

**MONITORING REPORT FORM (CDM-MR)**
Version 01 - in effect as of: 28/05/2010**CONTENTS**

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Annex I: Daily Calculation Result

**MONITORING REPORT**

Version 01.3 (30/08/2010)

Sudokwon Landfill Gas Electricity Generation Project (50MW)

0941

3rd monitoring period (01/06/2008 – 31/12/2008)**SECTION A. General description of the project activity****A.1. Brief description of the 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. There are 4 landfills in Sudokwon landfill. 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 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) is designed to minimize greenhouse gas emission by enhancing capturing efficiency of landfill gas (LFG) and utilizing it as a fuel of 50MW power plant.

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

For treating LFG and generating renewable energy, 50MW power plant was constructed. This power plant is mainly composed of 2 boilers which generate steam by LFG and 1 steam turbine. The construction of power plant was finished in 15/12/2006 and it has been under commercial run since 15/03/2007.

Finally, this is the 3rd monitoring period covering 7 months (from 01/06/2008 to 31/12/2008, 214 days) and monitored emission reduction is 548,276 tCO₂e.

A.2. Project Participants

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Sudokwon Landfill site management Corporation (SLC)

- Involved party: Republic of Korea (host country)

A.3. Location of the project activity:

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

North latitude over 37 ° 33 ' ~ 37 ° 37 ' and east longitude over 126 ° 33 ' ~ 126 ° 40 '

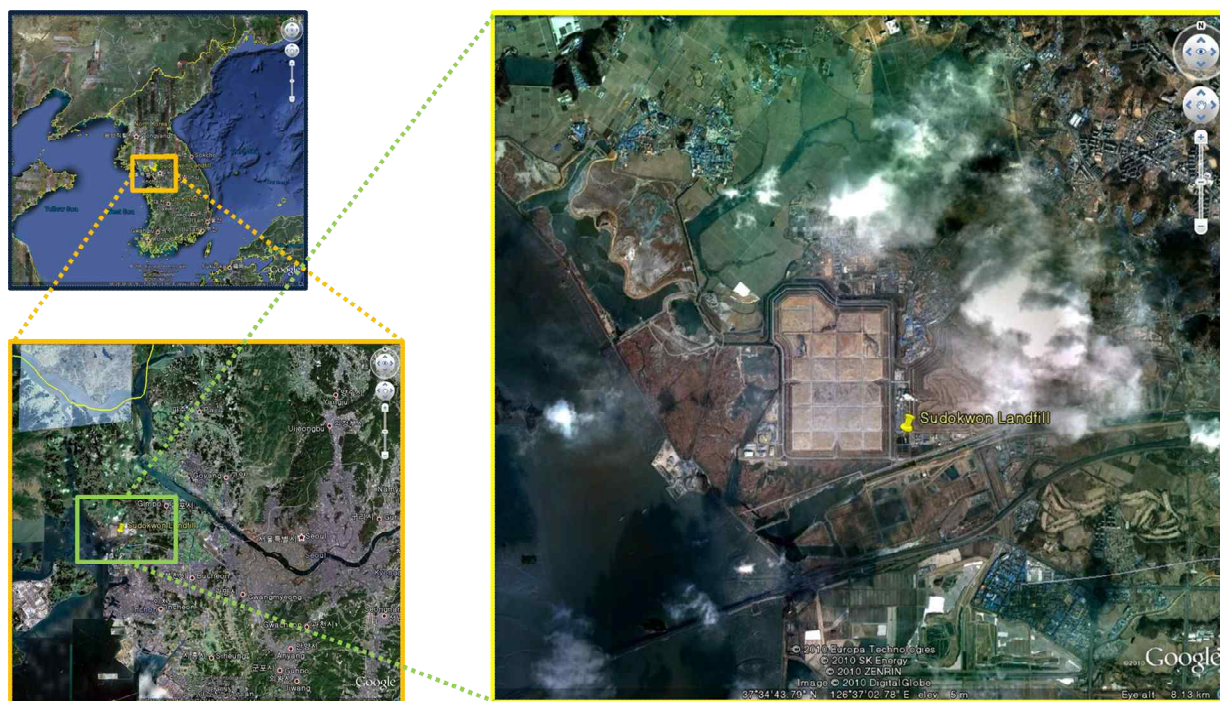


Figure 1 Location of the project activity (SLC)

A.4. Technical description of the project

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Landfill Gas Collection System

Construction of 1st site for stabilization is completed in Dec 2004, and LFG is collected by existing horizontal pipes and new vertical pipes. These vertical pipes are installed as additional facilities for 50MW power plant.

Reclamation of 2nd site is on progress and vertical pipes are installed on reclamation for maximizing LFG collection efficiency, which makes LFG from 2nd site increase.

In case of normal operation, most of LFG is planned to be used by 50MW power plant and only the rest will be destroyed by central flaring facility. In case of emergency or maintenance of 50MW power plant, LFG will be flared by central flaring facility.

Major specification of collection system is as below;

Facilities	Capacity	Quantity	Remarks
Collection pipes (horizontal)	D150, D200	24 ea	O, P block
		24 ea	Level 6
		12 ea	Level 7
Collection pipes (separation linking)	D100	60 ea	
Collection pipes (vertical)	D200, D250	329 ea	
Transferring pipes	D100	80.5 km	



Outer header pipes	D600	6.4 km 6.2 km 6.0 km	Level 2 Level 4 Level 6
Condensing water excluding system		57 ea 57ea	Level 2 Level 6
Gas blowers	85 m ³ /min 170 m ³ /min	4 ea 2 ea	
Gas distributor		31 ea	Manifold station

Table 1 LFG Collection system in 1st landfill

Facilities	Capacity	Quantity	Remarks
Collection pipes (horizontal)	D200, D300	36 km	
Collection pipes (supplement header)	D400	5 km	
Collection pipes (vertical)	D200, D250	699 ea	
Transferring pipes	D100	194 km	
Outer header pipes	D400 ~ D600 D700	6.5 km 8.6 km	Level 2 Level 3
Condensing water excluding system		52 ea	
Gas blowers	250 m ³ /min	5 ea	
Gas distributor		44 ea	Manifold station

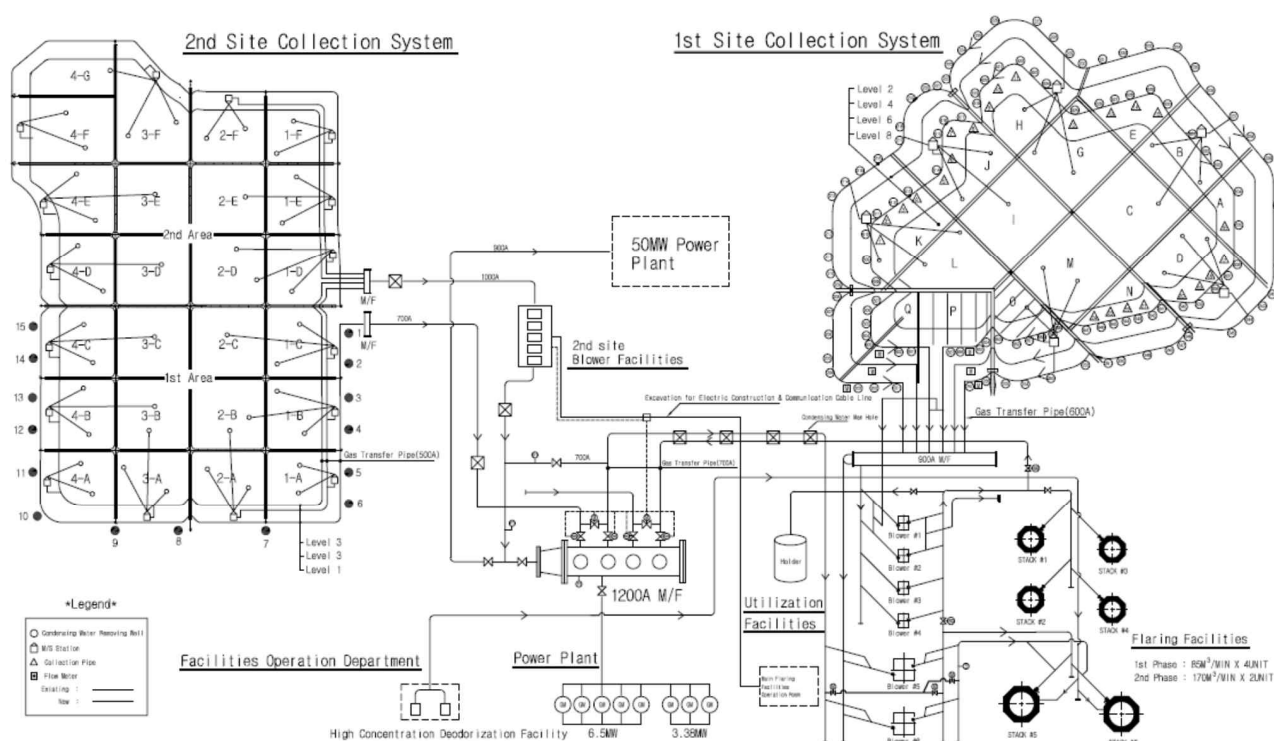
Table 2 LFG Collection system in 2nd landfill

Figure 2 50MW project LFG Collection and Decomposition facilities

Generating System

50MW Boiler was supplied and installed by Doosan Heavy Industries and steam turbine by Mitsubishi Heavy Industries.

The process of boiler is as follows; flue gas is generated by combustion of CH₄ in combustor, this flue gas produces steam by heat-transfer to heating surface and is supplied to turbine. This boiler is semi-open, Drum, Natural draft and Forced draft type which has simple structure and is easy to operate. As a fuel, LPG is used for start-up and LFG for normal operation.

Major specification of boiler is as below

- Steam flow: 106.2 ton/hr (@BMCR)
- Steam pressure: 100 kg/cm².g (@BMCR)
- Steam Temperature: 539 °C
- Efficiency : 82.4 % @ HHV, ASME Condition

This project adopts steam turbine for following reasons; (1) Steam turbine produces pollutant less than other alternatives (i.e. gas engine, gas turbine, HRSG etc.) (2) it needs no pretreatment facilities (3) low quality LFG can be used (4) when generating capacity exceeds 10MW, it is economically more attractive than other alternatives.

Most of thermal energy of superheated steam supplied by boiler is converted to kinetic energy which operates generator, some of thermal energy is used for heating feed water and the rest are transferred to circulation system by condenser. Supplied turbine is single casing, non-reheating, recycling and condensing one.

Major specification of steam turbine is as below

- Power: 50,000 kW
- Steam temperature and pressure: 536 °C, 95 kg/cm².g
- Rotation per minute: 3,600 rpm
- Steam flow: 184,300 kg/hr (@MGR)
- Heat Consumption: 2,201.4 kcal/kWh (@MGR)

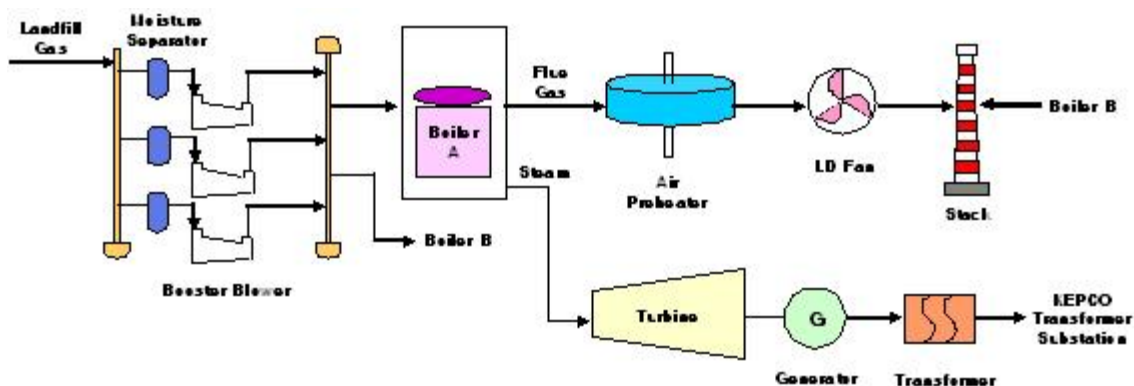


Figure 3 Steam Turbine and electricity grid system flow chart



Major specification of transmission system is as below

- Specification: 154kV 1 line, 240 mm²
- Overhead transmission tower: 29 units
- Overhead transmission line: 7.615 km
- Connection point : KEPCO Kyeyang Substation

A.5. Title, reference and version of the baseline and monitoring methodology applied to the project activity:

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There are two methodologies applied to the project activity;

“Consolidated baseline methodology for landfill gas project activities”, ACM0001 version 04

http://cdm.unfccc.int/UserManagement/FileStorage/CDMWF_AM_TX29WGSXE4781NKGQGCPT_HM2F3V3D

“Consolidated baseline methodology for grid-connected electricity generation from renewable sources”, ACM0002 version 06

http://cdm.unfccc.int/UserManagement/FileStorage/CDMWF_AM_BW759ID58ST5YEEV6WUCN5744MN763

A.6. Registration date of the project activity:

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30/04/2007

A.7. Crediting period of the project activity and related information (start date and choice of crediting period):

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

According to the PDD, the crediting period started the 01/04/2007 for a period of 10 years. In accordance with the Conference of the Parties decision 17/CP.7, however, the start date of the crediting period has been changed to the date of registration, 30/04/2007.

A.8. Name of responsible person(s)/entity(ies):

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Lae Bong Han (Mr)

Seongmin Park (Mr)



CDM – Executive Board

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SECTION B. Implementation of the project activity

B.1. Implementation status of the 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 4 The front view of 50MW LFG power plant

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

Date	Duration	Operation events	Note
01/06/2008		Operated with full load (50MW)	
15/06/2008	415 hours	Periodic overhaul (on a yearly basis)	
16/07/2008	2 hours	The output downed to 30MW in order to tune LFG booster blower	
17/07/2008	2 hours		
22/07/2008	5 hours	Lowered its output for boilers test	
28/07/2008	100 hours	Stopped for maintenance of LFG capturing pipeline	
02/08/2008	11 hours	Emergency stoppage due to boiler problem	
03/08/2008	7 hours		
18/08/2008	7 hours	Emergency stoppage due to failure of LFG booster blower	
10/09/2008	2 hours	Lowered its output for burner test	
02/10/2008	9 hours	Emergency stoppage due to failure of LFG booster blower	
30/11/2008	91 hours	Periodic maintenance (on a half year basis)	

Table 3 Operational events of 50MW power plant



Date	Duration	Operation events	Note
01/06/2008		#6 flare is operational for treating LFG which is not treated by 50MW power plant	
15/06/2008	415 hours	Due to periodic overhaul of 50MW power plant, all flares ignited in order to treat LFG	
19/06/2008	18 hours	For credibility and stability of monitoring, new flow meters installed for #1, 3, 4 & 6 flare (FT-04, 06, 07 & 09 respectively). For safety, all LFG capturing facilities and flares were shut down during this period	
20/06/2008	3 hours	Stoppage of #6 flare for maintenance	
27/06/2008	4 hours	Stoppage of #2 flare for maintenance	
30/06/2008	2 hours	LFG flow of each flare adjusted as flaring temperature of #6 flare exceeds its measuring range	
07/07/2008	1 hour	Temporal operation of #1 flare for exhaust gas sampling	
08/07/2008	3 hours	Temporal operation of #2 ~ #5 flares for exhaust gas sampling. Operational flare changed from #6 to #5 afterward.	
11/07/2008	11 hours	For credibility and stability of monitoring, new flow meters installed for #2 & 5 flare (FT-05 & 08 respectively). For safety, operational flare changed from #5 to #1, 3, 4 & 6.	
29/09/2008	1 hour	Due to maintenance work, operational flare changed from #6 to #5	
30/11/2008	91 hours	Due to periodic maintenance of 50MW power plant, all flares ignited in order to treat LFG. Operational flare changed from #5 to #6 afterward	
09/12/2008	10 hours	For landfill stability, #2 & #3 flare ignited in order to treat LFG from 1 st landfill which is not collected continuously by blowers	

Table 4 Operational events of central flaring facility

Date	Duration	Operation events	Corrective actions on data
01/06/2008	108 days	Temperature transmitter in LFG management centre (TT-03) records unreasonably constant values (46°C, 31°C)	Most conservative value in entire monitoring period (63°C) applied. Compare to TT-04, which highest value is 53.1°C, this approach is conservative
02/06/2008	176 hours	Due to 3 rd party calibration, methane analysers (GA-01, 02) were removed and therefore no data recorded	Most conservative value in entire monitoring period (both 38%) applied
28/06/2008	44 hours	Due to temporal error of signal converter, methane fraction of LFG from 1 st landfill was not recorded	Most conservative value in entire monitoring period (38%) applied
28/07/2008	92 hours	LFG flow of 2 nd landfill was not recorded due to extraction of flow meter for 3 rd party calibration	In order to calculate the flow, following equation used; $\text{LFG}_{2^{\text{nd}}} = \text{LFG}_{50\text{MW}} + \text{LFG}_{\text{flare}} - \text{LFG}_{1^{\text{st}}}$



29/07/2008	76 hours	Methane fraction of LFG from 2 nd landfill was not recorded due to calibration of LFG flow meter, which includes LFG sampling point for analysis	Most conservative value in entire monitoring period (38%) applied
29/07/2008	22 hours	Due to excessive condensing water, LFG flow meter of #6 flare was malfunctioning	Most conservative value of 0 Nm ³ applied
11/08/2008	71 hours	LFG flow of 50MW power plant was not recorded due to extraction of flow meter for 3 rd party calibration (2 times)	Minimum LFG usage of 50MW power plant during entire monitoring period (23,433.7 Nm ³) applied where the power plant was fully operational and electricity output is same or more than minimum (44,793,73 kWh & 44,808,96 kWh respectively) in this period
27/08/2008	49 hours		
19/09/2008	500 hours	Temperature of LFG which flared was not recorded due to extraction of temperature transmitter (TT-03) for 3 rd party repair & calibration	Most conservative value in entire monitoring period (63°C) applied
24/11/2008	104 hours	Due to 3 rd party calibration, LFG flow meter at 2 nd landfill (FT-02), temperature & pressure meters (TT-03, TC-01 ~ 04 & 06, PT-05) were removed and therefore no data recorded	For conservativeness, maximum & minimum values in entire monitoring period (63°C, 264 mmAq) applied for TT-03 & PT-05 respectively For TCs, 0°C applied for conservativeness. For FT-02, following equation used for calculation; $\text{LFG}_{2^{\text{nd}}} = \text{LFG}_{50\text{MW}} + \text{LFG}_{\text{flare}} - \text{LFG}_{1^{\text{st}}}$
27/11/2008	24 hours	Due to temporal program error, flow, temperature and pressure of LFG which fed to 50MW power plant were not recorded	For conservativeness, maximum & minimum values in entire monitoring period (53.1°C, 92.52mmAq) applied to TT-04 & PT-06 respectively. Minimum LFG usage of 50MW power plant during entire monitoring period (30,716.56 Nm ³) applied where the plant was fully operational and electricity output is same or more than minimum (45,384.19kWh) in this period.
01/12/2008	49 hours	Due to maintenance of LFG blower at 2 nd landfill, reserve pipeline was connected to central flaring facility, which cannot be measured by LFG flow meter of 2 nd landfill in order to ensure safety	Following equation used for calculation; $\text{LFG}_{2^{\text{nd}}} = \text{LFG}_{50\text{MW}} + \text{LFG}_{\text{flare}} - \text{LFG}_{1^{\text{st}}}$



01/12/2008	73 hours	Due to 3 rd party calibration, LFG temperature & pressure meters (TT-04 & PT-06) were removed and therefore no data recorded	For conservativeness, maximum & minimum values in entire monitoring period (53.1°C, 92.52mmAq) applied to TT-04 & PT-06 respectively.
09/12/2008	17 hours	Due to temporal program error, flow & methane fraction of LFG from 2 nd landfill were not recorded	For methane fraction, most conservative value in entire monitoring period (38%) applied. Following equation used to calculate LFG flow of 2 nd landfill; LFG_2nd = LFG_50MW + LFG_Flare - LFG_1st

Table 5 Operational events of monitoring system and corrective actions

All facilities were already installed and fully operational as per PDD description except the 9.88MW power plant. It had not been operated since 03/2007 due to the technical problem. Therefore, the rest of LFG which is not treated in 50MW power plant was destroyed by central flaring facility only.

Regarding the stoppage of 9.88MW power plant, request for review was made by CDM Executive Board during 1st request for issuance. In accordance with the request for review of CDM Executive Board, emissions from the electricity generated by the existing 9.88MW power plant are regarded as baseline emissions and therefore should be deducted from emission reductions generated by the project activity.

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 214 days, total of 26,166 tCO₂ (215.79MWh × 214 days × 0.5666tCO₂/MWh) is deducted from emission reductions.

The request was raised in 18/02/2010. Joint response from SLC & DOE was made in 05/03/2010 and approved on 53th EB meeting. Related documents are available on the UNFCCC website.

Issuance Request for Review

<http://cdm.unfccc.int/Projects/DB/DNV-CUK1171534717.86/iProcess/TUEV-SUED1208270995.94/Review/PTFL27IU6U3QJIMC9WF8MZSN4F0HM7/viewPDF>

Joint response from project participant and DOE

<http://cdm.unfccc.int/UserManagement/FileStorage/CSV DHT7LAQW60Z8B5MKI4YN9RFPO2G>

Paragraph 83 (d) of CDM EB meeting report

<http://cdm.unfccc.int/EB/053/eb53rep.pdf>

B.2. Revision of the monitoring plan

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The monitoring plan has not been revised.

**B.3. Request for deviation applied to this monitoring period**

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No deviation applied to this monitoring period.

B.4. Notification or request of approval of changes

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There is no notification or request of approval of changes to this monitoring period.

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

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Data Collection Procedures

Monitoring and calculation were 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, flare 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 the collected data at fixed frequencies.

The data were measured and collected at each control system of the 50MW power plant, central flaring facility and internal electricity monitoring system. Data aggregation and emission reduction calculation has been made on a daily basis. The result of calculation is reported monthly and raw data is archived every two months. 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 were recorded electronically on hourly basis. Every recorded electronic data were also recorded in handwritten form.

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.

In order to enhance the accuracy & credibility of monitoring system, SLC replaced several LFG flow meters. In detail, LFG flow meters for central flaring facility (total of 6), which installed & operated more than 10 years and measure & record LFG flow in ACM (Actual Cubic Meter) unit, were replaced by new thermal mass type flow meters made by EPI ([Eldridge Product Inc.](#)). New meters can measure & record LFG flow in NCM (Normal Cubic Meter) unit.

CH₄ fraction

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

Electricity exported & imported

The amount of imported electricity which used for LFG capturing and flaring was recorded electronically by electricity monitoring system of SLC. Imported electricity for 50MW power plant was monitored by watt-hour meter and recorded in handwritten form, which can cross-checked by invoices from 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.

**Flare efficiency**

ACM0001 version 4 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.

Since the flare exhaust gas analysis was made in 11/02/2008 to 13/02/2008 and there were no methane content in exhaust gas at the start of the monitoring period, FE was regarded as 99.9% if the flaring temperature exceeds 600°C. Otherwise, the efficiency was regarded as 0% for conservativeness.

Considering the operational condition, the content analysis of flare's exhaust gas was conducted by 3rd party (Institute of Industrial Pollution Co. Ltd) in 08/07/2008. Details of the results are as follows;

	Date of analysis	Result of analysis	FE application over 600°C	
#1 Flare	08/07/2008 (at 600°C)	CH ₄ Not detected (ppm)	01/06/2008 ~ 31/12/2008	99.9%
#2 Flare	08/07/2008 (at 600°C)	CH ₄ Not detected (ppm)	01/06/2008 ~ 31/12/2008	99.9%
#3 Flare	08/07/2008 (at 600°C)	CH ₄ Not detected (ppm)	01/06/2008 ~ 31/12/2008	99.9%
#4 Flare	08/07/2008 (at 600°C)	CH ₄ Not detected (ppm)	01/06/2008 ~ 31/12/2008	99.9%
#5 Flare	08/07/2008 (at 600°C)	CH ₄ Not detected (ppm)	01/06/2008 ~ 31/12/2008	99.9%
#6 Flare	08/07/2008 (at 600°C)	CH ₄ Not detected (ppm)	01/06/2008 ~ 31/12/2008	99.9%

Table 6 Summary of flare exhaust gas analysis results

In ACM0001 version 4, FE should be calculated by analyzing methane contents of the flare emissions at least on a yearly basis for enclosed flares. Considering above and the result of former analysis made in 11/02/2008 to 13/02/2008 showed that there were no methane detected in exhaust gas of all flares at 600°C, above FE application is assumed as conservative. 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 also conservative approach.

Fossil fuel usage

The amount of fossil fuel (LPG) usage which supplied to flares and boilers of 50MW power plant in its ignition stage was checked monthly by weighing LPG vessels. The difference between each month was regarded as LPG usage.

Data Management

The accumulated data from control station was analyzed for the verification of this project. All required guidances were stated in SLC's internal procedure. These include data handling protocol, monitoring procedure, operation & maintenance guide, problem solving procedure, etc.

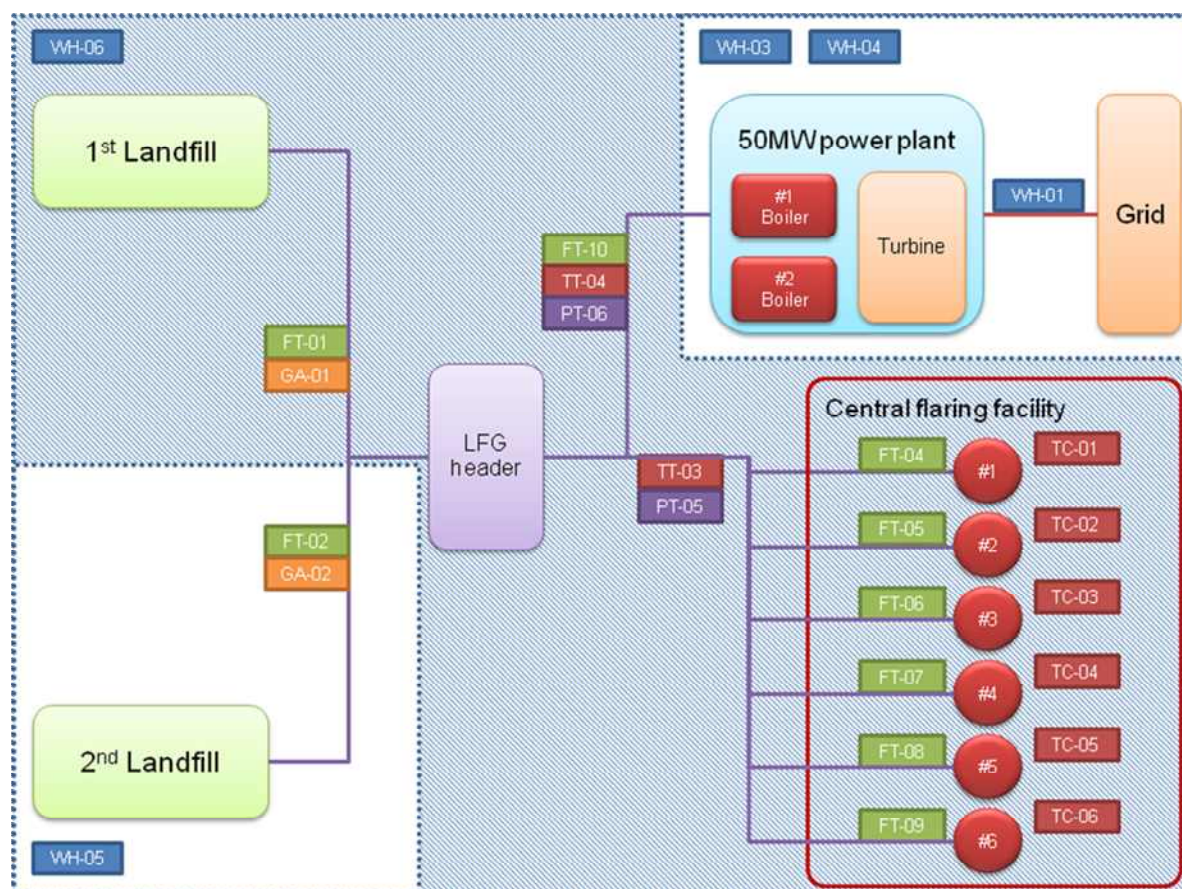


Figure 5 Line Diagram of Monitoring Points

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	CEO		ChunKoo Cho	Approval of monthly calculation result & monitoring report
	Executive Director (Project Development)		ChongSik Shin	Approval calculation result & monitoring report
	Environmental Technology Support Division	Head	Soosung Song	Approval calculation result & monitoring report
		Manager	LaeBong Han	Approval of daily calculation result & supervision of facility management



		Assistant manager	Seongmin Park	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
	50MW Power plant	Team manager	KyungYong Song	Management & operation of 50MW power plant
	Capture and Flaring	Part manager	Gilwon Kim	Management & operation of central flaring facility

Table 7 Major responsible personnel and its rules

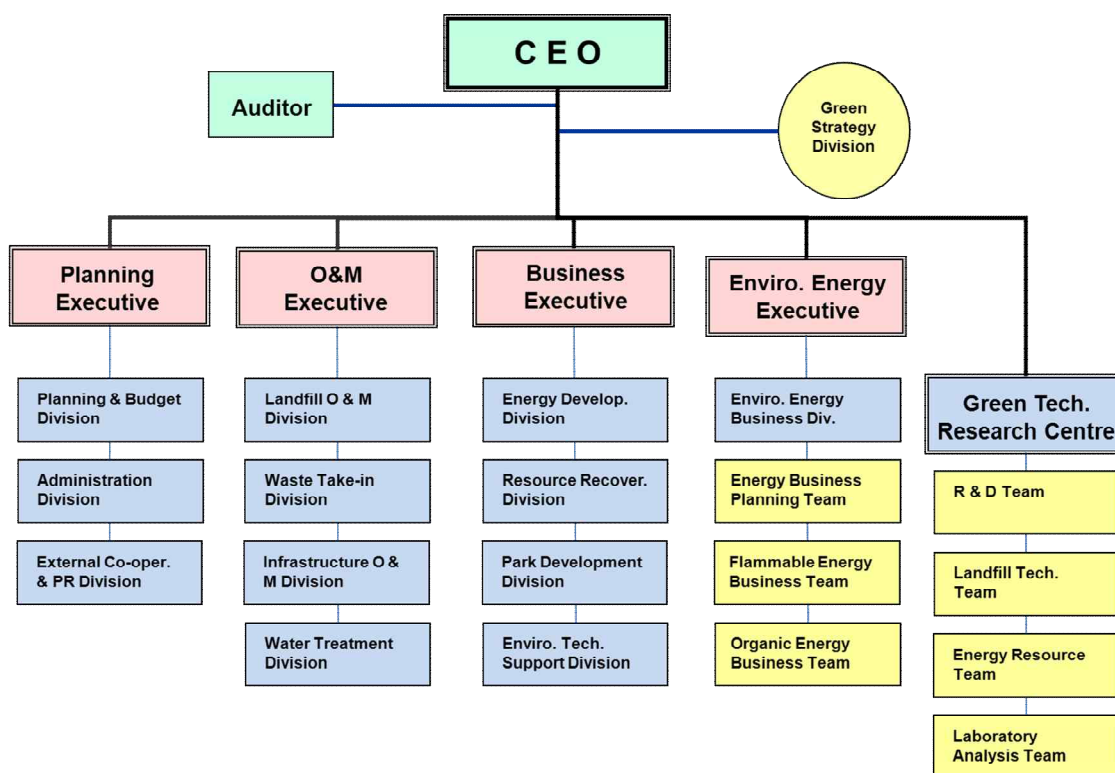


Figure 6 Organization Chart of SLC

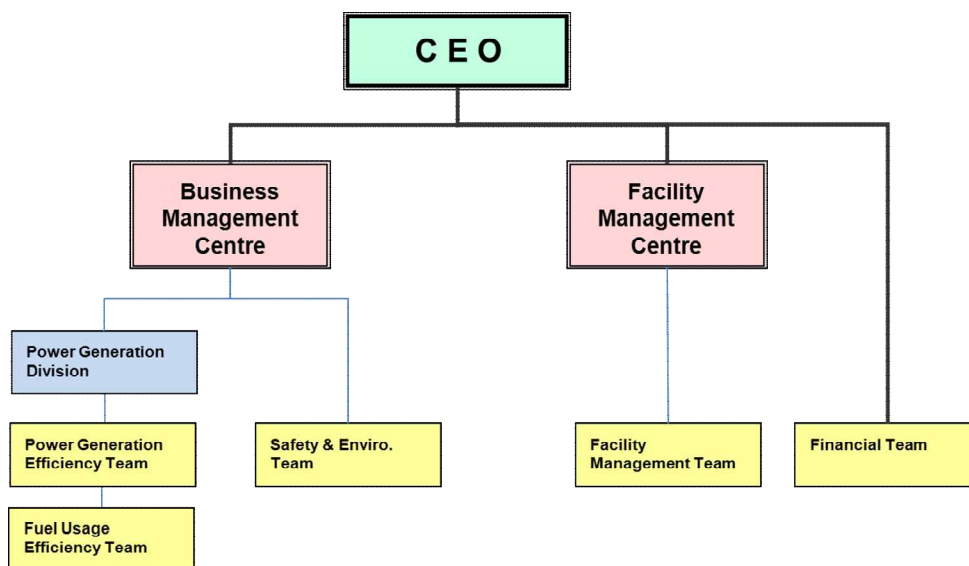


Figure 7 Organization Chart of Ecoenergy

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 -> Team manager -> Managing Partner -> CEO	Discoverer -> Team manager -> Managing Partner -> CEO
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 (Kum 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 (Kum am 032-568-7119, Seo bu 032-565-8119) if needed
Check frequency	Per week	Per month

Table 8 Typical emergency cases and its countermeasures

**SECTION D. Data and parameters****D.1. Data and parameters determined at registration and not monitored during the monitoring period, including default values and factors**

Data / Parameter:	GWP_{CH₄}
Data unit:	tCO₂/tCH₄
Description:	Global warming potential for methane (CH ₄)
Source of data used:	Default value in IPCC & ACM0001 version 4
Value(s) :	21
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Used for emission reductions calculation.
Additional comment:	N/A

Data / Parameter:	AF
Data unit:	%
Description:	Adjustment factor for calculating baseline emission.
Source of data used:	PDD
Value(s) :	61.15
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Used for emission reductions calculation.
Additional comment:	Ex-ante calculation in accordance with ACM0001 ver. 4 for entire crediting period.

Data / Parameter:	EF
Data unit:	tCO₂/MWh
Description:	Grid CO ₂ emission factor
Source of data used:	PDD
Value(s) :	0.5666
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Used for emission reductions calculation.
Additional comment:	Ex-ante calculation in accordance with ACM0002 ver. 6 for entire crediting period.

Data / Parameter:	D_{CH₄}
Data unit:	tCH₄/Nm³
Description:	Density of methane
Source of data used:	Default value in ACM0001 version 4
Value(s) :	0.0007168
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Used for emission reductions calculation.



Leakage emission calculations)	
Additional comment:	N/A

D.2. Data and parameters monitored

Data / Parameter:	LFG_{total,y}	
Data unit:	Nm³	
Description:	Total amount of landfill gas captured in year y	
Measured /Calculated /Default:	Continuously 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:	156,450,629	
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Used for baseline emissions calculation	
Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	Item name	FT-01
	Coverage	LFG flow of 1 st landfill
	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	14/05/2008
	Validity	Valid
	Item name	FT-02
	Coverage	LFG flow of 2 nd landfill
	Type	V-cone type flow meter
	Accuracy class	FE: ±1% DPT: ±0.1%
	Serial number	FE: HFV-20041004 DPT: CEQ-0383
	Calibration frequency	1 year
	Date of last calibration	FE: 31/07/2008 DPT: 27/11/2008(former: 15/10/2007)
	Validity	Valid For FE, calibration result of -4.938% applied in accordance with “Guidelines for assessing compliance with the calibration frequency requirements (version 01)” from 01/06/2008 to 30/07/2008. For DPT, maximum permissible error of -



		0.1% applied in accordance with “Guidelines for assessing compliance with the calibration frequency requirements (version 01)” from 15/10/2008 to 26/11/2008.
Measuring/ Reading/ Recording frequency:	Continuous measuring & reading, hourly recording	
Calculation method (if applicable):	(FT-01) + (FT-02)	
QA/QC procedures applied:	Daily check and regular maintenance Calibrated by approved 3 rd party authority	

Data / Parameter:	LFG_{flare,v}	
Data unit:	Nm³	
Description:	Amount of landfill gas which flared	
Measured /Calculated /Default:	Continuously 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 6 flaring stacks	
Value(s) of monitored parameter:	26,188,142	
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Used for baseline emissions calculation	
Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	Item name	FT-04 (old) from 01/06/2008 to 19/06/2008
	Coverage	LFG flow of #1 flaring stack
	Type	Pitot tube type flow meter
	Accuracy class	FE: ±1% DPT: ±0.1%
	Serial number	FE: V2062-01.1 DPT: A2B4536T
	Calibration frequency	1 year
	Date of last calibration	FE: 05/09/2008 DPT: 17/10/2007
	Validity	Valid For FE, -1% of maximum permissible error applied in accordance with “Guidelines for assessing compliance with the calibration frequency requirements (version 01)”.
	Item name	FT-04 (new) from 20/06/2008 to 31/12/2008
	Coverage	LFG flow of #1 flaring stack
	Type	Thermal mass type flow meter



	Accuracy class	$\pm[1\% \text{ RDG} + (0.5\% \text{ FS} + 0.02\% / ^\circ\text{C})]$
	Serial number	28031701
	Calibration frequency	1 year
	Date of last calibration	12/05/2008
	Validity	Valid
	Item name	FT-05 (old) from 01/06/2008 to 10/07/2008
	Coverage	LFG flow of #2 flaring stack
	Type	Pitot tube type flow meter
	Accuracy class	FE: $\pm 1\%$ DPT: $\pm 0.1\%$
	Serial number	FE: V2062-01.2 DPT: A2P5559T
	Calibration frequency	1 year
	Date of last calibration	FE: 05/09/2008 DPT: 17/10/2007
	Validity	Valid For FE, -1% of maximum permissible error applied in accordance with “Guidelines for assessing compliance with the calibration frequency requirements (version 01)”.
	Item name	FT-05 (new) from 11/07/2008 to 31/12/2008
	Coverage	LFG flow of #2 flaring stack
	Type	Thermal mass type flow meter
	Accuracy class	$\pm[1\% \text{ RDG} + (0.5\% \text{ FS} + 0.02\% / ^\circ\text{C})]$
	Serial number	28012903
	Calibration frequency	1 year
	Date of last calibration	08/07/2008
	Validity	Valid
	Item name	FT-06 (old) from 01/06/2008 to 19/06/2008
	Coverage	LFG flow of #3 flaring stack
	Type	Pitot tube type flow meter
	Accuracy class	FE: $\pm 1\%$ DPT: $\pm 0.1\%$
	Serial number	FE: V2062-01.4 DPT: A2B4530T
	Calibration frequency	1 year
	Date of last calibration	FE: 05/09/2008 DPT: 17/10/2007
	Validity	Valid For FE, -1% of maximum permissible error applied in accordance with



	“Guidelines for assessing compliance with the calibration frequency requirements (version 01)”.
Item name	FT-06 (new) from 20/06/2008 to 31/12/2008
Coverage	LFG flow of #3 flaring stack
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	09/05/2008
Validity	Valid
Item name	FT-07 (old) from 01/06/2008 to 19/06/2008
Coverage	LFG flow of #4 flaring stack
Type	Pitot tube type flow meter
Accuracy class	FE: $\pm 1\%$ DPT: $\pm 0.1\%$
Serial number	FE: V2062-01.3 DPT: A2P5551T
Calibration frequency	1 year
Date of last calibration	FE: 05/09/2008 DPT: 17/10/2007
Validity	Valid For FE, -1% of maximum permissible error applied in accordance with “Guidelines for assessing compliance with the calibration frequency requirements (version 01)”.
Item name	FT-07 (new) from 20/06/2008 to 31/12/2008
Coverage	LFG flow of #4 flaring stack
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	09/05/2008
Validity	Valid
Item name	FT-08 (old) from 01/06/2008 to 10/07/2008
Coverage	LFG flow of #5 flaring stack
Type	Pitot tube type flow meter
Accuracy class	FE: $\pm 1\%$ DPT: $\pm 0.1\%$



	Serial number	FE: V2973-01.1 DPT: A1F3913T
	Calibration frequency	1 year
	Date of last calibration	FE: 13/06/2008 DPT: 04/10/2007
	Validity	Valid For FE, -1% of maximum permissible error applied in accordance with “Guidelines for assessing compliance with the calibration frequency requirements (version 01)”.
	Item name	FT-08 (new) from 11/07/2008 to 31/12/2008
	Coverage	LFG flow of #5 flaring stack
	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	08/07/2008
	Validity	Valid
	Item name	FT-09 (old) from 01/06/2008 to 19/06/2008
	Coverage	LFG flow of #6 flaring stack
	Type	Pitot tube type flow meter
	Accuracy class	FE: $\pm 1\%$ DPT: $\pm 0.1\%$
	Serial number	FE: V2973-01.2 DPT: A5H2952T
	Calibration frequency	1 year
	Date of last calibration	FE: 13/06/2008 DPT: 04/10/2007
	Validity	Valid For FE, -1% of maximum permissible error applied in accordance with “Guidelines for assessing compliance with the calibration frequency requirements (version 01)”.
	Item name	FT-09 (new) from 20/06/2008 to 31/12/2008
	Coverage	LFG flow of #6 flaring stack
	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	12/05/2008



	Validity	Valid
Measuring/ Reading/ Recording frequency:	Continuous measuring & reading, hourly recording	
Calculation method (if applicable):	(FT-04) + (FT-05) + (FT-06) + (FT-07) + (FT-08) + (FT-09)	
QA/QC procedures applied:	Daily check and regular maintenance Calibrated by approved 3 rd party authority	

Data / Parameter:	LFG_{electricity,v}	
Data unit:	Nm³	
Description:	Amount of landfill gas which fed to 50MW power plant	
Measured /Calculated /Default:	Continuously measured by flow meter	
Source of data:	DCS data: The flow meter, FT-10 is continuously measure the LFG flow of the power plant	
Value(s) of monitored parameter:	130,262,487	
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Used for baseline emissions calculation	
Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	Item name	FT-10
	Coverage	LFG flow of 50MW power plant
	Type	Ultrasonic type flow meter
	Accuracy class	±1%
	Serial number	465
	Calibration frequency	1 year
	Date of last calibration	13/08/2008
	Validity	Valid For FE, -1% of maximum permissible error applied in accordance with “Guidelines for assessing compliance with the calibration frequency requirements (version 01)” from 01/06/2008 to 12/08/2008.
Measuring/ Reading/ Recording frequency:	Continuous measuring & reading, hourly recording	
Calculation method (if applicable):	Not applicable	
QA/QC procedures applied:	Daily check and regular maintenance Calibrated by approved 3 rd party authority	

Data / Parameter:	W_{CH₄,v}
Data unit:	% (Nm³ CH₄ / Nm³ LFG)
Description:	Methane fraction in LFG
Measured /Calculated /Default:	Continuously measured by methane gas analyzers (total of 2)



Source of data:	MMI data: The methane gas analyzer, GA-01 and GA-02 are continuously measure the methane concentration of LFGs from 1 st and 2 nd landfill	
Value(s) of monitored parameter:	37.7 ~ 55.6 (average: 50.6)	
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Used for baseline emissions calculation	
Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	Item name	GA-01 (old) from 01/06/2008 to 08/06/2008
	Coverage	Methane fraction of LFG captured from 1 st landfill
	Type	Infrared gas analyzer
	Accuracy class	Linearity: $\pm 1\%$ of FS Repeatability: $\pm 0.5\%$ of FS
	Serial number	N6E2427T
	Calibration frequency	1 year
	Date of last calibration	09/06/2008
	Validity	Valid For FE, -2.19% of maximum permissible error applied in accordance with “Guidelines for assessing compliance with the calibration frequency requirements (version 01)”.
	Item name	GA-01 (new) from 09/06/2008 to 31/12/2008
	Coverage	Methane fraction of LFG captured from 1 st landfill
	Type	Infrared gas analyzer
	Accuracy class	Linearity: $\pm 1\%$ of FS Repeatability: $\pm 0.5\%$ of FS
	Serial number	A2B4359T
	Calibration frequency	1 year
	Date of last calibration	09/06/2008
	Validity	Valid
	Item name	GA-02
	Coverage	Methane fraction of LFG captured from 2 nd landfill
	Type	Infrared gas analyzer
	Accuracy class	Linearity: $\pm 1\%$ of FS Repeatability: $\pm 0.5\%$ of FS
	Serial number	A4J0063T
	Calibration frequency	1 year
	Date of last calibration	09/06/2008
	Validity	Valid



		For FE, -1.5% of maximum permissible error applied in accordance with “Guidelines for assessing compliance with the calibration frequency requirements (version 01)” from 01/06/2008 to 08/06/2008.
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 applied:	Daily check and regular maintenance Calibrated by approved 3 rd party authority	

Data / Parameter:	FE	
Data unit:	%	
Description:	Efficiency of flare	
Measured /Calculated /Default:	Laboratory measurement and calculation	
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 ~ 99.9% - 0% , in case flaring temperature is below 600°C - 99.9% , in case flaring temperature is above 600°C	
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Used for baseline emissions calculation	
Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	Item name	TC-01 ~ 06
	Coverage	Flaring temperature of each flares
	Type	Thermocouple, k-type
	Accuracy class	±(B) 0.3 class
	Serial number	TC-01: 07014280 TC-02: 07014281 TC-03: 07014282 TC-04: 07014283 TC-05: 07014284 TC-06: 07014285
	Calibration frequency	1 year
	Date of last calibration	26/11/2008(former 05/06/2007)
	Validity	Valid -0.3% of maximum permissible error applied in accordance with Guideline from 06/06/2008 to 25/11/2008.
Measuring/ Reading/ Recording frequency:	Continuous measuring & reading, hourly recording for TC-01 to TC-06	
Calculation method (if applicable):	Not applicable	
QA/QC procedures applied:	Daily check and regular maintenance, calibrated by approved 3 rd party authority for TC-01 to TC-06	



Data / Parameter:	T	
Data unit:	°C	
Description:	Temperature of LFG	
Measured /Calculated /Default:	Measured	
Source of data:	MMI / DCS data The temperature transmitters, TT-03 and TT-04 are continuously measure the temperature of LFG for the flow normalization.	
Value(s) of monitored parameter:	28.3 ~ 63.3 (average: 54.1)	
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Used for baseline emissions calculation	
Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	Item name	TT-03
	Coverage	Temperature of LFG which fed to flares
	Type	PT 100Ω
	Accuracy class	Transmitter : ±0.1% RTD: ±0.1%
	Serial number	A6B3331T
	Calibration frequency	1 year
	Date of last calibration	26/11/2008
	Validity	Valid +0.5% of maximum permissible error applied in accordance with Guideline from 01/06/2008 to 25/11/2008.
	Item name	TT-04
	Coverage	Temperature of LFG which fed to 50MW power plant
	Type	Thermocouple E
	Accuracy class	±0.5%
	Serial number	099169
	Calibration frequency	1 year
	Date of last calibration	03/12/2008
	Validity	Valid +0.75% of maximum permissible error applied in accordance with Guideline from 01/06/2008 to 02/12/2008.
Measuring/ Reading/ Recording frequency:	Continuous measuring & reading, hourly recording	
Calculation method (if applicable):	Not applicable	
QA/QC procedures applied:	Daily check and regular maintenance Calibrated by approved 3 rd party authority	

Data / Parameter:**P**



Data unit:	mmAq	
Description:	Pressure of LFG	
Measured /Calculated /Default:	Measured	
Source of data:	MMI / DCS data The pressure transmitters, PT-05 and PT-06 are continuously measure the pressure of LFG for the flow normalization.	
Value(s) of monitored parameter:	173.83 ~ 1178.13 (average: 635.71)	
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Used for baseline emissions calculation	
Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	Item name	PT-05
	Coverage	Pressure of LFG which fed to flares
	Type	Absolute pressure transmitter
	Accuracy class	±0.5%
	Serial number	A4J4159T
	Calibration frequency	1 year
	Date of last calibration	27/11/2008 (former 04/10/2007)
	Validity	Valid -0.1% of maximum permissible error applied in accordance with Guideline from 04/10/2008 to 26/11/2008.
	Item name	PT-06
	Coverage	Pressure of LFG which fed to 50MW power plant
	Type	Thermocouple E
	Accuracy class	±0.5%
	Serial number	0447-04111204003
	Calibration frequency	1 year
	Date of last calibration	27/11/2008
	Validity	Valid -0.1% of maximum permissible error applied in accordance with Guideline from 01/06/2008 to 26/11/2008.
Measuring/ Reading/ Recording frequency:	Continuous measuring & reading, hourly recording	
Calculation method (if applicable):	Not applicable	
QA/QC procedures applied:	Daily check and regular maintenance Calibrated by approved 3 rd party authority	

Data / Parameter:	EL_{EX,LFG}
Data unit:	MWh
Description:	Total amount of electricity exported out of the project boundary
Measured /Calculated	Measured



/Default:		
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:	200,072.16	
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Used for baseline emissions calculation	
Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	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, Korea Power Exchange)
	Date of last calibration	11/07/2007
	Validity	Valid
Measuring/ Reading/ Recording frequency:	Continuous measuring & reading, hourly recording	
Calculation method (if applicable):	Not applicable	
QA/QC procedures applied:	Daily check and regular maintenance Calibrated by KPX	

Data / Parameter:	EL_{IMP}	
Data unit:	MWh	
Description:	Total amount of electricity imported to the project boundary	
Measured /Calculated /Default:	Measured	
Source of data:	Log sheet & KOPEC data Total of 4 watt hour meters are installed to monitor electricity imported. WH-03 & WH-04 are 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:	2,725.05	
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Used for baseline emissions calculation	
Monitoring equipment (type, accuracy class, serial number, calibration	Item name	WH-03
	Coverage	Electricity imported to the 50MW power plant



frequency, date of last calibration, validity)	Type	Electronic watt hour meter
	Accuracy class	0.5 class
	Serial number	6063941
	Calibration frequency	15 years (according to the national standard)
	Date of last calibration	17/08/2005
	Validity	Valid
	Item name	WH-04
	Coverage	Electricity imported to the 50MW power plant
	Type	Electronic watt hour meter
	Accuracy class	0.5 class
	Serial number	HPM-12-040325-06
	Calibration frequency	15 years (according to the national standard)
	Date of last calibration	29/03/2004
	Validity	Valid
	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	MFR0411001F
	Calibration frequency	15 years (according to the national standard)
	Date of last calibration	05/2005
	Validity	Valid
	Item name	WH-06
	Coverage	Electricity imported to the central flaring facility
	Type	Electronic watt hour meter
	Accuracy class	0.5 class
	Serial number	2KLM001A
	Calibration frequency	15 years (according to the national standard)
	Date of last calibration	10/2003
	Validity	Valid
Measuring/ Reading/ Recording frequency:	Continuous measuring & reading, hourly recording	
Calculation method (if applicable):	Not applicable	
QA/QC procedures applied:	Daily check and regular maintenance Calibrated by approved 3 rd party authority	



Data / Parameter:	Regulatory requirements relating to landfill gas projects
Data 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
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Not applicable
Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	Not applicable
Measuring/ Reading/ Recording frequency:	Annually recorded
Calculation method (if applicable):	Not applicable
QA/QC procedures applied:	Not applicable

Data / Parameter:	Hours
Data unit:	Hours
Description:	Operation of the energy plant (50MW power plant)
Measured /Calculated /Default:	Measured
Source of data:	Generated (exported) amount of electricity by 50MW power plant
Value(s) of monitored parameter:	Not applicable
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Not applicable
Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	Same as above 'EL _{EXLFG} '
Measuring/ Reading/ Recording frequency:	Annually recorded
Calculation method (if applicable):	Not applicable
QA/QC procedures applied:	Not applicable



Data / Parameter:	LPG
Data 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 sheet
Value(s) of monitored parameter:	59 Kg
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Used for project emissions calculation
Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	Not applicable
Measuring/ Reading/ Recording frequency:	Monthly
Calculation method (if applicable):	Not applicable
QA/QC procedures applied:	Not applicable

SECTION E. Emission reductions calculation

E.1. Baseline emissions calculation

>>

According to ACM0001 version 4, emission reductions are calculated by following equation (page 2).

Emission Reduction

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

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

where:

ER_y	is emissions reduction, in tonnes of CO ₂ equivalents (tCO ₂ e).
$MD_{project,y}$	the amount of methane that would have been destroyed/combusted during the year, in, tonnes of methane (tCH ₄)
$MD_{reg,y}$	the amount of methane that would have been destroyed/combusted during the year in the absence of the project, in, tonnes of methane (tCH ₄)
GWP_{CH4}	Global Warming Potential value for methane for the first commitment period is 21 tCO ₂ e/tCH ₄
EL_y	net quantity of electricity exported during year y, in megawatt hours (MWh).
$CEF_{electricity,y}$	CO ₂ emissions intensity of the electricity displaced, in tCO ₂ e/MWh. This can 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 4 (page 2)

As there are no consideration about project emissions and leakage in ACM0001 version 4, above equation can be used to calculate baseline emissions;

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

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;

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

Baseline emissions from methane avoidance

In accordance with ACM0001 version 4, 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.

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

	LFG _{selected} (Nm ³)	W _{CH₄} (%)	CH ₄ treated (Nm ³)	BE from CH ₄ avoidance (tCO ₂ e)	AF applied BE (tCO ₂ e)
Jun 2008	17,203,911.6	49.9	8,533,965.6	128,460.1	49,906.7
Jul	19,412,888.1	53.2	10,371,408.7	156,118.7	60,652.1
Aug	21,724,455.8	53.5	11,629,216.9	175,052.3	68,007.8
Sep	24,852,766.5	50.5	12,543,172.2	188,809.9	73,352.6
Oct	25,584,336.8	49.7	12,723,961.1	191,531.2	74,409.9
Nov	24,312,249.8	49.5	12,037,869.6	181,203.6	70,397.6
Dec	23,360,020.5	47.8	11,268,699.0	169,625.5	65,899.5
Total	156,450,629.0	59.0	79,108,293.1	1,190,801.3	462,626.3

* 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 and Annex I 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)
Jun 2008	15,005.0	432.4	14,572.6	8,256.9
Jul	26,938.5	414.5	26,524.0	15,028.5
Aug	30,552.6	217.3	30,335.4	17,188.0
Sep	32,429.5	469.1	31,960.4	18,108.7
Oct	33,404.0	420.5	32,983.5	18,688.4
Nov	32,496.6	322.0	32,174.6	18,230.1
Dec	29,246.0	449.3	28,796.7	16,316.2
Total	200,072.2	2,725.0	197,347.1	111,816.9

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

Baseline emissions from 9.88MW power plant

As described in B. 1, however, request for review was made by CDM Executive Board during 1st request for issuance of the project regarding the stoppage of 9.88MW power plant. In accordance with the request for review of CDM Executive Board, emissions from the electricity generated by the existing 9.88MW power plant are regarded as baseline emissions and should be deducted from calculated baseline emissions. It is calculated as follows;

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

	Maximum theoretical output of 9.88MW (MWh)	Monitoring period (days)	EF (tCO ₂ /MWh)	BE _{9.88MW} (tCO ₂)
Total	215.79	214	0.5666	26,166

E.2. Project emissions calculation

>>

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 ER 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)
Jun 2008	0	0	0.00000
Jul	5	5	0.02179
Aug	8	6	0.03051
Sep	7	1	0.01743
Oct	1	0	0.00218
Nov	5	8	0.02833
Dec	5	8	0.02833
Total	31	28	0.12857

For conservativeness, 1 tCO₂e applied though calculated project emissions from LPG usage were 0.12857 tCO₂e.

E.3. Leakage calculation

>>

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

**E.4. Emission reductions calculation / table**

>>

Total emission reductions

Total emission reductions can be calculated as follows;

$$ER_{total} = BE_{methane_avoidance} + BE_{electricity_generation} - BE_{9.88MW} - PE_{fossilfuel} - Leakage$$

(Units: tCO₂e)

Total baseline emissions		548,277
	Baseline emissions from methane avoidance	462,626
	Baseline emissions from electricity generation	111,817
	Baseline emissions from 9.88MW power plant	(-) 26,166
Total project emissions		1
	Project emissions from fossil fuel (LPG) usage	1
Total leakage		0
	Leakage	0
Total emission reductions		548,276

* Please refer calculation spread sheet file and Annex I for more detailed calculation.

E.5. Comparison of actual emission reductions with estimates in the CDM-PDD

>>

Item	Values applied in ex-ante calculation of the registered CDM-PDD	Actual values reached during the monitoring period
Emission reductions (tCO₂e)	778,715	548,276

The estimated ER in PDD (page 8) is as follows;

**A.4.4 Estimated amount of emission reductions over the chosen crediting period:**

Years	Annual estimation of emission reduction in tonnes of CO ₂ e
2007	1,012,459
2008	1,334,940
2009	1,319,283
2010	1,303,224
2011	1,286,969
2012	1,270,689
2013	1,254,526
2014	1,147,223
2015	1,033,187
2016	931,042
2017	209,875
Total estimated reductions (tonnes of CO₂e)	12,103,416
Total number of crediting years	10 years
Annual average over the crediting period of estimated reductions (tonnes of CO₂e)	1,210,342

Crediting period is 10years from 01.Apr.2007 to 31.Mar.2017.

Though the crediting period starts at 30/04/2007, above PDD mentioned that the crediting period started the 01/04/2007 for a period of 10 years. Therefore, estimated ER of 778,715 tCO₂e (1,334,940 tCO₂e / 12 months × 7 month (monitoring period)) used in order to compare with actual ER.

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

>>

Claimed actual ER is about 70.4% of estimated ER 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).

It seems that the ratio increased compare to 1st monitoring period (50.1%), but this is mainly because there was long overhaul period (90 days of stoppage for maintenance) of 50MW power plant in 1st monitoring period. It is also considered that this monitoring period has overhaul period (total of 18 days) which makes the ratio lower.

Compare to other landfill projects listed in CDM Pipeline (dated 01/07/2010) which issuance success rate is about 35%, however, the performance of this project is not extraordinary.



ANNEX I: Daily Calculation Results

Date	LFG _{selected}	W _{CH4_weighted}	CH _{4_combusted}	BE from CH _{4combusted}	AF adjusted BE	Net elec. generation	BE from elec. generation	Total BE
2008-06-01	661,314.5	52.8	349,083.8	5,254.7	2,041.4	1,074.5	608.8	2,650.3
2008-06-02	664,502.2	44.8	297,779.3	4,482.4	1,741.4	1,073.1	608.0	2,349.4
2008-06-03	642,020.2	37.7	241,987.9	3,642.6	1,415.1	1,072.7	607.8	2,023.0
2008-06-04	620,398.9	37.7	233,800.3	3,519.3	1,367.3	1,073.5	608.2	1,975.5
2008-06-05	618,989.3	37.7	233,269.5	3,511.4	1,364.2	1,072.9	607.9	1,972.1
2008-06-06	617,669.0	37.7	232,772.5	3,503.9	1,361.3	1,073.0	608.0	1,969.2
2008-06-07	615,799.3	37.7	232,063.0	3,493.2	1,357.1	1,072.4	607.6	1,964.7
2008-06-08	614,938.8	37.7	231,736.6	3,488.3	1,355.2	1,072.9	607.9	1,963.1
2008-06-09	623,765.5	42.2	263,501.8	3,966.4	1,541.0	1,070.6	606.6	2,147.6
2008-06-10	631,148.3	54.9	346,645.8	5,218.0	2,027.2	1,068.7	605.5	2,632.7
2008-06-11	633,726.7	54.5	345,210.0	5,196.4	2,018.8	1,069.9	606.2	2,625.0
2008-06-12	637,358.2	54.2	345,523.7	5,201.1	2,020.6	1,070.7	606.6	2,627.3
2008-06-13	639,325.2	54.1	346,168.7	5,210.8	2,024.4	1,071.0	606.9	2,631.3
2008-06-14	603,571.3	54.2	327,026.5	4,922.7	1,912.5	940.9	533.1	2,445.6
2008-06-15	537,130.2	54.4	292,335.2	4,400.5	1,709.6	-40.0	-22.7	1,686.9
2008-06-16	596,768.5	54.2	323,436.4	4,868.6	1,891.5	-24.1	-13.7	1,877.8
2008-06-17	599,079.3	54.2	324,619.4	4,886.4	1,898.4	-15.2	-8.6	1,889.8
2008-06-18	594,834.2	54.3	322,790.2	4,858.9	1,887.7	-9.1	-5.2	1,882.5
2008-06-19	175,376.5	54.0	94,739.0	1,426.1	554.0	-3.1	-1.8	552.3
2008-06-20	467,658.0	55.1	257,614.7	3,877.8	1,506.5	-8.4	-4.8	1,501.8
2008-06-21	582,347.7	55.4	322,902.5	4,860.6	1,888.3	-9.5	-5.4	1,883.0
2008-06-22	573,538.7	55.3	317,231.7	4,775.2	1,855.2	-9.5	-5.4	1,849.8
2008-06-23	560,609.2	55.1	308,836.1	4,648.8	1,806.1	-9.6	-5.5	1,800.6
2008-06-24	571,671.0	55.1	314,885.5	4,739.9	1,841.5	-10.7	-6.1	1,835.4
2008-06-25	506,636.2	54.8	277,804.3	4,181.7	1,624.6	-15.7	-8.9	1,615.7
2008-06-26	451,280.8	54.1	244,099.8	3,674.4	1,427.5	-23.4	-13.3	1,414.2
2008-06-27	533,728.5	54.9	292,862.9	4,408.4	1,712.7	-20.5	-11.6	1,701.1
2008-06-28	453,194.2	45.4	205,601.8	3,094.9	1,202.4	-19.7	-11.2	1,191.2
2008-06-29	586,435.3	50.4	295,463.4	4,447.6	1,727.9	-24.4	-13.8	1,714.0
2008-06-30	589,095.9	53.0	312,173.2	4,699.1	1,825.6	-61.3	-34.7	1,790.8
2008-07-01	505,971.9	54.8	277,351.4	4,174.9	1,622.0	-22.4	-12.7	1,609.3
2008-07-02	529,571.0	55.0	291,019.3	4,380.7	1,701.9	-28.2	-16.0	1,685.9
2008-07-03	590,343.9	54.4	321,179.7	4,834.7	1,878.3	281.6	159.6	2,037.8
2008-07-04	664,999.0	53.9	358,462.8	5,395.9	2,096.3	1,073.1	608.0	2,704.3
2008-07-05	665,180.9	53.8	357,909.3	5,387.5	2,093.1	1,074.7	608.9	2,702.0
2008-07-06	666,482.7	53.5	356,548.8	5,367.1	2,085.1	1,075.2	609.2	2,694.3
2008-07-07	663,772.2	53.6	355,721.8	5,354.6	2,080.3	1,074.2	608.7	2,688.9
2008-07-08	681,057.0	53.5	364,324.3	5,484.1	2,130.6	1,071.0	606.8	2,737.4
2008-07-09	714,975.7	53.5	382,491.7	5,757.6	2,236.8	1,068.7	605.5	2,842.3
2008-07-10	716,287.3	53.4	382,324.8	5,755.1	2,235.8	1,069.0	605.7	2,841.5
2008-07-11	672,083.8	53.5	359,302.4	5,408.5	2,101.2	1,069.0	605.7	2,706.9
2008-07-12	676,948.8	53.2	359,840.3	5,416.6	2,104.4	1,069.1	605.8	2,710.1
2008-07-13	677,688.2	53.5	362,515.1	5,456.9	2,120.0	1,069.2	605.8	2,725.8
2008-07-14	677,758.4	53.4	361,859.2	5,447.0	2,116.2	1,068.8	605.6	2,721.7
2008-07-15	674,168.8	53.3	359,531.6	5,412.0	2,102.5	1,070.2	606.4	2,708.9



Date	LFG _{selected}	W _{CH4_weighted}	CH _{4_combusted}	BE from CH ₄ combusted	AF adjusted BE	Net elec. generation	BE from elec. generation	Total BE
2008-07-16	658,857.7	53.4	351,677.5	5,293.7	2,056.6	1,051.7	595.9	2,652.5
2008-07-17	652,730.9	53.4	348,829.1	5,250.9	2,040.0	1,041.6	590.2	2,630.1
2008-07-18	671,280.3	53.1	356,748.6	5,370.1	2,086.3	1,068.0	605.2	2,691.4
2008-07-19	660,714.1	53.5	353,361.6	5,319.1	2,066.5	1,068.3	605.3	2,671.8
2008-07-20	656,692.5	54.1	355,079.4	5,344.9	2,076.5	1,070.2	606.4	2,682.9
2008-07-21	654,564.8	54.3	355,115.0	5,345.5	2,076.7	1,073.9	608.5	2,685.2
2008-07-22	631,113.5	54.7	345,523.7	5,201.1	2,020.6	1,032.1	584.8	2,605.4
2008-07-23	645,324.7	54.9	354,500.3	5,336.2	2,073.1	1,072.7	607.8	2,680.9
2008-07-24	645,533.5	55.3	356,760.1	5,370.2	2,086.3	1,072.5	607.7	2,694.0
2008-07-25	642,267.8	55.3	355,324.4	5,348.6	2,077.9	1,072.8	607.9	2,685.8
2008-07-26	641,168.1	55.3	354,681.4	5,338.9	2,074.2	1,074.1	608.6	2,682.7
2008-07-27	640,241.8	55.3	354,175.9	5,331.3	2,071.2	1,074.0	608.5	2,679.8
2008-07-28	570,801.5	54.9	313,517.0	4,719.3	1,833.5	753.5	426.9	2,260.4
2008-07-29	373,967.7	48.4	180,976.4	2,724.2	1,058.4	-31.4	-17.8	1,040.5
2008-07-30	404,482.1	43.8	177,121.9	2,666.2	1,035.8	-23.5	-13.3	1,022.5
2008-07-31	485,857.7	42.7	207,634.3	3,125.5	1,214.2	-29.7	-16.8	1,197.4
2008-08-01	340,567.6	48.1	163,768.2	2,465.2	957.7	-31.3	-17.7	940.0
2008-08-02	602,648.5	55.6	334,848.0	5,040.4	1,958.2	550.4	311.9	2,270.1
2008-08-03	500,125.1	55.0	275,253.5	4,143.3	1,609.7	248.3	140.7	1,750.4
2008-08-04	621,253.2	55.2	342,867.8	5,161.1	2,005.1	948.8	537.6	2,542.7
2008-08-05	642,200.9	55.2	354,177.2	5,331.4	2,071.2	1,074.6	608.9	2,680.1
2008-08-06	641,230.1	55.0	352,954.6	5,313.0	2,064.1	1,074.6	608.9	2,673.0
2008-08-07	640,628.8	55.1	353,117.9	5,315.4	2,065.0	1,074.8	609.0	2,674.0
2008-08-08	639,612.4	55.0	351,749.2	5,294.8	2,057.0	1,074.6	608.8	2,665.9
2008-08-09	643,642.1	54.9	353,495.1	5,321.1	2,067.2	1,073.5	608.3	2,675.5
2008-08-10	644,104.5	54.6	351,545.4	5,291.7	2,055.8	1,073.7	608.3	2,664.2
2008-08-11	636,144.1	54.4	345,929.2	5,207.2	2,023.0	1,073.0	608.0	2,631.0
2008-08-12	626,815.6	54.4	340,939.8	5,132.1	1,993.8	1,073.4	608.2	2,602.0
2008-08-13	631,149.0	54.3	342,846.4	5,160.8	2,005.0	1,073.3	608.1	2,613.1
2008-08-14	713,519.1	54.7	390,465.5	5,877.6	2,283.4	1,073.7	608.3	2,891.8
2008-08-15	798,740.6	54.6	436,199.1	6,566.0	2,550.9	1,074.4	608.8	3,159.7
2008-08-16	792,462.5	54.8	434,094.4	6,534.3	2,538.6	1,074.4	608.7	3,147.3
2008-08-17	790,332.4	54.8	432,745.5	6,514.0	2,530.7	1,074.3	608.7	3,139.4
2008-08-18	676,583.0	55.4	374,569.9	5,638.3	2,190.5	706.1	400.1	2,590.5
2008-08-19	782,549.7	55.5	434,047.0	6,533.6	2,538.3	1,072.1	607.5	3,145.8
2008-08-20	785,290.0	55.1	432,844.4	6,515.5	2,531.3	1,071.5	607.1	3,138.4
2008-08-21	782,842.1	54.6	427,819.8	6,439.9	2,501.9	1,073.2	608.1	3,110.0
2008-08-22	788,910.0	53.9	424,887.5	6,395.7	2,484.7	1,073.3	608.1	3,092.9
2008-08-23	793,511.1	52.9	419,986.7	6,322.0	2,456.1	1,072.9	607.9	3,064.0
2008-08-24	797,133.9	52.9	421,408.4	6,343.4	2,464.4	1,072.6	607.8	3,072.2
2008-08-25	804,555.1	51.9	417,838.9	6,289.6	2,443.5	1,072.0	607.4	3,050.9
2008-08-26	813,701.0	51.3	417,077.6	6,278.2	2,439.1	1,071.7	607.2	3,046.3
2008-08-27	726,163.7	50.3	365,355.1	5,499.6	2,136.6	1,071.5	607.1	2,743.7
2008-08-28	645,631.5	49.5	319,840.5	4,814.5	1,870.4	1,071.7	607.2	2,477.6
2008-08-29	740,097.8	49.8	368,290.4	5,543.8	2,153.8	1,071.6	607.1	2,760.9
2008-08-30	841,150.2	50.6	425,571.5	6,406.0	2,488.7	1,071.9	607.3	3,096.1



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Date	LFG _{selected}	W _{CH4_weighted}	CH _{4_combusted}	BE from CH _{4combusted}	AF adjusted BE	Net elec. generation	BE from elec. generation	Total BE
2008-08-31	841,160.0	50.2	422,682.4	6,362.6	2,471.9	1,084.8	614.6	3,086.5
2008-09-01	844,244.4	50.3	424,646.8	6,392.1	2,483.3	1,072.2	607.5	3,090.9
2008-09-02	840,040.1	50.4	423,575.7	6,376.0	2,477.1	1,072.0	607.4	3,084.5
2008-09-03	840,898.6	50.2	422,019.1	6,352.6	2,468.0	1,071.7	607.2	3,075.2
2008-09-04	832,847.9	50.6	421,157.2	6,339.6	2,462.9	794.7	450.3	2,913.2
2008-09-05	824,982.8	50.8	418,953.0	6,306.4	2,450.0	1,068.1	605.2	3,055.2
2008-09-06	827,049.2	50.9	421,377.0	6,342.9	2,464.2	1,068.3	605.3	3,069.5
2008-09-07	825,858.6	50.9	420,229.6	6,325.6	2,457.5	1,068.6	605.5	3,063.0
2008-09-08	828,293.6	50.8	421,096.1	6,338.7	2,462.6	1,068.0	605.1	3,067.7
2008-09-09	828,745.5	50.7	419,886.1	6,320.5	2,455.5	1,067.8	605.0	3,060.5
2008-09-10	816,566.3	50.9	415,325.8	6,251.8	2,428.8	1,053.5	596.9	3,025.7
2008-09-11	822,947.9	50.6	416,088.0	6,263.3	2,433.3	1,072.1	607.4	3,040.7
2008-09-12	827,571.3	50.6	418,377.1	6,297.7	2,446.7	1,072.3	607.6	3,054.3
2008-09-13	832,743.4	50.5	420,345.5	6,327.4	2,458.2	1,072.4	607.6	3,065.8
2008-09-14	832,535.8	50.5	420,109.2	6,323.8	2,456.8	1,072.4	607.6	3,064.4
2008-09-15	834,168.7	50.6	421,884.1	6,350.5	2,467.2	1,072.5	607.7	3,074.9
2008-09-16	833,866.9	50.5	421,416.4	6,343.5	2,464.4	1,071.9	607.3	3,071.8
2008-09-17	830,593.4	50.6	420,203.7	6,325.2	2,457.4	1,076.0	609.7	3,067.0
2008-09-18	828,989.3	50.6	419,546.2	6,315.3	2,453.5	1,078.2	610.9	3,064.4
2008-09-19	826,237.1	50.3	415,598.4	6,255.9	2,430.4	1,078.3	610.9	3,041.4
2008-09-20	824,985.4	50.6	417,163.7	6,279.5	2,439.6	1,078.4	611.0	3,050.6
2008-09-21	824,574.7	50.1	412,868.4	6,214.8	2,414.5	1,078.8	611.2	3,025.7
2008-09-22	824,384.0	50.2	413,502.4	6,224.4	2,418.2	1,078.3	611.0	3,029.1
2008-09-23	824,519.9	50.5	416,133.1	6,264.0	2,433.6	1,077.8	610.7	3,044.2
2008-09-24	823,108.3	50.6	416,541.2	6,270.1	2,435.9	1,076.3	609.8	3,045.8
2008-09-25	819,117.9	50.5	413,662.6	6,226.8	2,419.1	1,078.1	610.9	3,030.0
2008-09-26	829,028.4	49.9	413,906.1	6,230.4	2,420.5	1,081.9	613.0	3,033.5
2008-09-27	835,309.7	50.0	417,826.6	6,289.5	2,443.5	1,085.0	614.8	3,058.2
2008-09-28	817,300.7	50.0	408,398.3	6,147.5	2,388.3	1,085.1	614.8	3,003.1
2008-09-29	810,559.1	50.1	405,916.4	6,110.2	2,373.8	1,083.6	614.0	2,987.8
2008-09-30	840,697.5	50.6	425,418.5	6,403.7	2,487.9	1,086.3	615.5	3,103.3
2008-10-01	841,821.7	50.6	425,621.2	6,406.8	2,489.0	1,086.6	615.7	3,104.7
2008-10-02	669,142.1	50.9	340,453.7	5,124.8	1,991.0	718.4	407.0	2,398.0
2008-10-03	840,956.6	50.6	425,400.3	6,403.5	2,487.7	1,083.8	614.1	3,101.8
2008-10-04	842,581.0	50.4	424,803.8	6,394.5	2,484.3	1,085.2	614.9	3,099.1
2008-10-05	844,507.2	50.3	424,777.5	6,394.1	2,484.1	1,085.4	615.0	3,099.1
2008-10-06	844,813.7	50.2	424,410.8	6,388.6	2,482.0	1,084.7	614.6	3,096.5
2008-10-07	845,846.3	50.2	424,535.1	6,390.4	2,482.7	1,087.0	615.9	3,098.6
2008-10-08	842,559.2	50.4	424,676.9	6,392.6	2,483.5	1,088.7	616.9	3,100.4
2008-10-09	841,619.1	50.5	425,222.9	6,400.8	2,486.7	1,089.1	617.1	3,103.8
2008-10-10	840,215.4	50.2	421,965.2	6,351.8	2,467.7	1,088.2	616.6	3,084.2
2008-10-11	840,331.6	49.8	418,679.7	6,302.3	2,448.4	1,091.1	618.2	3,066.7
2008-10-12	838,200.8	49.9	417,932.2	6,291.1	2,444.1	1,071.7	607.2	3,051.3
2008-10-13	839,769.7	49.8	418,245.6	6,295.8	2,445.9	1,086.4	615.6	3,061.5
2008-10-14	841,628.0	49.7	417,939.4	6,291.2	2,444.1	915.1	518.5	2,962.6
2008-10-15	844,076.8	49.7	419,255.4	6,311.0	2,451.8	1,078.9	611.3	3,063.1



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Date	LFG _{selected}	W _{CH4_weighted}	CH _{4_combusted}	BE from CH _{4combusted}	AF adjusted BE	Net elec. generation	BE from elec. generation	Total BE
2008-10-16	842,968.5	49.7	419,318.0	6,311.9	2,452.2	1,077.5	610.5	3,062.7
2008-10-17	841,311.9	49.7	417,919.0	6,290.9	2,444.0	1,084.0	614.2	3,058.2
2008-10-18	840,938.4	49.6	416,964.6	6,276.5	2,438.4	1,087.4	616.1	3,054.5
2008-10-19	841,327.1	49.2	413,616.2	6,226.1	2,418.8	1,087.4	616.1	3,035.0
2008-10-20	840,261.3	49.4	415,042.1	6,247.5	2,427.2	1,050.2	595.1	3,022.2
2008-10-21	838,572.5	49.7	416,928.0	6,275.9	2,438.2	1,077.7	610.6	3,048.8
2008-10-22	832,316.2	49.8	414,618.1	6,241.2	2,424.7	1,078.2	610.9	3,035.6
2008-10-23	827,504.5	49.5	409,674.7	6,166.8	2,395.8	1,076.0	609.7	3,005.4
2008-10-24	817,515.9	49.6	405,333.9	6,101.4	2,370.4	1,080.6	612.3	2,982.7
2008-10-25	804,754.2	49.7	400,135.1	6,023.2	2,340.0	1,080.8	612.4	2,952.4
2008-10-26	805,103.5	49.0	394,114.4	5,932.5	2,304.8	1,081.4	612.7	2,917.5
2008-10-27	790,342.6	48.9	386,848.9	5,823.2	2,262.3	1,081.0	612.5	2,874.8
2008-10-28	795,503.3	48.4	384,763.4	5,791.8	2,250.1	1,080.9	612.4	2,862.5
2008-10-29	801,899.5	48.5	388,907.6	5,854.1	2,274.3	1,080.9	612.4	2,886.8
2008-10-30	809,239.8	48.7	394,498.7	5,938.3	2,307.0	1,080.9	612.4	2,919.5
2008-10-31	796,708.2	49.1	391,358.4	5,891.0	2,288.7	1,058.5	599.8	2,888.4
2008-11-01	802,240.6	49.6	397,872.7	5,989.1	2,326.8	1,081.5	612.8	2,939.6
2008-11-02	825,163.0	49.8	410,660.7	6,181.6	2,401.5	1,081.3	612.6	3,014.2
2008-11-03	821,636.7	50.8	417,370.5	6,282.6	2,440.8	1,079.4	611.6	3,052.4
2008-11-04	818,800.7	51.1	418,622.0	6,301.4	2,448.1	1,078.5	611.1	3,059.2
2008-11-05	814,253.0	50.7	412,951.8	6,216.1	2,414.9	1,080.8	612.4	3,027.3
2008-11-06	815,076.4	50.7	413,059.1	6,217.7	2,415.6	1,079.1	611.4	3,027.0
2008-11-07	815,426.4	50.5	411,578.9	6,195.4	2,406.9	1,079.8	611.8	3,018.7
2008-11-08	818,320.3	51.2	418,650.1	6,301.9	2,448.3	1,080.9	612.4	3,060.7
2008-11-09	820,403.2	51.8	425,285.0	6,401.7	2,487.1	1,081.5	612.8	3,099.8
2008-11-10	820,399.6	51.9	426,008.0	6,412.6	2,491.3	1,080.3	612.1	3,103.4
2008-11-11	814,342.6	51.9	422,676.7	6,362.5	2,471.8	1,080.3	612.1	3,083.9
2008-11-12	814,956.2	51.5	419,646.4	6,316.9	2,454.1	1,080.4	612.2	3,066.2
2008-11-13	818,084.1	51.2	418,860.8	6,305.0	2,449.5	1,080.2	612.0	3,061.6
2008-11-14	816,221.6	50.0	407,973.7	6,141.1	2,385.8	1,080.3	612.1	2,997.9
2008-11-15	813,307.0	49.2	400,001.8	6,021.1	2,339.2	1,080.4	612.2	2,951.4
2008-11-16	812,875.9	49.0	398,385.3	5,996.8	2,329.8	1,080.9	612.4	2,942.2
2008-11-17	807,792.7	48.9	395,195.1	5,948.8	2,311.1	1,079.6	611.7	2,922.8
2008-11-18	812,592.3	48.9	397,072.7	5,977.1	2,322.1	1,079.1	611.4	2,933.5
2008-11-19	820,345.1	48.8	399,990.2	6,021.0	2,339.1	1,079.4	611.6	2,950.7
2008-11-20	816,188.8	48.7	397,426.4	5,982.4	2,324.2	1,078.7	611.2	2,935.3
2008-11-21	829,673.4	48.0	398,191.7	5,993.9	2,328.6	1,078.7	611.2	2,939.8
2008-11-22	822,186.4	48.4	397,548.8	5,984.2	2,324.9	1,079.4	611.6	2,936.5
2008-11-23	803,873.4	47.9	385,370.3	5,800.9	2,253.7	1,079.4	611.6	2,865.2
2008-11-24	800,182.8	48.1	384,826.0	5,792.7	2,250.5	1,078.7	611.2	2,861.7
2008-11-25	798,100.1	47.8	381,183.5	5,737.9	2,229.2	1,078.7	611.2	2,840.4
2008-11-26	811,330.5	47.8	387,663.4	5,835.4	2,267.1	1,079.1	611.4	2,878.5
2008-11-27	789,635.9	47.8	377,722.1	5,685.8	2,208.9	1,078.5	611.1	2,820.0
2008-11-28	803,132.8	47.7	383,295.7	5,769.7	2,241.5	1,079.2	611.5	2,853.0
2008-11-29	825,279.2	47.9	394,916.4	5,944.6	2,309.5	1,079.3	611.5	2,921.0
2008-11-30	710,429.2	47.6	337,863.6	5,085.8	1,975.8	861.2	488.0	2,463.8
2008-12-01	303,874.8	45.9	139,581.1	2,101.1	816.3	-36.6	-20.8	795.5



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Date	LFG _{selected}	W _{CH4_weighted}	CH _{4_combusted}	BE from CH ₄ combusted	AF adjusted BE	Net elec. generation	BE from elec. generation	Total BE
2008-12-02	258,555.2	39.0	100,917.1	1,519.1	590.2	-29.4	-16.7	573.5
2008-12-03	212,961.8	40.9	87,152.8	1,311.9	509.7	-28.3	-16.0	493.6
2008-12-04	312,665.0	46.3	144,694.1	2,178.1	846.2	-47.8	-27.1	819.1
2008-12-05	806,587.0	49.9	402,557.5	6,059.6	2,354.2	956.7	542.1	2,896.2
2008-12-06	845,990.8	49.7	420,837.5	6,334.8	2,461.1	1,077.0	610.2	3,071.3
2008-12-07	832,587.5	49.9	415,646.8	6,256.6	2,430.7	1,077.1	610.3	3,041.0
2008-12-08	824,211.7	49.7	410,010.3	6,171.8	2,397.7	1,076.9	610.2	3,007.9
2008-12-09	819,824.9	46.8	383,690.6	5,775.6	2,243.8	1,079.8	611.8	2,855.6
2008-12-10	812,778.0	45.9	372,954.7	5,614.0	2,181.0	1,073.7	608.3	2,789.4
2008-12-11	817,228.8	49.2	401,880.0	6,049.4	2,350.2	1,077.2	610.3	2,960.5
2008-12-12	821,633.7	49.1	403,547.8	6,074.5	2,360.0	1,076.7	610.1	2,970.0
2008-12-13	823,390.0	49.1	404,177.7	6,084.0	2,363.6	1,076.9	610.2	2,973.8
2008-12-14	825,677.8	49.0	404,922.5	6,095.2	2,368.0	1,077.4	610.4	2,978.4
2008-12-15	824,239.7	48.9	403,420.1	6,072.6	2,359.2	1,076.7	610.0	2,969.2
2008-12-16	822,100.1	49.0	402,434.1	6,057.8	2,353.4	1,076.5	610.0	2,963.4
2008-12-17	822,806.1	48.7	401,016.1	6,036.4	2,345.1	1,076.6	610.0	2,955.1
2008-12-18	825,173.7	48.4	399,297.2	6,010.5	2,335.1	1,083.2	613.8	2,948.9
2008-12-19	823,915.0	48.6	400,036.6	6,021.7	2,339.4	1,087.8	616.3	2,955.7
2008-12-20	827,329.0	48.1	397,914.1	5,989.7	2,327.0	1,088.1	616.5	2,943.5
2008-12-21	829,594.7	48.2	399,931.4	6,020.1	2,338.8	1,088.3	616.7	2,955.5
2008-12-22	829,688.9	48.2	399,645.8	6,015.8	2,337.1	1,035.0	586.5	2,923.6
2008-12-23	823,873.7	48.1	396,407.9	5,967.0	2,318.2	1,075.9	609.6	2,927.8
2008-12-24	820,976.7	48.4	397,157.3	5,978.3	2,322.6	1,076.0	609.7	2,932.2
2008-12-25	823,655.9	48.1	396,002.5	5,960.9	2,315.8	1,076.3	609.8	2,925.7
2008-12-26	827,601.1	47.9	396,362.2	5,966.4	2,317.9	1,075.3	609.3	2,927.2
2008-12-27	825,402.2	47.9	395,755.4	5,957.2	2,314.4	1,075.9	609.6	2,924.0
2008-12-28	824,362.4	48.0	396,017.3	5,961.2	2,315.9	1,076.5	609.9	2,925.8
2008-12-29	823,725.5	48.1	396,609.2	5,970.1	2,319.4	1,076.0	609.6	2,929.0
2008-12-30	829,716.0	47.8	396,270.7	5,965.0	2,317.4	1,075.9	609.6	2,927.0
2008-12-31	837,892.8	48.0	401,850.6	6,049.0	2,350.0	1,069.5	606.0	2,956.0

* Above results are only for baseline emissions calculation. BE_{9.88MW} & PE_{LPG} are separately calculated.

History of the document

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