015																																																								
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Date of last calibration	15/10/2013, 20/08/2014																																																								
Validity	Valid from 15/10/2013 to 19/08/2015.																																																								

Monitoring equipment:	Item name	FT-03
	Coverage	LFG flow of 1 st landfill(reserve) from 28/05/2015 to 30/06/2015
	Type	Thermal mass type flow meter
	Accuracy class	±[1% RDG +(0.5%FS + 0.02%/°C)]
	Serial number	28012905
	Calibration frequency	1 year
	Date of last calibration	15/10/2013, 20/08/2014
	Validity	Valid from 15/10/2013 to 19/08/2015
	Item name	FT-02
	Coverage	LFG flow of 2 nd landfill from 01/07/2014 to 22/10/2014 and from 04/11/2014 to 30/06/2015
	Type	V-cone type flow meter
	Accuracy class	±0.075%
	Serial number	9C03490109D
	Calibration frequency	1 year
	Date of last calibration	01/10/2013, 23/10/2014
	Validity	Valid from 01/10/2013 to 30/09/2014 and from 23/10/2014 to 22/10/2015 In order to deal with the uncertainty caused by delayed calibration, -0.075% of maximum permissible error applied in accordance with “Validation and Verification Standard(version 09.0)” from 1/10/2014 to 22/10/2014.
	Measuring/reading/recording frequency:	Continuous measuring & reading, hourly recording
	Calculation method (if applicable):	(FT-01) or (700A) or (FT-03) + (FT-02)
	QA/QC procedures:	State-check is made by responsible staff of SLC on a daily basis Regular maintenance is made by staff of Ecoenergy Periodically calibrated by approved 3 rd party authority or manufacturer
Purpose of data:	Calculation of baseline emissions	
Additional comment:		

Data/parameter:	LFG_{flare,y}
Unit	Nm³
Description	Amount of landfill gas which flared in year y
Measured/calculated/default	Measured by flow meters (total of 6)
Source of data	MMI data; The six flow meters, FT-04 to FT-09 are continuously measure the LFG flow of each flare

Value(s) of monitored parameter	Measured Value	Applied Value	Remarks
Jul 2014	12,892,758.0	12,610,234.0	
Aug	9,512,197.0	9,506,595.9	
Sep	13,038,511.0	13,038,511.0	
Oct	10,673,867.0	10,673,867.0	
Nov	7,503,252.0	7,503,252.0	
Dec	8,288,882.0	8,235,677.0	
Jan 2015	5,650,186.0	5,636,641.0	
Feb	6,564,433.0	6,564,433.0	
Mar	8,274,945.0	8,273,099.0	
Apr	7,733,168.0	7,733,168.0	
May	2,487,560.0	2,487,560.0	
Jun	5,129,873.0	5,129,873.0	
Total	97,749,632.0	97,392,910.9	

For applied value, please refer to the worksheet of '07_LFG_flare' of 'SLC CDM Data Workbook Phase 10'

For measured value, please refer to the worksheet of '07_0_LFG_flare(Raw data)' of 'SLC CDM Data Workbook Phase 10'

Item name	FT-04
Coverage	LFG flow of #1 flare from 01/09/2014 to 28/05/2015
Type	Thermal mass type flow meter
Accuracy class	$\pm[1\% \text{ RDG} + (0.5\% \text{ FS} + 0.02\% / ^\circ\text{C})]$
Serial number	28031701
Calibration frequency	1 year
Date of last calibration	16/08/2013, 03/07/2014
Validity	Valid from 16/08/2013 to 02/07/2015

Item name	FT-05
Coverage	LFG flow of #2 flare from 01/07/2014 to 10/07/2014 and from 01/09/2014 to 30/06/2015
Type	Thermal mass type flow meter
Accuracy class	$\pm[1\% \text{ RDG} + (0.5\% \text{ FS} + 0.02\% / ^\circ\text{C})]$
Serial number	28012903
Calibration frequency	1 year
Date of last calibration	16/08/2013, 20/08/2014
Validity	Valid from 16/08/2013 to 15/08/2014 and from 20/08/2014 to 19/08/2015 In order to deal with the uncertainty caused by delayed calibration, -0.023% of maximum permissible error applied in accordance with "Validation and Verification Standard(version 09.0)" from 16/08/2014 to 19/08/2014.

Item name	FT-04
Coverage	LFG flow of #2 flare(reserve) from 10/07/2014 to 01/09/2014
Type	Thermal mass type flow meter
Accuracy class	$\pm[1\% \text{ RDG} + (0.5\% \text{ FS} + 0.02\% / ^\circ\text{C})]$
Serial number	28031701
Calibration frequency	1 year
Date of last calibration	16/08/2013, 03/07/2014
Validity	Valid from 16/08/2013 to 02/07/2015

Monitoring equipment:

Item name	FT-06
Coverage	LFG flow of #3 flare from 22/10/2014 to 28/05/2015
Type	Thermal mass type flow meter
Accuracy class	$\pm[1\% \text{ RDG} + (0.5\% \text{ FS} + 0.02\% / ^\circ\text{C})]$
Serial number	28042402
Calibration frequency	1 year
Date of last calibration	13/05/2013, 03/07/2014
Validity	Valid from 03/07/2014 to 02/07/2015

Item name	FT-03
Coverage	LFG flow of #3 flare(reserve) from 18/09/2014 to 22/10/2014 (temporally installed in order to prevent measuring gap caused by technical problem)
Type	Thermal mass type flow meter
Accuracy class	$\pm[1\% \text{ RDG} + (0.5\% \text{ FS} + 0.02\% / ^\circ\text{C})]$
Serial number	28012905
Calibration frequency	1 year
Date of last calibration	15/10/2013, 20/08/2014
Validity	Valid from 15/10/2013 to 19/08/2015

Item name	FT-07
Coverage	LFG flow of #4 flare from 01/07/2014 to 10/07/2014 and from 22/10/2014 to 22/06/2015
Type	Thermal mass type flow meter
Accuracy class	$\pm[1\% \text{ RDG} + (0.5\% \text{ FS} + 0.02\% / ^\circ\text{C})]$
Serial number	28042401
Calibration frequency	1 year
Date of last calibration	15/10/2013, 06/10/2014
Validity	Valid from 15/10/2013 to 05/10/2015

Item name	FT-06
Coverage	LFG flow of #4 flare(reserve) from 10/07/2014 to 22/10/2014
Type	Thermal mass type flow meter
Accuracy class	$\pm[1\% \text{ RDG} + (0.5\% \text{ FS} + 0.02\% / ^\circ\text{C})]$
Serial number	28042402
Calibration frequency	1 year
Date of last calibration	03/07/2014
Validity	Valid from 03/07/2014 to 02/07/2015

Item name	FT-08
Coverage	LFG flow of #5 flare from 10/07/2014 to 28/05/2015
Type	Thermal mass type flow meter
Accuracy class	$\pm[1\% \text{ RDG} + (0.5\% \text{ FS} + 0.02\% / ^\circ\text{C})]$
Serial number	28012904
Calibration frequency	1 year
Date of last calibration	16/08/2013, 03/07/2014
Validity	Valid from 16/08/2013 to 02/07/2015

Monitoring equipment:	Item name	FT-09
	Coverage	LFG flow of #5 flare(reserve) from 01/07/2014 to 10/07/2014 and from 28/05/2015 to 30/06/2015
	Type	Thermal mass type flow meter
	Accuracy class	$\pm[1\% \text{ RDG} + (0.5\% \text{ FS} + 0.02\% / ^\circ\text{C})]$
	Serial number	28031702
	Calibration frequency	1 year
	Date of last calibration	15/10/2013, 08/10/2014
	Validity	Valid from 15/10/2013 to 07/10/2015
	Item name	FT-09
	Coverage	LFG flow of #6 flare from 22/10/2014 to 28/05/2015
	Type	Thermal mass type flow meter
	Accuracy class	$\pm[1\% \text{ RDG} + (0.5\% \text{ FS} + 0.02\% / ^\circ\text{C})]$
	Serial number	28031702
	Calibration frequency	1 year
	Date of last calibration	15/10/2013, 08/10/2014
	Validity	Valid from 15/10/2013 to 07/10/2015
	Item name	700A
	Coverage	LFG flow of #6 flare (reserve) from 18/09/2014 to 22/10/2014
	Type	Thermal mass type flow meter
	Accuracy class	$\pm[1\% \text{ RDG} + (0.5\% \text{ FS} + 0.02\% / ^\circ\text{C})]$
	Serial number	28031703
	Calibration frequency	1 year
	Date of last calibration	15/10/2013, 20/08/2014
	Validity	Valid from 15/10/2013 to 19/08/2015.
	Item name	900A
	Coverage	LFG flow of #6 flare (reserve) from 10/07/2014 to 01/09/2014
	Type	Thermal mass type flow meter
	Accuracy class	$\pm[1\% \text{ RDG} + (0.5\% \text{ FS} + 0.02\% / ^\circ\text{C})]$
	Serial number	26050201
	Calibration frequency	1 year
	Date of last calibration	16/08/2013, 03/07/2014
	Validity	Valid from 16/08/2013 to 03/07/2015.
	Item name	FT-07
	Coverage	LFG flow of #6 flare (reserve) from 22/06/2015 to 30/06/2015
	Type	Thermal mass type flow meter
	Accuracy class	$\pm[1\% \text{ RDG} + (0.5\% \text{ FS} + 0.02\% / ^\circ\text{C})]$
	Serial number	28042401
	Calibration frequency	1 year
	Date of last calibration	15/10/2013, 06/10/2014
	Validity	Valid from 15/10/2013 to 05/10/2015
Measuring/reading/recording frequency:	Continuous measuring & reading, hourly recording	
Calculation method (if applicable):	(FT-04) + (FT-05 or FT-04) + (FT-06 or FT-03) + (FT-07 or FT-06) + (FT-08 or FT-09) + (FT-09 or 700A or 900A or FT-07)	
QA/QC procedures:	State-check is made by responsible staff of SLC on a daily basis Regular maintenance is made by staff of Ecoenergy Periodically calibrated by approved 3 rd party authority or manufacturer	

Purpose of data:	Calculation of baseline emissions
Additional comments:	

Data/parameter:	LFG_{electricity,y}																																																								
Unit	Nm³																																																								
Description	Amount of landfill gas which fed to 50MW power plant in year y																																																								
Measured/calculated/default	Measured by flow meter																																																								
Source of data	DCS data: The flow meter, FT-10 is continuously measure the LFG flow of the 50MW power plant																																																								
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Monitoring equipment:	<table> <tr><td>Item name</td><td>FT-10</td></tr> <tr><td>Coverage</td><td>LFG flow of 50MW power plant</td></tr> <tr><td>Type</td><td>Ultrasonic type flow meter</td></tr> <tr><td>Accuracy class</td><td>±1%</td></tr> <tr><td>Serial number</td><td>1378</td></tr> <tr><td>Calibration frequency</td><td>1 year</td></tr> <tr><td>Date of last calibration</td><td>19/07/2013, 15/10/2014</td></tr> <tr><td>Validity</td><td>Valid from 19/07/2013 to 18/07/2014 and from 15/10/2014 to 14/10/2015 In order to deal with the uncertainty caused by delayed calibration, -1.000% of maximum permissible error applied in accordance with "Validation and Verification Standard(version 09.0)" from 19/07/2014 to 14/10/2014.</td></tr> </table>	Item name	FT-10	Coverage	LFG flow of 50MW power plant	Type	Ultrasonic type flow meter	Accuracy class	±1%	Serial number	1378	Calibration frequency	1 year	Date of last calibration	19/07/2013, 15/10/2014	Validity	Valid from 19/07/2013 to 18/07/2014 and from 15/10/2014 to 14/10/2015 In order to deal with the uncertainty caused by delayed calibration, -1.000% of maximum permissible error applied in accordance with "Validation and Verification Standard(version 09.0)" from 19/07/2014 to 14/10/2014.																																								
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Purpose of data:	Calculation of baseline emissions																																																								
Additional comments:																																																									

Data/parameter:	W_{CH₄,y}																																																								
Unit	% (Nm³ CH₄ / Nm³ LFG)																																																								
Description	Average methane fraction of LFG in year y																																																								
Measured/calculated/default	Measured by methane gas analyzers (total of 2)																																																								
Source of data	MMI data: The methane gas analyzers, GA-01 and GA-02 are continuously measure the methane concentration of LFG from 1 st and 2 nd landfill																																																								
Value(s) of monitored parameter	<table border="1"> <thead> <tr> <th></th><th>Measured Value</th><th>Applied Value</th><th>Remarks</th></tr> </thead> <tbody> <tr><td>Jul 2013</td><td>45.6</td><td>45.6</td><td></td></tr> <tr><td>Aug</td><td>47.1</td><td>46.4</td><td></td></tr> <tr><td>Sep</td><td>39.5</td><td>43.1</td><td></td></tr> <tr><td>Oct</td><td>41.2</td><td>44.3</td><td></td></tr> <tr><td>Nov</td><td>50.9</td><td>50.9</td><td></td></tr> <tr><td>Dec</td><td>48.3</td><td>49.6</td><td></td></tr> <tr><td>Jan 2014</td><td>47.0</td><td>46.9</td><td></td></tr> <tr><td>Feb</td><td>47.2</td><td>46.7</td><td></td></tr> <tr><td>Mar</td><td>36.2</td><td>42.6</td><td></td></tr> <tr><td>Apr</td><td>45.3</td><td>44.8</td><td></td></tr> <tr><td>May</td><td>44.1</td><td>44.0</td><td></td></tr> <tr><td>Jun</td><td>31.7</td><td>41.5</td><td></td></tr> <tr><td>Average</td><td>43.7</td><td>45.5</td><td></td></tr> </tbody> </table> <p>For applied value, please refer to the worksheet of '05_wCH4' of 'SLC CDM Data Workbook Phase 10'.</p> <p>For measured value, please refer to the worksheet of '05_0_wCH4(Raw data)' of 'SLC CDM Data Workbook Phase 10'.</p>		Measured Value	Applied Value	Remarks	Jul 2013	45.6	45.6		Aug	47.1	46.4		Sep	39.5	43.1		Oct	41.2	44.3		Nov	50.9	50.9		Dec	48.3	49.6		Jan 2014	47.0	46.9		Feb	47.2	46.7		Mar	36.2	42.6		Apr	45.3	44.8		May	44.1	44.0		Jun	31.7	41.5		Average	43.7	45.5	
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Average	43.7	45.5																																																							
Monitoring equipment:	<table border="1"> <tr><td>Item name</td><td>GA-01</td></tr> <tr><td>Coverage</td><td>CH₄ fraction of LFG at 1st landfill from 01/07/2014 to 30/06/2015</td></tr> <tr><td>Type</td><td>Infrared gas analyser</td></tr> <tr><td>Accuracy class</td><td>Linearity: ±1% of FS Repeatability: ±0.5% of FS</td></tr> <tr><td>Serial number</td><td>A2B4359T</td></tr> <tr><td>Calibration frequency</td><td>1 year</td></tr> <tr><td>Date of last calibration</td><td>30/09/2013, 15/10/2014</td></tr> <tr><td>Validity</td><td>Valid from 30/09/2013 to 29/09/2014 and from 15/10/2014 to 14/10/2015 In order to deal with the uncertainty caused by delayed calibration, -1.000% of maximum permissible error applied in accordance with "Validation and Verification Standard(version 09.0)" from 30/09/2014 to 14/10/2014.</td></tr> </table>	Item name	GA-01	Coverage	CH ₄ fraction of LFG at 1 st landfill from 01/07/2014 to 30/06/2015	Type	Infrared gas analyser	Accuracy class	Linearity: ±1% of FS Repeatability: ±0.5% of FS	Serial number	A2B4359T	Calibration frequency	1 year	Date of last calibration	30/09/2013, 15/10/2014	Validity	Valid from 30/09/2013 to 29/09/2014 and from 15/10/2014 to 14/10/2015 In order to deal with the uncertainty caused by delayed calibration, -1.000% of maximum permissible error applied in accordance with "Validation and Verification Standard(version 09.0)" from 30/09/2014 to 14/10/2014.																																								
Item name	GA-01																																																								
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Accuracy class	Linearity: ±1% of FS Repeatability: ±0.5% of FS																																																								
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Monitoring equipment:	Item name	GA-02
	Coverage	CH ₄ fraction of LFG at 2 nd landfill from 01/07/2014 to 30/06/2015
	Type	Infrared gas analyzer
	Accuracy class	Linearity: ±1% of FS Repeatability: ±0.5% of FS
	Serial number	A4J0063T
	Calibration frequency	1 year
	Date of last calibration	30/09/2013, 15/10/2014
	Validity	Valid from 30/09/2013 to 29/09/2014 and from 15/10/2014 to 14/10/2015 In order to deal with the uncertainty caused by delayed calibration, -1.000% of maximum permissible error applied in accordance with "Validation and Verification Standard(version 09.0)" from 30/09/2014 to 14/10/2014.
Measuring/reading/recording frequency:	Continuous measuring & reading, hourly recording	
Calculation method (if applicable):	$\frac{(FT - 01) \times (GA - 01) + (FT - 02) \times (GA - 02)}{LFG_{total}}$	
QA/QC procedures:	State-check is made by responsible staff of SLC on a daily basis Regular maintenance is made by staff of Ecoenergy Periodically calibrated by approved 3 rd party authority	
Purpose of data:	Calculation of baseline emissions	
Additional comments:		

Data/parameter:	FE	
Unit	%	
Description	Efficiency of flare	
Measured/calculated/default	Calculated based on laboratory analysis result	
Source of data	Test report made by 3 rd party authority which mentioning the result of exhaust gas analysis for each flares. Thermocouples installed in order to measure flaring temperature in each flares (total of 6)	
Value(s) of monitored parameter	0% or 99.9% - 0% , in case flaring temperature is below 600°C - 99.9% , in case flaring temperature is above 600°C and the result of exhaust gas analysis is appropriate (below 250 ppm CH ₄).	
Monitoring equipment:	Item name	FE
	Coverage	Flaring efficiency of each flares
	Type	Accredited 3 rd party laboratory analysis result
	Accuracy class	-
	Serial number	Certification No. AI1409058, AI1410008, AI1412023, AI1503028, AI1506031 * For detailed results, please refer to Table 5 in page 19
	Calibration frequency	-
	Date of last calibration	-
	Validity	

Monitoring equipment:

Item name	TC-01
Coverage	Flaring temperature of #1 flare from 01/07/2014 to 22/10/2014 and from 04/11/2014 to 30/06/2015
Type	Thermocouple, k-type
Accuracy class	$\pm 0.4 \%$
Serial number	012902
Calibration frequency	1 year
Date of last calibration	27/11/2013, 31/10/2014
Validity	Valid from 27/11/2013 to 30/10/2015.

Item name	TC-02
Coverage	Flaring temperature of #2 flare from 01/07/2014 to 22/10/2014 and from 04/11/2014 to 30/06/2015
Type	Thermocouple, k-type
Accuracy class	$\pm 0.4 \%$
Serial number	012905
Calibration frequency	1 year
Date of last calibration	27/11/2013, 31/10/2014
Validity	Valid from 27/11/2013 to 30/10/2015.

Item name	TC-03
Coverage	Flaring temperature of #3 flare from 01/07/2014 to 22/10/2014 and from 13/11/2014 to 30/06/2015
Type	Thermocouple, k-type
Accuracy class	$\pm 0.4 \%$
Serial number	012908
Calibration frequency	1 year
Date of last calibration	27/11/2013, 31/10/2014
Validity	Valid from 27/11/2013 to 30/10/2015.

Item name	TC-04
Coverage	Flaring temperature of #4 flare from 01/07/2014 to 22/10/2014 and from 13/11/2014 to 30/06/2015
Type	Thermocouple, k-type
Accuracy class	$\pm 0.4 \%$
Serial number	012910
Calibration frequency	1 year
Date of last calibration	27/11/2013, 31/10/2014
Validity	Valid from 27/11/2013 to 30/10/2015.

Item name	TC-05
Coverage	Flaring temperature of #5 flare from 01/07/2014 to 4/11/2014 and from 13/11/2014 to 30/06/2015
Type	Thermocouple, k-type
Accuracy class	$\pm 0.4 \%$
Serial number	012912
Calibration frequency	1 year
Date of last calibration	27/11/2013, 06/11/2014
Validity	Valid from 27/11/2013 to 05/11/2015.

Monitoring equipment	Item name	TC-03
	Coverage	Flaring temperature of #5 flare(reserve) from 04/11/2014 to 13/11/2014
	Type	Thermocouple, k-type
	Accuracy class	± 0.4 %
	Serial number	012908
	Calibration frequency	1 year
	Date of last calibration	27/11/2013, 31/10/2014
	Validity	Valid from 27/11/2013 to 30/10/2015.
	Item name	TC-06
	Coverage	Flaring temperature of #6 flare from 01/07/2014 to 04/11/2014 and from 13/11/2014 to 30/06/2015
	Type	Thermocouple, k-type
	Accuracy class	± 0.4 %
	Serial number	012915
	Calibration frequency	1 year
	Date of last calibration	27/11/2013, 06/11/2014
	Validity	Valid from 27/11/2013 to 05/11/2015.
	Item name	TC-04
	Coverage	Flaring temperature of #6 flare(reserve) from 04/11/2014 to 13/11/2014
	Type	Thermocouple, k-type
	Accuracy class	± 0.4 %
	Serial number	012910
	Calibration frequency	1 year
	Date of last calibration	27/11/2013, 31/10/2014
	Validity	Valid from 27/11/2013 to 30/10/2015.
Measuring/reading/recording frequency:	Periodic analysis was made for flare exhaust gas Continuous measuring & reading, hourly recording for TC-01 to TC-06	
Calculation method (if applicable):	Not applicable	
QA/QC procedures:	State-check is made by responsible staff of SLC on a daily basis Regular maintenance is made by staff of Ecoenergy Periodically calibrated by approved 3 rd party authority	
Purpose of data:	Calculation of baseline emissions	
Additional comments:		

Data/parameter:	T
Unit	°C
Description	Temperature of LFG
Measured/calculated/default	Measured
Source of data	MMI / DCS data The temperature transmitters, TT-02, TT-03 and TT-10 are continuously measure the temperature of LFG for the flow normalization.
Value(s) of monitored parameter	0.0 ~ 60.0 For applied value, please refer to the worksheet of '08-1_T_2nd_LF' and "08-2_T_Flares" of 'SLC CDM Data Workbook Phase 10'

Monitoring equipment:	Item name	TT-02
	Coverage	Temperature of LFG captured from 2 nd landfill from 01/07/2014 to 22/10/2014 and from 04/11/2014 to 30/06/2015
	Type	PT 100Ω
	Accuracy class	±0.2%
	Serial number	WS1025016
	Calibration frequency	1 year
	Date of last calibration	26/09/2013, 24/10/2014
	Validity	Valid from 26/09/2013 to 25/09/2014 and from 24/10/2014 to 23/10/2015 In order to deal with the uncertainty caused by delayed calibration, 0.2% of maximum permissible error applied in accordance with "Validation and Verification Standard(version 09.0)" from 26/09/2014 to 23/10/2014.
	Item name	TT-03
	Coverage	Temperature of LFG which fed to overall flaring facility(reserve) from 01/07/2014 to 22/10/2014 and from 04/11/2014 to 30/06/2015
	Type	PT 100Ω
	Accuracy class	±0.1%
	Serial number	A6B3331T
	Calibration frequency	1 year
	Date of last calibration	26/09/2013, 24/10/2014
	Validity	Valid from 26/09/2013 to 25/09/2014 and from 24/10/2014 to 23/10/2015 In order to deal with the uncertainty caused by delayed calibration, 0.1% of maximum permissible error applied in accordance with "Validation and Verification Standard(version 09.0)" from 26/09/2014 to 23/10/2014
	Item name	TT-10
	Coverage	Temperature of LFG which fed to 50MW power plant from 01/07/2014 to 22/10/2014 and from 04/11/2014 to 30/06/2015
	Type	PT 100Ω
	Accuracy class	±0.2%
	Serial number	WS1025017
	Calibration frequency	1 year
	Date of last calibration	26/09/2013, 24/10/2014
	Validity	Valid from 26/09/2013 to 25/09/2014 and from 24/10/2014 to 23/10/2015 In order to deal with the uncertainty caused by delayed calibration, data of TT-10 did not applied from 26/09/2014 to 23/10/2014
Measuring/reading/recording frequency:	Continuous measuring & reading, hourly recording	
Calculation method (if applicable):	Not applicable	

QA/QC procedures:	State-check is made by responsible staff of SLC on a daily basis Regular maintenance is made by staff of Ecoenergy Periodically calibrated by approved 3 rd party authority
Purpose of data:	Calculation of baseline emissions
Additional comments:	

Data/parameter:	P																																
Unit	mmAq																																
Description	Pressure of LFG																																
Measured/calculated/default	Measured																																
Source of data	MMI / DCS data The pressure transmitters, PT-02, PT-05 and PT-10 are continuously measure the pressure of LFG for the flow normalization.																																
Value(s) of monitored parameter	-2,868.0 ~ 838.0 For applied value, please refer to the worksheet of '09-1_P_2nd_LF' and '09-2_P_Flares' of 'SLC CDM Data Workbook Phase 10'																																
Monitoring equipment:	<table border="1"> <tr> <td>Item name</td><td>PT-02</td></tr> <tr> <td>Coverage</td><td>Pressure of LFG captured from 2nd landfill from 01/07/2014 to 22/10/2014 and from 04/11/2014 to 30/06/2015</td></tr> <tr> <td>Type</td><td>Smart gauge pressure transmitter</td></tr> <tr> <td>Accuracy class</td><td>±0.075% at span</td></tr> <tr> <td>Serial number</td><td>3940244</td></tr> <tr> <td>Calibration frequency</td><td>1 year</td></tr> <tr> <td>Date of last calibration</td><td>26/09/2013, 31/10/2014</td></tr> <tr> <td>Validity</td><td>Valid from 26/09/2013 to 25/09/2014 and from 31/10/2014 to 30/10/2015 In order to deal with the uncertainty caused by delayed calibration, -0.075% of maximum permissible error applied in accordance with "Validation and Verification Standard(version 09.0)" from 26/09/2014 to 30/10/2014</td></tr> </table> <table border="1"> <tr> <td>Item name</td><td>PT-05</td></tr> <tr> <td>Coverage</td><td>Pressure of LFG which fed to overall flaring facility from 01/07/2014 to 22/10/2014 and from 04/11/2014 to 30/06/2015</td></tr> <tr> <td>Type</td><td>Absolute pressure transmitter</td></tr> <tr> <td>Accuracy class</td><td>±0.5%</td></tr> <tr> <td>Serial number</td><td>A4J4159T</td></tr> <tr> <td>Calibration frequency</td><td>1 year</td></tr> <tr> <td>Date of last calibration</td><td>11/10/2013, 23/10/2014</td></tr> <tr> <td>Validity</td><td>Valid from 11/10/2013 to 10/10/2014 and from 23/10/2014 to 22/10/2015 In order to deal with the uncertainty caused by delayed calibration, -0.5% of maximum permissible error applied in accordance with "Validation and Verification Standard(version 09.0)" from 11/10/2014 to 22/10/2014</td></tr> </table>	Item name	PT-02	Coverage	Pressure of LFG captured from 2 nd landfill from 01/07/2014 to 22/10/2014 and from 04/11/2014 to 30/06/2015	Type	Smart gauge pressure transmitter	Accuracy class	±0.075% at span	Serial number	3940244	Calibration frequency	1 year	Date of last calibration	26/09/2013, 31/10/2014	Validity	Valid from 26/09/2013 to 25/09/2014 and from 31/10/2014 to 30/10/2015 In order to deal with the uncertainty caused by delayed calibration, -0.075% of maximum permissible error applied in accordance with "Validation and Verification Standard(version 09.0)" from 26/09/2014 to 30/10/2014	Item name	PT-05	Coverage	Pressure of LFG which fed to overall flaring facility from 01/07/2014 to 22/10/2014 and from 04/11/2014 to 30/06/2015	Type	Absolute pressure transmitter	Accuracy class	±0.5%	Serial number	A4J4159T	Calibration frequency	1 year	Date of last calibration	11/10/2013, 23/10/2014	Validity	Valid from 11/10/2013 to 10/10/2014 and from 23/10/2014 to 22/10/2015 In order to deal with the uncertainty caused by delayed calibration, -0.5% of maximum permissible error applied in accordance with "Validation and Verification Standard(version 09.0)" from 11/10/2014 to 22/10/2014
Item name	PT-02																																
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	<table border="1"> <tr> <td>Item name</td><td>PT-10</td></tr> <tr> <td>Coverage</td><td>Pressure of LFG which fed to 50MW power plant from 01/07/2014 to 22/10/2014 and from 04/11/2014 to 30/06/2015</td></tr> <tr> <td>Type</td><td>Absolute pressure transmitter</td></tr> <tr> <td>Accuracy class</td><td>±0.5%</td></tr> <tr> <td>Serial number</td><td>WS1025015</td></tr> <tr> <td>Calibration frequency</td><td>1 year</td></tr> <tr> <td>Date of last calibration</td><td>26/09/2013, 23/10/2014</td></tr> <tr> <td>Validity</td><td>Valid from 26/09/2013 to 25/09/2014 and from 23/10/2014 to 22/10/2015 In order to deal with the uncertainty caused by delayed calibration, data of PT-10 did not applied from 26/09/2014 to 22/10/2014</td></tr> </table>	Item name	PT-10	Coverage	Pressure of LFG which fed to 50MW power plant from 01/07/2014 to 22/10/2014 and from 04/11/2014 to 30/06/2015	Type	Absolute pressure transmitter	Accuracy class	±0.5%	Serial number	WS1025015	Calibration frequency	1 year	Date of last calibration	26/09/2013, 23/10/2014	Validity	Valid from 26/09/2013 to 25/09/2014 and from 23/10/2014 to 22/10/2015 In order to deal with the uncertainty caused by delayed calibration, data of PT-10 did not applied from 26/09/2014 to 22/10/2014
Item name	PT-10																
Coverage	Pressure of LFG which fed to 50MW power plant from 01/07/2014 to 22/10/2014 and from 04/11/2014 to 30/06/2015																
Type	Absolute pressure transmitter																
Accuracy class	±0.5%																
Serial number	WS1025015																
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Measuring/reading/recording frequency:	Continuous measuring & reading, hourly recording																
Calculation method (if applicable):	Not applicable																
QA/QC procedures:	State-check is made by responsible staff of SLC on a daily basis Regular maintenance is made by staff of Ecoenergy Periodically calibrated by approved 3 rd party authority																
Purpose of data:	Calculation of baseline emissions																
Additional comments:																	

Data/parameter:	EL_{EX,LFG}																																																								
Unit	MWh																																																								
Description	Total amount of electricity exported out of the project boundary																																																								
Measured/calculated/default	Measured																																																								
Source of data	Log sheet & KPX data The watt-hour meter, WH-01 is continuously measure the exported electricity and written in log sheet by operators																																																								
Value(s) of monitored parameter	<table border="1"> <thead> <tr> <th></th><th>Measured Value</th><th>Applied Value</th><th>Remarks</th></tr> </thead> <tbody> <tr><td>Jul 2013</td><td>10,891.4</td><td>10,891.4</td><td></td></tr> <tr><td>Aug</td><td>18,091.7</td><td>18,091.7</td><td></td></tr> <tr><td>Sep</td><td>12,883.0</td><td>12,883.0</td><td></td></tr> <tr><td>Oct</td><td>16,053.6</td><td>16,053.6</td><td></td></tr> <tr><td>Nov</td><td>17,704.2</td><td>17,704.2</td><td></td></tr> <tr><td>Dec</td><td>16,788.3</td><td>16,788.3</td><td></td></tr> <tr><td>Jan 2014</td><td>20,638.1</td><td>20,638.1</td><td></td></tr> <tr><td>Feb</td><td>14,087.4</td><td>14,087.4</td><td></td></tr> <tr><td>Mar</td><td>4,643.4</td><td>4,643.4</td><td></td></tr> <tr><td>Apr</td><td>15,944.5</td><td>15,944.5</td><td></td></tr> <tr><td>May</td><td>25,027.5</td><td>25,027.5</td><td></td></tr> <tr><td>Jun</td><td>16,661.5</td><td>16,661.5</td><td></td></tr> <tr><td>Total</td><td>189,414.7</td><td>189,414.7</td><td></td></tr> </tbody> </table> <p>For applied value and measured value, please refer to the worksheet of '06-1_EL_exp' of 'SLC CDM Data Workbook Phase 10'</p>		Measured Value	Applied Value	Remarks	Jul 2013	10,891.4	10,891.4		Aug	18,091.7	18,091.7		Sep	12,883.0	12,883.0		Oct	16,053.6	16,053.6		Nov	17,704.2	17,704.2		Dec	16,788.3	16,788.3		Jan 2014	20,638.1	20,638.1		Feb	14,087.4	14,087.4		Mar	4,643.4	4,643.4		Apr	15,944.5	15,944.5		May	25,027.5	25,027.5		Jun	16,661.5	16,661.5		Total	189,414.7	189,414.7	
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Monitoring equipment:	Item name	WH-01
	Coverage	Electricity exported from 50MW power plant
	Type	Electronic watt-hour meter
	Accuracy class	0.2 class
	Serial number	PR-0411A055-02
	Calibration frequency	3.5 ± 0.5 years (according to the Operational Directive of Korean Electricity Market controlled by KPX)
	Date of last calibration	09/04/2014
	Validity	Valid from 09/04/2014 to 08/04/2018
Measuring/reading/recording frequency:	Continuous measuring & reading, hourly recording	
Calculation method (if applicable):	Not applicable	
QA/QC procedures:	State-check is made by responsible staff of SLC on a daily basis Regular maintenance is made by staff of Ecoenergy Periodically calibrated by approved 3 rd party authority	
Purpose of data:	Calculation of baseline emissions	
Additional comments:		

Data/parameter:	EL_{IMP}																																																										
Unit	MWh																																																										
Description	Total amount of electricity imported to the project boundary																																																										
Measured/calculated/default	Measured																																																										
Source of data	SLC's internal electricity surveillance system & KEPCO data Total of 2 watt-hour meters are installed to monitor electricity imported. WH-05 is for LFG blower of 2 nd landfill and WH-06 is for central flaring facility. The data of KEPCO Invoice is for imported electricity in 50MW power plant.																																																										
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Jun	532.4	530.7																																																									
Total	5,539.5	5,186.1																																																									

Monitoring equipment:	Item name	WH-05
	Coverage	Electricity imported to the LFG blower of 2 nd landfill
	Type	Electronic watt-hour meter
	Accuracy class	0.5 class
	Serial number	1104001
	Calibration frequency	7 years (according to the national standard)
	Date of last calibration	14/02/2011
	Validity	Valid from 14/02/2011 to 13/02/2018
	Item name	WH-06
	Coverage	Electricity imported to the central flaring facility
	Type	Electronic watt-hour meter
	Accuracy class	0.5 class
	Serial number	10JAJ073(24)
	Calibration frequency	7 years (according to the national standard)
	Date of last calibration	05/04/2011
Validity	Valid from 05/04/2011 to 04/04/2018	
Measuring/reading/recording frequency:	Continuous measuring & reading, hourly recording	
Calculation method (if applicable):	(WH-05) + (WH-06)+ (KEPCO data)	
QA/QC procedures:	WH-05 and WH-06; State-check is made by responsible staff of SLC on a daily basis Regular maintenance is made by staff of Ecoenergy Periodically calibrated by approved 3 rd party authority KEPCO data : Under control of KEPCO	
Purpose of data:	Calculation of baseline emissions	
Additional comments:		

Data/parameter:	Regulatory requirements relating to landfill gas project
Unit	Not applicable
Description	Regulatory requirements relating to landfill gas projects
Measured/calculated/default	Not applicable
Source of data	Investigation of legislation by CDM monitoring staff (Lae Bong HAN)
Value(s) of monitored parameter	Not applicable
Monitoring equipment:	Not applicable
Measuring/reading/recording frequency:	Annually recorded
Calculation method (if applicable):	Not applicable
QA/QC procedures:	Not applicable
Purpose of data:	Not applicable
Additional comments:	

Data/parameter:	Hours
Unit	Hours
Description	Operation of the energy plant (50MW power plant)

Measured/calculated/default	On site measurement
Source of data	Generated (exported) amount of electricity by 50MW power plant
Value(s) of monitored parameter	7,609
Monitoring equipment:	Same as above 'EL _{EXLFG} '
Measuring/reading/recording frequency:	Continuous measuring & reading, hourly recording
Calculation method (if applicable):	Electricity exported to grid > 0 kWh
QA/QC procedures:	Not applicable
Purpose of data:	Not applicable
Additional comments:	

Data/parameter:	LPG
Unit	Kg
Description	The amount of LPG used for start-up (ignition) of 50MW power plant and each flares
Measured/calculated/default	Measured
Source of data	Log data and invoices
Value(s) of monitored parameter	290 Kg Please refer to the worksheet of '10_PE_LPG' of 'SLC CDM Data Workbook Phase 10'.
Monitoring equipment:	Not applicable
Measuring/reading/recording frequency:	Monthly recorded
Calculation method (if applicable):	Not applicable
QA/QC procedures:	Not applicable
Purpose of data:	Calculation of project emissions
Additional comments:	

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

>>

According to applied methodology ACM0001 (Version 04), emission reductions are calculated by following equation (page 2).

Emission Reduction

The greenhouse gas emission reduction achieved by the project activity during a given year “y” (ER_y) are estimated as follows:

$$ER_y = (MD_{project,y} - MD_{reg,y}) * GWP_{CH4} + EL_y * CEF_{electricity,y} - ET_y * CEF_{thermal,y} \quad (1)$$

where:

ER_y	is emissions reduction, in tonnes of CO ₂ equivalents (tCO ₂ e).
$MD_{project,y}$	the amount of methane that would have been destroyed/combusted during the year, in, tonnes of methane (tCH ₄)
$MD_{reg,y}$ ²	the amount of methane that would have been destroyed/combusted during the year in the absence of the project, in, tonnes of methane (tCH ₄)
GWP_{CH4}	Global Warming Potential value for methane for the first commitment period is 21 tCO ₂ e/tCH ₄
EL_y	net quantity of electricity exported during year y, in megawatt hours (MWh).
$CEF_{electricity,y}$	CO ₂ emissions intensity of the electricity displaced, in tCO ₂ e/MWh. This can be estimated using either ACM0002 or AMSI.D, if the capacity is within the small scale threshold values, when grid electricity is used or displaced.
ET_y	incremental quantity of fossil fuel, defined as difference of fossil fuel used in the baseline and fossil use during project, for energy requirement on site under project activity during the year y, in TJ.
$CEF_{thermal,y}$	CO ₂ emissions intensity of the fuel used to generate thermal/mechanical energy, in tCO ₂ e/TJ

Figure 8 Emission reduction equation in ACM0001 (Version 04) (page 2)

As there are no consideration about project emissions and leakage in ACM0001 (Version 04), above equation can be used to calculate baseline emissions;

$$BE = (MD_{project} - MD_{reg}) \times GWP_{CH4} + EL \times CEF_{electricity} + ET \times CEF_{thermal}$$

Where this project does not include thermal energy displacement and MD_{reg} is calculated by AF (Adjustment factor), above equation can be simplified as below, which could be divided into two steps, baseline emissions from methane avoidance and from electricity generation;

$$BE = (MD_{project} \times (1 - AF) \times GWP_{CH4} + (EL_{exp} - EL_{imp}) \times EF$$

Baseline emissions from methane avoidance

In accordance with applied methodology ACM0001 (Version 04), captured amount of LFG and treated amount of LFG should be compared and smaller value ($LFG_{selected}$) should be used to determine the amount of methane destruction.

Next, weighted average of methane fraction from 1st and 2nd landfill multiplied in order to calculate methane content and global warming potential and AF applied to calculate baseline emissions.

$$BE_{methane_avoidance} = (LFG_{selected} \times W_{CH4} \times D_{CH4} \times (1 - AF) \times GWP_{CH4}$$

$$MD_{project} = LFG_{selected} \times W_{CH4} \times D_{CH4}$$

	LFG _{selected} (Nm ³)	W _{CH4} (%)	MD _{project} (tCH ₄)	AF applied BE (tCH ₄)	BE from CH ₄ avoidance (tCO ₂ e)
Jul 2014	22,223,826.3	45.6	7,466.6	2,900.7	72,518
Aug	23,760,534.1	46.4	8,213.0	3,190.7	79,768
Sep	23,073,222.9	43.1	7,496.9	2,912.5	72,813
Oct	21,286,275.7	44.3	6,896.9	2,679.4	66,985
Nov	22,749,060.7	50.9	7,808.3	3,033.5	75,837
Dec	22,680,017.3	49.6	7,804.0	3,031.8	75,796
Jan 2015	22,928,508.3	46.9	7,676.7	2,982.4	74,559
Feb	19,050,892.5	46.7	6,492.9	2,522.5	63,062
Mar	12,307,161.9	42.6	3,887.8	1,510.4	37,759
Apr	21,518,554.8	44.8	7,138.8	2,773.4	69,335
May	23,309,584.4	44.0	7,710.0	2,995.3	74,882
Jun	19,326,116.4	41.5	6,395.4	2,484.6	62,114
Total	254,213,755.3	45.5	84,987.3	33,017.2	825,427

* The above data, sum of each month, may not be equal to calculation. Calculation of emission reductions is more accurate than the above data because it was calculated on daily basis and especially, CH₄_{treated} on hourly basis. Please refer calculation spread sheet file for more detailed calculation.

Baseline emissions from electricity generation

In accordance with methodology, the amount of net generation and CO₂ emission factor of grid (EF) shall be used to calculate baseline emissions.

$$BE_{\text{electricity_generation}} = (EL_{\text{exp}} - EL_{\text{imp}}) \times EF$$

	Elec. exported (MWh)	Elec. imported (MWh)	Net generation (MWh)	BE from elec. generation (tCO ₂ e)
Jul 2014	10,891.4	553.9	10,337.5	5,857
Aug	18,091.7	328.9	17,762.8	10,064
Sep	12,883.0	509.1	12,373.9	7,011
Oct	16,053.6	339.9	15,713.7	8,903
Nov	17,704.2	333.9	17,370.3	9,841
Dec	16,788.3	356.6	16,431.7	9,309
Jan 2015	20,638.1	350.7	20,287.4	11,494
Feb	14,087.4	311.1	13,776.3	7,805
Mar	4,643.4	716.1	3,927.3	2,226
Apr	15,944.5	535.4	15,409.1	8,730
May	25,027.5	319.8	24,707.7	13,999
Jun	16,661.5	530.7	16,130.8	9,139
Total	189,414.7	5,186.1	184,228.6	104,378

* The above data, sum of each month, may not be equal to calculation because emission reductions are calculated with several decimal places i.e. it is calculated in kWh unit instead of MWh for accuracy. Please refer calculation spread sheet file for more detailed calculation

Baseline emissions from 9.88MW power plant

The 9.88MW power plants had not been operated since 03/2007 due to the technical problem. Therefore, the rest of LFG which is not treated in 50MW power plants was destroyed by central flaring facility only.

Emissions from the electricity generated by the existing 9.88MW power plants are regarded as baseline emissions and should be deducted from calculated baseline emissions.

For conservativeness, maximum theoretical output of 9.88MW power plant (78,760MWh/yr or 215.79MWh/day, approx. 91% of total capacity) has been chosen for additional baseline emission calculation. Since this monitoring period is 1 year (365 days), total of 44,628 tCO₂ (215.79MWh × 365 days × 0.5666tCO₂/MWh) is deducted from emission reductions.

$$BE_{9.88MW} = \text{Maximum theoretical output of 9.88MW power plant} \times \text{monitoring period} \times EF$$

	Maximum theoretical output of 9.88MW (MWh)	Monitoring period (days)	EF (tCO ₂ /MWh)	BE _{9.88MW} (tCO ₂)
Total	215.79	365	0.5666	44,628

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

>>

Project emissions calculation is included in E.1 Emission reductions calculation, e.g. electricity usage is included in EL_{imp} except project emissions from fossil fuel usage, which is not included in above emission reductions calculation equation.

Project emissions from fossil fuel (LPG) usage are calculated as following equation:

$$PE_{LPG} = Usage(Kg) \times 0.509 Nm^3 / Kg \times 57.8 MJ / Nm^3 \times 20.2 CKg / GJ \times 10^{-6} \times \frac{44}{12} CO_2 / C$$

	Usage of 50MW power plant and central flaring facility (Kg)	PE _{LPG} (tCO ₂ e)
2011	40	0.08717
2012	90	0.19612
2013	60	0.13075
2014	100	0.21791
2015	0	0
Total	290	0.63195

For conservativeness, 1 tCO₂e applied though calculated project emissions from LPG usage were 0.63195 tCO₂e.

E.3. Calculation of leakage

>>

There was no leakage in this monitoring period (in accordance with applied methodologies, leakage considered as zero (0) in PDD).

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 ₂ e)	Project emissions or actual net GHG removals by sinks (t CO ₂ e)	Leakage (t CO ₂ e)	GHG emission reductions or net GHG removals by sinks (t CO ₂ e) achieved in the monitoring period		
				Up to 31/12/2012	From 01/01/2013	Total amount
Total	885,177	1	0	0	885,176	885,176

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 ₂ e)	1,090,673	885,176

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

>>

Claimed actual emission reductions are about 81.2% of estimated ones in PDD. This is mainly owing to the difference between estimated LFG generation by MELF model in PDD and actual amount of treated LFG which caused by model's own limitation and change of characteristics of reclaimed waste (portion of degradable organic waste decreased).

Recently, due to supplementation of calculation method for LFG monitoring, the issuance success ratio was increased compare to estimated value in registered PDD. Compared to other landfill projects listed in CDM Pipeline(dated 01/06/2016), the performance of this project is not extraordinary

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

Project participant and/or responsible person/ entity	<input type="checkbox"/> Project participant <input type="checkbox"/> Person/entity responsible for completing the CDM-MR-FORM
Organization name	Sudokwon Landfill Site Management Corp.
Street/P.O. Box	#61 Geowol-Ro, Seo Gu
Building	
City	Incheon
State/region	
Postcode	22688
Country	Republic of Korea
Telephone	+82-32-560-9600
Fax	+82-32-560-9615
E-mail	hlb2305@slc.or.kr
Website	www.slc.or.kr
Contact person	Lae Bong Han
Title	Director
Salutation	-
Last name	Han
Middle name	
First name	Lae Bong
Department	Climate Change Business Division
Mobile	+82-10-3308-2305
Direct fax	-
Direct tel.	+82-32-560-9600
Personal e-mail	hlb2305@slc.or.kr

Project participant and/or responsible person/ entity	<input type="checkbox"/> Project participant <input type="checkbox"/> Responsible person/ entity for completing the CDM-MR-FORM
Organization name	Sudokwon Landfill Site Management Corp.
Street/P.O. Box	#61 Geowol-Ro, Seo Gu
Building	
City	Incheon
State/Region	
Postcode	404-706
Country	Republic of Korea
Telephone	+82-32-560-9605
Fax	+82-32-560-9615
E-mail	tercker@slc.or.kr
Website	www.slc.or.kr
Contact person	WonGu Hwang
Title	Staff
Salutation	-
Last name	Hwang
Middle name	
First name	WonGu
Department	Climate Change Business Division
Mobile	+82-10-5183-1979
Direct fax	-
Direct tel.	+82-32-560-9605
Personal e-mail	tercker@slc.or.kr

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Document information

<i>Version</i>	<i>Date</i>	<i>Description</i>
05.1	4 May 2015	Editorial revision to correct version numbering.
05.0	1 April 2015	Revisions to: <ul style="list-style-type: none"> • 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: <ul style="list-style-type: none"> • 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 <i>F-CDM-MR</i> to <i>CDM-MR-FORM</i>; • 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.
Decision Class: Regulatory Document Type: Form Business Function: Issuance Keywords: monitoring report		