CLEAN DEVELOPMENT MECHANISM
PROJECT DESIGN DOCUMENT FORM (CDM-SSC-PDD)
Version 03 - in effect as of: 22 December 2006

CONTENTS

Annexes

Revision history of this document

Version Number	Date	Description and reason of revision
01	21 January 2003	Initial adoption
02	8 July 2005	•The Board agreed to revise the CDM SSC PDD to reflect guidance and clarifications provided by the Board since version 01 of this document. •As a consequence, the guidelines for completing CDM SSC PDD have been revised accordingly to version 2. The latest version can be found at <http://cdm.unfccc.int/Reference/Documents>.
03	22 December 2006	•The Board agreed to revise the CDM project design document for small-scale activities (CDM-SSC-PDD), taking into account CDM-PDD and CDM-NM.

SECTION A. General description of small-scale project activity

A.1 Title of the small-scale project activity:

LG Chem Naju plant fuel switching project (the Project or Project activity)
(Version 7.0, 31/08/2007)

삭제됨: 6.0
삭제됨: 05
삭제됨: 06

A.2. Description of the small-scale project activity:

LG Chem currently produces octanol, plasticizers and acrylic acid at Naju plant. Originally, Naju plant was founded as a fertilizer plant, in 1962 and was modified in 1982 to allow production of octanol. Through subsequent modification and expansion of the plant, current production has reached 190,000 MT/year for octanol, 166,000 MT/year for plasticizers and 26,000 MT/year for acrylic acid.

Steam, which is used in the production process of petrochemical products, is mainly produced in a boiler using bunker fuel oil C (Sulphur 0.5%). On average over the past 4 years, LG Chem has used approximately 27,000 kilolitres of bunker fuel oil C annually for steam generation at Naju plant. The Project activity involves retrofitting a boiler to allow fuel switching from bunker fuel oil C to natural gas.

삭제됨: the
삭제됨: s

The Project will contribute to the sustainable development of Korea in the following ways:

- Mitigation of GHGs
  Natural gas is less carbon intensive than bunker fuel oil C. Therefore switching fuel from bunker fuel oil C to natural gas will reduce GHGs emissions.

- Transfer of new technology
  The equipments used for the boiler retrofit will be imported from United Kingdom. The natural gas burner in industrial facility is not common practice in Korea. Therefore, it is expected that there exists technology transfer effects through the Project activity including the operation and maintenance of the newly installed equipments.

- Improvement of environmental condition
  In addition to GHGs emission reduction, the Project activity will reduce emissions of SO_x and NO_x. Under current regulations, bunker fuel oil C (Sulphur 0.5%) can be used as an industrial fuel in the Naju area. Therefore, by switching fuel from bunker fuel oil C to natural gas, which does not contain sulphur, it is expected that emissions of SO_x will be reduced by more than 90%. It is also expected that emissions of NO_x will be reduced by 30~40%.

- Promotion of clean energy usage in the local area
  At present, while natural gas is used as a household fuel in some large cities in Korea, it is not being supplied to many smaller cities such as Naju area due to the lack of infrastructure. However, once the natural gas station is established for the Project, natural gas can also be supplied to Naju area for household fuel, resulting in improvement of the quality of life for locals.

A.3. Project participants:

Name of Party involved(*) ((host) indicates a host Party)	Private and/ or Public entity(ies) Project participants(*) (as applicable)	Kindly indicate if the Party involved wishes to be considered as project participants (Yes/ No)
Korea (host)	LG Chem, Ltd.	No
Japan	Mitsubishi UFJ Securities Co., Ltd	No

In addition to being a project participant, Mitsubishi UFJ Securities is the CDM Advisor to the Project and the contact for the CDM Project activity.

A.4. Technical description of the small-scale project activity:

A.4.1. Location of the small-scale project activity:

A.4.1.1. Host Party(ies):

Republic of Korea

A.4.1.2. Region/State/Province etc.:

Jeollanam-do

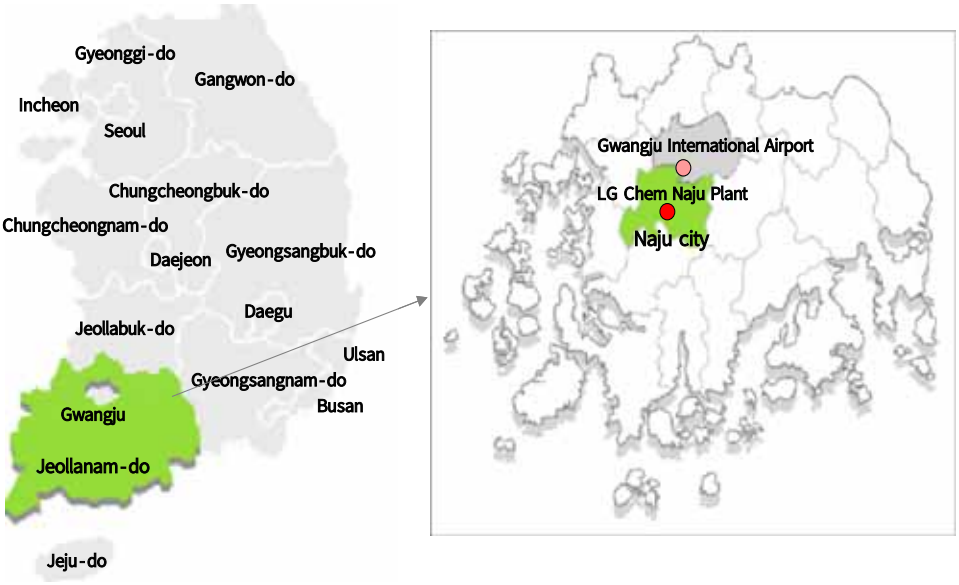
A.4.1.3. City/Town/Community etc:

Naju

A.4.1.4. Details of physical location, including information allowing the unique identification of this small-scale project activity :

The Project site is located at 1, Songwal-dong, Naju, Jeollanam-do, 520-130, Korea. It is located in the Naju city and about 20 km southwest from Gwangju International Airport.

Figure 1 – Map of Republic of Korea, Project activity Location



A.4.2. Type and category(ies) and technology/measure of the small-scale project activity:

In accordance with Appendix B of the simplified modalities and procedures for small-scale clean development mechanism project activities ("SSC M&P"), the Project activity falls under the following type and category:

Type III: Other project activities
Category B: Switching fossil fuels (Version 10)
Sectoral Scope 1 – Energy industries (renewable - / non-renewable sources)

The existing boiler will be retrofitted by installing special purpose burners for natural gas combustion as well as other necessary minor modifications. There are three boilers in Naju plant, Among the three boilers, one boiler, which is the main boiler in Naju plant and of which specification is described in the following table, is retrofitted. Four natural gas burners are installed for the main boiler. Total capacity of four natural gas burners installed is 5,353 Nm^3/hr, which is of sufficient capacity for the expected amount of natural gas consumption at Naju plant. The natural gas burners are provided by HAMWORTHY COMBUSTION, which is one of the world's largest combustion equipment manufacturers, with the experiences of equipment installation in over 100 countries. The specifications of the current boiler, the Project boiler (after modification) and natural gas burner are as follows:

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Boiler specification

	Current situation	Project activity
Capacity	70 T/H	70 T/H
Operating pressure	35 kg/cm^{2}G	35 kg/cm^{2}G
Steam Temperature	400 ℃	400 ℃
Main fuel used	Bunker fuel oil C	Natural gas
Efficiency	91 %	More than 91 %

Source: LG Chem, Ltd

Burner specification

Description	Specification
Maker	HAMWORTY
Model	DF 505
Type	Manifold & Spud
Burning Capacity	
Max	1,405 (Nm^3/hr)
MCR	1,338 (Nm^3/hr)
Min	267 (Nm^3/hr)

Source: HAMWORTHY COMBUSTION

The natural gas will be supplied by Hae Yang City Gas in Gwangju Metropolitan City. The composition of the natural gas is described in the following table.

Composition of natural gas

Component		Value
Methane (CH_4)		89.78 %
Ethane (C_2H_6)		7.48 %
Propane (C_3H_3)		2.02 %
Propylene (C_3H_6)		-
Butane	**i–C_4H_{10}**	0.36 %
	n-C_4H_{10}	0.34 %
Nitrogen (N_2)		0.02 %
Oxygen (O_2)		-

Source: Hae Yang City Gas

A.4.3 Estimated amount of emission reductions over the chosen crediting period:

< Table A-1 Estimated amount of emission reductions >

Years	Annual estimation of emission reductions in tonnes of CO_2e
2007	22,504
2008	22,504
2009	22,504
2010	22,504
2011	22,504
2012	22,504
2013	22,504
2014	22,504
2015	22,504
2016	22,504
Total estimated reductions (tonnes of CO_2e)	225,040
Total number of crediting years	10 years
Annual average over the crediting periods of estimated reductions (tonnes of CO_2e)	22,504

A.4.4. Public funding of the small-scale project activity:

Project financing will not involve ODA or public funding from Annex I countries.

A.4.5. Confirmation that the small-scale project activity is not a debundled component of a large scale project activity:

There is no registered small-scale CDM project activity or an application to register another small-scale CDM project activity in the same project category and technology/measure within 1 km of the project boundary. Therefore, the Project is not a debundled component of any other large project.

SECTION B. Application of a baseline and monitoring methodology

B.1. Title and reference of the approved baseline and monitoring methodology applied to the small-scale project activity:

AMS Type III. – "Other Project Activity"
Category B. Switching fossil fuels (version 10)

B.2 Justification of the choice of the project category:

Category B. Switching fossil fuels (version 10)

- This category comprises fossil fuel switching in existing industrial, residential, commercial, institutional or electricity generation applications. Fuel switching may change efficiency as well. If the project activity primarily aims at reducing emissions through fuel switching, it falls into this category. If fuel switching is part of a project activity focussed primarily on energy efficiency, the project activity falls in category II.D or II.E.

- Measures are limited to those that result in emission reductions of less than or equal to 60 $ktCO_2$ equivalent annually.

The Project activity aims at reducing GHG emissions through fuel switching, from bunker fuel oil C to natural gas, in existing LG Chem's Naju plant. Fuel switching may change efficiency as well. However, the main purpose of the Project activity is fuel switching, not energy efficiency. Also, in any year of the crediting period, emissions reductions resulting from the Project activity will not exceed 60 $ktCO_2$ equivalent annually. Therefore the Project activity falls into the category B. Switching fossil fuels.

B.3. Description of the project boundary:

As per the baseline methodology, the project boundary is the physical, geographical site where the fuel combustion affected by the fuel switching measure occurs. Therefore the project boundary encompasses the boiler in the Naju plant that the fuel switching occurs.

B.4. Description of baseline and its development:

As described in the methodology, the emission baseline is the current emissions of the facility. In the absence of the Project activity, LG Chem would be utilizing bunker fuel oil C for steam generation, which is the current situation. Under the current regulations, it is allowed to use bunker fuel oil C at Naju area and there are no regulations that requires the use of natural gas or any other fuel. Also, as shown in the Section B.5 below, it is not economically attractive to switch fuel from bunker fuel oil C to natural gas. Therefore, the current situation of using bunker fuel oil C for steam generation is considered as baseline scenario for the Project activity.

Emission reductions will be determined using actual data which are to be monitored. The key variables and parameters used to calculate the emission reductions are as follows:

Variables & Parameters	Data source
Quantity of natural gas combusted in the boiler	LG Chem
Quantity of steam generated by natural gas combustion	LG Chem
Energy efficiency of the boiler if fired with natural gas	LG Chem
Average net calorific value of the natural gas	Standard Manual for Calorific Value[1)]
Average net calorific value of the bunker fuel oil C	Standard Manual for Calorific Value[1)]

Energy efficiency of boiler if fired with bunker fuel oil C	Manufacture specification
CO_2 emission factor of the natural gas	IPCC default value
CO_2 emission factor of the bunker fuel oil C	IPCC default value

삭제됨: LG Chem

1) The Standard Manual for Calorific Value is approved by Ministry of Commerce, Industry and Energy/ Korea Energy Management Corporation.

B.5. Description of how the anthropogenic emissions of GHG by sources are reduced below those that would have occurred in the absence of the registered small-scale CDM project activity:

As described in the Section B.4, it is allowed to use bunker fuel oil C at Naju area and there are no regulations that requires the use of natural gas or any other fuel. Therefore the fuel used for steam generation is decided based on the economics. However, in the absence of the CDM, the Project activity could not be implemented due to the following insurmountable barrier:

Investment barrier

Since the price of natural gas is higher than that of bunker fuel oil C in Korea, fuel switching from bunker fuel oil C to natural gas requires significant amount of additional fuel costs. As described in the table below, NPV of the Project activity is negative, approximately – 14.68 billion KRW, which means that the Project activity is not economically attractive. Therefore, in the absence of the CDM, the Project activity could not be implemented.

NPV analysis

	Baseline scenario (Bunker fuel oil C)	**Project scenario (Natural gas)**
Initial Equipment cost	0 KRW	800,000,000 KRW
O&M costs	697,000,000 KRW/yr	371,000,000 KRW/yr
Fuel consumption	27,021,500 liter/yr	26,413,516 m^3/yr
Fuel costs	433 KRW/liter	516.64 KRW/m^3
Fuel efficiency	91%	91%
Net calorific value of fuel	39.1MJ/liter	40.0 MJ/m^3
NPV of the Project activity	-14,686,374,314 KRW	

Note

1. A discount rate of 9.9% is applied to net present value analysis. This discount rate has been substantiated by an independent financial expert[1].
2. Lifetime of the Project activity is 20 years.
3. Fuel efficiency of the boiler in each scenario is from the nameplate of the boiler. In the Project scenario, actual efficiency will be measure for the calculation of the emission reductions.
4. The difference in O&M costs reflects the parasitic fuel consumption, electricity consumption, maintenance costs and after-treatment costs.

[1] Asia Pacific Equity Research, JPMorgan

5. The residual value of the new equipment at the end of the lifetime of the Project activity is 1,000 KRW.
6. Net calorific values of bunker fuel oil C and natural gas are adopted from "The Standard Manual for Calorific Value" approved by Ministry of Commerce, Industry and Energy/ Korea Energy Management Corporation.

Even with the expected amount additional income from CERs sales, the Project activity is still economically unattractive. However, LG Chem put significant non-monetary values on the Project activity as a CDM activity. With the confidence that the Project activity is eligible for a CDM activity, LG Chem decided to implement the Project activity.

B.6. Emission reductions:

B.6.1. Explanation of methodological choices:

Project emissions

Project emissions consist of those emissions related with the use of fossil fuel after the fuel switch. Project emissions are calculated as follows:

$$PE_y = FF_{project,y} \cdot NCV_{NG} \cdot EF_{NG,CO2}$$

where,

PE_y	Project emissions during the year y (tCO_2e)
$FF_{project,y}$	Quantity of natural gas combusted in the project boiler during the year y (m^3)
NCV_{NG}	Net calorific value of the natural gas combusted (TJ/m^3)
$EF_{NG,CO2}$	CO_2 emission factor of the natural gas combusted in the project boiler (tCO_2/TJ)

Baseline emissions

Baseline emissions are the emissions that would otherwise be emitted in the absence of the Project activity by using bunker fuel oil C in the project boiler. The amount of bunker fuel oil C that would otherwise be emitted in the absence of the Project activity is calculated based on the amount of natural gas used, net calorific value of natural gas/ bunker fuel oil C and energy efficiency of the project boiler fired with natural gas/ bunker fuel oil C.

$$BE_y = FF_{baseline,y} \cdot NCV_{FF} \cdot EF_{FF,CO2,y}$$

with

$$FF_{baseline,y} = FF_{project,y} \cdot \frac{NCV_{NG} \cdot \varepsilon_{project}}{NCV_{FF} \cdot \varepsilon_{baseline}}$$

where:

BE_y	Baseline emission during the year y (tCO_2e)
$FF_{baseline,y}$	Quantity of bunker fuel oil C that would be combusted in the absence of the project activity in the project boiler during the year y (volume or mass unit)
NCV_{FF}	Net calorific value of bunker fuel oil C that would be combusted in the absence of the project activity in the project boiler (TJ/ volume or mass unit)
$EF_{FF,CO2}$	CO_2 emission factor of bunker fuel oil C that would be combusted in the absence of the project activity in the project boiler (tCO_2/TJ)
$\varepsilon_{project}$	Energy efficiency of the project boiler if fired with natural gas
$\varepsilon_{baseline}$	Energy efficiency of the project boiler if fired with bunker fuel oil C

Leakage

As described in AMS III.B, no leakage calculation is required.

Emission reductions

$$ER_y = BE_y - PE_y$$

where,

ER_y	Emissions reductions of the project activity during the year y (tCO_2e)
BE_y	Baseline emissions during the year y (tCO_2e)
PE_y	Project emissions during the year y (tCO_2e)

B.6.2. Data and parameters that are available at validation:

Data / Parameter:	**Amount of bunker fuel oil C used**
Data unit:	Liter
Description:	Amount of bunker fuel oil C used in the project boiler before the implementation of the Project activity
Source of data used:	LG Chem
Value applied:	27,021,500
Justification of the choice of data or description of measurement methods and procedures actually applied :	Average value for 4 years (2002 ~ 2005) is used. Historical data is described in the Annex 3.
Any comment:	

Data / Parameter:	**Amount of steam generated using bunker fuel oil C**
Data unit:	TJ

Description:	Amount of steam generated by the project boiler using bunker fuel oil C before the implementation of the Project activity
Source of data used:	LG Chem
Value applied:	961.45 TJ
Justification of the choice of data or description of measurement methods and procedures actually applied :	Average value for 4 years (2002 ~ 2005) is used. Historical data is described in the Annex 3.
Any comment:	

Data / Parameter:	**NCV_{NG}**
Data unit:	TJ/m^3
Description:	Net calorific value of natural gas
Source of data used:	Standard Manual for Calorific Value
Value applied:	40.0×10^{-6} TJ/m^3
Justification of the choice of data or description of measurement methods and procedures actually applied :	The accurate and reliable national data is used. The value is from the "Standard Manual for Calorific Value" approved by Ministry of Commerce, Industry and Energy/ Korea Energy Management Corporation.
Any comment:	

Data / Parameter:	**$EF_{NG,CO2}$**
Data unit:	tCO_2/TJ
Description:	CO_2 emission factor of the natural gas combusted
Source of data used:	IPCC default value
Value applied:	56.1 tCO_2/TJ
Justification of the choice of data or description of measurement methods and procedures actually applied :	Since the accurate and reliable national data is not available, default value from 2006 IPCC Guidelines for National Greenhouse Gas Inventories is used. (Table 1.4)
Any comment:	

Data / Parameter:	**NCV_{FF}**
Data unit:	TJ/kg
Description:	Net calorific value of bunker fuel oil C that would be combusted in the absence of the Project activity
Source of data used:	Standard Manual for Calorific Value
Value applied:	39.1×10^{-6} TJ /liter
Justification of the choice of data or description of	The accurate and reliable national data is used. The value is from the "Standard Manual for Calorific Value" approved by Ministry of Commerce, Industry and Energy/ Korea Energy Management Corporation.

measurement methods and procedures actually applied :	
Any comment:	

Data / Parameter:	**$EF_{FF,CO2}$**
Data unit:	tCO_2/TJ
Description:	CO_2 emission factor of bunker fuel oil C that would be combusted in the absence of the project activity
Source of data used:	IPCC default value
Value applied:	77.4 tCO_2/TJ
Justification of the choice of data or description of measurement methods and procedures actually applied :	Since the accurate and reliable national data is not available, default value from 2006 IPCC Guidelines for National Greenhouse Gas Inventories is used. (Table 1.4)
Any comment:	

Data / Parameter:	$\varepsilon_{baseline}$
Data unit:	%
Description:	Energy efficiency of the boiler with bunker fuel oil C
Source of data used:	Manufacture specification
Value applied:	91%
Justification of the choice of data or description of measurement methods and procedures actually applied :	The energy efficiency indicated in the nameplate of the boiler is used.
Any comment:	

B.6.3 Ex-ante calculation of emission reductions:

Project emissions

$$PE_y = FF_{project,y} \cdot NCV_{NG} \cdot EF_{NG,CO2}$$
$$= 26{,}413{,}516\, Nm^3 \cdot 40.0 \times 10^{-6} / Nm^3 \cdot 56.1 tCO_2 / TJ$$
$$= 59{,}272\, tCO_2$$

Baseline emissions

$$BE_y = FF_{baseline,y} \cdot NCV_{FF} \cdot EF_{FF,CO2,y}$$
$$= 27{,}021{,}500\, liter \cdot 39.1\times10^{-6}\, TJ/liter \cdot 77.4\, tCO_2/TJ$$
$$= 81{,}776\, tCO_2$$

with

$$FF_{baseline,y} = FF_{project,y} \cdot \frac{NCV_{NG} \cdot \varepsilon_{project}}{NCV_{FF} \cdot \varepsilon_{baseline}} = 26{,}413{,}516 \cdot \frac{40.0\times10^{-6} \cdot 0.91}{39.1\times10^{-6} \cdot 0.91} = 27{,}021{,}500$$

Emission reductions

$$ER_y = BE_y - PE_y$$
$$= 81{,}776 - 59{,}272$$
$$= 22{,}504\, tCO_2e/yr$$

B.6.4 Summary of the ex-ante estimation of emission reductions:

Year	Estimation of project activity emissions (tonnes of CO_2e)	Estimation of baseline emissions (tonnes of CO_2e)	Estimation of leakage (tonnes of CO_2e)	Estimation of overall emission reductions (tonnes of CO_2e)
2007	59,272	81,776	0	22,504
2008	59,272	81,776	0	22,504
2009	59,272	81,776	0	22,504
2010	59,272	81,776	0	22,504
2011	59,272	81,776	0	22,504
2012	59,272	81,776	0	22,504
2013	59,272	81,776	0	22,504
2014	59,272	81,776	0	22,504
2015	59,272	81,776	0	22,504
2016	59,272	81,776	0	22,504
Total	592,720	817,760	0	225,040

B.7 Application of a monitoring methodology and description of the monitoring plan:

B.7.1 Data and parameters monitored:

Data / Parameter:	**$FF_{project,y}$**
Data unit:	m^3
Description:	Natural gas consumed in the project boiler in year y
Source of data to be used:	On-site measurement
Value of data applied for the purpose of calculating expected	26,413,516 m^3

emission reductions in section B.5	
Description of measurement methods and procedures to be applied:	Monitored continuously using meters by operation.
QA/QC procedures to be applied:	The meters will be calibrated periodically by the natural gas provider, Hae Yang City Gas, according to the internal regulation of the provider. Certificates will be issued after the periodic calibrations are conducted. Once the erroneous measurement or malfunction is detected, corrective actions will be taken by the natural gas provider. The amount of natural gas combusted will be double checked with the receipt of purchase.
Any comment:	

Data / Parameter:	**Amount of steam generated using natural gas**
Data unit:	TJ
Description:	Amount of steam generated by the project boiler using natural gas after the implementation of the Project activity
Source of data to be used:	On-site measurement (calculated)
Value of data applied for the purpose of calculating expected emission reductions in section B.5	961.45 TJ
Description of measurement methods and procedures to be applied:	This value is calculated using the monitored fuel consumption data and energy efficiency of the project boiler.
QA/QC procedures to be applied:	The meters used to measure the fuel consumption and energy efficiency of the project boiler will be calibrated periodically.
Any comment:	This value is not used in the calculation of emission reductions. However, it is monitored using indirect method for a reference purpose.

Data / Parameter:	$\varepsilon_{project}$
Data unit:	%
Description:	Energy efficiency of the boiler with natural gas
Source of data to be used:	On-site measurement
Value of data applied for the purpose of calculating expected emission reductions in section B.5	91%
Description of measurement methods	Determined by undertaking measurements at the element process firing natural gas. All measurement will be conducted at a representative load factor (or

and procedures to be applied:	operation mode), based on the Korean Industrial Standard or internationally recognized procedures. It will be measured at the early stage of the crediting period and the measured energy efficiency will be used during the crediting period.
QA/QC procedures to be applied:	The meters will be calibrated according to Korean Industrial Standards or internationally recognized procedures.
Any comment:	

B.7.2 Description of the monitoring plan:

LG Chem will organize a Operating and Monitoring Team, which composes of a manager and operators. The manager will be responsible for monitoring and archiving all data associated with items depicted in the monitoring plan. Operators working under the manager will be assigned to the task of monitoring different parameters on a timely basis as well as recording and archiving data in an orderly manner. All data collected as part of monitoring plan will be archived electronically and be kept at least 2 years after the end of the crediting period. Monitoring reports will be reviewed by the manager on a monthly basis in order to ensure that the Project activity meets all requirements as outlines above.

B.8 Date of completion of the application of the baseline and monitoring methodology and the name of the responsible person(s)/entity(ies)

The baseline study was completed in 26/06/2006 by the Clean Energy Finance Committee. The contact details of Mitsubishi UFJ Securities Co., Ltd. appear below:

Clean Energy Finance Committee
Mitsubishi UFJ Securities Co., Ltd.
Tokyo, Japan
Tel: (81-3) 6213-6860
E-mail: hatano-junji@sc.mufg.jp

The Clean Energy Finance Committee, Mitsubishi UFJ Securities Co., Ltd. is the CDM Adviser to the Project and will be the contact for the CDM activity described in this PDD.

SECTION C. Duration of the project activity / crediting period

C.1 Duration of the project activity:

C.1.1. Starting date of the project activity:

30/09/2006

C.1.2. Expected operational lifetime of the project activity:

20 years

C.2 Choice of the crediting period and related information:

C.2.1. Renewable crediting period

C.2.1.1. Starting date of the first crediting period:

Not applicable

C.2.1.2. Length of the first crediting period:

Not applicable

C.2.2. Fixed crediting period:

C.2.2.1. Starting date:

01/08/2007

C.2.2.2. Length:

10 years

SECTION D. Environmental impacts

D.1. If required by the host Party, documentation on the analysis of the environmental impacts of the project activity:

"Enforcement Decree of the Act on Assessment of Impacts of Works on Environment, Traffic, Disasters, etc." describes projects for which an Environment Impact Assessment (EIA) is required. Under the Act, the proposed Project activity does not require the completion of an EIA.

In actual fact, the Project activity will help to improve local air quality as well as mitigate climate change. Since the natural gas will not contain sulphur, it is expected that emissions of SO_x will be reduced by more than 90% comparing to the baseline situation (bunker fuel oil C consumption). It is also expected that emissions of NO_x will be reduced by 30 ~ 40 % by the Project activity.

D.2. If environmental impacts are considered significant by the project participants or the host Party, please provide conclusions and all references to support documentation of an environmental impact assessment undertaken in accordance with the procedures as required by the host Party:

It is expected that there will be no negative environmental impacts associated with the Project activity.

SECTION E. Stakeholders' comments

E.1. Brief description how comments by local stakeholders have been invited and compiled:

A stakeholders' meeting was conducted by LG Chem on July 28, 2006. The meeting took place at the Project plant in Naju. Local network and newspaper announcements were used to advertise the stakeholders' meeting and invite local stakeholders. A total of 17 local inhabitants attended the meeting and showed strong interest in the Project as it will help to improve local air quality.

The below is a brief summary of points elaborated on by LG Chem staff during a presentation held at the meeting.

- Description of the Project and explanation of its main objectives.
- Explanation of how the Project helps to reduce local air pollution
- Explanation of how the Project contributes to reducing GHG emissions.

E.2. Summary of the comments received:

The following concerns were expressed by local stakeholders:

1. What is the reason for the 3 ~ 4 ℃ higher temperature in the area near where the Project plant is located as compared to other areas in Naju?

   LG Chem's response: This is just because of regional climate characteristics, and not caused by industrial activities at the LG Chem plant. Therefore, the Project will also not affect the local climate other than helping to mitigate the adverse effects of climate change by reducing GHG gas emissions

2. Will the pilot flame on the flare stack disappear after the implementation of the Project?

   LG Chem's response: The spark on the flare stack should always remain lit, even after project implementation. Actually, this pilot flame is installed for environmental reasons.

The stakeholders were satisfied with the answers by LG Chem.

There were no adverse comments in regards to the Project activity.

E.3. Report on how due account was taken of any comments received:

As stated above, there were no negative comments from local stakeholders in regards to the Project activity.

Annex 1

CONTACT INFORMATION ON PARTICIPANTS IN THE PROJECT ACTIVITY

Organization:	LG Chem, Ltd.
Street/P.O.Box:	20, Yeouido-dong, Yeongdeungpo-gu
Building:	LG Twin Towers
City:	Seoul
State/Region:	
Postfix/ZIP:	150-721
Country:	Korea
Telephone:	82-2-3773-3561
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URL:	http://www.lgchem.co.kr/index.jsp
Represented by:	
Title:	Manager
Salutation:	Mr.
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State/Region:	-
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Represented by:	
Title:	Chairman
Salutation:	Mr.
Last Name:	Hatano
Middle Name:	
First Name:	Junji
Department:	Clean Energy Finance Committee
Mobile:	
Direct FAX:	
Direct tel:	
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Annex 2

INFORMATION REGARDING PUBLIC FUNDING

Project financing will not involve ODA or public funding from any Annex I countries

Annex 3

BASELINE INFORMATION

Variables & Parameters	Value (Data source)
Net calorific value of the natural gas	40.0×10^{-6} TJ/m^3 (Standard Manual for Calorific Value)
Net calorific value of the bunker fuel oil C	39.1×10^{-6} TJ/liter (Standard Manual for Calorific Value)
Energy efficiency of the boiler if fired with bunker fuel oil C	91% (LG Chem)
CO_2 emission factor of the natural gas	56.1 tCO_2/TJ (IPCC)
CO_2 emission factor of the bunker fuel oil C	77.4 tCO_2/TJ (IPCC)

Historical Bunker fuel oil C use and steam generated

Year	Bunker fuel oil C use (kl)	Steam generated (TJ)
2002	27,814	989.65
2003	29,383	1,045.48
2004	26,292	935.50
2005	24,597	875.19

Annex 4

MONITORING INFORMATION

1. Introduction

The purpose of this Monitoring Plan (MP) is to provide a standard by which LG Chem. (LGC) will conduct monitoring and verification. The MP shall be in accordance with all relevant rules and regulations of the CDM. The MP is an integral part of this PDD and can be utilized to facilitate accurate and consistent monitoring of the Project's Certified Emission Reductions (CERs).

LGC will use the MP for the duration of the Project activity. The company will strictly follow the MP in order to measure and track the project impacts and prepare for the periodic verification process required to confirm the amount of CERs achieved.

Specifically, the MP facilitates the following;

- Establishing and maintaining a suitable monitoring system
- Guide for the implementation of necessary measurement and management operations
- Guide for meeting CDM requirements for verification and certification

2. Operational and Monitoring Obligations

In order to facilitate accurate CER determination, the project participant must fulfil a number of operational and data collection obligations. This will ensure that CERs are calculated in a transparent manner and monitoring is carried out as stipulated in the MP.

All data required for emission reduction determination shall be monitored as directed in Section B of this PDD.

3. Management and Operational Systems

In order to ensure a successful operation of the Project and the credibility and verifiability of the CERs achieved, the Project will have a well-defined management and operational system. A system will be put in place for the Project and include the operation and management of the monitoring and record keeping system that is described in this MP.

3.1 Allocation of Project management responsibilities

The management and operation of the Project is the responsibility of LGC, the Project operator. Ensuring the environmental credibility of the Project through accurate and systematic monitoring of the project's implementation and operation for the purpose of achieving trustworthy CERs is the key responsibility and accountability of the operator.

3.2 Management and operational systems

The project developers will implement a management and operational system that meets the requirements of the Project. This includes:

3.2.1 Data handling

– The establishment of a transparent system for the collection, computation and storage of data, including adequate record keeping and data monitoring systems. The project participants will develop and implement a protocol that provides for these critical functions and processes, which will be fit for independent auditing.

3.2.2 Quality assurance

– LGC will designate a competent manager who will be in charge of and accountable for the generation of CERs including monitoring, record keeping, computation of CERs, audits and verification. The person will officially sign-off on all GHG Emission worksheets.
– Well-defined protocols and routine procedures, with good, professional data entry, extraction and reporting will be encouraged to maximise transparency of data archiving.
– Proper management processes and recording of official data

3.2.3 Training

- Internal training will be made available to operational staff to enable them to undertake the tasks required by this MP. Initial staff training will be provided before the Project starts operating and generating CERs.

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