



Monitoring report form (Version 03.1)

Monitoring report

Title of the project activity	Sudokwon Landfill Gas Electricity Generation Project (50MW)
Reference number of the project activity	0941
Version number of the monitoring report	1.0
Completion date of the monitoring report	23/10/2013
Registration date of the project activity	30/04/2007
Monitoring period number and duration of this monitoring period	8 th monitoring period (01/07/2012 – 30/06/2013)
Project participant(s)	- Sudokwon Landfill Site Management Corporation (SLC) - Rhodia Energy GHG - DASCO Partners LLP
Host Party(ies)	Republic of Korea
Sectoral scope(s) and applied methodology(ies)	- Sectoral Scopes: 1, 13 - Applied Methodologies: •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)
Estimated amount of GHG emission reductions or net anthropogenic GHG removals by sinks for this monitoring period in the registered PDD	1,260,923 tCO ₂ e
Actual GHG emission reductions or net anthropogenic GHG removals by sinks achieved in this monitoring period	1,054,063 tCO ₂ e

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 21 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 sulfurization 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 expected to operate at the end of 2013.

This is the 8th monitoring period covering 12 months from 01/07/2012 to 30/06/2013 (365 days) and monitored emission reductions are 1,054,063 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° ~ 66667°

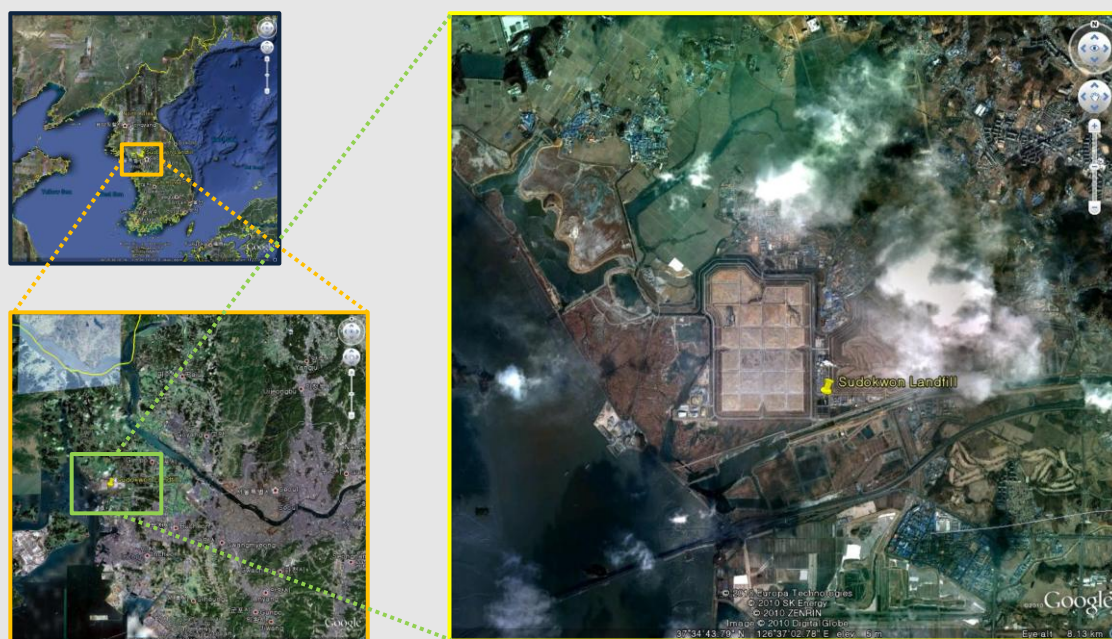


Figure 1 Location of the project activity (SLC)

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 if 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
France	Private entity Rhodia Energy GHG	No
United Kingdom of Great Britain and Northern Ireland	Private entity DASCO Partners LLP ²	No

A.4. Reference of applied methodology

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

http://cdm.unfccc.int/UserManagement/FileStorage/CDMWF_AM_TX29WGSXE4781NKGQGCPTM2F3V3D

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).

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).



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

² DASCO Partners LLP has joined as a project participant from 29/08/2013.

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.
Due to the intensive works from 2011 to 2013, amount of LFG was increased.
Detailed enhancement works are as follows;

Item	Number (ea)	Reasons for enhancement	Note
LFG transferring pipes re-installation	172	Installation of additional LFG transferring pipe for malfunctioning ones in accordance with the inspection.	
Check point inspection in LFG transferring pipes	699	Check the operational status of LFG transferring pipes.	
Flexible pipes replacement	115	Occurrence of pin-hole, which may cause possible influx of oxygen.	

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
01/07/2012		Operated with full load (50MW)	
01/07/2012	30 hours	Due to technical problem of #2 boiler, 50MW power plant decrease its output from 50MW to 17MW.	
03/07/2012	7 hours	Due to system error of blower, 50MW power plant was stopped.	
03/07/2012	25.5 hours	Due to technical problem of blower, 50MW power plant decrease its output from 50MW to 17MW.	
30/07/2012	30 hours	Due to technical problem of boiler, 50MW power plant was stopped.	
09/09/2012	285 hours	Due to technical problem of boiler, 50MW power plant was stopped.	
15/09/2012	20 hours	50MW power plant had a trial operation. However, Due to technical problem of boiler, 50MW power plant was stopped.	
16/12/2012	144 hours	Due to maintenance of GHA(heat exchanger) , 50MW power plant was stopped.	
29/12/2012	7 hours	Due to periodic safety check, 50MW power plant reduced its output from 50MW to 18MW	
20/01/2013	265 hours	Due to maintenance of #2 boiler, 50MW power plant was stopped.	
28/02/2013	57 hours	Due to technical problem of #2 boiler, 50MW power plant decreased its output from 50MW to 17MW	

10/03/2013	554 hours	Due to periodic maintenance of 50MW power plant, it was stopped.(Test operation of 50MW power plant was started 31/03/2013)	
29/03/2013	12 hours	Due to safety inspection of #1 and #2 boiler, 50MW power plant was temporally operated.	
29/06/2013	8 hours	Due to maintenance of electric system, 50MW power plant reduced its output from 50MW to 17MW.	
Table 2 Operational events of 50MW power plant			
Date	Duration	Operation events	Note
01/07/2012	29 hours	Due to technical problem of 50MW power plant, #1 and #6 flares were operated.	
01/07/2012	26 hours	Due to technical problem of 50MW power plant, #3 flare was operated.	
01/07/2012	28 hours	Due to technical problem of 50MW power plant, #4 flare was operated.	
03/07/2012	22 hours	Due to technical problem of 50MW power plant, #1, #3 and #4 flares were operated.	
03/07/2012	34 hours	Due to technical problem of 50MW power plant, #6 flare was operated.	
04/07/2012	1 hour	Due to technical problem of 50MW power plant, #2 flare was stopped.	
04/07/2012	8 hours	Due to technical problem of 2 nd landfill LFG Blower, #1, #2, #3 & #4 flare was operated.	
04/07/2012	2 hours	Operational flare changed from #6 to #1 flare	
25/07/2012	1 hour	Due to ignition test of flares, #3 flare was operated.	
30/07/2012	11 hours	Due to technical problem of 50MW power plant, #2 flare was operated.	
30/07/2012	9 hours	Due to technical problem of 50MW power plant, #3 flare was operated.	
30/07/2012	13 hours	Due to technical problem of 50MW power plant, #4 flare was operated.	
30/07/2012	16 hours	Due to technical problem of 50MW power plant, #6 flare was operated.	
30/07/2012	1 hour	Due to technical test of flare, operational flare changed from #1 to #2 flare.	
30/07/2012	4 hours	Due to maintenance of flare, #5 flare was operated instead of #6 flare.	
01/09/2012	1 hour	Due to system error of LFG management centre, LFG flow of 1 st landfill and #5 flare were decreased.	
04/09/2012	1 hour	Due to system error of LFG management centre, LFG flow of 1 st landfill and #2 flare were decreased.	
07/09/2012	1 hour	Operational flare changed from #2 to #1 flare	
09/09/2012	1 hour	Due to technical problem of 50MW power plant, #2 flare was ignited.	
09/09/2012	300 hours	Due to technical problem of 50MW power plant, #3 flare was operated.	
09/09/2012	299 hours	Due to technical problem of 50MW power plant, #4 flare was operated. However, Due to detachment of flow meter, flow of LFG fed to #4 flare did not recorded.(until 10/9/2012 11:00)	
09/09/2012	298hours	Due to technical problem of 50MW power plant, #6 flare was operated. However, Due to detached of flow meter, flow of LFG fed to #6 flare did not recorded.(until 10/9/2012 11:00)	
12/09/2012	2 hours	Due to backfire arrester problem of #3 flare, LFG flow of 1 st landfill was decreased.	
21/09/2012	1 hour	Due to completion of maintenance, #1 flare was stopped.	
27/09/2012	2 hours	Due to maintenance of flare, operational flare changed from #5 to #6 flare.	
04/10/2012	1 hour	Operational flare changed from #1 to #2 flare.	

22/11/2012	1 hour	Due to system error of LFG management centre, LFG flow of #5 was decreased.	
26/11/2012	4 hours	Due to flaring test, #1 flare was operated.	
16/12/2012	20 hours	Due to sensor cleansing of FT-08, flow of LFG fed to #5 was decreased.	
16/12/2012	159 hours	Due to maintenance of 50MW power plant, #1 and #4 flares were operated.	
16/12/2012	155 hours	Due to maintenance of 50MW power plant, #2 flare was operated.	
16/12/2012	160 hours	Due to maintenance of 50MW power plant, #3 and #6 flares were operated.	
16/12/2012	13 hours	Due to over-flow of LFG fed to #1 flare, #1 flare recorded maximum value.	
16/12/2012	141 hours	Due to over-flow of LFG fed to #4 flare, #4 flare recorded maximum value.	
16/12/2012	142 hours	Due to over-flow of LFG fed to #6 flare, #6 flare recorded maximum value.	
17/12/2012	124 hours	Due to over-flow of LFG fed to #1 flare, #1 flare recorded maximum value.	
29/12/2012	3 hours	Due to periodic electricity safety check, #1 flare was operated.	
29/12/2012	2 hours	Due to periodic electricity safety check, #4 flare was operated.	
20/01/2013	263 hours	Due to maintenance of 50MW power plant, #1 and #3 flares were operated.	
20/01/2013	261 hours	Due to maintenance of 50MW power plant, #2 flare was operated.	
20/01/2013	264 hours	Due to maintenance of 50MW power plant, #4 and #6 flares were operated.	
20/02/2013	2 hours	Due to perform backfire arrester cleansing, LFG flow of #5 flare was decreased.	
28/02/2013	57 hours	Due to technical problem of #2 boiler, 50MW power plant decreased its output from 50MW to 17MW. During this period, #1, #2, #3 and #4 flares were operated.	
28/02/2013	1 hour	Due to maintenance of #5 flare, operational flare changed from #5 to #6 flare.	
10/03/2013	545 hours	Due to periodic maintenance of 50MW power plant, #1 flare was operated.	
10/03/2013	558 hours	Due to periodic maintenance of 50MW power plant, #2 flare was operated.	
10/03/2013	553 hours	Due to periodic maintenance of 50MW power plant, #3 flare was operated.	
10/03/2013	557 hours	Due to periodic maintenance of 50MW power plant, #4 & #5 flares were operated.	
25/03/2013	9 hours	Due to maintenance of 2 nd landfill Blower facility, #1 flare was stopped.	
25/03/2013	13 hours	Due to maintenance of 2 nd landfill Blower facility, #2, #3, #4 and #5 flares were stopped.	
25/03/2013	5 hours	Due to maintenance of 2 nd landfill Blower facility, #6 flare was stopped.	
26/03/2013	183 hours	Due to technical error of flow meter, flow meter of #3 flare recorded extraordinary value.	
31/03/2013	3 hours	Due to test operation of 50MW power plant, #1 and #3 flares were stopped.	
31/03/2013	1 hour	Due to test operation of 50MW power plant, #4 flare was stopped.	
26/06/2013	2 hours	Operational flare changed from #6 to #5 flare.	
28/06/2013	1 hour	Due to technical problem, temperature of #5 flare was temporally decreased.	
29/06/2013	4 hours	Due to maintenance of electric system, #5 flare was stopped.	

29/06/2013	1 hour	Due to maintenance of #5 flare, operational flare changed from #5 to #6 flare.	
Table 3 Operational events of central flaring facility			
Date	Duration	Deviations and its reason	Corrective actions on data and its conservativeness
04/07/2012	2 hours	Due to technical problem of 2 nd Landfill LFG Blower, GA-02 recorded extraordinary value.	Most conservative value in entire 8 th monitoring period (40.0%) applied.
01/08/2012	1 hour	Due to server error of LFG management centre, LFG flow of 1 st & 2 nd landfill did not recorded.	Where CH ₄ fraction of 1 st landfill LFG was lower than that of 2 nd landfill in entire 8 th 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
22/08/2012	24 hours	Due to condensate water, Gas analyzer of 1 st landfill LFG recorded extraordinary value.	Most conservative value in entire 8 th monitoring period (36.0%) applied.
24/08/2012	24 hours	Due to condensate water, Gas analyzer of 1 st landfill LFG recorded extraordinary value.	Most conservative value in entire 8 th monitoring period (36.0%) applied.
18/10/2012	1 hour	Due to change of Gas analyzer, methane fraction of 1 st landfill & 2 nd landfill LFG did not recorded.	Most conservative value in entire 8 th monitoring period (36.0%, 40%) applied.
19/10/2012	1 hour	Due to technical problem of 2 nd Landfill LFG Blower, GA-02 recorded extraordinary value.	Most conservative value in entire 8 th monitoring period (40.0%) applied.
23/10/2012	81 hours	Due to delayed calibration of TT-10 & PT-10, FT-10 recorded incorrect value.	Most conservative value in entire 8 th monitoring period applied. The minimum ratio(methane input per electricity generation in 50MW) in normal operation condition is calculated 0.192 tCH ₄ /MWh. LFG_50MW = EL_exp * 0.192 tCH ₄ /MWh / CH ₄ density / w CH ₄
25/10/2012	504 hours	Due to conduct the 3rd party calibration of FT-02, LFG flow of 2 nd landfill did not recorded.	Where CH ₄ fraction of 1 st landfill LFG was lower than that of 2 nd landfill in entire 8 th 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
26/10/2012	172 hours	Due to technical problem of Flow meter, FT-10 recorded extraordinary value.	Most conservative value in entire 8 th monitoring period applied. The minimum ratio(methane input per electricity generation in 50MW) in normal operation condition is calculated 0.192 tCH ₄ /MWh. LFG_50MW = EL_exp * 0.192 tCH ₄ /MWh / CH ₄ density / w CH ₄
02/11/2012	820 hours	Due to system error of TT-10 & PT-10, FT-10 recorded actual cubic meter.	FT-10 normalize pressure and temperature using TT-04 & PT-06.
24/11/2012	1 hour	Due to technical problem of FT-01, FT-01 recorded extraordinary value.	Where CH ₄ fraction of 1 st landfill LFG was lower than that of 2 nd landfill in entire 8 th 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
26/11/2012	2 hours		

27/11/2012	2 hours	Due to freeze of 1 st Landfill LFG pipeline, FT-01 recorded extraordinary value.	Where CH ₄ fraction of 1 st landfill LFG was lower than that of 2 nd landfill in entire 8 th 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
01/12/2012	4 hours		
04/12/2012	4 hours		
05/12/2012	12 hours		
06/12/2012	7 hours		
07/12/2012	22 hours		
08/12/2012	4 hours		
09/12/2012	10 hours		
10/12/2012	12 hours		
11/12/2012	17 hours	Due to freeze of 1 st Landfill LFG pipeline, FT-01 recorded extraordinary value.	Where CH ₄ fraction of 1 st landfill LFG was lower than that of 2 nd landfill in entire 8 th 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
13/12/2012	3 hours		
18/12/2012	5 hours		
19/12/2012	4 hours		
20/12/2012	3 hours		
29/12/2012	7 hours	Due to periodic safety check, all facilities were shut down(except LFG capture facilities of 2nd landfill and 50MW power plant) and power plant reduced its output from 50MW to 18MW. During this period, only data from power plant related meter (FT-10 & WH-01) recorded.	For methane fraction(weighted), temperature and pressure, most conservative values in entire 8 th monitoring period(36%) applied. For LFG flow, following equation used to calculate; - LFG_1 st = LFG_50MW + LFG_Flare - LFG_2 nd = 0 Nm ³
03/01/2013	5 hours	Due to freeze of 1 st Landfill LFG pipeline, FT-01 recorded extraordinary value.	Where CH ₄ fraction of 1 st landfill LFG was lower than that of 2 nd landfill in entire 8 th 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
04/01/2013	6 hours		
05/01/2013	4 hours		
06/01/2013	1 hour		
24/01/2013	3 hours	Due to shut down of LFG management system, methane fraction and LFG flow of 1 st & 2 nd landfill did not recorded.	For methane fraction(weighted), temperature and pressure, most conservative values in entire 8 th monitoring period(36%) applied. For LFG flow, following equation used to calculate; - LFG_1 st = LFG_50MW + LFG_Flare - LFG_2 nd = 0 - Flow of LFG fed to flares = 0 Nm ³
15/02/2013	1 hour	Due to technical problem of gas analyzer, GA-02 recorded extraordinary value.	Most conservative value in entire 8 th monitoring period (40.0%) applied.
20/02/2013	2 hours	Due to technical problem of electricity system, electricity from 'EL-imp_LFG mgt. centre' and 'EL-imp_2 nd LF' were recorded extraordinary value.	Most conservative value in entire 8 th monitoring period applied. - EL-imp_LFG mgt. centre=549.7kWh - EL-imp_2 nd LF=748.0 kWh
21/02/2013	23 hours	Due to system error of LFG management system, LFG flow of 1 st & 2 nd landfill did not recorded.	Where CH ₄ fraction of 1 st landfill LFG was lower than that of 2 nd landfill in entire 8 th 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
21/02/2013	2 hours	Due to system error of LFG management system, methane fraction of 1 st landfill and temperature of #5 flare did not recorded.	Most conservative value in entire 8 th monitoring period (36.0%, 0°C) applied.
21/02/2013	21 hours	Due to system error of LFG management system, methane	Most conservative value in entire 8 th monitoring period (40.0%) applied.

		fraction of 2 nd landfill did not recorded.	
25/02/2013	2 hours	Due to signal error of flow meter, LFG flow of 1 st landfill was recorded extraordinary value.	Where CH ₄ fraction of 1 st landfill LFG was lower than that of 2 nd landfill in entire 8 th 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
01/03/2013	28 hours	Due to technical problem, LFG flow of 1 st landfill was recorded extraordinary value.	Where CH ₄ fraction of 1 st landfill LFG was lower than that of 2 nd landfill in entire 8 th 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
02/03/2013	5 hours	Due to signal error of flow meter, LFG flow of 1 st landfill was recorded extraordinary value.	Where CH ₄ fraction of 1 st landfill LFG was lower than that of 2 nd landfill in entire 8 th 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
03/03/2013	5 hours		
04/03/2013	51 hours		
06/03/2013	3 hours		
08/03/2013	20 hours		
09/03/2013	6 hours		
11/03/2013	8 hours		
12/03/2013	13 hours		
13/03/2013	15 hours		
14/03/2013	64 hours		
16/03/2013	62 hours		
16/03/2013	2 hours	Due to system error of 2 nd landfill Blower facility, LFG flow of 2 nd landfill was recorded extraordinary value.	Where CH ₄ fraction of 1 st landfill LFG was lower than that of 2 nd landfill in entire 8 th 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
17/03/2013	18 hours	Due to system error of 2 nd landfill Blower facility, LFG flow, temperature, pressure and methane fraction of 2 nd landfill, was recorded extraordinary value.	Where CH ₄ fraction of 1 st landfill LFG was lower than that of 2 nd landfill in entire 8 th 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 Most conservative value(temperature & pressure of 2 nd landfill LFG) in entire 8 th monitoring period applied. - T_2 nd = 28 °C - P_2 nd = -10000mmAq
19/03/2013	8 hours	Due to signal error of flow meter, LFG flow of 1 st landfill was recorded extraordinary value.	Where CH ₄ fraction of 1 st landfill LFG was lower than that of 2 nd landfill in entire 8 th 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
25/03/2013	35 hours	Due to monitoring program error of 50MW power plant, pressure of 2 nd landfill recorded extraordinary value.	Most conservative value in entire 8 th monitoring period (-634.4mmAq) applied.
26/03/2013	183 hours	Due to technical error of flow meter, flow meter of #3 flare recorded extraordinary value.	Most conservative value in entire 8 th monitoring period (0 Nm ³ /hr) applied.
01/04/2013	1 hour	Due to technical problem of gas analyzer, GA-02 recorded extraordinary value.	Most conservative value in entire 8 th monitoring period (40.0%) applied.
10/05/2013	1 hour		
03/06/2013	2 hours		

21/06/2013	1 hour		
29/06/2013	7 hours	Due to maintenance of electric system, LFG flow of 2 nd landfill did not recorded.	For methane fraction(weighted), temperature and pressure, most conservative values in entire 8 th monitoring period(36%) applied. For LFG flow, following equation used to calculate; - LFG_1 st = LFG_50MW + LFG_Flare - LFG_2 nd = 0 Nm ³
29/06/2013	4 hours	Due to maintenance of electric system, methane fraction of 1 st & 2 nd landfill did not recorded.	Most conservative value in entire 8 th monitoring period (36.0%, 40.0%) 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 or applied methodology

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Not applicable

B.2.2. Corrections

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Not applicable

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

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Not applicable

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

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Not applicable

B.2.5. Changes to start date of crediting period

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Not applicable

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

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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	465	GE Panametrics	50MW power plant	Ultrasonic type
700A	28031703	EPI	Reserve meter for all EPI meters	Thermal mass type
900A	26050201	EPI		
FT-03	28012905	EPI	Reserve meter for #4 flare	Pitot-tube type
FT-09 (reserve)	A5H2952T	Fuji Electrics	Reserve meter for #6 flare	
TT-02	WS1025016	Wise	Temperature of LFG captured from 2 nd landfill	For system stability check and (or) unit
TT-03	A6B3331T	Fuji Electrics	Temperature of LFG which	

			fed to overall flaring facility.	conversion from ACM(Actual Cubic Meter) to NCM(Normal Cubic Meter), if needed
TT-04	LG-TE-01	KONICS	Temperature of LFG which fed to 50MW power plant(reserve)	
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 Electrics	Pressure of LFG which fed to overall flaring facility	
PT-06	0447-04111204003	Honeywell	Pressure of LFG which fed to 50MW power plant(reserve)	
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 Electrics	1 st landfill	
GA-02	A4J0063T	Fuji Electrics	2 nd landfill	
GA-03 (Reserve)	N6E2427T	Fuji Electrics	Reserve meter for 1 st landfill	After detachment of GA-01 for periodic calibration, GA-03(Reserve) was installed at GA-01's location from 12/10/2012 to 18/10/2012
Reserve GA	A4M0708T	Fuji Electrics	Reserve meter for 2 nd landfill	After detachment of GA-02 for periodic calibration, Reserve GA was installed at GA-02's location from 12/10/2012 to 18/10/2012.

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-03	6063941	Seochang Electric Communication	Imported electricity (50MW power plant)	
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 18/06/2012, 19/09/2012, 18/12/2012 and 21/03/2013.

	Date of analysis	Result of analysis(ppm CH ₄)	FE application over 600°C
#1 Flare	18/06/2012 (at 603°C)	1.7	99.9%
	19/09/2012 (at 601°C)	7.1	
	18/12/2012 (at 601°C)	3.4	
	21/03/2013 (at 600°C)	3.4	
#2 Flare	18/06/2012 (at 601°C)	8.4	99.9%
	19/09/2012 (at 602°C)	15.7	
	18/12/2012 (at 602°C)	2.3	
	21/03/2013 (at 600°C)	5.0	
#3 Flare	18/06/2012 (at 600°C)	3.3	99.9%
	19/09/2012 (at 600°C)	3.3	
	18/12/2012 (at 600°C)	5.8	
	21/03/2013 (at 600°C)	1.8	
#4 Flare	18/06/2012 (at 603°C)	13.1	99.9%
	19/09/2012 (at 598°C)	28.5	
	18/12/2012 (at 600°C)	2.8	
	21/03/2013 (at 600°C)	12.9	
#5 Flare	18/06/2012 (at 599°C)	2.1	99.9%
	19/09/2012 (at 601°C)	6.1	
	18/12/2012 (at 599°C)	2.5	
	21/03/2013 (at 600°C)	0.9	
#6 Flare	18/06/2012 (at 602°C)	3.1	99.9%
	19/09/2012 (at 603°C)	3.8	
	18/12/2012 (at 600°C)	2.1	
	21/03/2013 (at 600°C)	1.8	

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	07014281	Wise	Flaring temperature of #1 flare	
	012902	WOO JIN		
TC-02	07014283	Wise	Flaring temperature of #2 flare	
	012905	WOO JIN		
TC-03	07014280	Wise	Flaring temperature of #3 flare	
	012908	WOO JIN		
TC-04	07014282	Wise	Flaring temperature of #4 flare	
	012910	WOO JIN		
TC-05	07014284	Wise	Flaring temperature of #5 flare	
	012912	WOO JIN		
TC-06	07014285	Wise	Flaring temperature of #6 flare	
	012915	WOO JIN		

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 238 of "Clean Development Mechanism Validation and Verification Standard (Version 05.0)" 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	09/12/2011	08/12/2012	09/10/2012	
FT-02	26/09/2011	25/09/2012	06/11/2012	P 238 (a) applied from "calibration due date" to "date of calibration".
FT-04	09/12/2011	08/12/2012	07/11/2012	
FT-05	09/12/2011	08/12/2012	07/11/2012	
FT-06	09/12/2011	08/12/2012	07/11/2012	
FT-07	09/12/2011	08/12/2012	09/10/2012	
FT-08	29/09/2011	28/09/2012	07/11/2012	P 238 (a) applied from "calibration due date" to "date of calibration".
FT-09	09/12/2011	08/12/2012	09/10/2012	
FT-10	07/10/2011	06/10/2012	15/06/2012	
	15/06/2012	14/06/2013	09/07/2013	P 238 (a) applied from "calibration due date" to "date of calibration".
700A	29/09/2011	28/09/2012	07/11/2012	P 238 (a) applied from "calibration due date" to "date of calibration".
900A	29/09/2011	28/09/2012	09/10/2012	P 238 (a) applied from "calibration due date" to "date of calibration".
FT-09 (reserve)	27/10/2010	26/10/2012	22/10/2012	
FT-03	29/09/2011	28/09/2012	07/11/2012	P 238 (a) applied from "calibration due date" to "date of calibration".
GA-01	08/11/2011	07/11/2012	17/10/2012	
GA-02	08/11/2011	07/11/2012	17/10/2012	
GA-03 (Reserve)	02/11/2011	01/11/2012	10/10/2012	
Reserve GA	02/11/2011	01/11/2012	10/10/2012	
TT-02	20/09/2011	19/09/2012	30/10/2012	P 238 (a) applied from "calibration due date" to "date of calibration".
TT-04	04/01/2012	03/01/2013	12/10/2012	
TT-10	24/10/2011	23/10/2012	30/10/2012	P 238 (a) applied from "calibration due date" to "date of calibration".
PT-02	26/09/2011	25/09/2012	06/11/2012	P 238 (a) applied from "calibration due date" to "date of calibration".
PT-06	27/10/2011	26/10/2012	22/10/2012	
PT-10	25/10/2011	24/10/2012	12/11/2012	P 238 (a) applied from "calibration due date" to "date of calibration".
WH-01	28/06/2010	26/12/2013		
WH-03	17/08/2006	16/08/2013		
WH-05	14/02/2011	12/02/2018		
WH-06	05/04/2011	03/04/2018		
TC-01	20/09/2011	19/09/2012	31/10/2012	P 238 (a) applied from "calibration due date" to "date of calibration".
	28/01/2013	27/01/2014		
TC-02	20/09/2011	19/09/2012	12/10/2012	P 238 (a) applied from

	28/01/2013	27/01/2014		"calibration due date" to "date of calibration".
TC-03	21/10/2011	20/10/2012	12/10/2012	
	28/01/2013	27/01/2014		
TC-04	21/10/2011	20/10/2012	12/10/2012	
	28/01/2013	27/01/2014		
TC-05	20/09/2011	19/09/2012	31/10/2012	P 238 (a) applied from "calibration due date" to "date of calibration".
	28/01/2013	27/01/2014		
TC-06	21/10/2011	20/10/2012	12/10/2012	
	28/01/2013	27/01/2014		

Fossil fuel usage

The purchased amount of LPG, which evidenced by invoices from 2010 to 2013, 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.

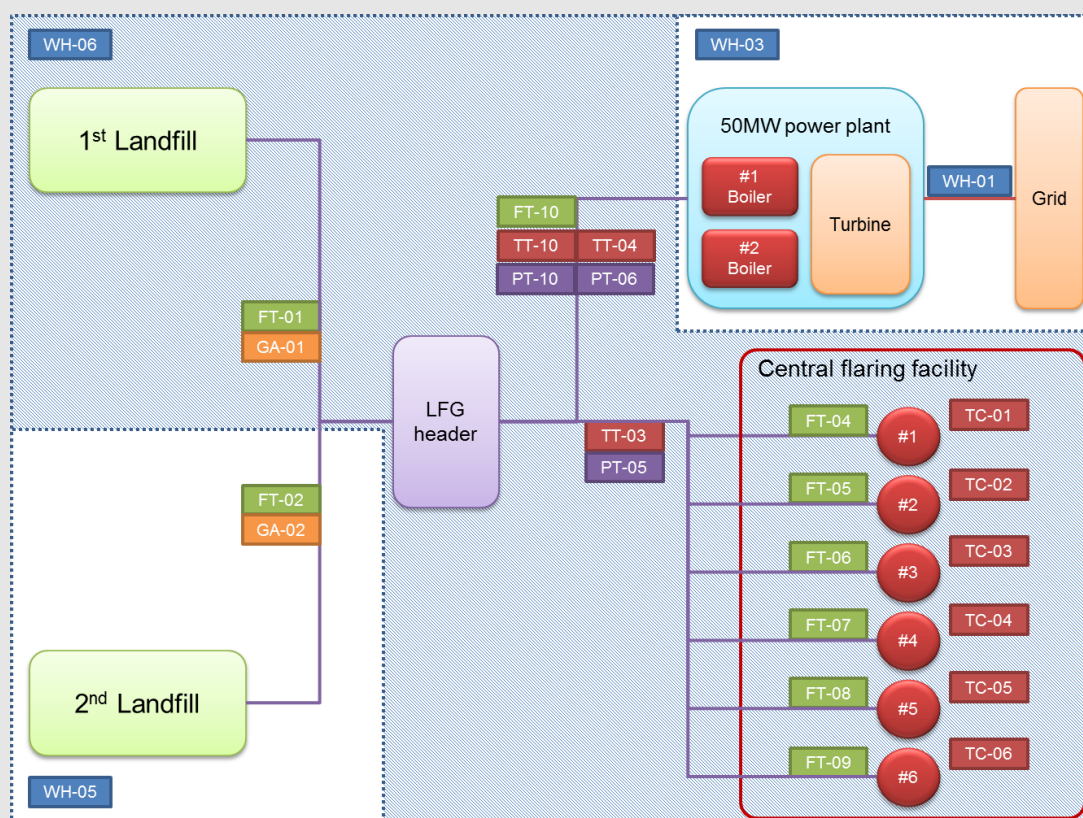


Figure 5 Line Diagram of Monitoring Points

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
	Executive Director (Project Development)		Nakbin Kim	Approval calculation result & monitoring report
	Climate Change Business Division	General Manager	Jongwan Kim	Approval calculation result & monitoring report
		Manager	Laebong Han	Approval of daily calculation result & supervision of facility management
		Staff	Wongu Hwang	Data analysis, calculation & arrangement of monitoring report
		Staff	Hyunseong Shin	Data aggregation & facility management
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

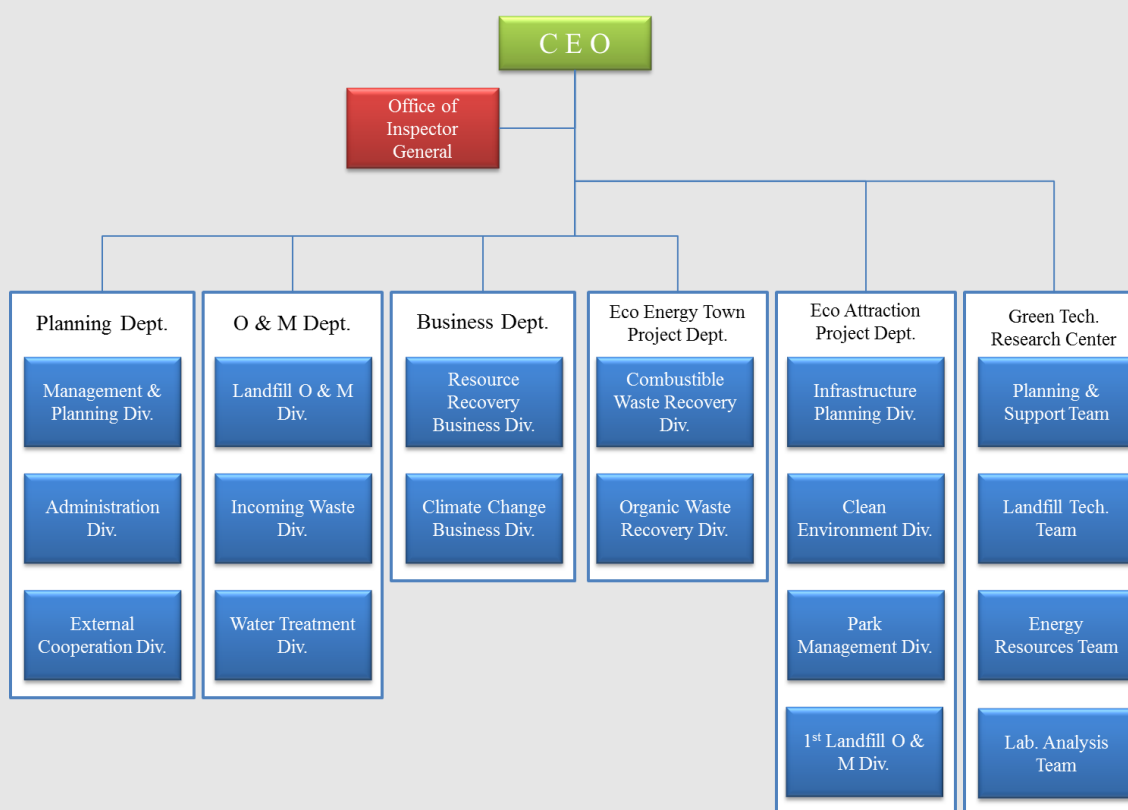


Figure 6 Organization Chart of SLC

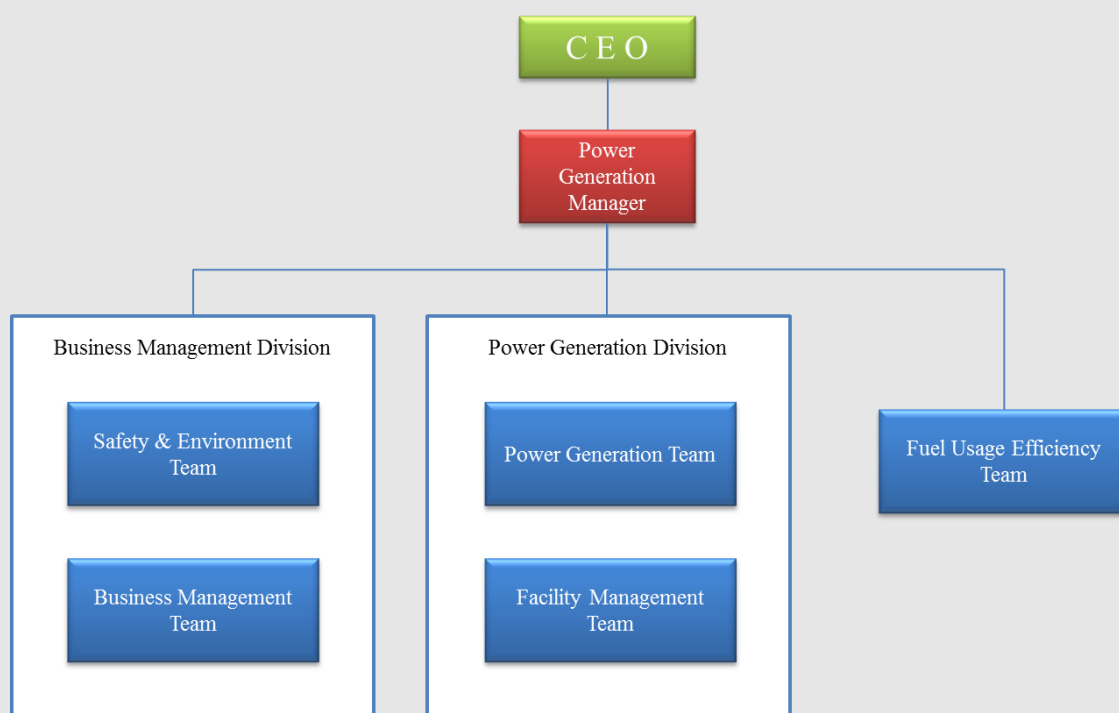


Figure 7 Organization Chart of Ecoenergy

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**

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:	21 or 25
Purpose of data:	Calculation of baseline emissions
Additional comment:	21 for the first commitment period. 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
Purpose of data:	Calculation of baseline emissions
Additional comment:	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
Purpose of data:	Calculation of baseline emissions
Additional comment:	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
Purpose of data:	Calculation of baseline emissions
Additional comment:	N/A

D.2. Data and parameters monitored

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:		Measured Value	Applied Value
	Jul 2012	32,772,608.0	27,867,416.8
	Aug	32,787,635.0	27,923,186.8
	Sep	31,976,898.0	27,286,937.7
	Oct	26,445,837.0	28,093,164.9
	Nov	17,365,843.0	25,852,779.3
	Dec	30,852,468.0	26,426,411.7
	Jan 2013	30,331,293.0	25,193,749.4
	Feb	26,590,605.0	23,637,834.3
	Mar	26,533,322.0	26,524,735.0
	Apr	27,712,912.0	24,974,325.0
	May	28,875,106.0	23,511,474.6
	Jun	27,302,916.0	22,261,575.6
	Total	339,547,443.0	309,553,591.1
	For applied value, please refer to the worksheet of '04_LFG' of 'SLC CDM Data Workbook Phase 8'.		
	For measured value, please refer to the worksheet of '04_0_LFG(Raw data)' of 'SLC CDM Data Workbook Phase 8'		
Monitoring equipment:	Item name	FT-01	
	Coverage	LFG flow of 1 st landfill from 01/07/2012 to 16/08/2012, from 15/10/2012 to 19/03/2013 and from 22/05/2013 to 30/06/2013	
	Type	Thermal mass type flow meter	
	Accuracy class	±[1% RDG +(0.5%FS + 0.02%/°C)]	
	Serial number	27051601	
	Calibration frequency	1 year	
	Date of last calibration	09/12/2011, 09/10/2012	
	Validity	Valid from 09/12/2011 to 08/10/2013	
	Item name	700A	
	Coverage	LFG flow of 1 st landfill from 16/08/2012 to 15/10/2012 (temporally installed in order to prevent measuring gap caused by 3 rd party calibration)	
	Type	Thermal mass type flow meter	
	Accuracy class	±[1% RDG +(0.5%FS + 0.02%/°C)]	
	Serial number	28031703	
	Calibration frequency	1 year	
	Date of last calibration	29/09/2011, 07/11/2012	
	Validity	Valid from 29/09/2011 to 28/09/2012 and from 07/11/2012 to 06/11/2013	

Monitoring equipment:	<table border="1"> <tr> <td>Item name</td> <td>900A</td> </tr> <tr> <td>Coverage</td> <td>LFG flow of 1st landfill from 19/03/2013 to 22/05/2013 (temporally installed in order to prevent measuring gap caused by technical problem of FT-01)</td> </tr> <tr> <td>Type</td> <td>Thermal mass type flow meter</td> </tr> <tr> <td>Accuracy class</td> <td>±[1% RDG +(0.5%FS + 0.02%/°C)]</td> </tr> <tr> <td>Serial number</td> <td>26050201</td> </tr> <tr> <td>Calibration frequency</td> <td>1 year</td> </tr> <tr> <td>Date of last calibration</td> <td>29/09/2011, 09/10/2012</td> </tr> <tr> <td>Validity</td> <td>Valid from 29/09/2011 to 28/09/2012 and 09/10/2012 to 08/10/2013</td> </tr> </table>	Item name	900A	Coverage	LFG flow of 1 st landfill from 19/03/2013 to 22/05/2013 (temporally installed in order to prevent measuring gap caused by technical problem of FT-01)	Type	Thermal mass type flow meter	Accuracy class	±[1% RDG +(0.5%FS + 0.02%/°C)]	Serial number	26050201	Calibration frequency	1 year	Date of last calibration	29/09/2011, 09/10/2012	Validity	Valid from 29/09/2011 to 28/09/2012 and 09/10/2012 to 08/10/2013
	Item name	900A															
Coverage	LFG flow of 1 st landfill from 19/03/2013 to 22/05/2013 (temporally installed in order to prevent measuring gap caused by technical problem of FT-01)																
Type	Thermal mass type flow meter																
Accuracy class	±[1% RDG +(0.5%FS + 0.02%/°C)]																
Serial number	26050201																
Calibration frequency	1 year																
Date of last calibration	29/09/2011, 09/10/2012																
Validity	Valid from 29/09/2011 to 28/09/2012 and 09/10/2012 to 08/10/2013																
<table border="1"> <tr> <td>Item name</td> <td>FT-02</td> </tr> <tr> <td>Coverage</td> <td>LFG flow of 2nd landfill from 01/07/2012 to 25/10/2012 and from 15/11/2012 to 30/06/2013</td> </tr> <tr> <td>Type</td> <td>V-cone type flow meter</td> </tr> <tr> <td>Accuracy class</td> <td>±0.075%</td> </tr> <tr> <td>Serial number</td> <td>9C03490109D</td> </tr> <tr> <td>Calibration frequency</td> <td>1 year</td> </tr> <tr> <td>Date of last calibration</td> <td>26/09/2011, 06/11/2012</td> </tr> <tr> <td>Validity</td> <td>Valid from 26/09/2011 to 25/09/2012 and from 06/11/2012 to 05/11/2013 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 5.0)" from 24/09/2012 to 06/11/2012.</td> </tr> </table>	Item name	FT-02	Coverage	LFG flow of 2 nd landfill from 01/07/2012 to 25/10/2012 and from 15/11/2012 to 30/06/2013	Type	V-cone type flow meter	Accuracy class	±0.075%	Serial number	9C03490109D	Calibration frequency	1 year	Date of last calibration	26/09/2011, 06/11/2012	Validity	Valid from 26/09/2011 to 25/09/2012 and from 06/11/2012 to 05/11/2013 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 5.0)" from 24/09/2012 to 06/11/2012.	
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Coverage	LFG flow of 2 nd landfill from 01/07/2012 to 25/10/2012 and from 15/11/2012 to 30/06/2013																
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Accuracy class	±0.075%																
Serial number	9C03490109D																
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Measuring/Reading/Recording frequency:	Continuous measuring & reading, hourly recording																
Calculation method (if applicable):	(FT-01) or (900A or 700A) + (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:	<table><thead><tr><th></th><th>Measured Value</th><th>Applied Value</th><th>Remarks</th></tr></thead><tbody><tr><td>Jul 2012</td><td>8,105,154.0</td><td>8,105,154.0</td><td></td></tr><tr><td>Aug</td><td>6,824,167.0</td><td>6,824,167.0</td><td></td></tr><tr><td>Sep</td><td>15,007,654.0</td><td>15,006,424.1</td><td></td></tr><tr><td>Oct</td><td>6,270,997.0</td><td>6,258,236.3</td><td></td></tr><tr><td>Nov</td><td>5,347,380.0</td><td>5,344,442.1</td><td></td></tr><tr><td>Dec</td><td>9,239,700.0</td><td>9,239,700.0</td><td></td></tr><tr><td>Jan 2013</td><td>8,718,564.0</td><td>8,718,564.0</td><td></td></tr><tr><td>Feb</td><td>3,273,716.0</td><td>3,273,716.0</td><td></td></tr><tr><td>Mar</td><td>19,591,442.0</td><td>19,571,714.0</td><td></td></tr><tr><td>Apr</td><td>3,958,756.0</td><td>3,948,033.0</td><td></td></tr><tr><td>May</td><td>2,738,373.0</td><td>2,738,373.0</td><td></td></tr><tr><td>Jun</td><td>2,699,317.0</td><td>2,699,317.0</td><td></td></tr><tr><td>Total</td><td>91,775,220.0</td><td>91,727,840.5</td><td></td></tr></tbody></table> <p>For applied value, please refer to the worksheet of '07_LFG_flare' of 'SLC CDM Data Workbook Phase 8'</p> <p>For measured value, please refer to the worksheet of '07_0_LFG_flare(Raw data)' of 'SLC CDM Data Workbook Phase 8'</p>					Measured Value	Applied Value	Remarks	Jul 2012	8,105,154.0	8,105,154.0		Aug	6,824,167.0	6,824,167.0		Sep	15,007,654.0	15,006,424.1		Oct	6,270,997.0	6,258,236.3		Nov	5,347,380.0	5,344,442.1		Dec	9,239,700.0	9,239,700.0		Jan 2013	8,718,564.0	8,718,564.0		Feb	3,273,716.0	3,273,716.0		Mar	19,591,442.0	19,571,714.0		Apr	3,958,756.0	3,948,033.0		May	2,738,373.0	2,738,373.0		Jun	2,699,317.0	2,699,317.0		Total	91,775,220.0	91,727,840.5	
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Monitoring equipment:	<table><tr><td>Item name</td><td>FT-04</td></tr><tr><td>Coverage</td><td>LFG flow of #1 flare from 01/07/2012 to 15/10/2012 and from 22/11/2012 to 30/06/2013</td></tr><tr><td>Type</td><td>Thermal mass type flow meter</td></tr><tr><td>Accuracy class</td><td>±[1% RDG +(0.5%FS + 0.02%/°C)]</td></tr><tr><td>Serial number</td><td>28031701</td></tr><tr><td>Calibration frequency</td><td>1 year</td></tr><tr><td>Date of last calibration</td><td>09/12/2011, 07/11/2012</td></tr><tr><td>Validity</td><td>Valid from 09/02/2011 to 06/11/2013</td></tr></table> <table><tr><td>Item name</td><td>FT-07</td></tr><tr><td>Coverage</td><td>LFG flow of #1 flare(reserve) from 15/10/2012 to 22/11/2012</td></tr><tr><td>Type</td><td>Thermal mass type flow meter</td></tr><tr><td>Accuracy class</td><td>±[1% RDG +(0.5%FS + 0.02%/°C)]</td></tr><tr><td>Serial number</td><td>28042401</td></tr><tr><td>Calibration frequency</td><td>1 year</td></tr><tr><td>Date of last calibration</td><td>09/12/2011, 09/10/2012</td></tr><tr><td>Validity</td><td>Valid from 09/02/2011 to 08/10/2013</td></tr></table> <table><tr><td>Item name</td><td>FT-05</td></tr><tr><td>Coverage</td><td>LFG flow of #2 flare</td></tr><tr><td>Type</td><td>Thermal mass type flow meter</td></tr><tr><td>Accuracy class</td><td>±[1% RDG +(0.5%FS + 0.02%/°C)]</td></tr><tr><td>Serial number</td><td>28012903</td></tr><tr><td>Calibration frequency</td><td>1 year</td></tr><tr><td>Date of last calibration</td><td>09/12/2011, 07/11/2012</td></tr><tr><td>Validity</td><td>Valid from 09/02/2011 to 06/11/2013</td></tr></table>				Item name	FT-04	Coverage	LFG flow of #1 flare from 01/07/2012 to 15/10/2012 and from 22/11/2012 to 30/06/2013	Type	Thermal mass type flow meter	Accuracy class	±[1% RDG +(0.5%FS + 0.02%/°C)]	Serial number	28031701	Calibration frequency	1 year	Date of last calibration	09/12/2011, 07/11/2012	Validity	Valid from 09/02/2011 to 06/11/2013	Item name	FT-07	Coverage	LFG flow of #1 flare(reserve) from 15/10/2012 to 22/11/2012	Type	Thermal mass type flow meter	Accuracy class	±[1% RDG +(0.5%FS + 0.02%/°C)]	Serial number	28042401	Calibration frequency	1 year	Date of last calibration	09/12/2011, 09/10/2012	Validity	Valid from 09/02/2011 to 08/10/2013	Item name	FT-05	Coverage	LFG flow of #2 flare	Type	Thermal mass type flow meter	Accuracy class	±[1% RDG +(0.5%FS + 0.02%/°C)]	Serial number	28012903	Calibration frequency	1 year	Date of last calibration	09/12/2011, 07/11/2012	Validity	Valid from 09/02/2011 to 06/11/2013								
Item name	FT-04																																																											
Coverage	LFG flow of #1 flare from 01/07/2012 to 15/10/2012 and from 22/11/2012 to 30/06/2013																																																											
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Date of last calibration	09/12/2011, 07/11/2012																																																											
Validity	Valid from 09/02/2011 to 06/11/2013																																																											

Monitoring
equipment:

Item name	FT-06
Coverage	LFG flow of #3 flare
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	09/12/2011, 07/11/2012
Validity	Valid from 09/02/2011 to 06/11/2013

Item name	FT-07
Coverage	LFG flow of #4 flare from 01/07/2012 to 16/08/2012 and from 22/11/2012 to 30/06/2013
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	09/12/2011, 09/10/2012
Validity	Valid from 09/02/2011 to 08/10/2013

Item name	FT-03
Coverage	LFG flow of #4 flare from 10/09/2012 to 21/09/2012
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	29/09/2011, 07/11/2012
Validity	Valid from 29/09/2011 to 28/09/2012 and from 07/11/2012 to 06/11/2013

Item name	FT-08
Coverage	LFG flow of #5 flare from 01/07/2012 to 15/10/2012 and from 22/11/2012 to 30/06/2013
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	29/09/2011, 07/11/2012
Validity	Valid from 29/09/2011 to 28/09/2012 and from 07/11/2012 to 06/11/2013

Item name	FT-09
Coverage	LFG flow of #5 flare(reserve) from 15/10/2012 to 22/11/2012
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	09/12/2011, 09/10/2012
Validity	Valid from 09/12/2011 to 08/10/2013

Monitoring equipment:	Item name	FT-09
	Coverage	LFG flow of #6 flare from 01/07/2012 to 16/08/2012 and from 22/11/2012 to 30/06/2013
	Type	Thermal mass type flow meter
	Accuracy class	±[1% RDG +(0.5%FS + 0.02%/°C)]
	Serial number	28031702
	Calibration frequency	1 year
	Date of last calibration	09/12/2011, 09/10/2012
	Validity	Valid from 09/12/2011 to 08/10/2013
	Item name	FT-09 (reserve)
	Coverage	LFG flow of #6 flare (reserve) from 10/09/2012 to 22/11/2012
	Type	Pitot-tube type flow meter
	Accuracy class	±0.07%
	Serial number	A5H2952T
	Calibration frequency	1 year
	Date of last calibration	27/10/2011, 22/10/2012
	Validity	Valid from 27/10/2011 to 23/10/2013
Measuring/ Reading/Recording frequency:	Continuous measuring & reading, hourly recording	
Calculation method (if applicable):	(FT-04 or FT-07) + (FT-05) + (FT-06) + (FT-07 or FT-03) + (FT-08 or FT-09) + (FT-09 or FT-09(reserve))	
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 _{electricity,y}
Unit:	Nm ³
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

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 2012</td> <td>19,770,368.0</td> <td>19,770,368.0</td> <td></td> </tr> <tr> <td>Aug</td> <td>21,105,844.0</td> <td>21,105,844.0</td> <td></td> </tr> <tr> <td>Sep</td> <td>12,295,520.0</td> <td>12,295,520.0</td> <td></td> </tr> <tr> <td>Oct</td> <td>21,592,496.0</td> <td>21,839,929.9</td> <td></td> </tr> <tr> <td>Nov</td> <td>21,880,840.0</td> <td>20,511,150.0</td> <td></td> </tr> <tr> <td>Dec</td> <td>17,577,888.0</td> <td>17,195,951.4</td> <td></td> </tr> <tr> <td>Jan 2013</td> <td>16,483,904.0</td> <td>16,483,904.0</td> <td></td> </tr> <tr> <td>Feb</td> <td>20,367,392.0</td> <td>20,367,392.0</td> <td></td> </tr> <tr> <td>Mar</td> <td>7,026,240.0</td> <td>7,026,240.0</td> <td></td> </tr> <tr> <td>Apr</td> <td>21,030,240.0</td> <td>21,030,240.0</td> <td></td> </tr> <tr> <td>May</td> <td>20,775,840.0</td> <td>20,775,840.0</td> <td></td> </tr> <tr> <td>Jun</td> <td>19,668,624.0</td> <td>19,564,957.9</td> <td></td> </tr> <tr> <td>Total</td> <td>219,575,196.0</td> <td>217,967,337.2</td> <td></td> </tr> </tbody> </table> <p>For applied value, please refer to the worksheet of '04_LFG' of 'SLC CDM Data Workbook Phase 8'.</p> <p>For measured value, please refer to the worksheet of '04_0_LFG(Raw data)' of 'SLC CDM Data Workbook Phase 8'</p>					Measured Value	Applied Value	Remarks	Jul 2012	19,770,368.0	19,770,368.0		Aug	21,105,844.0	21,105,844.0		Sep	12,295,520.0	12,295,520.0		Oct	21,592,496.0	21,839,929.9		Nov	21,880,840.0	20,511,150.0		Dec	17,577,888.0	17,195,951.4		Jan 2013	16,483,904.0	16,483,904.0		Feb	20,367,392.0	20,367,392.0		Mar	7,026,240.0	7,026,240.0		Apr	21,030,240.0	21,030,240.0		May	20,775,840.0	20,775,840.0		Jun	19,668,624.0	19,564,957.9		Total	219,575,196.0	217,967,337.2	
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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																																																											
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<table border="1"> <tr> <td>Data / Parameter:</td> <td>W_{CH₄,y}</td> </tr> <tr> <td>Unit:</td> <td>% (Nm³ CH₄ / Nm³ LFG)</td> </tr> <tr> <td>Description:</td> <td>Average methane fraction of LFG in year y</td> </tr> <tr> <td>Measured/ Calculated /Default:</td> <td>Measured by methane gas analyzers (total of 2)</td> </tr> </table>					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)																																																
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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><tr><td></td><td>Measured Value</td><td>Applied Value</td><td>Remarks</td></tr><tr><td>Jul 2012</td><td>47.7</td><td>47.5</td><td></td></tr><tr><td>Aug</td><td>48.4</td><td>47.7</td><td></td></tr><tr><td>Sep</td><td>47.8</td><td>47.7</td><td></td></tr><tr><td>Oct</td><td>45.1</td><td>44.8</td><td></td></tr><tr><td>Nov</td><td>44.1</td><td>43.9</td><td></td></tr><tr><td>Dec</td><td>47.1</td><td>46.3</td><td></td></tr><tr><td>Jan 2013</td><td>47.1</td><td>47.0</td><td></td></tr><tr><td>Feb</td><td>46.5</td><td>46.2</td><td></td></tr><tr><td>Mar</td><td>45.8</td><td>44.1</td><td></td></tr><tr><td>Apr</td><td>46.7</td><td>46.1</td><td></td></tr><tr><td>May</td><td>46.2</td><td>46.1</td><td></td></tr><tr><td>Jun</td><td>47.1</td><td>47.0</td><td></td></tr><tr><td>Average</td><td>46.6</td><td>46.2</td><td></td></tr></table>					Measured Value	Applied Value	Remarks	Jul 2012	47.7	47.5		Aug	48.4	47.7		Sep	47.8	47.7		Oct	45.1	44.8		Nov	44.1	43.9		Dec	47.1	46.3		Jan 2013	47.1	47.0		Feb	46.5	46.2		Mar	45.8	44.1		Apr	46.7	46.1		May	46.2	46.1		Jun	47.1	47.0		Average	46.6	46.2	
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Value(s) of monitored parameter:	For applied value, please refer to the worksheet of '05_wCH4' of 'SLC CDM Data Workbook Phase 8'. For measured value, please refer to the worksheet of '05_0_wCH4(Raw data)' of 'SLC CDM Data Workbook Phase 8'.																																																											
Monitoring equipment:	<table><tr><td>Item name</td><td>GA-01</td></tr><tr><td>Coverage</td><td>CH₄ fraction of LFG at 1st landfill from 01/07/2012 to 12/10/2012 and from 18/10/2012 to 30/06/2013</td></tr><tr><td>Type</td><td>Infrared gas analyzer</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>08/11/2011, 17/10/2012</td></tr><tr><td>Validity</td><td>Valid from 08/11/2011 to 16/10/2013.</td></tr></table> <table><tr><td>Item name</td><td>GA-03(reserve)</td></tr><tr><td>Coverage</td><td>CH₄ fraction of LFG at 1st landfill from 12/10/2012 to 18/10/2012(reserve)</td></tr><tr><td>Type</td><td>Infrared gas analyzer</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>N6E2427T</td></tr><tr><td>Calibration frequency</td><td>1 year</td></tr><tr><td>Date of last calibration</td><td>02/11/2011, 10/10/2012</td></tr><tr><td>Validity</td><td>Valid from 02/11/2011 to 09/10/2013.</td></tr></table>				Item name	GA-01	Coverage	CH ₄ fraction of LFG at 1 st landfill from 01/07/2012 to 12/10/2012 and from 18/10/2012 to 30/06/2013	Type	Infrared gas analyzer	Accuracy class	Linearity: ±1% of FS Repeatability: ±0.5% of FS	Serial number	A2B4359T	Calibration frequency	1 year	Date of last calibration	08/11/2011, 17/10/2012	Validity	Valid from 08/11/2011 to 16/10/2013.	Item name	GA-03(reserve)	Coverage	CH ₄ fraction of LFG at 1 st landfill from 12/10/2012 to 18/10/2012(reserve)	Type	Infrared gas analyzer	Accuracy class	Linearity: ±1% of FS Repeatability: ±0.5% of FS	Serial number	N6E2427T	Calibration frequency	1 year	Date of last calibration	02/11/2011, 10/10/2012	Validity	Valid from 02/11/2011 to 09/10/2013.																								
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Date of last calibration	02/11/2011, 10/10/2012																																																											
Validity	Valid from 02/11/2011 to 09/10/2013.																																																											

Monitoring equipment:	Item name	GA-02
	Coverage	CH ₄ fraction of LFG at 2 nd landfill from 01/07/2012 to 12/10/2012 and from 18/10/2012 to 30/06/2013
	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	08/11/2011, 17/10/2012
	Validity	Valid from 08/11/2011 to 16/10/2013.
	Item name	Reserve GA
	Coverage	CH ₄ fraction of LFG at 2 nd landfill from 12/10/2012 to 18/10/2012(reserve)
	Type	Infrared gas analyzer
	Accuracy class	Linearity: ±1% of FS Repeatability: ±0.5% of FS
	Serial number	A4M0708T
	Calibration frequency	1 year
	Date of last calibration	02/11/2011, 10/10/2012
	Validity	Valid from 02/11/2011 to 09/10/2013.
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 comment:		
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. AI1206015, AI1209022, AI1212014, AI1303019 * For detailed results, please refer to Table 5 in page 13
Calibration frequency	-
Date of last calibration	-
Validity	

Item name	TC-01
Coverage	Flaring temperature of each flares
Type	Thermocouple, k-type
Accuracy class	± (B)0.3 class(07014281) / ± 0.4 %(012902)
Serial number	07014281 012902
Calibration frequency	1 year
Date of last calibration	20/09/2011, 31/10/2012 28/01/2013
Validity	Valid from 20/09/2011 to 19/09/2012 and from 31/10/2012 to 27/01/2014.

Item name	TC-02
Coverage	Flaring temperature of each flares
Type	Thermocouple, k-type
Accuracy class	± (B)0.3 class(07014283) / ± 0.4 %(012905)
Serial number	07014283 012905
Calibration frequency	1 year
Date of last calibration	20/09/2011, 12/10/2012 28/01/2013
Validity	Valid from 20/09/2011 to 19/09/2012 and from 12/10/2012 to 27/01/2014.

Item name	TC-03
Coverage	Flaring temperature of each flares
Type	Thermocouple, k-type
Accuracy class	± (B)0.3 class(07014280) / ± 0.4 %(012908)
Serial number	07014280 012908
Calibration frequency	1 year
Date of last calibration	21/10/2011, 12/10/2012 28/01/2013
Validity	Valid from 21/10/2011 to 27/01/2014.

Monitoring equipment:	Item name	TC-04
	Coverage	Flaring temperature of each flares
	Type	Thermocouple, k-type
	Accuracy class	\pm (B)0.3 class(07014282) / \pm 0.4 %(012910)
	Serial number	07014282 012910
	Calibration frequency	1 year
	Date of last calibration	21/10/2011, 12/10/2012 28/01/2013
	Validity	Valid from 21/10/2011 to 27/01/2014.
	Item name	TC-05
	Coverage	Flaring temperature of each flares
	Type	Thermocouple, k-type
	Accuracy class	\pm (B)0.3 class(07014284) / \pm 0.4 %(012912)
	Serial number	07014284 012912
	Calibration frequency	1 year
	Date of last calibration	20/09/2011, 31/10/12 28/01/2013
	Validity	Valid from 20/09/2011 to 19/09/2012 and from 31/10/2012 to 27/01/2014.
	Item name	TC-06
	Coverage	Flaring temperature of each flares
	Type	Thermocouple, k-type
	Accuracy class	\pm (B)0.3 class(07014285) / \pm 0.4 %(012915)
	Serial number	07014285 012915
	Calibration frequency	1 year
	Date of last calibration	21/10/2011, 12/10/2012 28/01/2013
	Validity	Valid from 21/10/2011 to 27/01/2014.
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 comment:		
Data / Parameter:	T	
Unit:	°C	
Description:	Temperature of LFG	
Measured/ Calculated /Default:	Measured	

Source of data:	MMI / DCS data The temperature transmitters, TT-02 and TT-03 are continuously measure the temperature of LFG for the flow normalization.																																																	
Value(s) of monitored parameter:	0 ~ 66.0 For applied value, please refer to the worksheet of '08-1_T_50MW' and '08-2_T_2nd_LF' of 'SLC CDM Data Workbook Phase 8'																																																	
Monitoring equipment:	<table><tr><td>Item name</td><td>TT-02</td></tr><tr><td>Coverage</td><td>Temperature of LFG captured from 2nd landfill</td></tr><tr><td>Type</td><td>PT 100Ω</td></tr><tr><td>Accuracy class</td><td>±0.2%</td></tr><tr><td>Serial number</td><td>WS1025016</td></tr><tr><td>Calibration frequency</td><td>1 year</td></tr><tr><td>Date of last calibration</td><td>20/09/2011, 30/10/2012</td></tr><tr><td>Validity</td><td>Valid from 20/09/2011 to 19/09/2012 and from 30/10/2012 to 29/10/2013 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 5.0)" from 19/09/2012 to 30/10/2012.</td></tr></table> <table><tr><td>Item name</td><td>TT-04</td></tr><tr><td>Coverage</td><td>Temperature of LFG which fed to 50MW power plant(reserve) from 02/11/2012 to 06/12/2012</td></tr><tr><td>Type</td><td>PT 100Ω</td></tr><tr><td>Accuracy class</td><td>±2.5°C</td></tr><tr><td>Serial number</td><td>LG-TE-01</td></tr><tr><td>Calibration frequency</td><td>1 year</td></tr><tr><td>Date of last calibration</td><td>04/01/2012, 12/10/2012</td></tr><tr><td>Validity</td><td>Valid from 04/01/2012 to 11/10/2013</td></tr></table> <table><tr><td>Item name</td><td>TT-10</td></tr><tr><td>Coverage</td><td>Temperature of LFG which fed to 50MW power plant</td></tr><tr><td>Type</td><td>PT 100Ω</td></tr><tr><td>Accuracy class</td><td>±0.2%</td></tr><tr><td>Serial number</td><td>WS1025017</td></tr><tr><td>Calibration frequency</td><td>1 year</td></tr><tr><td>Date of last calibration</td><td>24/10/2011, 30/10/2012</td></tr><tr><td>Validity</td><td>Valid from 24/10/2011 to 23/10/2012 and from 30/10/2012 to 29/10/2013</td></tr></table>		Item name	TT-02	Coverage	Temperature of LFG captured from 2 nd landfill	Type	PT 100Ω	Accuracy class	±0.2%	Serial number	WS1025016	Calibration frequency	1 year	Date of last calibration	20/09/2011, 30/10/2012	Validity	Valid from 20/09/2011 to 19/09/2012 and from 30/10/2012 to 29/10/2013 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 5.0)" from 19/09/2012 to 30/10/2012.	Item name	TT-04	Coverage	Temperature of LFG which fed to 50MW power plant(reserve) from 02/11/2012 to 06/12/2012	Type	PT 100Ω	Accuracy class	±2.5°C	Serial number	LG-TE-01	Calibration frequency	1 year	Date of last calibration	04/01/2012, 12/10/2012	Validity	Valid from 04/01/2012 to 11/10/2013	Item name	TT-10	Coverage	Temperature of LFG which fed to 50MW power plant	Type	PT 100Ω	Accuracy class	±0.2%	Serial number	WS1025017	Calibration frequency	1 year	Date of last calibration	24/10/2011, 30/10/2012	Validity	Valid from 24/10/2011 to 23/10/2012 and from 30/10/2012 to 29/10/2013
Item name	TT-02																																																	
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Type	PT 100Ω																																																	
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Validity	Valid from 24/10/2011 to 23/10/2012 and from 30/10/2012 to 29/10/2013																																																	
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 comment:																																		
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-06 are continuously measure the pressure of LFG for the flow normalization.																																	
Value(s) of monitored parameter:	-2,556 ~ 1,636 For applied value, please refer to the worksheet of '09-1_P_50MW' and '09-2_P_2nd_LF' of 'SLC CDM Data Workbook Phase 8'																																	
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</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>26/09/2011, 06/11/2012</td> </tr> <tr> <td>Validity</td> <td> Valid from 26/09/2011 to 25/09/2012 and from 06/11/2012 to 05/11/2013 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 5.0)" from 26/09/2012 to 06/11/2012 </td> </tr> </table> <table border="1"> <tr> <td>Item name</td> <td>PT-06</td> </tr> <tr> <td>Coverage</td> <td>Pressure of LFG which fed to 50MW power plant(reserve) From 02/11/2012 to 06/12/2012</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>0447-04111204003</td> </tr> <tr> <td>Calibration frequency</td> <td>1 year</td> </tr> <tr> <td>Date of last calibration</td> <td>27/10/2011, 22/10/2012</td> </tr> <tr> <td>Validity</td> <td>Valid from 27/10/2011 to 21/10/2013</td> </tr> </table>		Item name	PT-02	Coverage	Pressure of LFG captured from 2 nd landfill	Type	Smart gauge pressure transmitter	Accuracy class	±0.075% at span	Serial number	3940244	Calibration frequency	1 year	Date of last calibration	26/09/2011, 06/11/2012	Validity	Valid from 26/09/2011 to 25/09/2012 and from 06/11/2012 to 05/11/2013 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 5.0)" from 26/09/2012 to 06/11/2012	Item name	PT-06	Coverage	Pressure of LFG which fed to 50MW power plant(reserve) From 02/11/2012 to 06/12/2012	Type	Absolute pressure transmitter	Accuracy class	±0.5%	Serial number	0447-04111204003	Calibration frequency	1 year	Date of last calibration	27/10/2011, 22/10/2012	Validity	Valid from 27/10/2011 to 21/10/2013
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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</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>25/10/2011, 12/11/2012</td></tr> <tr> <td>Validity</td><td>Valid from 25/10/2011 to 24/10/2012 and from 12/11/2012 to 11/11/2013</td></tr> </table>	Item name	PT-10	Coverage	Pressure of LFG which fed to 50MW power plant	Type	Absolute pressure transmitter	Accuracy class	±0.5%	Serial number	WS1025015	Calibration frequency	1 year	Date of last calibration	25/10/2011, 12/11/2012	Validity	Valid from 25/10/2011 to 24/10/2012 and from 12/11/2012 to 11/11/2013
Item name	PT-10																
Coverage	Pressure of LFG which fed to 50MW power plant																
Type	Absolute pressure transmitter																
Accuracy class	±0.5%																
Serial number	WS1025015																
Calibration frequency	1 year																
Date of last calibration	25/10/2011, 12/11/2012																
Validity	Valid from 25/10/2011 to 24/10/2012 and from 12/11/2012 to 11/11/2013																
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 comment:																	

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 2012</td><td>31,098.2</td><td>31,098.2</td><td></td></tr> <tr><td>Aug</td><td>33,891.9</td><td>33,891.9</td><td></td></tr> <tr><td>Sep</td><td>19,307.4</td><td>19,307.4</td><td></td></tr> <tr><td>Oct</td><td>34,048.5</td><td>34,048.5</td><td></td></tr> <tr><td>Nov</td><td>32,959.9</td><td>32,959.9</td><td></td></tr> <tr><td>Dec</td><td>26,286.1</td><td>26,286.1</td><td></td></tr> <tr><td>Jan 2013</td><td>25,822.5</td><td>25,822.5</td><td></td></tr> <tr><td>Feb</td><td>30,028.1</td><td>30,028.1</td><td></td></tr> <tr><td>Mar</td><td>9,137.7</td><td>9,137.7</td><td></td></tr> <tr><td>Apr</td><td>30,754.2</td><td>30,754.2</td><td></td></tr> <tr><td>May</td><td>33,296.5</td><td>33,296.5</td><td></td></tr> <tr><td>Jun</td><td>30,953.1</td><td>30,953.1</td><td></td></tr> <tr><td>Total</td><td>337,584.1</td><td>337,584.1</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 8'</p>		Measured Value	Applied Value	Remarks	Jul 2012	31,098.2	31,098.2		Aug	33,891.9	33,891.9		Sep	19,307.4	19,307.4		Oct	34,048.5	34,048.5		Nov	32,959.9	32,959.9		Dec	26,286.1	26,286.1		Jan 2013	25,822.5	25,822.5		Feb	30,028.1	30,028.1		Mar	9,137.7	9,137.7		Apr	30,754.2	30,754.2		May	33,296.5	33,296.5		Jun	30,953.1	30,953.1		Total	337,584.1	337,584.1	
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Total	337,584.1	337,584.1																																																							

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	11/07/2007, 28/06/2010																																																										
	Validity	Valid from 11/07/2007 to 27/12/2013																																																										
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 comment:																																																												
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 3 watt-hour meters are installed to monitor electricity imported. WH-03 is for imported electricity in 50MW power plant. WH-05 is for LFG blower of 2 nd landfill and WH-06 is for central flaring facility.																																																											
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 2012</td><td>483.2</td><td>483.2</td><td></td></tr> <tr><td>Aug</td><td>443.2</td><td>443.2</td><td></td></tr> <tr><td>Sep</td><td>801.9</td><td>801.9</td><td></td></tr> <tr><td>Oct</td><td>424.8</td><td>424.8</td><td></td></tr> <tr><td>Nov</td><td>427.1</td><td>427.1</td><td></td></tr> <tr><td>Dec</td><td>677.0</td><td>677.0</td><td></td></tr> <tr><td>Jan 2013</td><td>393.6</td><td>393.6</td><td></td></tr> <tr><td>Feb</td><td>350.5</td><td>352.3</td><td></td></tr> <tr><td>Mar</td><td>785.4</td><td>785.4</td><td></td></tr> <tr><td>Apr</td><td>450.7</td><td>450.7</td><td></td></tr> <tr><td>May</td><td>309.6</td><td>429.0</td><td></td></tr> <tr><td>Jun</td><td>300.2</td><td>379.3</td><td></td></tr> <tr><td>Total</td><td>5,847.2</td><td>6,047.6</td><td></td></tr> </tbody> </table>					Measured Value	Applied Value	Remarks	Jul 2012	483.2	483.2		Aug	443.2	443.2		Sep	801.9	801.9		Oct	424.8	424.8		Nov	427.1	427.1		Dec	677.0	677.0		Jan 2013	393.6	393.6		Feb	350.5	352.3		Mar	785.4	785.4		Apr	450.7	450.7		May	309.6	429.0		Jun	300.2	379.3		Total	5,847.2	6,047.6	
	Measured Value	Applied Value	Remarks																																																									
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Total	5,847.2	6,047.6																																																										

Value(s) of monitored parameter:	For applied value and measured value, please refer to the worksheet of '06-2_EL_imp_50MW', '06-3_EL_imp_LFG_mgt_centre' and '06-4_EL_imp_2nd_LF' of 'SLC CDM Data Workbook Phase 8'																																																	
Monitoring equipment:	<table border="1"> <tr><td>Item name</td><td>WH-03</td></tr> <tr><td>Coverage</td><td>Electricity imported to the 50MW power plant</td></tr> <tr><td>Type</td><td>Electronic watt-hour meter</td></tr> <tr><td>Accuracy class</td><td>0.5 class</td></tr> <tr><td>Serial number</td><td>6063941</td></tr> <tr><td>Calibration frequency</td><td>7 years (according to the national standard)</td></tr> <tr><td>Date of last calibration</td><td>17/08/2006</td></tr> <tr><td>Validity</td><td>Valid from 17/08/2006 to 16/08/2013</td></tr> </table> <table border="1"> <tr><td>Item name</td><td>WH-05</td></tr> <tr><td>Coverage</td><td>Electricity imported to the LFG blower of 2nd landfill</td></tr> <tr><td>Type</td><td>Electronic watt-hour meter</td></tr> <tr><td>Accuracy class</td><td>0.5 class</td></tr> <tr><td>Serial number</td><td>1104001</td></tr> <tr><td>Calibration frequency</td><td>7 years (according to the national standard)</td></tr> <tr><td>Date of last calibration</td><td>14/02/2011</td></tr> <tr><td>Validity</td><td>Valid from 14/02/2011 to 13/02/2018</td></tr> </table> <table border="1"> <tr><td>Item name</td><td>WH-06</td></tr> <tr><td>Coverage</td><td>Electricity imported to the central flaring facility</td></tr> <tr><td>Type</td><td>Electronic watt-hour meter</td></tr> <tr><td>Accuracy class</td><td>0.5 class</td></tr> <tr><td>Serial number</td><td>10JAJ073(24)</td></tr> <tr><td>Calibration frequency</td><td>7 years (according to the national standard)</td></tr> <tr><td>Date of last calibration</td><td>05/04/2011(10JAJ073(24))</td></tr> <tr><td>Validity</td><td>Valid from 05/04/2011 to 04/04/2018</td></tr> </table>		Item name	WH-03	Coverage	Electricity imported to the 50MW power plant	Type	Electronic watt-hour meter	Accuracy class	0.5 class	Serial number	6063941	Calibration frequency	7 years (according to the national standard)	Date of last calibration	17/08/2006	Validity	Valid from 17/08/2006 to 16/08/2013	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(10JAJ073(24))	Validity	Valid from 05/04/2011 to 04/04/2018
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Validity	Valid from 05/04/2011 to 04/04/2018																																																	
Measuring/ Reading/Recording frequency:	Continuous measuring & reading, hourly recording																																																	
Calculation method (if applicable):	(WH-03) + (WH-05) + (WH-06)																																																	
QA/QC procedures:	WH-03: Under control of KEPCO 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																																																	
Purpose of data:	Calculation of baseline emissions																																																	
Additional comment:																																																		

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 comment:	

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:	7,751
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 comment:	

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:	180 Kg Please refer to the worksheet of '10_PE_LPG' of 'SLC CDM Data Workbook Phase 8'.
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 comment:	

D.3. Implementation of sampling plan

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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

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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:

$$ER_y = (MD_{project,y} - MD_{reg,y}) * GWP_{CH_4} + EL_y \cdot CEF_{electricity,y} - ET_y * CEF_{thermal,y} \quad (1)$$

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_{CH_4}	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 AMSLD, 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;

$$BE = (MD_{project} - MD_{reg}) \times GWP_{CH_4} + EL \times CEF_{electricity} + ET \times CEF_{thermal}$$

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;

$$BE = (MD_{project} \times (1 - AF) \times GWP_{CH_4} + (EL_{exp} - EL_{imp}) \times EF$$

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.

$$BE_{methane_avoidance} = (LFG_{selected} \times W_{CH_4} \times D_{CH_4} \times (1 - AF) \times GWP_{CH_4}$$

$$MD_{project} = LFG_{selected} \times W_{CH_4} \times D_{CH_4}$$

	LFG _{selected} (Nm ³)	W _{CH₄} (%)	MD _{project} (tCH ₄)	AF applied BE (tCH ₄)	BE from CH ₄ avoidance (tCO ₂ e)
Jul 2012	27,867,416.8	47.5	9,489.6	3,686.7	77,421
Aug	27,923,186.8	47.7	9,543.4	3,707.6	77,860
Sep	27,286,937.7	47.7	9,321.0	3,621.2	76,046
Oct	28,091,908.0	44.8	9,021.7	3,504.9	73,603
Nov	25,850,247.6	43.9	8,134.0	3,160.0	66,361
Dec	26,426,411.7	46.3	8,759.1	3,402.9	71,461
Jan 2013	25,193,749.4	47.0	8,478.4	3,293.9	82,346
Feb	23,637,834.3	46.2	7,822.2	3,038.9	75,973
Mar	26,521,847.7	44.1	8,369.2	3,251.4	81,286
Apr	24,974,325.0	46.1	8,250.9	3,205.5	80,137
May	23,511,474.6	46.1	7,766.7	3,017.3	75,434
Jun	22,261,575.6	47.0	7,507.4	2,916.6	72,916
Total	309,546,915.2	46.2	102,463.6	39,807.1	910,844

* 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.

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

	Elec. exported (MWh)	Elec. imported (MWh)	Net generation (MWh)	BE from elec. generation (tCO ₂ e)
Jul 2012	31,098.2	483.2	30,615.0	17,346
Aug	33,891.9	443.2	33,448.7	18,952
Sep	19,307.4	801.9	18,505.5	10,485

Oct	34,048.5	424.8	33,623.7	19,051
Nov	32,959.9	427.1	32,532.7	18,433
Dec	26,286.1	677.0	25,609.2	14,510
Jan 2013	25,822.5	393.6	25,428.8	14,408
Feb	30,028.1	352.3	29,675.8	16,814
Mar	9,137.7	785.4	8,352.3	4,732
Apr	30,754.2	450.7	30,303.5	17,170
May	33,296.5	429.0	32,867.6	18,623
Jun	30,953.1	379.3	30,573.8	17,323
Total	337,584.1	6,047.6	331,536.5	187,849

* 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 (Kg)	Usage of central flaring facility (Kg)	PE _{LPG} (tCO ₂ e)
2010	50	0	0.10895
2011	0	40	0.08716
2012	0	40	0.08716
2013	0	50	0.10895
Total	50	130	0.39224

For conservativeness, 1 tCO₂e applied though calculated project emissions from LPG usage were 0.39224 tCO₂e.

E.3. Calculation of leakage

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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 anthropogenic 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)	Emission reductions or net anthropogenic GHG removals by sinks (t CO ₂ e)
Total	1,054,064	1	0	1,054,063

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

Item	Values estimated in ex-ante calculation of registered PDD	Actual values achieved during this monitoring period
Emission reductions or GHG removals by sinks (t CO ₂ e)	1,260,923	1,054,063

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

>>

Claimed actual emission reductions are about 83.4% 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 01/10/2013), the performance of this project is not extraordinary.

E.7. Actual emission reductions or net anthropogenic GHG removals by sinks during the first commitment period and the period from 1 January 2013 onwards

Item	Actual values achieved up to 31 December 2012	Actual values achieved from 1 January 2013 onwards
Emission reductions or GHG removals by sinks (t CO ₂ e)	519,032	535,031

Document information

<i>Version</i>	<i>Date</i>	<i>Description</i>
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 anthropogenic 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, performance monitoring		