Monitoring Report

Daegu Bangcheon-Ri Landfill Gas CDM Project

2nd Monitoring Period : 1st April, 2008 ~ 31th March, 2009

Version 1.0

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Contents

1. General Project Activity and Monitoring Information

1.1. Title of the Project Activity

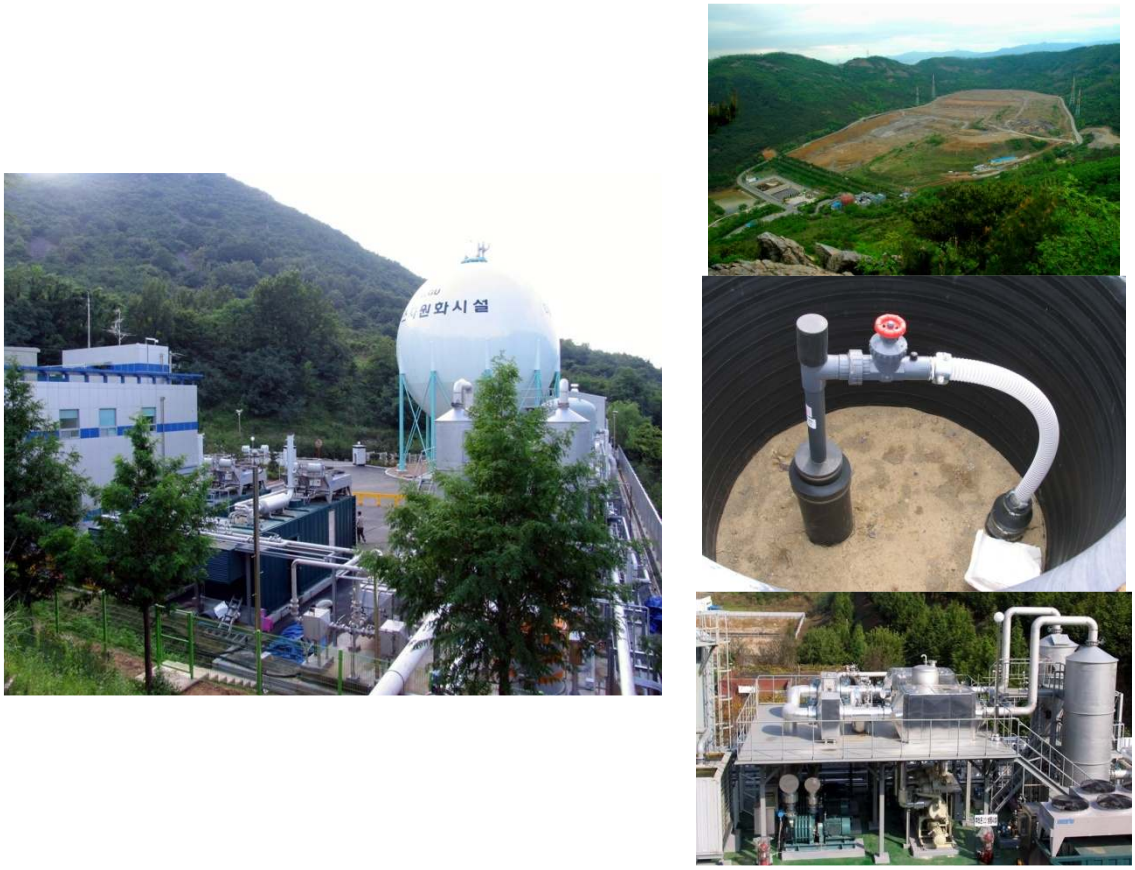
Daegu Bangcheon-Ri Landfill gas CDM Project
(CDM Ref. number: 0851)

1.2. Short Description of the Project Activity

Daegu Bangcheon-Ri Landfill gas CDM Project is located in 421, Bangcheon-Ri, Dasa-Eup, Dalsung-Gun, Daegu, Korea. The site is 596,760m^2 and over 14,700,000 tons of Municipal Solid Wastes(MSW) from Daegu City has been filled up since 1990.
The treatment of landfill gas from Daegu Bangcheon-Ri Landfill site had been managed the 'simple on-site treatment' to prevent odour, air pollution and fire before planning this project.
In addition, to reduce methane which otherwise may be released to atmosphere, vertical collection gas pipes and refinery facility was installed and operated in 10th Oct 2006. Daegu Bangcheon-Ri Landfill gas CDM Project is the project which captures and refines LFG and then refined LFG is supplied to Korea District Heating Corp(KDHC) to produce thermal energy. Produced thermal energy utilizing LFG is supplied to users for heating.

1.3. Real Project Implementation

- Complementation date of construction: 30th. Sep. 2006
- Starting date for commercial operating : 10th Oct 2006



<fig 1> Landscape of Daegu Bangcheon-Ri Landfill gas CDM project

1.4. Monitoring Period

The Monitoring Period is from 1st Apr. 2008 to 31th Mar. 2009.

1.5. Changes against the PDD

There is no changes against the PDD since the last verification.

1.6. Methodology applied to the Project Activity

1.6.1. Baseline Methodology

The baseline applied to this project activity is ACM0001 – version 05 ; "Consolidated baseline methodology for landfill gas project activities".

1.6.2. Monitoring Methodology

The Monitoring Methodology applied to this project activity is ACM0001 – version 05 ; "Consolidated baseline methodology for landfill gas project activities".

1.7. Changes since last Verification

There is no changes since last verification.

1.8. Person responsible for the preparation and submission of the Monitoring Report

This Monitoring Report was developed and revised by ;

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2. Key Monitoring Activities according to the plan for the monitoring period

2.1. Monitoring Plan

The Monitoring Plan was developed based on version 05 of the "Consolidated monitoring methodology for landfill gas project activities" – ACM0001. The data to be collected or used to monitor emissions from the project activity, and how this data will be archived are presented below:

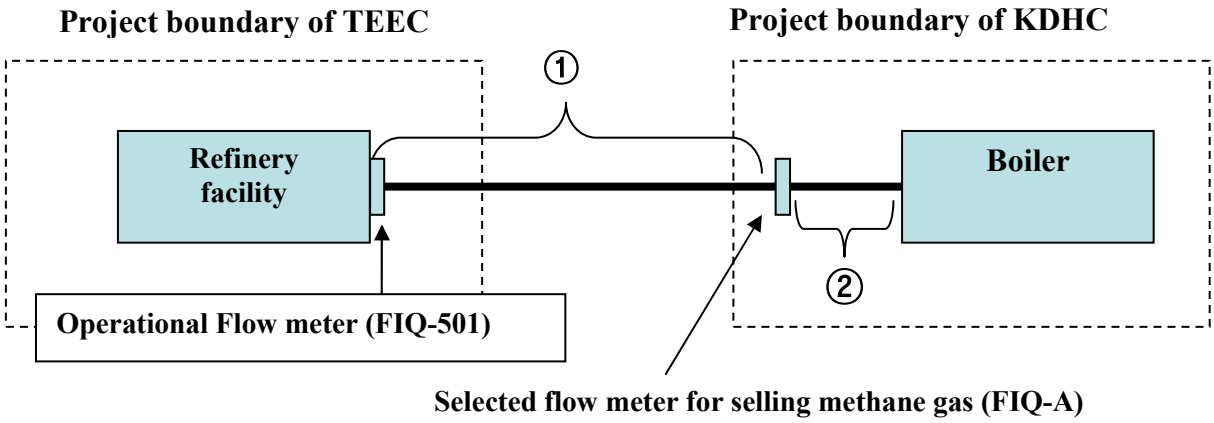
2.1.1. Monitoring Parameter

Parameter	Data variable	Data Unit	Measured(M) Calculated(C) Estimated(E)	Recording frequency	Proportion of data to be monitored	Data archievement Electronic(E) Paper(P)	Comment
LFG_{total}	Total amount of landfill gas captured	Nm^3	M	Continuously	100%	E/P	- The data is read from flow-meter installed continuously. - The data is the volume of wet gas and it will be used for reference.
LFG_{flare}	Amount of landfill gas flared	Nm^3	M	Continuously	100%	E/P	- Archived data are to be kept during the crediting period and two years after. - The data is read from flow-meter installed continuously.
w_{CH4} & $fv_{CH4,RG,h}$	Methane fraction in the landfill gas	%	M	Continuously	100%	E/P	- The data is read from gas analyzer installed continuously. - Gas Analyzer installed for monitoring this data is 'Infrared Gas Analyzer'.
T	Temperature in the exhaust gas of	℃	M	Continuously	100%	E	- Temperature in the exhaust gas of the flare with operation time is monitored in real-time and the

	the flare						data is stored in computer automatically. Therefore, project participant can monitor whether the flare stack is operated or not and can apply suitable flare efficiency.
$LFG_{electricity}$	Amount of landfill gas combusted in power plant	Nm^3	M	Continuously	100%	E/P	- The data is read from flow-meter installed continuously
$LFG_{thermal}$	Amount of landfill gas combusted in boiler	Nm^3	M	Continuously	100%	E/P	- The data is read from flow-meter installed continuously
EL_{IMP}	Amount of treated CH4 by a simple burning system	KWh	M	Continuously and Monthly	100%	E/P	- This data is read from watt-hour meter and can be double-checked with electric charge bill. - This date is required to determine CO2 emission from use of electricity to operate the project activity.
LNG	Amount of LNG supplied	Nm^3	M	Continuously	100%	E/P	- The data is read from flow meter installed continuously.
$CH4_{simple}$	Amount of treated CH4 by a simple burning system	CH4N m3/EA	M/C	quarterly	N/A	P	- Captured LFG by each simple burning system and methane fraction in the captured landfill gas will be measured quarterly for the first crediting period.
-	Regulatory requirements	-	-	Annually	-	P	- The information though recorded annually, is used for changes to the adjustment factor(AF) or

	relating to landfill gas projects						directly $MD_{reg,y}$ at renewal of the crediting period.
$PE_{flare,y}$	Project emissions from flaring of the residual gas stream in year y	tCO2	C	Continuously	100%	P	- The parameters used for determining the project emissions from flaring of the residual gas stream in year y ($PE_{flare,y}$) will be monitored as open flare
Content of supplied LNG		%	M/C	monthly	N/A	P	Monthly average value of content of supplied LNG When LNG is supplied, monthly average value of content of supplied LNG can be provided by the LNG supplier.
Operation time of gas engine generator		Hours	M	Continuously	100%	E/P	This is monitored to ensure claimed methane destruction caused by methane combustion in the electricity generator when it is operational.
Operation time of boiler		Hours	M	Continuously	100%	E/P	This is monitored to ensure claimed methane destruction caused by methane combustion in the boiler when it is operational

2.1.2. Emission calculation



1. When leakage occurs at the pipeline①, it will be indicated through the difference between two values measured by two flow meters (FIQ-501 and FIQ-A). (Refer to the submitted document.)

During the 1st monitoring period, there was no leakage occurred. It is assured by "Material balance check"

If there is leakage occurred at the pipeline① in the future, methane amount in added LNG should be deducted, because the mixture gas leaving the refinery facility concludes not only LFG but also LNG. Therefore, $PE_{Leakage,LNG}$ (methane contained in LNG calculated as tCO2 in leakage amount) needs to be considered project emission and deducted from total emission reduction. $PE_{Leakage,LNG}$ is calculated according to the Methodological tool "Tool to calculate project or leakage CO_2 emissions from fossil fuel combustion (ver.2)"

Leakage can be checked by monitoring of FIQ-501 and FIQ-A

2. For pipeline ②, there are 2 two options.
   1) When maintenance occurs,
      The methane amount in the pipeline ② will be deducted according to the formula below, which is derived from 'Ideal gas equation PV=nRT'.

$$V_2 = V_1 \times \frac{P_1}{P_2} \times \frac{T_2}{T_1}$$

V_1: Internal Volume of Pipeline
V_2: Gas volume at Standard State
P_1: internal Pressure of Pipeline
P_2: Gas Pressure at Standard State
T_1: Internal Temperature of Pipeline

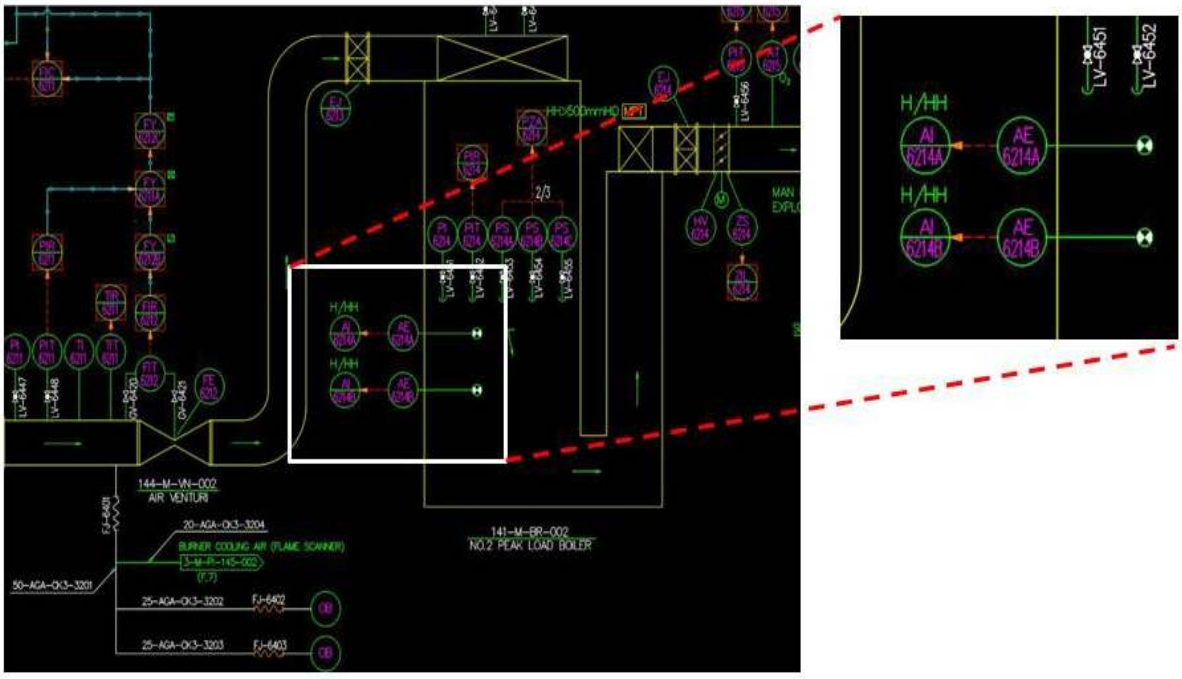
T_2: Temperature at Standard State
*Standard State: 0℃, 1 atm(=1.0332kg/cm2)

2) When leakage occurs,
Leakage amount should be calculated considering the time of it occurs, and it will be deducted from the emission reduction.

$$V = Q \times t$$

V= leakage amount of LFG
Q=methane flow measured by the flow meter (FIQ-A)
t= time of leakage (measured by gas detector or checked by pressure checking)

※Specification of Gas Detector installed at the boiler facility.



Sixteen gas detectors are installed and the picture above is CAD drawing of some of them.

* Specification of Gas Detector

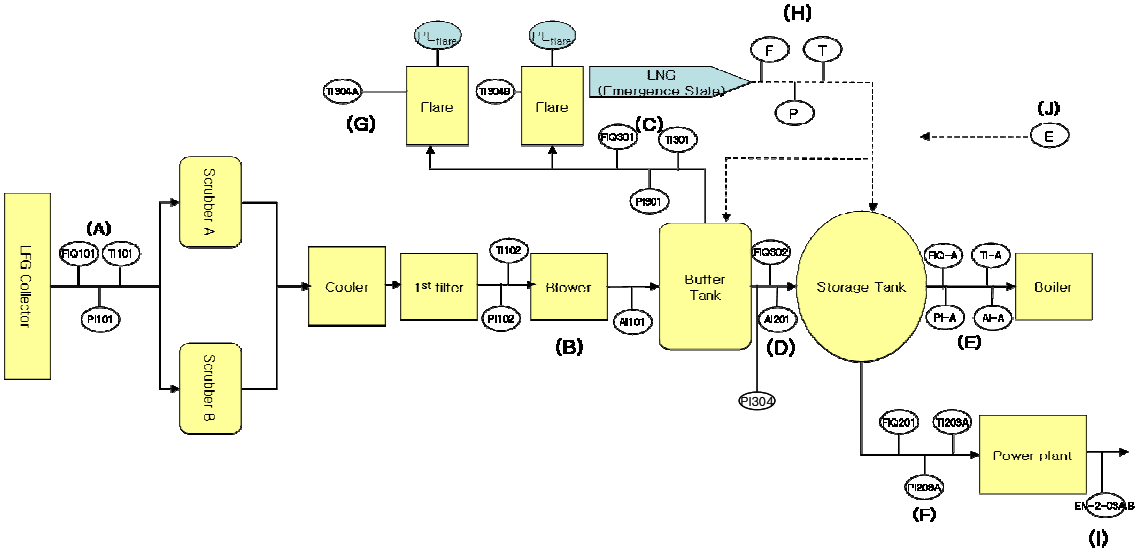
Input form	4-20mA.DC/Full Scale
Measure range	0.000 to 9999 Digital
Measure Accuracy	FND Digital - ±1% Full scale or 1Digit
	LED Bar - ±1% Full scale or 1Digit

Measure Period	100ms
Operational Power	DC 24V

2.2. Monitoring Equipment

All kinds of gas analyzing and gas measuring instruments are present. The data collected is registered continuously by the PLC(Programmable Logic Controller).

The following equipments are used to monitor the operation of the project and to monitor the emission reduction.



<fig 2> Monitoring instrument for LFG CDM project

Link	Tag No.	Monitoring parameter	Type	range	Location
(A)	FIQ101	LFG_{total}	Vortex	42~150 Nm3/min	Flow meter, the line that is from the LFG Collector to the Scrubber
	TI101		Bimetal	-30~50℃	Temperature transmitter, the line that is from the LFG Collector to the Scrubber
	PI101		Diaphragm	0~-0.5 kg/cm2G	Pressure transmitter, the line that is from the LFG Collector to the Scrubber
(B)	TI102	reference	Bimetal	-30~50℃	Temperature transmitter, the line that is from the 1st filter to the Blower

	PI102	reference	Diaphragm	0~-0.5 kg/cm2G	Pressure transmitter, the line that is from the 1st filter to the Blower
(C)	FIQ301	LFG_{flare}	Vortex	42~150 Nm3/min	Flow meter, the line that is from the Buffer tank to the Flare
	AI101		Gas Chromatograph	CH4, CO2, O2	Gas analyzer, the line that is from the Blower to the Buffer tank
	TI301		Bimetal	-30~50℃	Temperature transmitter, the line that is from the Buffer tank to the Flare
	PI301		Diaphragm	0~-1 kg/cm2G	Pressure transmitter, the line that is from the Buffer tank to the Flare
(D)	FIQ302	reference	Vortex	42~150 Nm3/min	Flow meter, the line that is from the Buffer tank to the Storage tank
	PI304	reference	Diaphragm	0~-1 kg/cm2G	Pressure transmitter, the line that is from the Buffer tank to the Storage tank
	AI201	reference	Gas Chromatograph	CH4, CO2, O2	Gas analyzer, the line that is from the Buffer tank to the Storage tank
(E)	FIQ-A	$LFG_{thermal}$	Turbine Flow Meter	42 ~ 150 NM3/min	Flow meter, the line that is from the Storage tank to the Boiler
	TI-A		Bimetal	-30~50℃	Temperature transmitter, the line that is from the Storage tank to the Boiler
	PI-A		Diaphragm	0~-15 kg/cm2G	Pressure transmitter, the line that is from the Storage tank to the Boiler
	AI-A		Gas Chromatograph	CH4, CO2, O2	Gas analyzer, the line that is from the Storage tank to the Boiler
(F)	FIQ201	$LFG_{electricity}$	Vortex	42 ~ 150 NM3/min	Flow meter, the line that is from the Storage tank to the Power plant
	TI203A		Bimetal	-30~50℃	Temperature transmitter, the line that is from the Storage tank to the Power plant

	PI203A		Diaphragm	0~15 kg/cm2G	Pressure transmitter, the line that is from the Storage tank to the Power plant
(G)	TI304A	Flare efficiency			Temperature transmitter, the line that is from the Flare
	TI304B				Temperature transmitter, the line that is from the Flare
(H)	F	PE_{LNG}	Rotary Flow Meter	0 ~ 20000 NM3/min	Flow meter, the line that is from the LNG supplier to the Storage tank
	T				Temperature transmitter, the line that is from the LNG supplier to the Storage tank
	P		Bourdon	0~15 kg/cm2G	Pressure transmitter, the line that is from the LNG supplier to the Storage tank
(I)	EN-2-03A, B	reference			Electricity from the Power plant
(J)	E	EL_{IMP}			Income Electricity used to operate the refining facility

2.2.1. Main Facilities

(1) Boiler

- type : LNG/LFG combined hot water boiler, water/smoke tube combined boiler
- Company: HAN KOOK BOILER TECHNOLOGY CO.,LTD
- Boiler Efficiency: 82%(based on HHV, MCR)

(2) Gas Engine generator

- type : Gas Engine(Container type)
- Company: Hyundai Mobis
- Model No. :P48GLD
- Gas Engine Efficiency : 94.8%

(3) Burner (Open flare system)

- Type : Cylinder type(internal flaring)
- Capacity : 35Nm3 *2 units
- Model No. :IF-3-01 A/B
- Destruction Efficiency of VOC : over 98%

2.2.2. Transmitters

Temperature Transmitter

- specification : bimetal
- structure : water proof
- accuracy : ± 0.5%
- type : any angle
- cover material : STS 304
- cover dia.(outsize) : 6.4mm O.D.
- type of process connection : KS 10K FF FLANGE(1 1/2”)

Pressure Transmitter

- specification : diaphragm
- pressure use : -0.5~0kg/cm^2
- material(body/element) : STS 304/STS 316)
- type of process connection : 1/2” PT
- case size : 100mm
- etc. : oil fill, blow-out hole

2.2.3. Flow Meter

(1) Rotary Flow Meter(F : LNG flow meter)

- specification : Rotary Flow Meter
- output signal : 4~20ma
- accuracy : ± 0.5%
- power : DC 24V
- material(body/element) : STS 304/STS 316)
- Temp. range : -10℃ ~ 60℃
- flow range : 0 ~ 20000 NM3/min

(2) Turbine Flow Meter(FIQ-A)

- specification : Turbine Flow Meter
- output signal : 4~20ma
- accuracy : ± 0.5%
- power : DC 24V
- Temp. range : -10℃ ~ 60℃
- Repeatability : +/- 0.02%
- measuring accuracy : +/- 1%
- material(body/element) : STS 304/STS 316)

(3) Vortex Flow Meter(FIQ-101, 301, 302, 201)

- specification : vortex flow meter
- output signal : 4~20ma
- accuracy : ± 0.5%
- power : DC 24V
- material(body/element) : STS 304/STS 316)
- Temp. range : -10 ~ 60 ℃
- flow range : 42 ~ 150 NM3/min

2.2.4. Gas Analyzer(AI-101, 201, A)

- specification : infrared analyzer
- ambient temperature : -5℃ to 45℃
- ambient humidity : 90% RH max., non-condensing
- repeatability : ± 0.5% of full-scale
- measurable gas components and measuring range :

	Minimum range	Maximum range
CO2	0 ~ 500 ppm	0 ~ 100vol%
CH4	0 ~ 1000 ppm	0 ~ 100 vol%
O2(built-in paramagnet)	0 ~ 5 vol%	0 ~ 100 vol%

2.2.5. Data Acquisition and record

All variables monitored are controlled by an electrical control system. This control system is provided with a PLC (Programmable Logic Controller). All the measured process signals are processed by the PLC. With this system it is possible to control and monitor the installation at a distance, including through the internet.

The main functions of PLC are indicated below.

1) Monitoring Function
All of the status and trouble about the other equipment and PLC are monitored. If there are breakdowns or abnormal status, it is indicated, if necessary, the counterplan of it is also informed.

2) Controlling Function
Each control station perform continuous control and sequence control by 32bit CPU, and even if obstacles may occur at primary CPU, due to duplicated processor by 32bit machine, bumpless stable gas treatment process control is performed by back-up CPU through one to one correspondence.

3) Recording Function
Such data about gas treatment and power equipment operation is collected, and the event recording about trouble and the operation of operator is recorded.

4) Accumulation of DATA Function
The data about flow, water quality, power and other useful data is accessed and preserved for efficient system management and the improvement of treated water

quality.

5) Emergency Operation Function
In case communication line or operation station is down, automatic operation will be performed by internal program of control station.

6) Down Loading Function
Each parameter, Database and Control program from the operator station is transferred to each remote control station and also be assigned and executed.

7) Warning Function
In case breakdowns occur during monitoring and controlling of each equipment, warning will be indicated and classified by importance.

2.3. Key Data Collection (accumulated for the monitoring period)

2.3.1. Collected Data related to emission reduction

The second monitoring period is 1st. Apr. 2008. ~ 31th Mar. 2009. And All collected data are based on the hourly data..

	LFG_{total}	LFG_{flare}	$fv_{CH4,RG,h}$	T[4)] TI-304A/B	$LFG_{electricity}$	w_{CH4} [1)]	$LFG_{thermal}$	w_{CH4} [2)]	EL_{IMP} [3)]	LNG [3)]
Unit	**Nm^3**	**Nm^3**	**m^3CH_4/m^3 LFG**	**℃**	**Nm^3**	**m^3CH_4/m^3 LFG**	**Nm^3**	**m^3CH_4/m^3 LFG**	**KWh**	**Nm^3**
TAG No.	FIQ-101	FIQ-301	AI-101	-	FIQ-201	AI-A	FIQ-A	AI-A	E	F
2008/4	4,117,184.00	0.00	0.00	-	0.00	0.00	4,054,592.00	50.20	642,056.00	12,969.00
2008/5	3,821,644.00	0.00	0.00	-	17,232.00	52.72	3,763,400.00	49.15	609,990.00	2,479.00
2007/6	3,949,368.00	0.00	0.00	-	78,450.00	52.99	3,843,568.00	49.84	574,720.00	0.00
2007/7	3,079,484.00	0.00	0.00	-	140,901.00	55.08	2,951,136.00	52.68	382,872.00	0.00
2007/8	2,942,120.00	303.00[4)]	40.31	-200	242,121.00	55.64	2,948,760.00	53.68	413,044.00	0.00
2008/9	3,948,896.00	101.00[4)]	49.44	-200	0.00	0.00	3,903,608.00	49.50	670,384.00	0.00
2008/10	4,104,234.00	0.00	0.00	-	0.00	0.00	4,095,592.00	50.02	674,038.00	0.00
2008/11	4,500,850.00	0.00	0.00	-	1.00	48.15	4,507,280.00	49.26	722,256.00	0.00
2008/12	4,509,388.00	0.00	0.00	-	0.00	0.00	4,533,048.00	49.68	694,840.00	0.00

2009/1	4,904,936.00	0.00	0.00	-	0.00	0.00	4,894,504.00	47.73	747,862.00	0.00
2009/2	4,483,948.00	0.00	0.00	-	0.00	0.00	4,461,837.00	47.53	676,090.00	18,902.00
2009/3	4,528,312.00	0.00	0.00	-	0.00	0.00	4,745,991.00	48.26	761,576.00	58,634.00
Sum	48,890,364.00	404.00	44.88		478,705.00	26.46	48,703,316.00	49.79	7,569,728.00	92,984.00

1, 2) The values of two w_{CH4} are not same because operating time is different.
3) In case of EL_{IMP} and LNG (TAG No E and F), it was used to monthly data.
4) Flaring temperature (TI-304A/B) is measured based on hourly measurement. Also, monitoring of the operation time of the flares is made continuously by the PLC and every hour the instantaneously flare temperature is registered by the supervisory system. Therefore, project participant can monitor whether the flare stack is operated or not and can apply fixed flare efficiency of open flare.

To decide the $PE_{flare,y}$, the following guideline was applied
- A hourly average of flares temperature was measured, considering the temperature registers when the instant gas-flow was above 0 Nm3/h (flares are accepting gas);
- If the average temperature is below 300℃, the gas-flow registered during this certain hour is considered equal to zero and excluded from ERs calculation.
- For example, in August and September, LFG_{flare} were 303 Nm^3 and 101 Nm^3, but the temperature (TI-304B) was below 300℃. They were excluded from ERs calculation

5) All information of the data is specified in Appendix A and excel file attached.

2.3.2. Operating time for check methane destruction.

		Apr.2008	May.2008	Jun.2008	Jul.2008	Aug.2008	Sep.2008	Oct.2008	Nov.2008	Dec.2008	Jan.2009	Feb.2009	Mar.2009
Boiler	Operating time	720	744	720	744	744	720	744	720	744	744	672	744
	Supplied amount(A)	4,057,784	3,766,064	3,846,944	2,953,024	2,853,912	3,906,416	4,099,160	4,510,464	4,536,256	4,897,808	4,458,288	4,749,464
$LFG_{thermal}$	Operating time	720	744	720	744	744	720	744	720	744	744	672	744
	Supplied amount(B)	4,054,592	3,763,400	3,843,568	2,951,136	2,850,648	3,903,608	4,095,592	4,507,280	4,533,048	4,894,504	4,461,837	4,745,991
Difference of amounts(A-B)		3,192	2,664	3,376	1,888	3,264	2,808	3,568	3,184	3,208	3,304	-3,549	3,473
Error(%) = (A-B)/B * 100 = -0.0625 %													

1) The methane gas amount supplied from boiler is the data managed by 'Korea District Heating Corp (KDHC)' measured by $LFG_{thermal}$ Flow meter(FIQ-A). The reason why there is difference from data used for calculating Emission reduction($LFG_{thermal}$) is caused by telecommunication error, and the error is -0.0625% which is reliable.

2.3.3. The formulas related to CERs

(1) $ER_y = (MD_{project,y} - MD_{reg,y}) * GWP_{CH4} - EL_{leakage} - PE_{LNG}$

ER_y	tCO_2e	Emission Reduction, in tones of CO_2 equivalents
$MD_{project,y}$	tCH4	The amount of methane that would have been destroyed/combusted during the year, in tonnes of methane
$MD_{reg,y}$	tCH4	The amount of methane that would have been destroyed/combusted during the year in the absence of the project, in tonnes of methane
GWP_{CH4}		Global Warming Portential of Methane during the first period : 21 tCO_2e/tCH_4
$EL_{leakage}$	tCO_2e	CO2 emissions caused by imported electricity to meet the project requirements
PE_{LNG}	tCO_2e	CO2 emissions caused by combustion of supplied LNG.

(2) $MD_{project,y}=MD_{flared,y}+ MD_{electricity,y}+ MD_{thermal,y}$

$MD_{flared,y}$	tCH4	the quantity of methane destroyed by flaring
$MD_{electricity,y}$	tCH4	the quantity of methane destroyed by generation of electricity
$MD_{thermal,y}$	tCH4	the quantity of methane destroyed for the generation of thermal energy

(3) $MD_{flared,y}=(LFG_{flared,y}*w_{CH4,y}*D_{CH4})-(PE_{flared,y}/GWP_{CH4})$

$LFG_{flared,y}$	Nm^3	Amount of landfill gas flared
$w_{CH4,y}$	m^3CH_4/m^3LFG	Methane fraction in the landfill gas flared(AI-101)
D_{CH4}	tCH4/m3CH4	the methane density expressed in tonnes of methane per cubic meter of methane (at standard temperature and pressure, the density of methane, 0.0007168 $tCH_4 / m^3 CH_4$
GWP_{CH4}		Global Warming Portential of Methane during the first period : 21 tCO_2e/tCH_4
$PE_{flared,y}$	tCO_2e	Project emissions from flaring of the residual gas stream in year y. In case of open flares, decision of the flare efficiency in the hour h ($\eta_{flare,h}$) is

		- 0% if the flame is not detected for more than 20 minutes during the hour h. - 50%, if the flare is detected for more than 20 minutes during the hour h.

(4) $MD_{electricity,y}=LFG_{electricity,y}*w_{CH4,y}*D_{CH4}$

$LFG_{electricity,y}$	Nm^3	Amount of landfill gas combusted in power plant
$w_{CH4,y}$	m^3CH_4/m^3LFG	Methane fraction in the landfill gas combusted in power plant(AI-A)
D_{CH4}	tCH4/m3CH4	the methane density expressed in tonnes of methane per cubic meter of methane (at standard temperature and pressure, the density of methane, 0.0007168 $tCH_4 / m^3 CH_4$

(5) $MD_{thermal,y}=LFG_{thermal,y}*w_{CH4,y}*D_{CH4}$

$LFG_{thermal,y}$	Nm^3	Amount of landfill gas combusted in boiler
$w_{CH4,y}$	m^3CH_4/m^3LFG	Methane fraction in the landfill gas combusted in boiler(AI-A)
D_{CH4}	tCH4/m3CH4	the methane density expressed in tonnes of methane per cubic meter of methane (at standard temperature and pressure, the density of methane, 0.0007168 $tCH_4 / m^3 CH_4$

(6) $EL_{leakage} = EL_{imp} * EF_{EL, leakage}$

EL_{imp}	MWh	net quantity of electricity imported during year y, in megawatt hours
$FE_{EL,leakage}$	tCO2e/MWh	CO2 emissions intensity of the electricity displaced, in tCO2e/MWh. This can estimated using either ACM0002 or AMSI.D, if the capacity is within the small scale threshold values, when grid electricity is used or displaced, or AMS-I.A if captive electricity is used or displaced

(7) $PE_{LNG} = CO2_{LNG,CH4} + CO2_{LNG,C2H6} + CO2_{LNG,C3H8} + CO2_{LNG,C4H10} + CO2_{LNG,C5H12}$

$CO2_{LNG,CH4}$	CO2 emissions caused by combustion of CH_4 in LNG
$CO2_{LNG,C2H6}$	CO2 emissions caused by combustion of C_2H_6 in LNG

$CO2_{LNG,C3H8}$	CO2 emissions caused by combustion of C_3H_8 in LNG
$CO2_{LNG,C4H10}$	CO2 emissions caused by combustion of C_4H_{10} in LNG
$CO2_{LNG,C5H12}$	CO2 emissions caused by combustion of C_5H_{12} in LNG

(8) $MD_{reg,y} = MD_{project,y} * AF$

AF	Adjustment Factor is a rate of the amount of captured LFG and flared LFG by existing simple burning system

2.4. On-site measurement for Adjustment Factor(AF) decision

2.4.1. Measuring Scheme

In Korea, as for the management of LFG, regulation contains that facility for LFG treatment should be established in landfill site but quantitative regulation of LFG treatment is not specified. In the case of Daegu Bangcheon-Ri Landfill site, simple burning system was installed and operated to meet this regulation. Therefore, amount of captured and flared LFG by existing simple burning system is necessary to calculate AF. However, monitoring of captured and flared LFG amount by existing simple burning system has not been performed and the amount of treated CH4 by simple burning system has not been performed in Daegu Bangcheon-Ri landfill site.

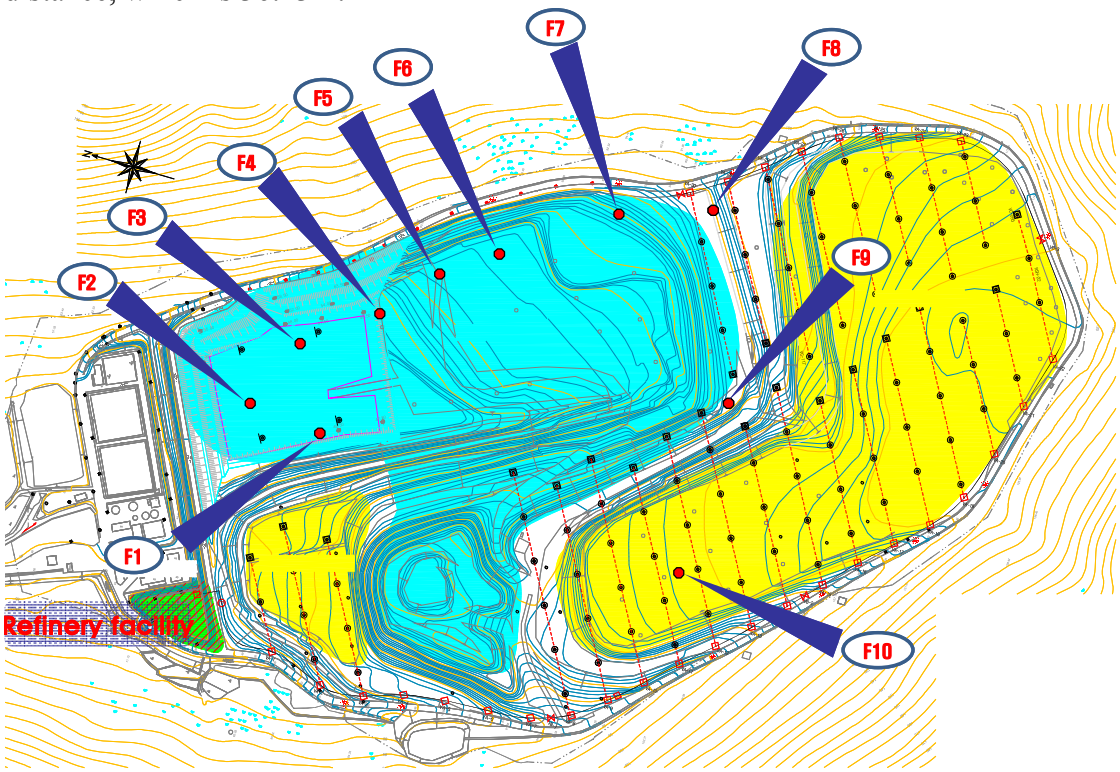
AF applied for estimation of emission reductions in the PDD is ex-ante value and AF was calculated again in the monitoring process and calculated value was applied for certifying emission reductions. Simple burning system had been used before the project activity but it is not used to treat LFG anymore. However, to calculate AF, 10 simple burning facilities were installed for measuring the amount of methane flared by simple burning facility and total number of simple burning facilities applied to calculate AF was assumed as 41 which were number of simple burning facilities before the project activity.

LFG flow captured and methane fraction of LFG of 10 simple burning facilities have measured 120 times(4measurements * 3 frequency *10 points) since the starting date of first crediting period and the measurements used the portable measuring equipment which has similar capability applied for measuring the value to calculate ex-ante AF. 10 simple burning facilities located evenly in the landfill site which is under filling-up and the landfill site in which filling-up is completed. Also, the point which is rarely influenced by capturing LFG by blower was selected as the location of 10 simple

burning facilities and establishment depth of simple burning facility is averagely 2 to 2.5m under the ground. Additionally, measurement was performed between 11 o'clock a.m. and 7 o'clock p.m.

2.4.2. Location of the 10 simple burning systems

In order to measure AF, 10 simple burning facilities were installed in 23th.Oct.07~26th.Oct.07. During monitoring period, the amount of methane exhausted from simple burning systems was measured. The points of measuring in the PDD were not the same as the points of actual measuring. The some among the selected points in PDD were considered to be influenced by vertical collector pipe; therefore the alternative points not influenced by blower were re-selected considering of influence distance, which is 36.13m.



<fig 3> Re-selected measurement points

In order to be grant confidence according to random sampling of quarterly measurement, 99.80% confidence level of all measured methane amount from simple burning facilities was chosen and reflected for AF value to calculate emission reductions.

2.4.3. Measuring time and frequency

Quarterly-based measurement is according to the PDD. Therefore, during the 1st monitoring period, which is 8 months, AF was calculated with the data of three measurements. However, since the 2nd monitoring period is 12 months, one more measurement was implemented after the 1st monitoring period, and the result was applied to recalculate the AF.

Measurement was performed 3 times between 11 o'clock a.m. and 7 o'clock p.m. Also, the internationally accredited procedure was followed for a measurement method. The date of measurement is as follow;

	Frequency		
	1st time	2nd time	3rd time
- the first measurement (29th, Nov. 2007)	11:40 ~ 12:55	14:05 ~ 15:05	15:40 ~ 16:30
- the second measurement (19th, Feb. 2008)	10:50 ~ 11:49	13:55 ~ 14:50	15:15 ~ 16:27
- the third measurement (31th, Aug. 2008)	12:15 ~ 15:07	15:31 ~ 17:00	15:52 ~ 19:17
- the fourth measurement (31th, May, 2009)	9:50 ~ 11:35	12:45~14:10	14:30 ~ 15:30

2.4.4. Measuring device

- Device specification

1) Hot Wire Anemometer(BM-BSV 101, LSI spa, Italy) 	Measuring Range	- Air velocity : 0～50m/sec - Temperature : -50～+50℃ - Humidity : 0～100% - CO2 : 0～3,000ppm
	Resolution	- Air velocity : 0.01m/sec - Temperature : 0.1℃ - Humidity : 0.1% - CO2 : 1ppm
	Accuracy	- Air velocity : ±0.04m/sec - Temperature : ±0.2℃ - Humidity : ±1% - CO2 : ±1%

<table>
<tr><td rowspan="2">2) Infrared Gas Analyzer(GA94A, Geotechnical Instruments, England)
 
</td><td>specification</td><td>- Methane (CH4) 0 - 100% vol.
- Oxygen (O2) 0 - 21%
- Carbon Dioxide (CO2) 0 - 50%
- Pressure 900 - 1100 mbar
- Integral sample draw pump
- Sample probe
- Infra red detection of methane</td></tr>
<tr><td>Certification of Calibration</td><td>Geotech
A subsidiary of LANDTEC
CERTIFICATE OF CALIBRATION
Certificate number: G3126_1/2618
Date of check: 22 July 2008
Product: GA94
Serial number: G3126
Calibration checked at: 23.4°C to 31.6°C
Primary Gas Channels
Methane (CH4) | Carbon Dioxide (CO2)
Certified Gas (%) | Reading (%) | Certified Gas (%) | Reading (%)
49.67 | 50.0 | 50.33 | 49.0
15.05 | 15.2 | 15.03 | 14.4
5.06 | 5.2 | 5.06 | 4.8
Oxygen (O2)
Certified Gas (%) | Reading (%)
20.95 | 21.0
Barometer
Certified (mb) | Reading (mb)
1015 | 1014
Approved by: P. Hanvey (Name) (Signature)
All gases are traceable to certified National Standards
This unit must be serviced at regular 12 monthly intervals by a Geotechnical Instruments (UK) Ltd approved service facility.
Geotechnical Instruments (UK) Ltd
Sovereign House, Queensway, Leamington Spa, Warwickshire, CV31 3JR, England.
Tel: +44 (0)1926 338111 Fax: +44 (0)1926 338110 www.geotech.co.uk</td></tr>
<tr><td>3) simple burning facilities (LFG collection well)
  </td><td>The dimension of the simple burning facilities</td><td>- Pressure tube :
φ100mm*3.0m(H)*5mm(t)
- PE CAP : φ100mm
- Assembly connected tube :
φ100mm
- The dimension of the simple burning facilities used to calculate AF is almost corresponded with the dimension before implementing the project. And the establishment depth(2~2.5m) of simple burning facility was implemented based on monitoring methodology of the PDD. It is also corresponded with the baseline before.</td></tr>
</table>

2.4.5. Operation entity of the measurement

The waste laboratory of the UOS(University of Seoul), which is one of major research institutes concerning landfill gas, has signed service agreement with Ecoeye as consulting company and then they measured. Participating researchers of UOS and relevant major research were presented to Verification team

2.4.6. Measurement method

<fig 5-1> LFG collection well

<fig 5-2> measuring picture

Measurement procedure is in the followings:

(a) General

- Methane volume of LFG gas issuing from a gas collection well is equal to an amount of: (i) a gas velocity measured by a hot-wire current meter; and (ii) area of a collection well or an artificially installed plastic pipe.
- Wet volume is equal to an amount of: (i) the conversion value to dry-base volume by Teten's formula(adopted by the saturated vapor pressure formula for water over 0℃, referred to (2)); and (ii) methane concentration(dry-base, %) of LFG measured by a portable gas analyzer.

(b) Measurement of methane fraction (w_{CH4})

- Portable gas analyzer is to be used to analyze the composition of gas.
- Prior to operation of the gas analyzer, tightly close gas collection well so as to prevent inflow of air.

- Connect the detector part with sampling point and operate the gas analyzer.
- Record the measured value after volume of gas is observed stable.
- Calculate methane fraction of 10 simple burning facilities.

(c) Measurement of flow rate of landfill gas in gas collection well

- Install portable equivalent flow meter in perpendicular angle to the gas flow.
- Measure a gas velocity
- Measure the diameter of collection well pipe(external diameter is 110mm)
- Calculate the volume of gas

(d) The formula to be adapted for calculation of methane flow rate is follows;

$$Fn_{,CH4} = V \times A \times \frac{273}{273+T} \times \frac{p-sp}{1013} \times 60 \times \frac{Cn}{100} \quad (1)$$

$$sp = 6.11 \times \exp[\tfrac{a(K-273.16)}{K-b}] \quad where, a = 17.26, b = 35.86 \ for \ water \quad (2)$$

Where:

$Fn_{,CH4}$: methane gas flow(dry base) through a collection well (Nm^3/min)

V : gas velocity(m/s)

A : Area of a collection well(m2)

p : gas pressure(mbar)

sp : steam pressure

Cn : concentration of methane gas issuing from a collection well(%, dry)

2.4.7. Measured data for calculation of AF

The results of each measurement are in the table below and the Source Data is attached in Appendix B.

		1st time					2nd time					3rd time				
		CH4	CO2	O2	Normalized vol. (L/min.)		CH4	CO2	O2	Normalized vol. (L/min.)		CH4	CO2	O2	Normalized vol. (L/min.)	
		(vol. %)	(vol. %)	(vol. %)	LFG	CH4	(vol. %)	(vol. %)	(vol. %)	LFG	CH4	(vol. %)	(vol. %)	(vol. %)	LFG	CH4
Measurement 1 (29th, Nov. 2007)	F1	10.3	9.4	14.4	5.22	0.54	52.5	40.2	0.2	299.02	**156.98**	42	33.5	3.2	4.66	1.96
	F2	56.59	43.41	0	46.73	26.44	59.31	40.69	0	181.76	107.8	57	41	0	42.71	24.35
	F3	50	41.3	0.4	56.69	28.35	0	0.1	19.4	246.53	0	57.4	40.8	0	215.41	**123.65**
	F4	59.96	40.04	0	36.73	22.02	0	0	19.9	30.53	0	61.8	36.9	0	104.06	64.31
	F5	0	0	20.4	5.29	0	9.8	19.8	4.1	70.45	6.9	7.3	12.8	4	18.49	1.35
	F6	0.2	7.5	10.6	5.25	0.01	0	0.71	12.1	182	0	2	13.5	4	4.58	0.09
	F7	8.8	12.1	10.5	10.6	0.93	57.06	42.94	0	140.97	80.44	23.3	30	0	65.94	15.36
	F8	55.5	42	0.5	51.97	28.84	10.6	19.1	2.6	10.28	1.09	56.1	43.6	0	154.34	86.58
	F9	50.3	41	1.9	202.08	**101.65**	5.1	12.7	8.3	799.6	40.78	7.7	20.5	1.2	9.38	0.72
	F10	32	23.2	4	95.71	30.63	28.9	32.7	0	280.04	80.93	14.1	18.1	4.4	4.75	0.67
	AVE					23.94					47.49					31.83
Measurement 2 (19th, Feb. 2008)	F1	25.2	24.8	5.0	5.24	1.32	50.1	40.1	0	359.66	180.19	42	33.6	3.1	4.86	2.04
	F2	56.45	43.46	0.1	36.33	20.5	59.36	40.64	0	454.41	**269.76**	55.72	44.28	0	67.5	37.61
	F3	45.5	38.9	2.4	56.33	25.63	0	0	19.9	50.51	0	56.2	43.8	0	209.53	117.76
	F4	59.61	40.39	0	25.6	15.26	0	0	20	30.25	0	57.35	42.65	0	128.35	73.61
	F5	0	0	20.3	31.21	0	28.7	32	0	196.52	56.4	0	0	0	4.66	0
	F6	0	0	20.1	5.15	0	0.6	10.5	7.3	148.11	0.89	0	0	17.2	9.7	0
	F7	0.4	0.3	20.1	5.19	0.02	56.9	43.1	0	161.68	91.99	26.6	31.5	0	36.21	9.63
	F8	56	43.2	0.1	77.26	43.27	12.6	20.4	1.6	20.1	2.53	56.3	42.1	0	223.87	**126.04**
	F9	55.05	44.95	0	128.2	**70.57**	20	24.2	0.6	806.1	161.22	7.8	19.6	3.6	9.46	0.74
	F10	34.6	26.1	2.9	95.52	33.05	35.4	34.9	0	238.15	84.3	10	13.5	7.8	4.6	0.46
	AVE					20.96					84.73					36.71
Measurement 3 (31th, Aug. 2008)	F1	30	30.1	2.1	5.28	1.58	50.6	40.6	0	217.91	110.26	47.3	38.4	1.6	4.88	2.31
	F2	55.97	44.03	0	57.82	32.37	59.12	40.88	0	402.12	**237.73**	55.12	44.88	0	4.86	2.68
	F3	51.5	41.2	0.5	15.57	8.02	0	0	19.9	202.25	0	53.96	46.04	0	47.93	25.86
	F4	59.4	40.51	0.09	73.17	43.46	0	0	20.1	70.82	0	56.98	43.02	0	135.34	77.11

	F5	0	0	20.4	26.46	0	29.2	32.5	0	58.11	16.97	0	0	0	9.28	0
	F6	0	0	20.4	10.48	0	1	14.1	2.4	167.07	1.67	0	0	19.9	4.86	0
	F7	0.4	0.5	19.8	52.38	0.21	56.82	43.18	0	109.79	62.39	17	23.4	4.1	14.46	2.46
	F8	55.7	42.8	0.1	15.77	8.78	8.5	14	7.2	10.07	0.86	54.92	45.08	0	234.81	**128.96**
	F9	54.9	44.3	0	143.8	**78.94**	20.4	24.8	0.2	823.39	167.97	6.5	16.2	6.7	9.64	0.63
	F10	35.1	26	2.4	81.14	28.48	35.7	35.2	0	49.64	17.72	15	20.2	2.6	4.8	0.72
	AVE					20.18					61.56					24.02
Measurement 4 (31th, May. 2009)	F1	2.40	11.40	11.50	5.54	0.13	5.30	27.50	0.00	9.50	0.50	4.50	27.20	0.00	4.86	0.22
	F2	37.30	37.80	0.00	44.40	16.56	36.10	38.20	0.00	28.11	10.15	30.20	35.20	0.00	24.34	7.35
	F3	0.00	11.60	6.50	5.55	0.00	0.10	11.40	7.70	38.18	0.04	0.30	13.10	7.20	13.89	0.04
	F4	50.50	41.10	1.90	110.88	**56.00**	53.20	44.40	0.00	38.53	20.50	48.30	41.60	0.10	19.26	**9.30**
	F5	0.00	0.50	19.50	5.55	0.00	0.00	0.00	20.00	9.63	0.00	0.00	0.40	19.10	4.87	0.00
	F6	0.00	0.00	20.40	5.53	0.00	0.00	0.00	20.00	9.73	0.00	0.00	0.00	19.90	4.77	0.00
	F7	8.40	17.20	6.50	22.21	1.87	14.10	23.00	3.10	13.79	1.94	17.00	27.20	0.25	13.86	2.36
	F8	5.30	18.20	2.00	55.47	2.94	5.60	17.80	2.40	446.66	**25.01**	8.10	20.10	1.70	86.67	7.02
	F9	15.40	25.00	6.60	33.28	5.13	14.40	25.30	0.50	24.07	3.47	17.60	26.60	0.80	24.00	4.22
	F10	12.00	22.70	2.40	27.64	3.32	12.10	19.30	3.50	13.98	1.69	14.20	23.10	0.10	47.13	6.69
	AVE					8.59					6.33					3.72

2.4.8. Decision of captured CH4 based on conservative principle

The measurement has resulted in that the deviation of methane volume is highly variable from the point each time of the measurement. Accordingly, of measured values, the maximum values ($F_{Mn,rth,max,CH4}$) from each a frequency(rth) are used based on conservative principle. Then, the average ($F_{Mn,rth,max,ave,CH4}$)of the values from each time(Mn) is used for the calculation of AF.

the maximum values from each a frequency ($F_{Mn,rth,max,CH4}$)		Measurement 1(M1) (29th, Nov. 2007)	Measurement 2(M2) (19th, Feb. 2008)	Measurement 3(M3) (31th, Aug. 2008)	Measurement 4(M4) (31th, May, 2009)
	1st time	101.65	156.98	123.65	56.00
	2nd time	70.57	269.76	126.04	25.01
	3rd time	78.94	237.73	128.96	9.30
	AVE	**83.72**	**221.49**	**126.22**	**30.10**
Average based on conservative principle ($F_{Mn,rth,max,ave,CH4}$)		Average amount of captured CH4 by a simple burning system = (83.72+221.49+126.22+30.10)/4 = **115.38 L/min/ea**			**115.38**

unit : CH4 L/min/ea

$F_{Mn,rth,max,CH4}$: Average of the maximum values of captured methane of each simple burning facility (m3/min/EA)

$F_{Mn,rth,max,ave,CH4} = (\sum F_{Mn,rth,max,CH4})/(i)$
i : frequency of measurement. Here is 12 times

An average of the highest flow rate of each measurement was used to calculate the AF. The reason to use the highest value in one set and the average in the other set is as follows;

- The AF result calculated above was approached conservatively than the calculation method mentioned in the monitoring plan in the PDD. In the monitoring plan, it was planned to use the average of every point, but at this first monitoring, the highest value among methane emission from each points was used.
- In case of following the calculation method stated in the PDD, which is using the average values from each frequency, AF is calculated as 2.75%. However, the calculated AF using the maximum values from each frequency is 10.27%, which is 3.7times higher than using the average values.
- The reason why this conservative approach was selected is that it was deemed the uncertainty according to the selection of 10 measuring point would be high. The selected conservative approach means that the methane amount from the point which generated the largest amount of methane among 10 points is also same methane

amount with generated from the rest of 9 points, and this result was approached very conservatively.

- Since the measurement was implemented in accordance with the measuring time stated in the PDD, the other set (the three maximum values from each frequency) was calculated as average value.

2.4.9. AF calculation

Using measured data and default value, AF can be calculated as follows:

$AF = MD_{reg}/MD_{project}$

Where:
MD_{reg} : methane destroyed in the baseline scenario (tCH4)
$MD_{project}$: methane destroyed by the project (tCH4)

$MD_{reg} = F_{Mn,rth,max,ave,CH4} * N * (60*24*365) * FE_{simple} * D_{CH4}$

Where:

N : the number of total simple burning facilities in the baseline scenario(When ex-ante value of AF was calculated, applied value was 41 of simple burning facilities which were established before the project activity. The same value, 41 simple burning facilities, was to be applied to calculate ex-post AF.)
FE_{simple} : Flare efficiency of simple burning system. (The most conservative default value for the baseline scenario is 100% of flare efficiency.)
D_{CH4} : Density of methane. (According to ACM 0001, at standard temperature and pressure, this value is 0.0007168 tCH4/m3CH4)

<AF for Daegu Bangcheon-Ri Landfill site>

Content	Value	Unit	Comment
Average amount of captured CH4 by a simple burning system	115.38	CH4-Liter/min/EA	
Number of simple burning systems [1)]	41	EA	
Crediting period time	525,600	min	Crediting periods are 365 days
the methane density	0.0007168	ton/m3	

Amount of treated CH4 included in LFG by simple burning system	1780.95	CH4-ton	MD_{reg} For conservativeness applied destruction factor is 100%
Amount of treated CH4 during monitoring periods [2)]	17,336.96	CH4-ton	$MD_{project}$
AF	**10.27**	**%**	

The AF of 1st monitoring period is 11.20%, and the AF calculated added with fourth measurement data is 10.27%. Therefore, based on conservative principle, the higher value, which is the AF of 1st monitoring period 11.20%, will be applied for the rest of 1st crediting period as a default value.

3. Quality Assurance and Quality Control Measures

3.1. Calibration

"The national calibration organization operating law of the paragraph 2 Article 42" shall apply with the period of all equipments. The testing method of all equipments went according to the international standard, "Korea Laboratory Accreditation Scheme (KOLAS)" in the ministry of knowledge economy, Republic of Korea.
The readings from all equipments are subjected to internal errors from a standard value. These errors are measured and described in the Calibration Certificates, in terms of ± % from the standard adopted. All calibrations usually have an expiration date; however there are no rules in Korea specifying the calibration periodicity. So, Project developer decided to adopt 2 years calibration frequency for all equipments based on suggestion of the manufacturers of the flow-meters and pressure-temperature transmitters.

Calibration of all equipments was done when last verification was performed. Therefore, there is no need to calibrate the equipments for the 2nd monitoring period.

3.1.1. Calibration of analyzer

An analyzer to measure methane gas has been regularly calibrated one time a month on-site by standard gas. The calibration consists of two steps. One is zero calibration, the other is span calibration. Zero calibration is used for zero point adjustment and N2 gas is used. Span calibration is used to perform a span point adjustment. For the span calibration gas for the CH4, CO2, O2 measurement, the standard gas was used with a concentration of 90%, or more of the range value according to manual by analyzer suppler. The certificate of standard gas(N2, CH4, CO2, O2) analysis was submitted to verifier. For the performance report of an analyzer revision is as follows:

1) Calibration report of analyzer

Date	Standard gas(CH4)	Measurement (CH4)	Error (%)	Standard gas(CO2)	Measurement (CO2)	Error (%)	Standard gas(O2)	Measurement (O2)	Error (%)	Manager
AT-101										
2008.4.1	95	94.5	-0.53%	49.6	48.5	-2.22%	4.53	4.51	-0.44%	Mr.Jang
2008.5.3	95	94.5	-0.53%	49.6	49.7	0.20%	4.53	4.52	-0.22%	Mr.Nam
2008.5.13	95	94.6	-0.42%	49.6	49.5	-0.20%	4.53	4.51	-0.44%	Mr.Jang
2008.7.2	95	94.9	-0.11%	49.6	49.4	-0.40%	4.53	4.52	-0.22%	Mr.Nam
2008.8.25	95	95.2	0.21%	49.9	49.9	0.00%	4.55	4.56	0.22%	Mr.Kim
2008.9.28	95	95.2	0.21%	49.9	50.5	1.20%	4.55	4.56	0.22%	Mr.Kwon
2008.10.20	95	95.1	0.11%	49.9	49.8	-0.20%	4.55	4.54	-0.22%	Mr.Kwon
2008.12.11	95	95	0.00%	49.9	50.4	1.00%	4.55	4.54	-0.22%	Mr.Kim
2009.1.6	95	95.7	0.74%	49.9	50.7	1.60%	4.55	4.6	1.10%	Mr.Nam
2009.2.10	95	93.8	-1.26%	49.9	48.7	-2.40%	4.55	4.58	0.66%	Mr.Nam
2009.3.9	95	95.2	0.21%	49.9	49.7	-0.40%	4.55	4.57	0.44%	Mr.Kwon
AT-102										
2008.4.4	95	94.7	-0.32%	49.6	49.4	-0.40%	4.53	4.52	-0.22%	Mr.Nam
2008.5.3	95	94.7	-0.32%	49.6	49.5	-0.20%	4.53	4.52	-0.22%	Mr.Nam
2008.5.13	95	94.7	-0.32%	49.6	49.6	0.00%	4.53	4.52	-0.22%	Mr.Jang
2008.7.27	95	94.8	-0.21%	49.9	49.9	0.00%	4.55	4.58	0.66%	Mr.Kwon
2008.8.25	95	94.9	-0.11%	49.9	49.8	-0.20%	4.55	4.54	-0.22%	Mr.Kim
2008.9.28	95	95.5	0.53%	49.9	50.8	1.80%	4.55	4.65	2.20%	Mr.Kim

2008.10.20	95	95.3	0.32%	49.9	49.7	-0.40%	4.55	4.56	0.22%	Mr.Kwon
2008.12.11	95	94.7	-0.32%	49.9	50.3	0.80%	4.55	4.76	4.62%	Mr.Kim
2009.1.6	95	95.6	0.63%	49.9	50.5	1.20%	4.55	4.59	0.88%	Mr.Nam
2009.2.10	95	94	-1.05%	49.9	49.1	-1.60%	4.55	4.57	0.44%	Mr.Nam
2009.3.9	95	94.9	-0.11%	49.9	50.3	0.80%	4.55	4.56	0.22%	Mr.Kwon

2008.4.3	95	95	0.00%	95	94.8	-0.21%	4.53	4.52	-0.22%	Mr.Moon
2008.5.6	95	94.8	-0.21%	50.1	49.8	-0.60%	4.54	4.55	0.22%	Mr.Nam
2008.6.17	95	94.6	-0.42%	50.1	49.3	-1.60%	4.54	4.61	1.54%	Mr.Kwon
2008.8.25	95	95.1	0.11%	50.1	50.2	0.20%	4.53	4.54	0.22%	Mr.Kim
2008.9.30	95	94.9	-0.11%	50.1	50.1	0.00%	4.53	4.52	-0.22%	Mr.Jang
2009.1.2	95	94.9	-0.11%	50.1	50.1	0.00%	4.53	4.5	-0.66%	Mr.Jang
2009.2.10	95	95	0.00%	50.1	50	-0.20%	4.53	4.52	-0.22%	Mr.Kwon
2009.3.9	95	94.8	-0.21%	50.1	50.1	0.00%	4.53	4.54	0.22%	Mr.Kwon

$$Error(\%) = \frac{MV - SV}{SV} \quad , \quad Error_{Ave}(\%) = \sqrt{(Er_1)^2 + (Er_1)^2 + (Er_1)^2 \cdots + (Er_n)^2}$$

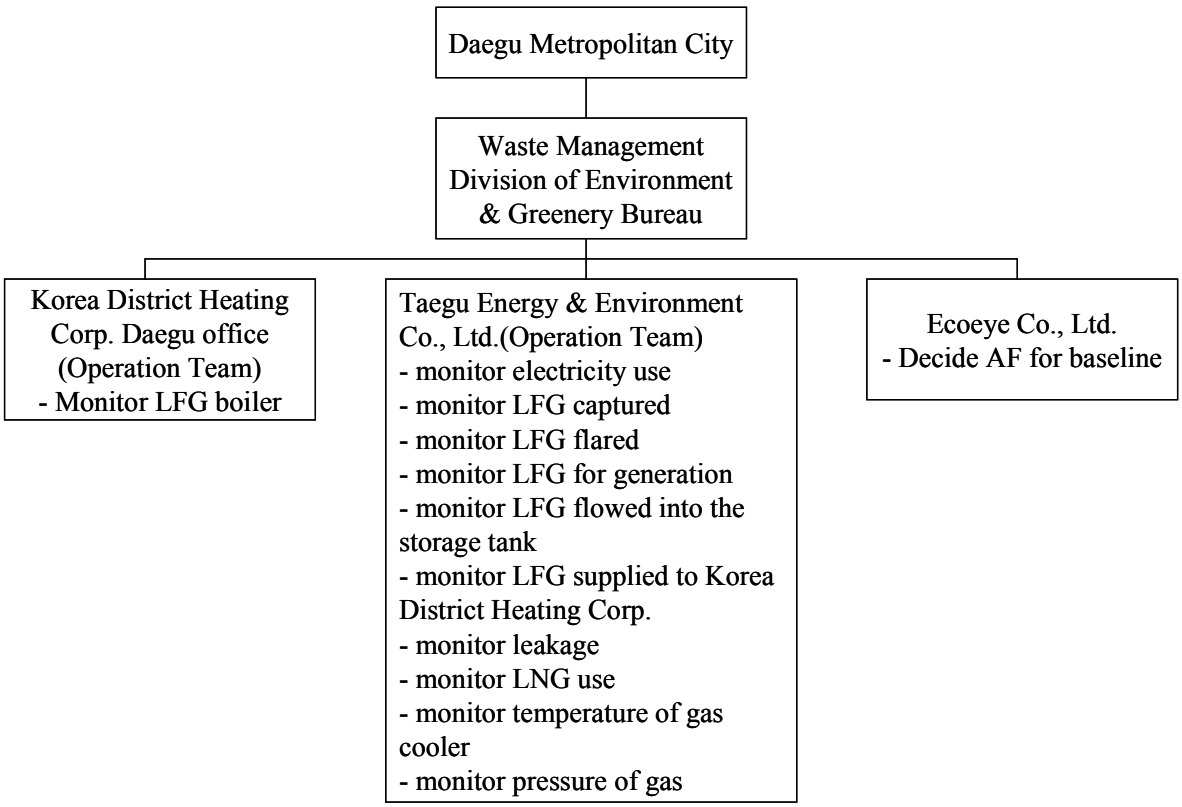
MV : Measurement gas Value

SV : Standard gas Value

$Error_{Ave}$: Average Error

3.2. Organization Structure, responsibilities and competencies

Positions and roles for this CDM project activity were defined. From the point of view of the plant operation, positions and roles are defined. Requirements for job positions are determined in documented procedures, as presented in Monitoring Manual.



- Responsible department and person for the monitoring : Kim, Han-su / Waste Management Division of Environment & Greenery Bureau of Daegu Metropolitan /city

- Practical and responsible monitoring person (about electricity, LFG and LNG) : Lee, Myoung-won / Taegu Energy & Environment Co., Ltd.(Operation Team)

- Practical and responsible monitoring person (about LFG boiler) : Kim, Young-min / Korea District Heating Corp. Daegu office (Operation Team)

- AF for the baseline calculating person : Dr. Jung, Jae-soo / Ecoeye. Co., Ltd.

4. Calculation of GHG emission Reductions

4.1. Conclusion of Emission Reduction

$$ER_y = (MD_{project,y} - MD_{reg,y}) * GWP_{CH4} - leakage - PE_{LNG}$$

period	ER_y(tCO2e)	$= (MD_{project,y} - MD_{reg,y}) * GWP_{CH4} - leakage - PE_{LNG}$
Apr.2008	26,583.20	= (1,446.01 – 161.95) * 21 – 356.60– 25.35
May. 2008	24,510.42	= (1,332.80 – 149.27) * 21 – 338.79 – 4.84
Jun. 2008	25,679.39	= (1,394.18 – 156.15) * 21 – 319.20 – 0
Jul. 2008	21,578.51	= (1,168.55 – 130.88) * 21 – 212.65 – 0
Aug. 2008	20,597.48	= (1,116.84 – 125.09) * 21 – 229.40 – 0
Sep. 2008	25,416.06	= (1,382.90 – 154.89) * 21 – 372.33 -0
Oct. 2008	26,788.32	= (1,456.60 – 163.14) * 21 – 374.36 – 0
Nov. 2008	29,264.36	= (1,590.81 – 178.17) * 21 – 401.14 – 0
Dec. 2008	29,714.19	=(1,614.12 – 180.78) * 21 – 385.91 – 0
Jan. 2009	30,810.35	=(1,674.48 – 187.54) * 21 – 415.36 – 0
Feb. 2009	27,933.13	=(1,520.03 – 170.24) * 21 – 375.50 – 36.94
Mar. 2009	30,038.22	=(1,639.63 – 183.64) * 21 – 422.98 – 114.61
Total	318,913.61	= (17,336.96 – 1941.74) * 21 – 4,204.23 – 181.74

4.1.1. Calculation of $MD_{project,y}$

(1) Calculation of MDproject,y

$$MD_{project,y} = MD_{flared,y} + MD_{electricity,y} + MD_{thermal,y}$$

Unit : tCH4

period	$MD_{project}$	$= MD_{flared,y} + MD_{electricity,y} + MD_{thermal,y}$
Apr.2008	1,446.01	= 0.00 + 0.00 + 1,446.01
May. 2008	1,332.80	= 0.00 + 6.54 + 1,326.26
Jun. 2008	1,394.18	= 0.00 + 29.99 + 1,364.18
Jul. 2008	1,168.55	= 0.00 + 55.73 + 1,112.83
Aug. 2008	1,116.84	= 0.00 +31.99 + 1,084.85
Sep. 2008	1,382.90	= 0.00 + 0.00 + 1,382.90
Oct. 2008	1,456.60	= 0.00 + 0.00 + 1,456.60
Nov. 2008	1,590.81	= 0.00 + 0.00 + 1,590.81
Dec. 2008	1,614.12	= 0.00 + 0.00 +1,614.12
Jan. 2009	1,674.48	= 0.00 + 0.00 +1,674.48
Feb. 2009	1,520.03	= 0.00 + 0.00 +1,520.03
Mar. 2009	1,639.63	= 0.00 + 0.00 +1,639.63
Total	17,336.96	= 0.00 +124.25 + 17,212.71

(2) Calculation of $MD_{thermal}$

$$MD_{thermal,y}=LFG_{thermal,y}*w_{CH4,y}*D_{CH4}$$

	$MD_{thermal}$	$LFG_{thermal}$	WCH4	DCH4
	t CH4	Nm3	(%)	ton/Nm3
Apr.2008	1,446.01	4,054,592	Use each daily data	0.0007168
May. 2008	1,326.26	3,763,400		0.0007168
Jun. 2008	1,364.18	3,843,568		0.0007168
Jul. 2008	1,112.83	2,951,136		0.0007168
Aug. 2008	1,084.85	2,948,760		0.0007168
Sep. 2008	1,382.90	3,903,608		0.0007168
Oct. 2008	1,456.60	4,095,592		0.0007168
Nov. 2008	1,590.81	4,507,280		0.0007168
Dec. 2008	1,614.12	4,533,048		0.0007168
Jan. 2009	1,674.48	4,894,504		0.0007168
Feb. 2009	1,520.03	4,461,837		0.0007168
Mar. 2009	1,639.63	4,745,991		0.0007168
Total	17,212.71	48,703,316		

(3) Calculation of $MD_{electricity}$

$$MD_{electricity,y}=LFG_{electricity,y}*w_{CH4,y}*D_{CH4}$$

	MDelectricity	LFGelectricity	WCH4	DCH4
	t CH4	Nm3	(%)	ton/Nm3
Apr.2008	0.00	0.00	Use each daily data	0.0007168
May. 2008	6.54	17.232.00		0.0007168
Jun. 2008	29.99	78,450.00		0.0007168
Jul. 2008	55.73	140,901.00		0.0007168
Aug. 2008	31.99	242,121.00		0.0007168
Sep. 2008	0.00	0.00		0.0007168
Oct. 2008	0.00	0.00		0.0007168
Nov. 2008	0.00	1.00		0.0007168
Dec. 2008	0.00	1.00		0.0007168
Jan. 2009	0.00	0.00		0.0007168
Feb. 2009	0.00	0.00		0.0007168
Mar. 2009	0.00	0.00		0.0007168
Total	124.25	478,705.00		

(4) Calculation of MD_{flared}

$$MD_{flared,y} = (LFG_{flared,y} * w_{CH4,y} * D_{CH4}) - (PE_{flared,y} / GWP_{CH4})$$
$$PE_{flared,y} = (LFG_{flared,y} * w_{CH4,y} * D_{CH4}) * (1 - \eta_{flare,h}) * GWP$$

	MDflared	LFG_{flared}	W_{CH4}	D_{CH4}	PEflared	$1 - \eta_{flare,h}$
	t CH4	Nm3	(%)	ton/Nm3	t CO2	
Apr.08	0.00	0.00	Use each daily data	0.0007168	0.00	0.5
May.08	0.00	0.00		0.0007168	0.00	0.5
Jun.08	0.00	0.00		0.0007168	0.00	0.5
Jul.08	0.00	0.00		0.0007168	0.00	0.5
Aug.08	0.00	0.00[1)]		0.0007168	0.00	0.5
Sep.08	0.00	0.00[2)]		0.0007168	0.00	0.5
Oct.08	0.00	0.00		0.0007168	0.00	0.5
Nov.08	0.00	0.00		0.0007168	0.00	0.5
Dec.08	0.00	0.00		0.0007168	0.00	0.5
Jan.09	0.00	0.00		0.0007168	0.00	0.5
Feb.09	0.00	0.00		0.0007168	0.00	0.5
Mar.09	0.00	0.00		0.0007168	0.00	0.5
Total	12.99	404.00		0.0007168		

1) LFG_{flared} is 303 Nm3, but it was corrected to 0Nm3 considered by the incineration temperature.

2) LFG_{flared} is 101 Nm3, but it was corrected to 0 Nm3 considered by the incineration temperature.

(5) Calculation of MDreg

$$MD_{reg,y} = MD_{project,y} * AF$$

	MDreg	$MD_{project}$	**AF**
	t CH4	**t CH4**	**(%)**
Apr.2008	161.95	1,446.01	11.20
May. 2008	149.27	1,332.80	
Jun. 2008	156.15	1,394.18	
Jul. 2008	130.88	1,168.55	
Aug. 2008	125.09	1,116.84	
Sep. 2008	154.89	1,382.90	
Oct. 2008	163.14	1,456.60	
Nov. 2008	178.17	1,590.81	
Dec. 2008	180.78	1,614.12	
Jan. 2009	187.54	1,674.48	
Feb. 2009	170.24	1,520.03	
Mar. 2009	183.64	1,639.63	
Total	1941.74	17,336.96	

(6) Calculation of Leakage

$$EL_{leakage} = EL_{imp} * EF_{EL,\ leakage}$$

	EL_{imp}	$EL_{leakage}$
	MWh	ton CO2 eq
Apr.2008	642.06	356.60
May. 2008	609.99	338.79
Jun. 2008	574.72	319.20
Jul. 2008	382.87	212.65
Aug. 2008	413.04	229.40
Sep. 2008	670.38	372.33
Oct. 2008	674.04	374.36
Nov. 2008	722.26	401.14
Dec. 2008	694.84	385.91
Jan. 2009	747.86	415.36
Feb. 2009	676.09	375.50
Mar. 2009	761.58	422.98
Total	7,569.73	**4204.23**

$EF_{EL,\ leakage}$ = **0.5554(option 1)** $tonCO_2/MWh$

(7) Calculation of PE_{LNG}

$PE_{LNG} = CO2_{LNG,CH4} + CO2_{LNG,C2H6} + CO2_{LNG,C3H8} + CO2_{LNG,C4H10} + CO2_{LNG,C5H12}$

$CO2_{LNG,CH4}$ CO2 emissions caused by combustion of CH_4 in LNG

$CO2_{LNG,C2H6}$ CO2 emissions caused by combustion of C_2H_6 in LNG

$CO2_{LNG,C3H8}$ CO2 emissions caused by combustion of C_3H_8 in LNG

$CO2_{LNG,C4H10}$ CO2 emissions caused by combustion of C_4H_{10} in LNG

$CO2_{LNG,C5H12}$ CO2 emissions caused by combustion of C_5H_{12} in LNG

PE_{LNG} (tCO2)= LNG(m3) * mol(%) * CO2 factor / 22.4(m3/kmol) * 44(kg/kmol) * Oxidation factor /1000(kg/t)

	CO2 factor	Oxidation Factor	kgmol weight of CO2 (kg/gkmol)	volume of kgmol (m3/kgmol)	Apr. 2008		May. 2008		Feb. 2008		Mar. 2009	
					(mol %)	ton CO2	(mol %)	ton CO2	(mol %)	ton CO2	(mol %)	ton CO2
CH4 (Methane)	1	0.995	44	22.4	90.94	23.05	90.93	4.41	91.24	33.71	91.30	104.63
C2H6 (Ethene)	2	0.995	44	22.4	5.78	1.47	5.69	0.28	5.60	2.07	5.49	6.29
C3H8 (Propane)	3	0.995	44	22.4	2.09	0.53	2.12	0.10	2.10	0.78	2.16	2.48
I-C4H10 (I-Butane)	4.	0.995	44	22.4	0.42	0.11	0.43	0.02	0.42	0.16	0.45	0.52
N-C4H10 (N-Butane)	4.	0.995	44	22.4	0.48	0.12	0.50	0.02	0.44	0.16	0.44	0.50
I-C5H12 (I-Pentane)	5	0.995	44	22.4	0.02	0.01	0.01	0.00	0.02	0.01	0.02	0.02

N-C5H12 (N-Pentane)	5	0.995	44	22.4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LNG(m3)					12969.00		2479.00		18902.00		58634.00	
Total PE_{LNG} (tCO2)	**181.74**				100.00	25.35	100.00	4.84	100.00	36.94	100.00	114.61

4.1.2. Description and consideration of measurement uncertainties and error propagation

1) Material Balance check

Result for checking material balance is follows. The range of deviation from the value of input and output is within ± 2% as an error tolerance.

$$\text{Material balance check}(\%) = \frac{LFG_{project}}{LFG_{total,dry} + LNG} * 100$$

	$LFG_{project}$ [1)] (Nm^3)		$LFG_{total,dry}$ (Nm^3)	+	LNG (Nm^3)	=	$LFG_{total,dry}$ + LNG (Nm^3)		Material balance %
Apr.08	4,054,592		4,055,044	+	12,969	=	4,068,013		99.7%
May.08	3,780,632		3,756,417	+	2,479	=	3,758,896		100.6%
Jun.08	3,922,018		3,885,007	+	-	=	3,885,007		101.0%
Jul.08	3,092,037		3,009,363	+	-	=	3,009,363		102.7%
Aug.08	3,191,184		2,875,819	+	-	=	2,875,819		101.9%
Sep.08	3,903,709		3,876,410	+	-	=	3,876,410		100.7%
Oct.08	4,095,592		4,029,896	+	-	=	4,029,896		101.6%
Nov.08	4,507,281		4,425,710	+	-	=	4,425,710		101.8%
Dec.08	4,533,048		4,438,288	+		=	4,438,288		102.1%
Jan.09	4,894,504		4,830,431	+		=	4,830,431		101.3%
Feb.09	4,461,837		4,413,599	+	18,902.00	=	4,432,501		100.7%
Mar.09	4,745,991		4,455,192	+	58,634.00	=	4,513,826		105.1%

1) $LFG_{project}$ is sum of LFGthermal, LFGflare and LFGelectricity.

Measured volume of $LFG_{total,y}$ by a flow meter is the volume of wet gas, but measured volume of behind chiller is dry gas. Therefore, to check material balance, measured volume of $LFG_{total,y}$ was converted to the value of dry basis.

$$H_2O(Nm^3) = \frac{Wet\ Gas\ Volume(Nm^3) \times steam\ pressure(kg/cm^2)}{(Outlet\ pressure(kg/cm^2)}$$

$$H_2O(Nm^3) = Wet\ Gas\ Volume(Nm^3) - Dry\ Gas\ Volume(Nm^3)$$
$$Dry\ Gas\ Volume(Nm^3) = Wet\ Gas\ Volume(Nm^3) - H_2O(Nm^3)$$

	Temp	Pressure	Stem pressure	$LFG_{total,wet}$	$LFG_{total,dry}$
	TI-104A/B	PICA-102	-	FIQ101	-
	℃	mmH2O	kg/cm2	Nm3	Nm3
Apr.08	15.4	11,818	0.017837	4,117,184	4,055,044
May.08	17.1	11,628	0.019847	3,821,644	3,756,417
Jun.08	18.0	12,905	0.021030	3,949,368	3,885,007
Jul.08	21.3	11,321	0.025778	3,079,484	3,009,363
Aug.08	21.1	11,323	0.025517	2,942,120	2,875,819
Sep.08	18.4	11,771	0.021607	3,948,896	3,876,410
Oct.08	18.2	11,751	0.021284	4,104,234	4,029,896
Nov.08	17.0	11,826	0.019743	4,500,850	4,425,710
Dec.08	16.0	11,750	0.018526	4,509,388	4,438,288
Jan.09	15.8	12,056	0.018313	4,904,936	4,830,431
Feb.09	16.4	12,109	0.018998	4,483,948	4,413,599
Mar.09	16.8	12,076	0.019500	4,528,312	4,455,192

5. Summary of the emission reductions

The emission reductions in 2nd monitoring period : **318,913.61 tCO2e**

$ER_y(tCO2e) = (MD_{project,y} - MD_{reg,y}) * GWP_{CH4} – leakage(EL_{leakage} + PE_{LNG})$

$MD_{project}$	tCH4	17,336.96
$MD_{thermal}$	tCH4	17,212.71
MD_{flared}	tCH4	0.00
$MD_{electricity}$	tCH4	124.25
MD_{reg}	tCH4	1941.74
leakage	tCO2	4385.97
$EL_{leakage}$	tCO2	4204.23
PE_{LNG}	tCO2	181.74
Total emission reduction(ER)		(17,336.96 - 1941.74) * 21 - 4385.97 = **318,913.61 tCO2e**

Appendix A

Measurement Source Data

(1) Daily Report(Apr.08)

	LFG total, y	MDthermal	W_{CH4}	MDelectricity	W_{CH4}	MDflared	W_{CH4}	MDthermal	MDelectricity	MDflared	Mdproject	KEPCO
	Nm3	Nm3	%	Nm3	%	Nm3	%	ton CH4	ton CH4	ton CH4	ton CH4	(kWh)
	FIQ101	FIQ-A	AI-A	FIQ201	AI-A	FIQ301	AI101	-	-	-	-	E
01-Apr-08	158248	156,592.00	49.46	0.00	0.00	0.00	0.00	55.52	0.00	0.00	55.52	
02-Apr-08	158756	156,328.00	49.52	0.00	0.00	0.00	0.00	55.49	0.00	0.00	55.49	
03-Apr-08	156436	154,192.00	49.39	0.00	0.00	0.00	0.00	54.59	0.00	0.00	54.59	
04-Apr-08	155852	154,776.00	49.65	0.00	0.00	0.00	0.00	55.08	0.00	0.00	55.08	
05-Apr-08	146,488.00	143,168.00	49.60	0.00	0.00	0.00	0.00	50.86	0.00	0.00	50.86	
06-Apr-08	83,596.00	82,400.00	52.97	0.00	0.00	0.00	0.00	31.24	0.00	0.00	31.24	
07-Apr-08	72,404.00	72,976.00	56.21	0.00	0.00	0.00	0.00	29.40	0.00	0.00	29.40	
08-Apr-08	52,168.00	52,464.00	56.58	0.00	0.00	0.00	0.00	21.27	0.00	0.00	21.27	
09-Apr-08	84,060.00	82,904.00	54.75	0.00	0.00	0.00	0.00	32.87	0.00	0.00	32.87	
10-Apr-08	171,116.00	167,824.00	51.23	0.00	0.00	0.00	0.00	62.86	0.00	0.00	62.86	
11-Apr-08	97,564.00	92,656.00	51.16	0.00	0.00	0.00	0.00	33.61	0.00	0.00	33.61	
12-Apr-08	78,100.00	75,488.00	53.74	0.00	0.00	0.00	0.00	29.54	0.00	0.00	29.54	
13-Apr-08	171,796.00	168,984.00	50.33	0.00	0.00	0.00	0.00	61.99	0.00	0.00	61.99	
14-Apr-08	169,616.00	168,936.00	49.12	0.00	0.00	0.00	0.00	59.48	0.00	0.00	59.48	
15-Apr-08	170,744.00	163,848.00	48.68	0.00	0.00	0.00	0.00	57.16	0.00	0.00	57.16	
16-Apr-08	166,740.00	163,240.00	49.15	0.00	0.00	0.00	0.00	57.50	0.00	0.00	57.50	
17-Apr-08	170,448.00	166,944.00	48.02	0.00	0.00	0.00	0.00	57.47	0.00	0.00	57.47	
18-Apr-08	149,872.00	144,848.00	48.44	0.00	0.00	0.00	0.00	50.29	0.00	0.00	50.29	
19-Apr-08	38,184.00	35,304.00	49.24	0.00	0.00	0.00	0.00	12.52	0.00	0.00	12.52	
20-Apr-08	60,644.00	61,880.00	51.74	0.00	0.00	0.00	0.00	23.66	0.00	0.00	23.66	
21-Apr-08	136,016.00	133,608.00	53.67	0.00	0.00	0.00	0.00	51.19	0.00	0.00	51.19	
22-Apr-08	170,752.00	168,656.00	49.62	0.00	0.00	0.00	0.00	59.99	0.00	0.00	59.99	

23-Apr-08	173,060.00	168,720.00	48.69	0.00	0.00	0.00	0.00	58.89	0.00	0.00	58.89	
24-Apr-08	166,316.00	162,376.00	48.10	0.00	0.00	0.00	0.00	55.99	0.00	0.00	55.99	
25-Apr-08	162,828.00	161,576.00	48.29	0.00	0.00	0.00	0.00	55.92	0.00	0.00	55.92	
26-Apr-08	162,388.00	161,176.00	47.63	0.00	0.00	0.00	0.00	55.03	0.00	0.00	55.03	
27-Apr-08	152,088.00	147,736.00	47.61	0.00	0.00	0.00	0.00	50.41	0.00	0.00	50.41	
28-Apr-08	149,428.00	150,144.00	48.13	0.00	0.00	0.00	0.00	51.80	0.00	0.00	51.80	
29-Apr-08	164,884.00	168,392.00	47.83	0.00	0.00	0.00	0.00	57.73	0.00	0.00	57.73	
30-Apr-08	166,592.00	166,456.00	47.50	0.00	0.00	0.00	0.00	56.67	0.00	0.00	56.67	
average	137,239.47	135,153.07	50.20	0.00	0.00	0.00	0.00	48.20	0.00	0.00	48.20	
max	173,060.00	168,984.00		0.00		0.00		62.86	0.00	0.00	62.86	0.00
min	38,184.00	35,304.00		0.00		0.00		12.52	0.00	0.00	12.52	0.00
acumulation	4,117,184.00	4,054,592.00		0.00		0.00		1,446.01	0.00	0.00	1,446.01	642,056.00

Daily Report(May.08)

	LFG total, y	MDthermal	WCH4	MDelectricity	WCH4	MDflared	W_{CH4}	MDthermal	MDelectricity	MDflared	Mdproject	KEPCO
	Nm3	Nm3	%	Nm3	%	Nm3	%	ton CH4	ton CH4	ton CH4	ton CH4	(kWh)
	FIQ101	FIQ-A	AI-A	FIQ201	AI-A	FIQ301	AI101	-	-	-	-	E
01-May-08	160,728.00	158,448.00	47.11	0.00	0.00	0.00	0.00	53.51	0.00	0.00	53.51	
02-May-08	99,672.00	95,056.00	47.20	0.00	0.00	0.00	0.00	32.42	0.00	0.00	32.42	
03-May-08	145,204.00	144,712.00	48.80	0.00	0.00	0.00	0.00	51.21	0.00	0.00	51.21	
04-May-08	107,468.00	104,376.00	48.31	0.00	0.00	0.00	0.00	36.28	0.00	0.00	36.28	
05-May-08	147,432.00	144,136.00	49.17	0.00	0.00	0.00	0.00	50.80	0.00	0.00	50.80	
06-May-08	145,664.00	144,416.00	47.65	0.00	0.00	0.00	0.00	49.32	0.00	0.00	49.32	
07-May-08	147,288.00	144,320.00	48.13	0.00	0.00	0.00	0.00	49.79	0.00	0.00	49.79	
08-May-08	106,008.00	104,280.00	48.31	0.00	0.00	0.00	0.00	36.07	0.00	0.00	36.07	
09-May-08	115,624.00	113,880.00	49.94	0.00	0.00	0.00	0.00	41.00	0.00	0.00	41.00	
10-May-08	145,156.00	145,472.00	50.07	0.00	0.00	0.00	0.00	52.21	0.00	0.00	52.21	
11-May-08	145,008.00	145,304.00	48.60	0.00	0.00	0.00	0.00	50.62	0.00	0.00	50.62	
12-May-08	145,552.00	145,216.00	48.19	0.00	0.00	0.00	0.00	50.16	0.00	0.00	50.16	
13-May-08	152,164.00	150,136.00	48.22	0.00	0.00	0.00	0.00	51.89	0.00	0.00	51.89	
14-May-08	157,860.00	157,224.00	47.01	0.00	0.00	0.00	0.00	53.00	0.00	0.00	53.00	
15-May-08	156,456.00	155,776.00	47.53	0.00	0.00	0.00	0.00	53.07	0.00	0.00	53.07	
16-May-08	162,576.00	158,408.00	46.93	0.00	0.00	0.00	0.00	53.29	0.00	0.00	53.29	
17-May-08	160,780.00	160,264.00	46.68	0.00	0.00	0.00	0.00	53.62	0.00	0.00	53.62	
18-May-08	163,304.00	160,136.00	46.69	0.00	0.00	0.00	0.00	53.59	0.00	0.00	53.59	
19-May-08	97,748.00	93,344.00	46.22	0.00	0.00	0.00	0.00	31.39	0.00	0.00	31.39	
20-May-08	52,604.00	53,920.00	48.99	0.00	0.00	0.00	0.00	19.44	0.00	0.00	19.44	
21-May-08	142,736.00	142,048.00	50.02	0.00	0.00	0.00	0.00	51.14	0.00	0.00	51.14	
22-May-08	102,100.00	100,912.00	50.83	0.00	0.00	0.00	0.00	37.50	0.00	0.00	37.50	
23-May-08	108,868.00	106,696.00	51.15	0.00	0.00	0.00	0.00	39.55	0.00	0.00	39.55	

24-May-08	95,508.00	92,752.00	49.72	0.00	0.00	0.00	0.00	33.41	0.00	0.00	33.41	
25-May-08	99,576.00	98,136.00	50.71	0.00	0.00	0.00	0.00	36.24	0.00	0.00	36.24	
26-May-08	94,132.00	93,752.00	50.89	0.00	0.00	0.00	0.00	34.78	0.00	0.00	34.78	
27-May-08	76,292.00	72,736.00	50.93	0.00	0.00	0.00	0.00	27.01	0.00	0.00	27.01	
28-May-08	92,264.00	92,928.00	53.12	154.00	52.50	0.00	0.00	35.68	0.06	0.00	35.73	
29-May-08	94,988.00	94,688.00	52.48	2,421.00	52.86	0.00	0.00	36.09	0.92	0.00	37.01	
30-May-08	100,628.00	94,808.00	52.45	6,838.00	52.91	0.00	0.00	36.18	2.61	0.00	38.79	
31-May-08	100,256.00	95,120.00	51.70	7,819.00	52.61	0.00	0.00	36.02	2.95	0.00	38.97	
average	123,278.84	121,400.00	49.15	555.87	52.72	0.00	0.00	42.78	0.21	0.00	42.99	
max	163,304.00	160,264.00		7,819.00		0.00		53.62	2.95	0.00	53.62	
min	52,604.00	53,920.00		0.00		0.00		19.44	0.00	0.00	19.44	
acumulation	3,821,644.00	3,763,400.00		17,232.00		0.00		1,326.26	6.54	0.00	1,332.80	609,990.00

Daily Report(Jun.08)

	LFG total, y	MDthermal	WCH4	MDelectricity	WCH4	MDflared	W_{CH4}	MDthermal	MDelectricity	MDflared	Mdproject	KEPCO
	Nm3	Nm3	%	Nm3	%	Nm3	%	ton CH4	ton CH4	ton CH4	ton CH4	(kWh)
	FIQ101	FIQ-A	AI-A	FIQ201	AI-A	FIQ301	AI101	-	-	-	-	E
01-Jun-08	96,736.00	94,248.00	51.92	4,421.00	52.88	0.00	0.00	35.56	1.68	0.00	37.24	
02-Jun-08	97,264.00	92,552.00	52.60	6,829.00	53.68	0.00	0.00	35.71	2.64	0.00	38.34	
03-Jun-08	94,408.00	91,960.00	52.29	6,766.00	52.93	0.00	0.00	35.03	2.58	0.00	37.60	
04-Jun-08	100,392.00	95,960.00	52.65	6,542.00	53.60	0.00	0.00	36.90	2.52	0.00	39.42	
05-Jun-08	137,356.00	132,224.00	52.75	8,882.00	53.06	0.00	0.00	50.24	3.38	0.00	53.62	
06-Jun-08	120,048.00	120,576.00	50.17	0.00	0.00	0.00	0.00	43.49	0.00	0.00	43.49	
07-Jun-08	103,640.00	100,464.00	51.89	6,144.00	52.97	0.00	0.00	38.24	2.34	0.00	40.58	
08-Jun-08	94,400.00	88,992.00	50.80	0.00	0.00	0.00	0.00	32.89	0.00	0.00	32.89	
09-Jun-08	94,204.00	90,200.00	51.90	5,715.00	52.96	0.00	0.00	34.25	2.17	0.00	36.42	
10-Jun-08	20,032.00	21,016.00	53.36	1,540.00	54.00	0.00	0.00	8.13	0.60	0.00	8.73	
11-Jun-08	99,124.00	91,456.00	54.43	4,474.00	54.75	0.00	0.00	35.97	1.76	0.00	37.73	
12-Jun-08	99,396.00	95,288.00	52.93	7,375.00	53.58	0.00	0.00	36.70	2.84	0.00	39.54	
13-Jun-08	97,324.00	92,752.00	52.14	6,857.00	52.85	0.00	0.00	35.30	2.61	0.00	37.90	
14-Jun-08	98,272.00	94,056.00	50.08	6,566.00	53.13	0.00	0.00	35.79	2.50	0.00	38.29	
15-Jun-08	99,840.00	93,312.00	52.53	5,181.00	53.16	0.00	0.00	35.67	1.98	0.00	37.65	
16-Jun-08	165,136.00	168,536.00	51.84	0.00	0.00	0.00	0.00	62.63	0.00	0.00	62.63	
17-Jun-08	169,088.00	168,576.00	48.89	0.00	0.00	0.00	0.00	59.08	0.00	0.00	59.08	
18-Jun-08	171,144.00	168,088.00	48.29	1,158.00	48.36	0.00	0.00	58.18	0.40	0.00	58.58	
19-Jun-08	170,360.00	167,792.00	47.64	0.00	0.00	0.00	0.00	57.30	0.00	0.00	57.30	
20-Jun-08	171,524.00	167,504.00	47.40	0.00	0.00	0.00	0.00	56.91	0.00	0.00	56.91	
21-Jun-08	172,128.00	164,288.00	46.88	0.00	0.00	0.00	0.00	55.21	0.00	0.00	55.21	
22-Jun-08	167,732.00	162,264.00	46.42	0.00	0.00	0.00	0.00	53.99	0.00	0.00	53.99	
23-Jun-08	165,864.00	162,424.00	46.57	0.00	0.00	0.00	0.00	54.21	0.00	0.00	54.21	

24-Jun-08	166,876.00	162,560.00	47.01	0.00	0.00	0.00	0.00	54.78	0.00	0.00	54.78	
25-Jun-08	166,464.00	162,552.00	46.78	0.00	0.00	0.00	0.00	54.51	0.00	0.00	54.51	
26-Jun-08	155,340.00	152,064.00	46.88	0.00	0.00	0.00	0.00	51.16	0.00	0.00	51.16	
27-Jun-08	163,768.00	160,816.00	46.92	0.00	0.00	0.00	0.00	54.09	0.00	0.00	54.09	
28-Jun-08	165,084.00	160,888.00	46.91	0.00	0.00	0.00	0.00	54.10	0.00	0.00	54.10	
29-Jun-08	164,152.00	160,856.00	47.18	0.00	0.00	0.00	0.00	54.40	0.00	0.00	54.40	
30-Jun-08	162,272.00	159,304.00	47.10	0.00	0.00	0.00	0.00	53.78	0.00	0.00	53.78	
average	131,645.60	128,118.93	49.84	2,615.00	52.99	0.00	0.00	45.47	1.00	0.00	46.47	
max	172,128.00	168,576.00		8,882.00		0.00		62.63	3.38	0.00	62.63	
min	20,032.00	21,016.00		0.00		0.00		8.13	0.00	0.00	8.73	
acumulation	3,949,368.00	3,843,568.00		78,450.00		0.00		1,364.18	29.99	0.00	1,394.18	574,720.00

Daily Report(Jul.08)

	LFG total, y	MDthermal	WCH4	MDelectricity	WCH4	MDflared	W_{CH4}	MDthermal	MDelectricity	MDflared	Mdproject	KEPCO
	Nm3	Nm3	%	Nm3	%	Nm3	%	ton CH4	ton CH4	ton CH4	ton CH4	(kWh)
	FIQ101	FIQ-A	AI-A	FIQ201	AI-A	FIQ301	AI101	-	-	-	-	E
01-Jul-08	152,232.00	149,272.00	48.00	0.00	0.00	0.00	0.00	51.35	0.00	0.00	51.35	
02-Jul-08	145,664.00	143,056.00	49.00	0.00	0.00	0.00	0.00	50.25	0.00	0.00	50.25	
03-Jul-08	145,992.00	142,792.00	49.06	0.00	0.00	0.00	0.00	50.22	0.00	0.00	50.22	
04-Jul-08	146,456.00	142,904.00	49.14	0.00	0.00	0.00	0.00	50.34	0.00	0.00	50.34	
05-Jul-08	147,324.00	142,864.00	49.47	0.00	0.00	0.00	0.00	50.66	0.00	0.00	50.66	
06-Jul-08	146,500.00	142,776.00	49.30	0.00	0.00	0.00	0.00	50.45	0.00	0.00	50.45	
07-Jul-08	146,412.00	142,928.00	49.28	0.00	0.00	0.00	0.00	50.49	0.00	0.00	50.49	
08-Jul-08	146,776.00	143,080.00	49.23	0.00	0.00	0.00	0.00	50.48	0.00	0.00	50.48	
09-Jul-08	53,840.00	52,448.00	49.23	0.00	0.00	0.00	0.00	18.58	0.00	0.00	18.58	
10-Jul-08	0.00	0.00	49.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
11-Jul-08	86,956.00	86,344.00	52.57	0.00	0.00	0.00	0.00	33.95	0.00	0.00	33.95	

12-Jul-08	86,284.00	85,112.00	54.07	0.00	0.00	0.00	0.00	33.21	0.00	0.00	33.21	
13-Jul-08	87,332.00	85,400.00	54.89	1,749.00	55.00	0.00	0.00	33.91	0.69	0.00	34.61	
14-Jul-08	80,644.00	79,112.00	54.80	6,619.00	55.38	0.00	0.00	31.39	2.63	0.00	34.02	
15-Jul-08	81,896.00	80,680.00	55.36	1,101.00	56.15	0.00	0.00	32.30	0.44	0.00	32.74	
16-Jul-08	86,856.00	79,920.00	54.81	8,693.00	55.33	0.00	0.00	31.73	3.45	0.00	35.18	
17-Jul-08	88,224.00	83,528.00	54.70	8,745.00	55.23	0.00	0.00	33.07	3.47	0.00	36.54	
18-Jul-08	87,016.00	80,920.00	54.05	8,955.00	54.66	0.00	0.00	31.75	3.52	0.00	35.27	
19-Jul-08	86,228.00	79,752.00	54.67	9,257.00	55.10	0.00	0.00	31.57	3.66	0.00	35.23	
20-Jul-08	89,128.00	83,144.00	54.80	9,061.00	55.31	0.00	0.00	32.97	3.60	0.00	36.56	
21-Jul-08	89,396.00	83,200.00	54.56	8,369.00	55.04	0.00	0.00	32.87	3.31	0.00	36.19	
22-Jul-08	89,648.00	82,064.00	54.47	8,648.00	54.93	0.00	0.00	32.37	3.42	0.00	35.78	
23-Jul-08	90,508.00	84,272.00	54.55	9,389.00	55.10	0.00	0.00	33.27	3.71	0.00	36.98	
24-Jul-08	98,116.00	92,792.00	54.30	6,446.00	54.63	0.00	0.00	36.41	2.53	0.00	38.94	
25-Jul-08	98,872.00	93,312.00	53.40	2,685.00	54.24	0.00	0.00	36.00	1.05	0.00	37.05	
26-Jul-08	88,416.00	84,112.00	54.12	6,724.00	54.93	0.00	0.00	32.94	2.65	0.00	35.59	
27-Jul-08	89,028.00	82,288.00	54.20	8,421.00	55.02	0.00	0.00	32.41	3.32	0.00	35.73	
28-Jul-08	88,368.00	82,080.00	54.41	9,506.00	55.10	0.00	0.00	32.48	3.76	0.00	36.24	
29-Jul-08	88,948.00	83,272.00	54.61	8,935.00	55.26	0.00	0.00	33.03	3.55	0.00	36.58	
30-Jul-08	82,828.00	78,048.00	54.33	8,750.00	55.02	0.00	0.00	30.82	3.46	0.00	34.28	
31-Jul-08	83,596.00	79,664.00	54.63	8,848.00	55.19	0.00	0.00	31.55	3.51	0.00	35.06	
average	99,338.19	95,197.94	52.68	4,545.19	55.08	0.00	0.00	35.90	1.80	0.00	37.70	
max	152,232.00	149,272.00		9,506.00		0.00		51.35	3.76	0.00	51.35	
min	0.00	0.00		0.00		0.00		0.00	0.00	0.00	0.00	
acumulation	3,079,484.00	2,951,136.00		140,901.00		0.00		1,112.83	55.73	0.00	1,168.55	382,872.00

Daily Report(Aug.08)

	LFG total, y	MDthermal	WCH4	MDelectricity	WCH4	MDflared	W_{CH4}	MDthermal	MDelectricity	MDflared	Mdproject	KEPCO
	Nm3	Nm3	%	Nm3	%	Nm3	%	ton CH4	ton CH4	ton CH4	ton CH4	(kWh)
	FIQ101	FIQ-A	AI-A	FIQ201	AI-A	FIQ301	AI101	-	-	-	-	E
01-Aug-08	77,384.00	70,240.00	54.92	8,138.00	55.44	0.00	0.00	27.97	3.24	0.00	31.21	
02-Aug-08	58,972.00	56,496.00	55.32	5,451.00	55.67	0.00	0.00	22.55	2.18	0.00	24.73	
03-Aug-08	62,704.00	57,032.00	55.63	6,094.00	56.02	0.00	0.00	22.91	2.45	0.00	25.36	
04-Aug-08	62,196.00	59,088.00	55.37	5,973.00	55.83	0.00	0.00	23.65	2.39	0.00	26.05	
05-Aug-08	60,176.00	57,296.00	55.72	6,012.00	56.15	0.00	0.00	23.07	2.42	0.00	25.50	
06-Aug-08	60,876.00	57,832.00	56.01	6,101.00	56.33	0.00	0.00	23.40	2.47	0.00	25.87	
07-Aug-08	56,848.00	52,392.00	55.71	5,704.00	56.16	0.00	0.00	21.11	2.30	0.00	23.41	
08-Aug-08	65,312.00	62,544.00	56.07	6,656.00	56.40	0.00	0.00	25.32	2.70	0.00	28.01	
09-Aug-08	61,232.00	57,728.00	56.16	5,655.00	56.61	100.00	31.26	23.40	2.30	0.00	25.70	
10-Aug-08	62,784.00	57,448.00	56.35	5,687.00	56.77	0.00	0.00	23.39	2.32	0.00	25.71	
11-Aug-08	62,028.00	57,736.00	56.36	6,401.00	56.72	0.00	0.00	23.48	2.60	0.00	26.09	
12-Aug-08	60,776.00	57,216.00	56.32	6,425.00	56.67	0.00	0.00	23.25	2.61	0.00	25.86	
13-Aug-08	74,176.00	68,768.00	56.19	4,039.00	56.60	0.00	0.00	27.84	1.64	0.00	29.49	
14-Aug-08	56,304.00	56,472.00	54.31	0.00	0.00	0.00	0.00	22.36	0.00	0.00	22.36	
15-Aug-08	126,888.00	123,048.00	54.61	0.00	0.00	0.00	0.00	48.41	0.00	0.00	48.41	
16-Aug-08	69,156.00	66,624.00	53.52	0.00	0.00	0.00	0.00	25.78	0.00	0.00	25.78	
17-Aug-08	89,772.00	89,104.00	54.81	0.00	0.00	0.00	0.00	35.39	0.00	0.00	35.39	
18-Aug-08	99,180.00	96,720.00	55.20	0.00	0.00	0.00	0.00	38.63	0.00	0.00	38.63	
19-Aug-08	101,112.00	97,256.00	54.36	941.00	54.17	0.00	0.00	38.25	0.37	0.00	38.62	
20-Aug-08	97,288.00	97,824.00	53.94	0.00	0.00	0.00	0.00	38.24	0.00	0.00	38.24	
21-Aug-08	100,232.00	97,488.00	54.30	0.00	0.00	0.00	0.00	38.38	0.00	0.00	38.38	
22-Aug-08	91,208.00	90,816.00	53.94	0.00	0.00	0.00	0.00	35.43	0.00	0.00	35.43	
23-Aug-08	168,796.00	166,272.00	52.81	0.00	0.00	0.00	0.00	62.95	0.00	0.00	62.95	

24-Aug-08	165,168.00	162,216.00	50.04	0.00	0.00	0.00	0.00	58.19	0.00	0.00	58.19	
25-Aug-08	155,204.00	149,424.00	49.55	0.00	0.00	0.00	0.00	53.08	0.00	0.00	53.08	
26-Aug-08	143,128.00	139,264.00	49.91	0.00	0.00	0.00	0.00	49.84	0.00	0.00	49.84	
27-Aug-08	109,412.00	113,816.00	49.61	0.00	0.00	0.00	0.00	40.45	0.00	0.00	40.45	
28-Aug-08	133,230.00	132,576.00	49.89	0.00	0.00	0.00	0.00	47.41	0.00	0.00	47.41	
29-Aug-08	136,538.00	133,320.00	48.46	3.00	49.06	203.00	49.36	46.31	0.00	0.00	46.31	
30-Aug-08	136,824.00	133,416.00	48.90	0.00	0.00	0.00	0.00	46.77	0.00	0.00	46.77	
31-Aug-08	137,216.00	133,176.00	49.91	0.00	0.00	0.00	0.00	47.65	0.00	0.00	47.65	
average	94,907.10	91,956.39	53.68	2,557.42	55.64	9.77	40.31	35.00	1.03	0.00	36.03	
max	168,796.00	166,272.00		8,138.00		203.00		62.95	3.24	0.00	62.95	
min	56,304.00	52,392.00		0.00		0.00		21.11	0.00	0.00	22.36	
acumulation	2,942,120.00	2,850,648.00		79,280.00		303.00		1,084.85	31.99	0.00	1,116.84	413,044.00

Daily Report(Sep.08)

	LFG total, y	MDthermal	WCH4	MDelectricity	WCH4	MDflared	W_{CH4}	MDthermal	MDelectricity	MDflared	Mdproject	KEPCO
	Nm3	Nm3	%	Nm3	%	Nm3	%	ton CH4	ton CH4	ton CH4	ton CH4	(kWh)
	FIQ101	FIQ-A	AI-A	FIQ201	AI-A	FIQ301	AI101	-	-	-	-	E
01-Sep-08	137,312.00	132,928.00	49.35	0.00	0.00	0.00	0.00	47.02	0.00	0.00	47.02	
02-Sep-08	134,552.00	132,880.00	49.25	0.00	0.00	101.00	49.44	46.91	0.00	0.00	46.91	
03-Sep-08	134,672.00	133,112.00	49.06	0.00	0.00	0.00	0.00	46.81	0.00	0.00	46.81	
04-Sep-08	134,400.00	133,240.00	48.81	0.00	0.00	0.00	0.00	46.61	0.00	0.00	46.61	
05-Sep-08	133,832.00	133,288.00	48.59	0.00	0.00	0.00	0.00	46.43	0.00	0.00	46.43	
06-Sep-08	130,724.00	127,864.00	48.72	0.00	0.00	0.00	0.00	44.64	0.00	0.00	44.64	
07-Sep-08	133,032.00	133,152.00	49.02	0.00	0.00	0.00	0.00	46.79	0.00	0.00	46.79	
08-Sep-08	133,600.00	133,136.00	48.75	0.00	0.00	0.00	0.00	46.53	0.00	0.00	46.53	
09-Sep-08	134,024.00	133,168.00	49.26	0.00	0.00	0.00	0.00	47.02	0.00	0.00	47.02	
10-Sep-08	134,224.00	133,080.00	49.38	0.00	0.00	0.00	0.00	47.11	0.00	0.00	47.11	
11-Sep-08	134,292.00	132,880.00	50.88	0.00	0.00	0.00	0.00	46.83	0.00	0.00	46.83	
12-Sep-08	134,756.00	132,696.00	49.29	0.00	0.00	0.00	0.00	46.89	0.00	0.00	46.89	
13-Sep-08	134,556.00	132,920.00	49.02	0.00	0.00	0.00	0.00	46.70	0.00	0.00	46.70	
14-Sep-08	134,332.00	133,056.00	48.99	0.00	0.00	0.00	0.00	46.72	0.00	0.00	46.72	
15-Sep-08	134,784.00	132,936.00	49.05	0.00	0.00	0.00	0.00	46.74	0.00	0.00	46.74	
16-Sep-08	135,492.00	132,840.00	50.29	0.00	0.00	0.00	0.00	46.61	0.00	0.00	46.61	
17-Sep-08	135,260.00	132,792.00	49.14	0.00	0.00	0.00	0.00	46.78	0.00	0.00	46.78	
18-Sep-08	134,624.00	132,760.00	48.94	0.00	0.00	0.00	0.00	46.57	0.00	0.00	46.57	
19-Sep-08	135,160.00	132,872.00	48.84	0.00	0.00	0.00	0.00	46.52	0.00	0.00	46.52	
20-Sep-08	135,416.00	132,888.00	49.16	0.00	0.00	0.00	0.00	46.83	0.00	0.00	46.83	
21-Sep-08	71,112.00	68,592.00	49.28	0.00	0.00	0.00	0.00	24.28	0.00	0.00	24.28	
22-Sep-08	41,144.00	38,856.00	50.00	0.00	0.00	0.00	0.00	14.54	0.00	0.00	14.54	
23-Sep-08	144,168.00	144,920.00	51.76	0.00	0.00	0.00	0.00	53.76	0.00	0.00	53.76	

24-Sep-08	146,772.00	145,240.00	50.49	0.00	0.00	0.00	0.00	52.56	0.00	0.00	52.56	
25-Sep-08	141,976.00	139,952.00	50.79	0.00	0.00	0.00	0.00	50.96	0.00	0.00	50.96	
26-Sep-08	135,668.00	133,736.00	50.07	0.00	0.00	0.00	0.00	48.00	0.00	0.00	48.00	
27-Sep-08	140,840.00	141,320.00	50.05	0.00	0.00	0.00	0.00	50.69	0.00	0.00	50.69	
28-Sep-08	145,688.00	145,648.00	49.70	0.00	0.00	0.00	0.00	51.89	0.00	0.00	51.89	
29-Sep-08	145,472.00	145,568.00	49.57	0.00	0.00	0.00	0.00	51.72	0.00	0.00	51.72	
30-Sep-08	147,012.00	145,288.00	49.37	0.00	0.00	0.00	0.00	51.44	0.00	0.00	51.44	
average	131,629.87	130,120.27	49.50	0.00	0.00	3.37	49.44	46.10	0.00	0.00	46.10	
max	147,012.00	145,648.00		0.00		101.00		53.76	0.00	0.00	53.76	
min	41,144.00	38,856.00		0.00		0.00		14.54	0.00	0.00	14.54	
acumulation	3,948,896.00	3,903,608.00		0.00		101.00		1,382.90	0.00	0.00	1,382.90	670,384.00

Daily Report(Oct.08)

	LFG total, y	MDthermal	WCH4	MDelectricity	WCH4	MDflared	W_{CH4}	MDthermal	MDelectricity	MDflared	Mdproject	KEPCO
	Nm3	Nm3	%	Nm3	%	Nm3	%	ton CH4	ton CH4	ton CH4	ton CH4	(kWh)
	FIQ101	FIQ-A	AI-A	FIQ201	AI-A	FIQ301	AI101	-	-	-	-	E
01-Oct-08	145,712.00	144,504.00	49.60	0.00	0.00	0.00	0.00	51.37	0.00	0.00	51.37	
02-Oct-08	145,188.00	144,624.00	49.44	0.00	0.00	0.00	0.00	51.25	0.00	0.00	51.25	
03-Oct-08	146,328.00	144,528.00	49.36	0.00	0.00	0.00	0.00	51.14	0.00	0.00	51.14	
04-Oct-08	146,056.00	144,504.00	49.07	0.00	0.00	0.00	0.00	50.83	0.00	0.00	50.83	
05-Oct-08	146,208.00	144,384.00	49.07	0.00	0.00	0.00	0.00	50.79	0.00	0.00	50.79	
06-Oct-08	57,668.00	56,088.00	48.62	0.00	0.00	0.00	0.00	19.67	0.00	0.00	19.67	
07-Oct-08	58,426.00	58,488.00	52.60	0.00	0.00	0.00	0.00	22.08	0.00	0.00	22.08	
08-Oct-08	58,288.00	59,616.00	54.31	0.00	0.00	0.00	0.00	23.41	0.00	0.00	23.41	
09-Oct-08	54,380.00	57,488.00	54.63	0.00	0.00	0.00	0.00	22.89	0.00	0.00	22.89	
10-Oct-08	54,024.00	51,264.00	55.72	0.00	0.00	0.00	0.00	20.57	0.00	0.00	20.57	
11-Oct-08	63,864.00	65,248.00	55.75	0.00	0.00	0.00	0.00	26.40	0.00	0.00	26.40	

12-Oct-08	153,148.00	156,472.00	54.10	0.00	0.00	0.00	0.00	60.68	0.00	0.00	60.68	
13-Oct-08	155,712.00	156,424.00	50.61	0.00	0.00	0.00	0.00	56.75	0.00	0.00	56.75	
14-Oct-08	155,396.00	156,464.00	49.09	0.00	0.00	0.00	0.00	55.05	0.00	0.00	55.05	
15-Oct-08	154,736.00	156,672.00	48.11	0.00	0.00	0.00	0.00	54.03	0.00	0.00	54.03	
16-Oct-08	153,556.00	156,760.00	47.85	0.00	0.00	0.00	0.00	53.77	0.00	0.00	53.77	
17-Oct-08	156,424.00	156,704.00	48.12	0.00	0.00	0.00	0.00	54.05	0.00	0.00	54.05	
18-Oct-08	153,588.00	156,664.00	48.67	0.00	0.00	0.00	0.00	54.66	0.00	0.00	54.66	
19-Oct-08	154,064.00	156,608.00	48.67	0.00	0.00	0.00	0.00	54.64	0.00	0.00	54.64	
20-Oct-08	156,944.00	156,448.00	48.65	0.00	0.00	0.00	0.00	54.55	0.00	0.00	54.55	
21-Oct-08	158,164.00	156,488.00	48.29	0.00	0.00	0.00	0.00	54.17	0.00	0.00	54.17	
22-Oct-08	53,540.00	50,560.00	47.96	0.00	0.00	0.00	0.00	17.69	0.00	0.00	17.69	
23-Oct-08	157,760.00	156,904.00	51.22	0.00	0.00	0.00	0.00	57.61	0.00	0.00	57.61	
24-Oct-08	161,748.00	157,288.00	48.76	0.00	0.00	0.00	0.00	54.97	0.00	0.00	54.97	
25-Oct-08	159,104.00	157,656.00	49.23	0.00	0.00	0.00	0.00	55.64	0.00	0.00	55.64	
26-Oct-08	158,116.00	156,912.00	49.10	0.00	0.00	0.00	0.00	55.23	0.00	0.00	55.23	
27-Oct-08	158,448.00	156,624.00	48.65	0.00	0.00	0.00	0.00	54.61	0.00	0.00	54.61	
28-Oct-08	157,824.00	155,944.00	48.93	0.00	0.00	0.00	0.00	54.70	0.00	0.00	54.70	
29-Oct-08	156,712.00	155,592.00	48.62	0.00	0.00	0.00	0.00	54.22	0.00	0.00	54.22	
30-Oct-08	156,756.00	155,872.00	48.69	0.00	0.00	0.00	0.00	54.40	0.00	0.00	54.40	
31-Oct-08	156,352.00	155,800.00	49.06	0.00	0.00	0.00	0.00	54.79	0.00	0.00	54.79	
average	132,394.65	132,115.87	50.02	0.00	0.00	0.00	0.00	46.99	0.00	0.00	46.99	
max	161,748.00	157,656.00		0.00		0.00		60.68	0.00	0.00	60.68	
min	53,540.00	50,560.00		0.00		0.00		17.69	0.00	0.00	17.69	
acumulation	4,104,234.00	4,095,592.00		0.00		0.00		1,456.60	0.00	0.00	1,456.60	674,038.00

Daily Report(Nov.08)

	LFG total, y	MDthermal	WCH4	MDelectricity	WCH4	MDflared	W_{CH4}	MDthermal	MDelectricity	MDflared	Mdproject	KEPCO
	Nm3	Nm3	%	Nm3	%	Nm3	%	ton CH4	ton CH4	ton CH4	ton CH4	(kWh)
	FIQ101	FIQ-A	AI-A	FIQ201	AI-A	FIQ301	AI101	-	-	-	-	E
01-Nov-08	156044	155,808.00	48.93	0.00	0.00	0.00	0.00	54.65	0.00	0.00	54.65	
02-Nov-08	156,420.00	155,528.00	48.85	0.00	0.00	0.00	0.00	54.46	0.00	0.00	54.46	
03-Nov-08	157,240.00	155,600.00	48.60	0.00	0.00	0.00	0.00	54.20	0.00	0.00	54.20	
04-Nov-08	155,528.00	155,256.00	48.48	0.00	0.00	0.00	0.00	53.96	0.00	0.00	53.96	
05-Nov-08	157,512.00	157,720.00	48.82	0.00	0.00	0.00	0.00	55.19	0.00	0.00	55.19	
06-Nov-08	157,960.00	157,344.00	48.97	0.00	0.00	0.00	0.00	55.23	0.00	0.00	55.23	
07-Nov-08	157,984.00	157,328.00	48.54	0.00	0.00	0.00	0.00	54.74	0.00	0.00	54.74	
08-Nov-08	158,856.00	157,736.00	48.52	0.00	0.00	0.00	0.00	54.85	0.00	0.00	54.85	
09-Nov-08	157,860.00	157,840.00	48.38	0.00	0.00	0.00	0.00	54.73	0.00	0.00	54.73	
10-Nov-08	158,428.00	158,120.00	48.23	0.00	0.00	0.00	0.00	54.67	0.00	0.00	54.67	
11-Nov-08	156,584.00	158,104.00	48.65	0.00	0.00	0.00	0.00	55.13	0.00	0.00	55.13	
12-Nov-08	157,644.00	157,944.00	48.74	0.00	0.00	0.00	0.00	55.18	0.00	0.00	55.18	
13-Nov-08	151,544.00	151,280.00	48.92	1.00	48.15	0.00	0.00	53.04	0.00	0.00	53.04	
14-Nov-08	113,404.00	121,344.00	49.70	0.00	0.00	0.00	0.00	43.26	0.00	0.00	43.26	
15-Nov-08	144,176.00	145,608.00	50.38	0.00	0.00	0.00	0.00	52.59	0.00	0.00	52.59	
16-Nov-08	147,696.00	145,512.00	49.16	0.00	0.00	0.00	0.00	51.27	0.00	0.00	51.27	
17-Nov-08	147,876.00	145,792.00	49.04	0.00	0.00	0.00	0.00	51.25	0.00	0.00	51.25	
18-Nov-08	153,284.00	154,624.00	49.08	0.00	0.00	0.00	0.00	54.39	0.00	0.00	54.39	
19-Nov-08	157,188.00	157,864.00	48.88	0.00	0.00	0.00	0.00	55.31	0.00	0.00	55.31	
20-Nov-08	151,008.00	151,600.00	48.96	0.00	0.00	0.00	0.00	53.20	0.00	0.00	53.20	
21-Nov-08	144,660.00	145,856.00	49.12	0.00	0.00	0.00	0.00	51.36	0.00	0.00	51.36	
22-Nov-08	144,616.00	146,048.00	50.04	0.00	0.00	0.00	0.00	52.39	0.00	0.00	52.39	
23-Nov-08	145,132.00	145,728.00	49.99	0.00	0.00	0.00	0.00	52.22	0.00	0.00	52.22	

24-Nov-08	145,636.00	145,752.00	50.17	0.00	0.00	0.00	0.00	52.41	0.00	0.00	52.41	
25-Nov-08	145,392.00	145,872.00	49.95	0.00	0.00	0.00	0.00	52.23	0.00	0.00	52.23	
26-Nov-08	132,302.00	133,096.00	50.77	0.00	0.00	0.00	0.00	48.47	0.00	0.00	48.47	
27-Nov-08	147,536.00	146,624.00	51.05	0.00	0.00	0.00	0.00	53.65	0.00	0.00	53.65	
28-Nov-08	147,316.00	146,480.00	49.92	0.00	0.00	0.00	0.00	52.41	0.00	0.00	52.41	
29-Nov-08	147,752.00	146,696.00	49.77	0.00	0.00	0.00	0.00	52.34	0.00	0.00	52.34	
30-Nov-08	146,272.00	147,176.00	49.32	0.00	0.00	0.00	0.00	52.03	0.00	0.00	52.03	
average	150,028.33	150,242.67	49.26	0.03	48.15	0.00	0.00	53.03	0.00	0.00	53.03	
max	158,856.00	158,120.00		1.00		0.00		55.31	0.00	0.00	55.31	
min	113,404.00	121,344.00		0.00		0.00		43.26	0.00	0.00	43.26	
acumulation	4,500,850.00	4,507,280.00		1.00		0.00		1,590.81	0.00	0.00	1,590.81	722,256.00

Daily Report(Dec.08)

	LFG total, y	MDthermal	WCH4	MDelectricity	WCH4	MDflared	W_{CH4}	MDthermal	MDelectricity	MDflared	Mdproject	KEPCO
	Nm3	Nm3	%	Nm3	%	Nm3	%	ton CH4	ton CH4	ton CH4	ton CH4	(kWh)
	FIQ101	FIQ-A	AI-A	FIQ201	AI-A	FIQ301	AI101	-	-	-	-	E
01-Dec-08	145872	146,952.00	49.97	0.00	0.00	0.00	0.00	52.64	0.00	0.00	52.64	
02-Dec-08	148,088.00	146,600.00	49.98	0.00	0.00	0.00	0.00	52.52	0.00	0.00	52.52	
03-Dec-08	146,908.00	146,712.00	49.49	0.00	0.00	0.00	0.00	52.04	0.00	0.00	52.04	
04-Dec-08	146,844.00	146,432.00	49.47	0.00	0.00	0.00	0.00	51.93	0.00	0.00	51.93	
05-Dec-08	146,320.00	147,288.00	49.53	0.00	0.00	0.00	0.00	52.29	0.00	0.00	52.29	
06-Dec-08	149,456.00	152,048.00	49.33	0.00	0.00	0.00	0.00	53.76	0.00	0.00	53.76	
07-Dec-08	144,048.00	147,496.00	49.68	0.00	0.00	0.00	0.00	52.52	0.00	0.00	52.52	

08-Dec-08	131,204.00	131,832.00	50.24	0.00	0.00	0.00	0.00	47.50	0.00	0.00	47.50	
09-Dec-08	145,552.00	146,776.00	50.02	0.00	0.00	0.00	0.00	52.62	0.00	0.00	52.62	
10-Dec-08	146,780.00	146,792.00	49.55	0.00	0.00	0.00	0.00	52.14	0.00	0.00	52.14	
11-Dec-08	147,604.00	146,640.00	49.31	0.00	0.00	0.00	0.00	51.82	0.00	0.00	51.82	
12-Dec-08	146,160.00	147,152.00	49.33	0.00	0.00	0.00	0.00	52.03	0.00	0.00	52.03	
13-Dec-08	146,568.00	147,144.00	49.54	0.00	0.00	0.00	0.00	52.25	0.00	0.00	52.25	
14-Dec-08	147,296.00	147,312.00	49.53	0.00	0.00	0.00	0.00	52.30	0.00	0.00	52.30	
15-Dec-08	139,552.00	141,536.00	49.89	0.00	0.00	0.00	0.00	50.62	0.00	0.00	50.62	
16-Dec-08	145,320.00	146,312.00	49.90	0.00	0.00	0.00	0.00	52.33	0.00	0.00	52.33	
17-Dec-08	144,708.00	146,048.00	49.83	0.00	0.00	0.00	0.00	52.16	0.00	0.00	52.16	
18-Dec-08	146,064.00	146,072.00	49.49	0.00	0.00	0.00	0.00	51.82	0.00	0.00	51.82	
19-Dec-08	145,100.00	146,216.00	49.56	0.00	0.00	0.00	0.00	51.94	0.00	0.00	51.94	
20-Dec-08	144,668.00	146,064.00	49.54	0.00	0.00	0.00	0.00	51.86	0.00	0.00	51.86	
21-Dec-08	145,520.00	146,192.00	49.47	0.00	0.00	0.00	0.00	51.83	0.00	0.00	51.83	
22-Dec-08	145,596.00	146,696.00	49.28	0.00	0.00	0.00	0.00	51.82	0.00	0.00	51.82	
23-Dec-08	144,092.00	146,552.00	49.57	0.00	0.00	0.00	0.00	52.07	0.00	0.00	52.07	
24-Dec-08	145,036.00	146,224.00	49.94	0.00	0.00	0.00	0.00	52.34	0.00	0.00	52.34	
25-Dec-08	145,724.00	146,168.00	49.41	0.00	0.00	0.00	0.00	51.77	0.00	0.00	51.77	
26-Dec-08	145,044.00	146,688.00	49.21	0.00	0.00	0.00	0.00	51.74	0.00	0.00	51.74	
27-Dec-08	144,012.00	146,504.00	49.89	0.00	0.00	0.00	0.00	52.39	0.00	0.00	52.39	
28-Dec-08	145,540.00	146,272.00	49.93	0.00	0.00	0.00	0.00	52.35	0.00	0.00	52.35	
29-Dec-08	145,616.00	146,040.00	49.78	0.00	0.00	0.00	0.00	52.11	0.00	0.00	52.11	
30-Dec-08	147,640.00	146,288.00	50.06	0.00	0.00	0.00	0.00	52.49	0.00	0.00	52.49	
31-Dec-08	151,456.00	150,000.00	50.31	0.00	0.00	0.00	0.00	54.09	0.00	0.00	54.09	
average	145,464.13	146,227.35	49.68	0.00	0.00	0.00	0.00	52.07	0.00	0.00	52.07	
max	151,456.00	152,048.00		0.00		0.00		54.09	0.00	0.00	53.76	
min	131,204.00	131,832.00		0.00		0.00		47.50	0.00	0.00	47.50	
acumulation	4,509,388.00	4,533,048.00		0.00		0.00		1,614.12	0.00	0.00	1,614.12	694,840.00

Daily Report(Jan.09)

	LFG total, y	MDthermal	WCH4	MDelectricity	WCH4	MDflared	W_{CH4}	MDthermal	MDelectricity	MDflared	Mdproject	KEPCO
	Nm3	Nm3	%	Nm3	%	Nm3	%	ton CH4	ton CH4	ton CH4	ton CH4	(kWh)
	FIQ101	FIQ-A	AI-A	FIQ201	AI-A	FIQ301	AI101	-	-	-	-	E
01-Jan-09	157512	159,024.00	49.55	0.00	0.00	0.00	0.00	56.48	0.00	0.00	56.48	
02-Jan-09	158,848.00	159,208.00	49.10	0.00	0.00	0.00	0.00	56.04	0.00	0.00	56.04	
03-Jan-09	158,816.00	159,080.00	48.79	0.00	0.00	0.00	0.00	55.63	0.00	0.00	55.63	
04-Jan-09	159,060.00	159,008.00	48.70	0.00	0.00	0.00	0.00	55.50	0.00	0.00	55.50	
05-Jan-09	152,396.00	152,872.00	48.61	0.00	0.00	0.00	0.00	53.29	0.00	0.00	53.29	
06-Jan-09	157,804.00	158,904.00	48.34	0.00	0.00	0.00	0.00	55.06	0.00	0.00	55.06	
07-Jan-09	159,624.00	159,128.00	47.95	0.00	0.00	0.00	0.00	54.69	0.00	0.00	54.69	
08-Jan-09	159,412.00	158,192.00	47.85	0.00	0.00	0.00	0.00	54.26	0.00	0.00	54.26	
09-Jan-09	158,804.00	158,184.00	48.07	0.00	0.00	0.00	0.00	54.50	0.00	0.00	54.50	
10-Jan-09	158,848.00	158,448.00	47.71	0.00	0.00	0.00	0.00	54.19	0.00	0.00	54.19	
11-Jan-09	159,732.00	158,504.00	47.36	0.00	0.00	0.00	0.00	53.81	0.00	0.00	53.81	
12-Jan-09	159,184.00	158,944.00	47.07	0.00	0.00	0.00	0.00	53.62	0.00	0.00	53.62	
13-Jan-09	157,816.00	158,840.00	46.98	0.00	0.00	0.00	0.00	53.49	0.00	0.00	53.49	
14-Jan-09	159,420.00	158,800.00	47.30	0.00	0.00	0.00	0.00	53.84	0.00	0.00	53.84	
15-Jan-09	155,556.00	155,840.00	47.25	0.00	0.00	0.00	0.00	52.78	0.00	0.00	52.78	
16-Jan-09	155,840.00	158,128.00	47.41	0.00	0.00	0.00	0.00	53.73	0.00	0.00	53.73	
17-Jan-09	157,608.00	157,696.00	47.95	0.00	0.00	0.00	0.00	54.20	0.00	0.00	54.20	
18-Jan-09	158,424.00	157,400.00	48.50	0.00	0.00	0.00	0.00	54.72	0.00	0.00	54.72	
19-Jan-09	159,288.00	157,464.00	47.48	0.00	0.00	0.00	0.00	53.59	0.00	0.00	53.59	
20-Jan-09	158,432.00	157,720.00	47.54	0.00	0.00	0.00	0.00	53.75	0.00	0.00	53.75	
21-Jan-09	158,752.00	157,504.00	47.58	0.00	0.00	0.00	0.00	53.72	0.00	0.00	53.72	
22-Jan-09	158,984.00	157,264.00	47.31	0.00	0.00	0.00	0.00	53.34	0.00	0.00	53.34	

23-Jan-09	160,352.00	157,832.00	46.84	0.00	0.00	0.00	0.00	52.99	0.00	0.00	52.99	
24-Jan-09	158,216.00	157,752.00	47.25	0.00	0.00	0.00	0.00	53.43	0.00	0.00	53.43	
25-Jan-09	157,952.00	157,320.00	47.28	0.00	0.00	0.00	0.00	53.32	0.00	0.00	53.32	
26-Jan-09	157,488.00	157,440.00	47.05	0.00	0.00	0.00	0.00	53.10	0.00	0.00	53.10	
27-Jan-09	157,424.00	157,960.00	46.81	0.00	0.00	0.00	0.00	52.99	0.00	0.00	52.99	
28-Jan-09	158,872.00	157,952.00	47.37	0.00	0.00	0.00	0.00	53.63	0.00	0.00	53.63	
29-Jan-09	158,024.00	157,640.00	47.84	0.00	0.00	0.00	0.00	54.06	0.00	0.00	54.06	
30-Jan-09	158,328.00	157,232.00	47.73	0.00	0.00	0.00	0.00	53.80	0.00	0.00	53.80	
31-Jan-09	158,120.00	157,224.00	46.98	0.00	0.00	0.00	0.00	52.95	0.00	0.00	52.95	
average	158,223.74	157,887.23	47.73	0.00	0.00	0.00	0.00	54.02	0.00	0.00	54.05	
max	160,352.00	159,208.00		0.00		0.00		56.48	0.00	0.00	56.48	
min	152,396.00	152,872.00		0.00		0.00		52.78	0.00	0.00	52.78	
acumulation	4,904,936.00	4,894,504.00		0.00		0.00		1,674.48	0.00	0.00	1,674.48	747,862.00

Daily Report(Feb.02)

	LFG total, y	MDthermal	WCH4	MDelectricity	WCH4	MDflared	W_{CH4}	MDthermal	MDelectricity	MDflared	Mdproject	KEPCO
	Nm3	Nm3	%	Nm3	%	Nm3	%	ton CH4	ton CH4	ton CH4	ton CH4	(kWh)
	FIQ101	FIQ-A	AI-A	FIQ201	AI-A	FIQ301	AI101	-	-	-	-	E
01-Feb-09	158144	157,848.00	46.99	0.00	0.00	0.00	0.00	53.17	0.00	0.00	53.17	
02-Feb-09	157,384.00	157,496.00	47.38	0.00	0.00	0.00	0.00	53.49	0.00	0.00	53.49	
03-Feb-09	158,680.00	157,216.00	47.29	0.00	0.00	0.00	0.00	53.29	0.00	0.00	53.29	
04-Feb-09	158,400.00	157,272.00	47.21	0.00	0.00	0.00	0.00	53.22	0.00	0.00	53.22	
05-Feb-09	158,688.00	157,104.00	47.16	0.00	0.00	0.00	0.00	53.11	0.00	0.00	53.11	

06-Feb-09	157,440.00	155,936.00	46.90	0.00	0.00	0.00	0.00	52.42	0.00	0.00	52.42	
07-Feb-09	158,568.00	158,024.00	47.39	0.00	0.00	0.00	0.00	53.68	0.00	0.00	53.68	
08-Feb-09	159,288.00	158,288.00	47.03	0.00	0.00	0.00	0.00	53.35	0.00	0.00	53.35	
09-Feb-09	159,928.00	157,784.00	47.38	0.00	0.00	0.00	0.00	53.58	0.00	0.00	53.58	
10-Feb-09	159,528.00	157,352.00	47.50	0.00	0.00	0.00	0.00	53.57	0.00	0.00	53.57	
11-Feb-09	159,832.00	157,536.00	47.77	0.00	0.00	0.00	0.00	53.94	0.00	0.00	53.94	
12-Feb-09	160,216.00	157,504.00	47.30	0.00	0.00	0.00	0.00	53.40	0.00	0.00	53.40	
13-Feb-09	160,360.00	156,920.00	47.55	0.00	0.00	0.00	0.00	53.48	0.00	0.00	53.48	
14-Feb-09	161,264.00	158,888.00	46.22	0.00	0.00	0.00	0.00	52.64	0.00	0.00	52.64	
15-Feb-09	162,296.00	159,760.00	47.02	0.00	0.00	0.00	0.00	53.85	0.00	0.00	53.85	
16-Feb-09	158,936.00	160,296.00	47.03	0.00	0.00	0.00	0.00	54.04	0.00	0.00	54.04	
17-Feb-09	159,112.00	160,312.00	47.61	0.00	0.00	0.00	0.00	54.70	0.00	0.00	54.70	
18-Feb-09	160,688.00	160,304.00	47.87	0.00	0.00	0.00	0.00	55.00	0.00	0.00	55.00	
19-Feb-09	162,824.00	160,640.00	48.35	0.00	0.00	0.00	0.00	55.68	0.00	0.00	55.68	
20-Feb-09	165,120.00	161,528.00	47.85	0.00	0.00	0.00	0.00	55.41	0.00	0.00	55.41	
21-Feb-09	163,192.00	162,072.00	47.22	0.00	0.00	0.00	0.00	54.86	0.00	0.00	54.86	
22-Feb-09	164,504.00	161,808.00	47.81	0.00	0.00	0.00	0.00	55.45	0.00	0.00	55.45	
23-Feb-09	162,224.00	159,000.00	47.49	0.00	0.00	0.00	0.00	54.10	0.00	0.00	54.10	
24-Feb-09	165,696.00	168,632.00	47.96	0.00	0.00	0.00	0.00	57.97	0.00	0.00	57.97	
25-Feb-09	163,292.00	163,733.00	47.81	0.00	0.00	0.00	0.00	56.12	0.00	0.00	56.12	
26-Feb-09	159,288.00	162,128.00	48.09	0.00	0.00	0.00	0.00	55.89	0.00	0.00	55.89	
27-Feb-09	151,632.00	155,272.00	49.16	0.00	0.00	0.00	0.00	54.72	0.00	0.00	54.72	
28-Feb-09	157,424.00	161,184.00	48.39	0.00	0.00	0.00	0.00	55.91	0.00	0.00	55.91	
average	160,141.00	159,351.32	47.53	0.00	0.00	0.00	0.00	54.29	0.00	0.00	54.29	
max	165,696.00	168,632.00		0.00		0.00		57.97	0.00	0.00	57.97	
min	151,632.00	155,272.00		0.00		0.00		52.42	0.00	0.00	52.42	
acumulation	4,483,948.00	4,461,837.00		0.00		0.00		1,520.03	0.00	0.00	1,520.03	676,090.00

Daily Report(Mar.09)

	LFG total, y	MDthermal	WCH4	MDelectricity	WCH4	MDflared	W_{CH4}	MDthermal	MDelectricity	MDflared	Mdproject	KEPCO
	Nm3	Nm3	%	Nm3	%	Nm3	%	ton CH4	ton CH4	ton CH4	ton CH4	(kWh)
	FIQ101	FIQ-A	AI-A	FIQ201	AI-A	FIQ301	AI101	-	-	-	-	E
01-Mar-09	158696	162,152.00	48.17	0.00	0.00	0.00	0.00	55.99	0.00	0.00	55.99	
02-Mar-09	160,040.00	162,416.00	48.47	0.00	0.00	0.00	0.00	56.42	0.00	0.00	56.42	
03-Mar-09	158,384.00	162,144.00	49.16	0.00	0.00	0.00	0.00	57.14	0.00	0.00	57.14	
04-Mar-09	158,736.00	162,120.00	48.62	0.00	0.00	0.00	0.00	56.50	0.00	0.00	56.50	
05-Mar-09	159,256.00	161,704.00	49.31	0.00	0.00	0.00	0.00	57.16	0.00	0.00	57.16	
06-Mar-09	160,816.00	161,592.00	48.44	0.00	0.00	0.00	0.00	56.11	0.00	0.00	56.11	
07-Mar-09	159,592.00	162,328.00	47.90	0.00	0.00	0.00	0.00	55.73	0.00	0.00	55.73	
08-Mar-09	160,208.00	161,984.00	48.11	0.00	0.00	0.00	0.00	55.86	0.00	0.00	55.86	
09-Mar-09	153,920.00	158,112.00	48.17	0.00	0.00	0.00	0.00	54.61	0.00	0.00	54.61	
10-Mar-09	159,848.00	162,072.00	47.84	0.00	0.00	0.00	0.00	55.58	0.00	0.00	55.58	
11-Mar-09	159,504.00	162,344.00	47.90	0.00	0.00	0.00	0.00	55.74	0.00	0.00	55.74	
12-Mar-09	157,368.00	162,344.00	48.43	0.00	0.00	0.00	0.00	56.36	0.00	0.00	56.36	
13-Mar-09	161,104.00	161,400.00	49.15	0.00	0.00	0.00	0.00	56.87	0.00	0.00	56.87	
14-Mar-09	159,760.00	162,160.00	47.64	0.00	0.00	0.00	0.00	55.37	0.00	0.00	55.37	
15-Mar-09	159,056.00	161,784.00	47.98	0.00	0.00	0.00	0.00	55.65	0.00	0.00	55.65	
16-Mar-09	159,448.00	161,336.00	47.65	0.00	0.00	0.00	0.00	55.10	0.00	0.00	55.10	
17-Mar-09	160,416.00	161,463.00	47.30	0.00	0.00	0.00	0.00	54.74	0.00	0.00	54.74	
18-Mar-09	152,408.00	151,040.00	47.40	0.00	0.00	0.00	0.00	51.35	0.00	0.00	51.35	
19-Mar-09	90,024.00	94,824.00	48.03	0.00	0.00	0.00	0.00	32.58	0.00	0.00	32.58	
20-Mar-09	80,392.00	80,848.00	51.44	0.00	0.00	0.00	0.00	30.38	0.00	0.00	30.38	
21-Mar-09	90,632.00	90,368.00	51.85	0.00	0.00	0.00	0.00	34.23	0.00	0.00	34.23	
22-Mar-09	161,032.00	160,632.00	51.28	0.00	0.00	0.00	0.00	59.03	0.00	0.00	59.03	

23-Mar-09	161,264.00	161,648.00	48.20	0.00	0.00	0.00	0.00	55.85	0.00	0.00	55.85	
24-Mar-09	140,808.00	144,304.00	47.87	0.00	0.00	0.00	0.00	49.64	0.00	0.00	49.64	
25-Mar-09	161,712.00	162,056.00	48.01	0.00	0.00	0.00	0.00	55.77	0.00	0.00	55.77	
26-Mar-09	159,440.00	161,904.00	47.45	0.00	0.00	0.00	0.00	55.07	0.00	0.00	55.07	
27-Mar-09	155,744.00	159,528.00	46.67	0.00	0.00	0.00	0.00	53.36	0.00	0.00	53.36	
28-Mar-09	155,624.00	157,280.00	46.87	0.00	0.00	0.00	0.00	52.84	0.00	0.00	52.84	
29-Mar-09	156,656.00	157,352.00	46.89	0.00	0.00	0.00	0.00	52.89	0.00	0.00	52.89	
30-Mar-09	156,424.00	157,480.00	46.77	0.00	0.00	0.00	0.00	52.79	0.00	0.00	52.79	
31-Mar-09	157,024.00	157,272.00	46.94	0.00	0.00	0.00	0.00	52.91	0.00	0.00	52.91	
average	150,943.73	153,096.48	48.26	0.00	0.00	0.00	0.00	52.89	0.00	0.00	52.89	
max	161,712.00	162,416.00		0.00		0.00		59.03	0.00	0.00	59.03	
min	80,392.00	80,848.00		0.00		0.00		30.38	0.00	0.00	30.38	
acumulation	4,528,312.00	4,745,991.00		0.00		0.00		1,639.63	0.00	0.00	1,639.63	761,576.00

Appendix B

Source data for calculating AF

B-1. The 1st collected data from simple burning systems

	Point	Time	Velocity (m/s)	Gas temperature(℃)	Temperature (℃)	Air pressure (mbar)	Wind velocity (m/s)	Diameter	CH_4 (%)	CO_2 (%)	O_2 (%)	N2 (%)	Q_LFG (㎥ wet LFG/min)	Q_LFG (㎥ dry LFG/min)	Q_CH4 (㎥ dry CH4/min)	Q_CO2 (㎥ dry CO2/min)
1st	F1	12:55	0.01	18.2	19.8	1011	0.45	110	10.3	9.4	14.4	65.9	0.0058	0.006	0.0006	0.0005
	F2	12:50	0.09	19.4	18.2	1011	0.42	110	56.6	43.4	0.0	0.0	0.052	0.051	0.0289	0.0221
	F3	12:45	0.11	20.7	20.8	1010	0.78	110	50.0	41.3	0.4	8.3	0.063	0.062	0.0309	0.0256
	F4	12:35	0.07	17	14.6	1010	0.84	110	60.0	40.0	0.0	0.0	0.041	0.040	0.0240	0.0160
	F5	12:25	0.01	15.1	15.9	1009	1.76	110	0.0	0.0	20.4	79.6	0.006	0.006	0.0000	0.0000
	F6	12:15	0.01	16.5	16.4	1009	0.3	110	0.2	7.5	10.6	81.7	0.006	0.006	0.0000	0.0004
	F7	12:00	0.02	14.6	15	1009	0.63	110	8.8	12.1	10.5	68.6	0.012	0.012	0.0010	0.0014
	F8	11:55	0.1	18.8	16.8	1009	0.53	110	55.5	42.0	0.5	2.0	0.058	0.057	0.0315	0.0238
	F9	11:45	0.39	19.4	14.7	1009	0.07	110	50.3	41.0	1.9	6.8	0.226	0.221	0.1110	0.0904
	F10	11:40	0.19	24.8	14.2	1008	0.16	110	32.0	23.2	4.0	40.8	0.108	0.104	0.0334	0.0242
2nd	F1	14:05	0.01	17.2	16.8	1010	0.24	110	25.2	24.8	5.0	45.0	0.0058	0.006	0.0014	0.0014
	F2	14:15	0.07	19.5	20.5	1011	0.38	110	56.4	43.5	0.1	0.0	0.041	0.040	0.0224	0.0172
	F3	14:20	0.11	22	18	1010	0.42	110	45.5	38.9	2.4	13.2	0.063	0.061	0.0280	0.0239
	F4	14:30	0.05	21.8	18.3	1009	0.88	110	59.6	40.4	0.0	0.0	0.029	0.028	0.0167	0.0113
	F5	14:35	0.06	18.4	21.3	1008	0.43	110	0.0	0.0	20.3	79.7	0.035	0.034	0.0000	0.0000
	F6	14:40	0.01	20.3	19	1008	1.66	110	0.0	0.0	20.1	79.9	0.006	0.006	0.0000	0.0000
	F7	14:50	0.01	18.7	18	1007	0.18	110	0.4	0.3	20.1	79.2	0.006	0.006	0.0000	0.0000
	F8	14:58	0.15	20	17.9	1006	0.58	110	56.0	43.2	0.1	0.7	0.086	0.084	0.0472	0.0364
	F9	15:15	0.25	20.7	15.3	1005	0.98	110	55.0	45.0	0.0	0.0	0.143	0.140	0.0770	0.0629
	F10	15:05	0.19	24.2	16.8	1003	0.73	110	34.6	26.1	2.9	36.4	0.108	0.104	0.0361	0.0272
3rd	F1	16:30	0.01	15.3	13.3	1009	0.92	110	30.0	30.1	2.1	37.8	0.0059	0.006	0.0017	0.0017
	F2	16:25	0.11	16.8	14.4	1011	0.67	110	56.0	44.0	0.0	0.0	0.064	0.063	0.0353	0.0278
	F3	16:20	0.03	19.5	14.4	1011	0.95	110	51.5	41.2	0.5	6.8	0.017	0.017	0.0088	0.0070
	F4	16:15	0.14	17.6	15	1009	0.74	110	59.4	40.5	0.1	0.0	0.081	0.080	0.0474	0.0324
	F5	16:10	0.05	14.7	15.5	1008	0.62	110	0.0	0.0	20.4	79.6	0.029	0.029	0.0000	0.0000

	F6	16:05	0.02	17.1	16	1009	0.82	110	0.0	0.0	20.4	79.6	0.012	0.011	0.0000	0.0000
	F7	15:55	0.1	16.9	15.3	1008	0.64	110	0.4	0.5	19.8	79.3	0.058	0.057	0.0002	0.0003
	F8	15:50	0.03	16	14.7	1007	0.59	110	55.7	42.8	0.1	1.4	0.018	0.017	0.0096	0.0074
	F9	15:25	0.28	20.6	15.8	1006	0.44	110	54.9	44.3	0.0	0.8	0.161	0.157	0.0862	0.0695
	F10	15:40	0.16	22.9	14.5	1005	0.2	110	35.1	26.0	2.4	36.5	0.091	0.089	0.0311	0.0230

B-2. The 2nd collected data from simple burning systems

	Point	Time	Velocity (m/s)	Gas temperature (℃)	Temperature (℃)	Air pressure (mbar)	Wind velocity (m/s)	Diameter	CH_4 (%)	CO_2 (%)	O_2 (%)	N2 (%)	Q_LFG (㎥ wet LFG/min)	Q_LFG (㎥ dry LFG/min)	Q_CH4 (㎥ dry CH4/min)	Q_CO2 (㎥ dry CO2/min)
1st	F1	11:25	0.3	13.2	9.5	1014	3.74	110	52.5	40.2	0.2	7.1	0.1782	0.176	0.0922	0.0706
	F2	11:32	0.18	9.8	8.6	1012	2.29	110	59.3	40.7	0.0	0.0	0.108	0.107	0.0633	0.0434
	F3	11:43	0.24	5.8	8.8	1012	2.05	110	0.0	0.1	19.4	80.5	0.146	0.145	0.0000	0.0001
	F4	11:45	0.03	7.8	9.1	1011	1.04	110	0.0	0.0	19.9	80.1	0.018	0.018	0.0000	0.0000
	F5	11:49	0.07	10.1	10.7	1010	2.11	110	9.8	19.8	4.1	66.3	0.042	0.041	0.0041	0.0082
	F6	10:50	0.18	8.8	6.3	1009	0.8	110	0.0	0.7	12.1	87.2	0.108	0.107	0.0000	0.0008
	F7	11:20	0.14	10.9	9.6	1014	1.5	110	57.1	42.9	0.0	0.0	0.084	0.083	0.0472	0.0355
	F8	11:15	0.01	6.2	10.7	1014	1.28	110	10.6	19.1	2.6	67.7	0.006	0.006	0.0006	0.0012
	F9	11:00	0.82	17.1	9.2	1010	4.3	110	5.1	12.7	8.3	73.9	0.479	0.469	0.0239	0.0596
	F10	11:55	0.28	11.3	10.3	1009	2.35	110	28.9	32.7	0.0	38.4	0.167	0.164	0.0475	0.0538
2nd	F1	14:26	0.36	12	13.5	1011	0.86	110	50.1	40.1	0.0	9.8	0.2141	0.211	0.1058	0.0847
	F2	14:30	0.45	9.1	13.4	1009	3.96	110	59.4	40.6	0.0	0.0	0.270	0.267	0.1584	0.1084
	F3	14:35	0.05	8.8	13.6	1008	3.5	110	0.0	0.0	19.9	80.1	0.030	0.030	0.0000	0.0000
	F4	14:38	0.03	9.2	14	1008	2.8	110	0.0	0.0	20.0	80.0	0.018	0.018	0.0000	0.0000
	F5	14:45	0.2	14.8	13	1007	3.89	110	28.7	32.0	0.0	39.3	0.117	0.115	0.0331	0.0369
	F6	13:55	0.15	13.5	10.7	1006	2.09	110	0.6	10.5	7.3	81.6	0.088	0.087	0.0005	0.0091
	F7	14:22	0.16	9.4	12.6	1011	1.04	110	56.9	43.1	0.0	0.0	0.096	0.095	0.0540	0.0409
	F8	14:17	0.02	10.7	13.4	1011	1.72	110	12.6	20.4	1.6	65.4	0.012	0.012	0.0015	0.0024
	F9	13:59	0.85	22.4	11.8	1008	1.42	110	20.0	24.2	0.6	55.2	0.486	0.473	0.0946	0.1145
	F10	14:50	0.24	12.4	13.9	1006	2.96	110	35.4	34.9	0.0	29.7	0.142	0.140	0.0495	0.0488
3rd	F1	15:43	0.22	13.7	14.6	1010	0.93	110	50.6	40.6	0.0	8.8	0.1299	0.128	0.0647	0.0519
	F2	15:49	0.4	9.9	12.7	1008	2.53	110	59.1	40.9	0.0	0.0	0.239	0.236	0.1396	0.0965
	F3	15:53	0.2	8.3	12.9	1007	2.63	110	0.0	0.0	19.9	80.1	0.120	0.119	0.0000	0.0000

	F4	15:57	0.07	8.2	11.8	1007	2.51	110	0.0	0.0	20.1	79.9	0.042	0.042	0.0000	0.0000
	F5	16:07	0.06	17.7	11.2	1006	3.5	110	29.2	32.5	0.0	38.3	0.035	0.034	0.0100	0.0111
	F6	15:15	0.17	14.1	13.1	1004	2.98	110	1.0	14.1	2.4	82.5	0.100	0.098	0.0010	0.0138
	F7	15:40	0.11	12	13.1	1010	0.99	110	56.8	43.2	0.0	0.0	0.065	0.064	0.0366	0.0278
	F8	15:35	0.01	9.8	13.1	1009	0.99	110	8.5	14.0	7.2	70.3	0.006	0.006	0.0005	0.0008
	F9	15:20	0.87	22.4	12.9	1006	3.97	110	20.4	24.8	0.2	54.6	0.497	0.483	0.0986	0.1199
	F10	16:27	0.05	12.3	9.8	1006	1.92	110	35.7	35.2	0.0	29.1	0.030	0.029	0.0104	0.0103

B-3. The 3rd collected data from simple burning systems

	Point	Time	Velocity (m/s)	Gas temperature (℃)	Temperature (℃)	Air pressure (mbar)	Wind velocity (m/s)	Diameter	CH_4 (%)	CO_2 (%)	O_2 (%)	N2 (%)	Q_LFG (㎥ wet LFG/min)	Q_LFG (㎥ dry LFG/min)	Q_CH4 (㎥ dry CH4/min)	Q_CO2 (㎥ dry CO2/min)
1st	F1	15:07	0.01	35.5	29.3	991	4.24	110	42.0	33.5	3.2	21.3	0.0054	0.005	0.0021	0.0017
	F2	14:56	0.09	32.7	28.9	992	4.24	110	57.0	41.0	0.0	2.0	0.049	0.047	0.0265	0.0191
	F3	14:50	0.46	34.8	29.4	992	4.24	110	57.4	40.8	0.0	1.8	0.249	0.235	0.1347	0.0957
	F4	14:38	0.22	32.9	29.3	990	4.24	110	61.8	36.9	0.0	1.3	0.119	0.113	0.0700	0.0418
	F5	14:29	0.04	36.4	29.5	990	4.24	110	7.3	12.8	4.0	75.9	0.021	0.020	0.0015	0.0026
	F6	14:16	0.01	37.5	29.8	989	4.24	110	2.0	13.5	4.0	80.5	0.005	0.005	0.0001	0.0007
	F7	14:00	0.16	50.1	28.2	989	4.24	110	23.3	30.0	0.0	46.7	0.082	0.072	0.0167	0.0215
	F8	13:41	0.34	38.7	30.1	988	4.24	110	56.1	43.6	0.0	0.3	0.181	0.168	0.0943	0.0733
	F9	13:10	0.02	34.1	28.9	989	4.24	110	7.7	20.5	1.2	70.6	0.011	0.010	0.0008	0.0021
	F10	12:15	0.01	32	28.3	988	4.24	110	14.1	18.1	4.4	63.4	0.005	0.005	0.0007	0.0009
2nd	F1	17:07	0.01	28.6	27.1	991	4.24	110	42.0	33.6	3.1	21.3	0.0055	0.005	0.0022	0.0018
	F2	17:00	0.14	30.1	28.3	992	4.24	110	55.7	44.3	0.0	0.0	0.077	0.074	0.0410	0.0326
	F3	16:56	0.45	35.5	29.5	991	4.24	110	56.2	43.8	0.0	0.0	0.242	0.228	0.1283	0.1000
	F4	16:47	0.27	32.1	29.6	990	4.24	110	57.4	42.6	0.0	0.0	0.147	0.140	0.0802	0.0596
	F5	16:37	0.01	35.2	28	989	4.24	110	0.0	0.0	0.0	100.0	0.005	0.005	0.0000	0.0000
	F6	16:30	0.02	28.5	28.2	989	4.24	110	0.0	0.0	17.2	82.8	0.011	0.011	0.0000	0.0000
	F7	16:21	0.08	39.1	27.2	988	4.24	110	26.6	31.5	0.0	41.9	0.042	0.039	0.0105	0.0124
	F8	16:14	0.49	37.8	28.3	988	4.24	110	56.3	42.1	0.0	1.6	0.261	0.244	0.1373	0.1026
	F9	15:44	0.02	32.5	28.7	988	4.24	110	7.8	19.6	3.6	69.0	0.011	0.010	0.0008	0.0020
	F10	15:31	0.01	36.5	29.2	986	4.24	110	10.0	13.5	7.8	68.7	0.005	0.005	0.0005	0.0007
3rd	F1	19:17	0.01	27.9	26.5	992	4.24	110	47.3	38.4	1.6	12.7	0.0055	0.005	0.0025	0.0020
	F2	19:02	0.01	28.6	26.7	992	4.24	110	55.1	44.9	0.0	0.0	0.006	0.005	0.0029	0.0024
	F3	18:43	0.1	31.1	26.6	992	4.24	110	54.0	46.0	0.0	0.0	0.055	0.052	0.0282	0.0240

	F4	18:25	0.28	29.3	26	990	4.24	110	57.0	43.0	0.0	0.0	0.154	0.147	0.0840	0.0634
	F5	18:12	0.02	35.7	28.3	989	4.24	110	0.0	0.0	0.0	100.0	0.011	0.010	0.0000	0.0000
	F6	17:54	0.01	28.2	26.3	989	4.24	110	0.0	0.0	19.9	80.1	0.006	0.005	0.0000	0.0000
	F7	17:35	0.03	29.6	25.1	989	4.24	110	17.0	23.4	4.1	55.5	0.016	0.016	0.0027	0.0037
	F8	17:20	0.5	33.7	24.8	988	4.24	110	54.9	45.1	0.0	0.0	0.270	0.256	0.1405	0.1153
	F9	16:01	0.02	29.5	27.8	988	4.24	110	6.5	16.2	6.7	70.6	0.011	0.010	0.0007	0.0017
	F10	15:52	0.01	29.6	28.4	986	4.24	110	15.0	20.2	2.6	62.2	0.005	0.005	0.0008	0.0011

B-4. The 4th collected data from simple burning systems

	Point	**Time**	**Velocity (m/s)**	**Gas temperature** (℃)	**Temperature** (℃)	**Air pressure (mbar)**	**Wind velocity (m/s)**	**Diameter**	**CH_4** (%)	**CO_2** (%)	**O_2** (%)	**N2 (%)**	**Q_LFG (㎥ wet LFG/min)**	**Q_LFG (㎥ dry LFG/min)**	**Q_CH4 (㎥ dry CH4/min)**	**Q_CO2 (㎥ dry CO2/min)**
1st	F1	11:35	0.01	28.2	25.9	995	1.20	110	2.4	11.4	11.5	74.7	0.0061	0.006	0.0001	0.0007
	F2	11:28	0.08	29.1	27.9	995	0.60	110	37.3	37.8	0.0	24.9	0.049	0.048	0.0181	0.0183
	F3	11:20	0.01	28.4	27.3	995	0.60	110	0.0	11.6	6.5	81.9	0.006	0.006	0.0000	0.0007
	F4	11:10	0.20	28.7	26.4	994	0.60	110	50.5	41.1	1.9	6.5	0.122	0.121	0.0611	0.0497
	F5	10:55	0.01	28.7	27.3	993	0.00	110	0.0	0.5	19.5	80.0	0.006	0.006	0.0000	0.0000
	F6	10:45	0.01	26.9	24.5	993	0.80	110	0.0	0.0	20.4	79.6	0.006	0.006	0.0000	0.0000
	F7	10:28	0.04	27.6	24.8	993	0.00	110	8.4	17.2	6.5	67.9	0.024	0.024	0.0020	0.0042
	F8	10:18	0.10	26.7	24.8	992	0.00	110	5.3	18.2	2.0	74.5	0.061	0.061	0.0032	0.0110
	F9	10:03	0.06	27.1	24.4	992	0.00	110	15.4	25.0	6.6	53.0	0.037	0.036	0.0056	0.0091
	F10	9:50	0.05	33.9	27.3	991	0.61	110	12.0	22.7	2.4	62.9	0.030	0.030	0.0036	0.0068
2nd	F1	2:10	0.02	32.3	30.0	993	1.00	110	5.3	27.5	0.0	67.2	0.0109	0.010	0.0005	0.0029
	F2	2:00	0.06	34.7	30.4	994	0.80	110	36.1	38.2	0.0	25.7	0.032	0.031	0.0111	0.0117

	F3	1:55	0.08	31.6	28.5	993	1.30	110	0.1	11.4	7.7	80.8	0.044	0.042	0.0000	0.0048
	F4	1:50	0.08	29.9	28.5	992	1.30	110	53.2	44.4	0.0	2.4	0.044	0.042	0.0224	0.0187
	F5	1:45	0.02	29.8	28.7	991	0.20	110	0.0	0.0	20.0	80.0	0.011	0.011	0.0000	0.0000
	F6	1:40	0.02	28.0	27.5	991	2.50	110	0.0	0.0	20.0	80.0	0.011	0.011	0.0000	0.0000
	F7	1:30	0.03	36.9	27.6	990	2.20	110	14.1	23.0	3.1	59.8	0.016	0.015	0.0021	0.0035
	F8	1:12	0.95	33.5	29.1	990	1.80	110	5.6	17.8	2.4	74.2	0.514	0.488	0.0273	0.0868
	F9	12:55	0.05	29.6	27.5	990	0.80	110	14.4	25.3	0.5	59.8	0.027	0.026	0.0038	0.0066
	F10	12:45	0.03	34.6	27.9	988	2.00	110	12.1	19.3	3.5	65.1	0.016	0.015	0.0018	0.0029
3rd	F1	15:30	0.01	28.4	26.7	992	2.50	110	4.5	27.2	0.0	68.3	0.0055	0.005	0.0002	0.0014
	F2	15:25	0.05	28.2	27.5	993	0.00	110	30.2	35.2	0.0	34.6	0.028	0.027	0.0080	0.0094
	F3	15:20	0.03	36.2	27.8	992	1.50	110	0.3	13.1	7.2	79.4	0.016	0.015	0.0000	0.0020
	F4	15:10	0.04	29.8	27.8	991	0.00	110	48.3	41.6	0.1	10.0	0.022	0.021	0.0102	0.0087
	F5	15:05	0.01	27.9	27.1	991	0.80	110	0.0	0.4	19.1	80.5	0.006	0.005	0.0000	0.0000
	F6	15:00	0.01	31.2	29.1	991	1.20	110	0.0	0.0	19.9	80.1	0.005	0.005	0.0000	0.0000
	F7	14:50	0.03	36.0	28.3	989	0.80	110	17.0	27.2	0.3	55.6	0.016	0.015	0.0026	0.0041
	F8	14:45	0.18	29.4	26.8	989	0.80	110	8.1	20.1	1.7	70.1	0.099	0.095	0.0077	0.0190
	F9	14:40	0.05	29.9	27.7	989	2.00	110	17.6	26.6	0.8	55.0	0.027	0.026	0.0046	0.0070
	F10	14:30	0.10	32.6	28.8	987	0.60	110	14.2	23.1	0.1	62.6	0.054	0.051	0.0073	0.0119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