CLEAN DEVELOPMENT MECHANISM
PROJECT DESIGN DOCUMENT FORM (CDM-PDD)
Version 03 - in effect as of: 28 July 2006

CONTENTS

Annexes

SECTION A. General description of project activity

A.1 Title of the project activity:

>>
Use of FINEX Off Gas for power generation in Pohang Steel Works

- Version number of the document: 3.0
- Date of the document: Feb 25th, 2008

A.2. Description of the project activity:

>>
Description of the project activity

The purpose of the project activity is to recover waste gas from FINEX process for power generation. Power generated by using FOG(FINEX off Gas) will be supplied for internal use in Pohang Steel Works. Currently POSCO predicts shortage of power in the near future. If power generation by using FOG is not undertaken in Pohang Steel Works, POSCO will have to purchase from KEPCO(Korea Power Electricity Corporation) or use fossil fuel to generate power in Pohang Steel Works. The power generated by this project activity will displace the major quantity of electricity from the grid.

531,697 tons of CO2 emission will be abated through this project. The facility needed for this project is combined cycle power plant with capacity of 145.9MW. This facility will be installed in Pohang Steel Works located near Pohang city. The project was started construction in Jun/29/2005. POSCO is commissioning the FINEX power plant and the date expected of construction completion is Jul/10/2007. Currently, some FINEX gas is being unsteadily used in the commission process of the FINEX power plant and the other remaining FINEX gas is flared into the atmosphere. POSCO is in charge of all the investment plans, construction and operation.

POSCO is a leading steel making company in Korea. POSCO's total production capacity is 30 million tons of crude steel—13.3 million at Pohang Works and 16.7 million tons at Gwangyang Works. In 2005, POSCO produced 30.545 million tons, an increase of 341,000 tons over the previous year. The utilization ratio, production compared to capacity, was 102%. The production of finished products was 29.495 million tons, an 80,000 ton increase over the corresponding period in 2004. Pohang Works accounted for 13.007 million tons and Gwangyang, 16.488 million. Total production of hot-rolled steel was 9.765 million tons and cold-rolled, 9.016 million. Plate production was 3.236 million tons, while Electrical Steel Sheet and Stainless Steel were 748,000 tons and 1.9 million tons respectively.

Contribution of the project activity to sustainable development

This project can contribute to sustainable development by the following.

- Recycling waste resources by using waste gas which would have been flared into the atmosphere.
- Replacing conventional fossil-fuel generation system
- Improving local environment and removing elements threatening public health.
- As a good practice for environmental improvement, the project activity could be replicated by other steel companies.

A.3. Project participants:

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Name of Party involved ((host) indicates a host party)	Private and/or public entity(ies) project participants	Kindly indicates if the Party involved wish to be considered a project participant (yes/no)
The Republic of Korea (host party)	POSCO	No

A.4. Technical description of the project activity:

A.4.1. Location of the project activity:

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A.4.1.1. Host Party(ies):

>>

The Republic of Korea

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

>>

Gyeongsangbuk-do

A.4.1.3. City/Town/Community etc:

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Pohang Steel Works, 5 Dongchon-dong, Nam-gu, Pohang city

A.4.1.4. Detail of physical location, including information allowing the unique identification of this project activity (maximum one page):

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This project is undertaken by POSCO at Pohang Steel Works. Pohang Steel Works is located near Pohang city which is on the Southeastern coast of Korea (129° 24' longitude and 36° 2' latitude)

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<Figure 1> Location of Pohang Steel Works

A.4.2. Category(ies) of project activity:

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Sectoral scope 1 – Energy industries (renewable / non-renewable sources)

A.4.3. Technology to be employed by the project activity:

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Introduction to the FINEX process

The blast furnace process includes sintering and coke-making where air pollutants such as SOx and NOx are created, and consequently, this process requires various technologies and high costs for prevention of air pollution.

Otherwise, the FINEX method permits the production of hot metals using cheap and abundant ore fines and steaming coals without pre-treatment, as required in sintering and coke-making. Therefore, the FINEX method can considerably reduce processing costs and emissions of compared to the traditional blast furnace method.

The FINEX process is a new innovative new iron-making process that does not require any preparation stage of the iron ores or other source materials including the Cokes and sintering processes. Additionally,

as it uses the iron ores and other coals that are less than 8mm in diameter and that are worldly abundant, it is even more advantageous than COREX process that can omit the Cokes and sintering processes.

Characteristics of FOG

The main fuel for this project is FINEX off gas(FOG) generated from the FINEX process. FOG is consisted mainly of CO and H2. This project will generate power by using FOG and it would be supplied for internal use in Pohang Steel Works. Since the FINEX process is the first of its kind in the world, the flow rate and calorific value of FOG generated from FINEX process is expected to be unstable than expected. So in order to use unstable FOG, POSCO plans to supply COG and N2 as a measure to control the calorific value of FOG in two ways as listed below;

1. Supply COG(Cokes Oven Gas) when the calorific value of FOG is lower than that needed for operating the FINEX power plant.
2. Supply N_2 when the calorific value of FOG is higher than that needed for operating the FINEX power plant.

Because the calorific value of COG, 4,400 Kcal/Nm3, is higher than the calorific value of FOG, COG can contribute to making the calorific value of FOG higher. When the calorific value of FOG is higher than expected, N_2 will be supplied to lower the calorific value of FOG. The gas mixing tank facility will be facilitated to use COG and N2 for this project

FINEX combined cycle power technology

The details of the FINEX combined cycle power facilities are as below.

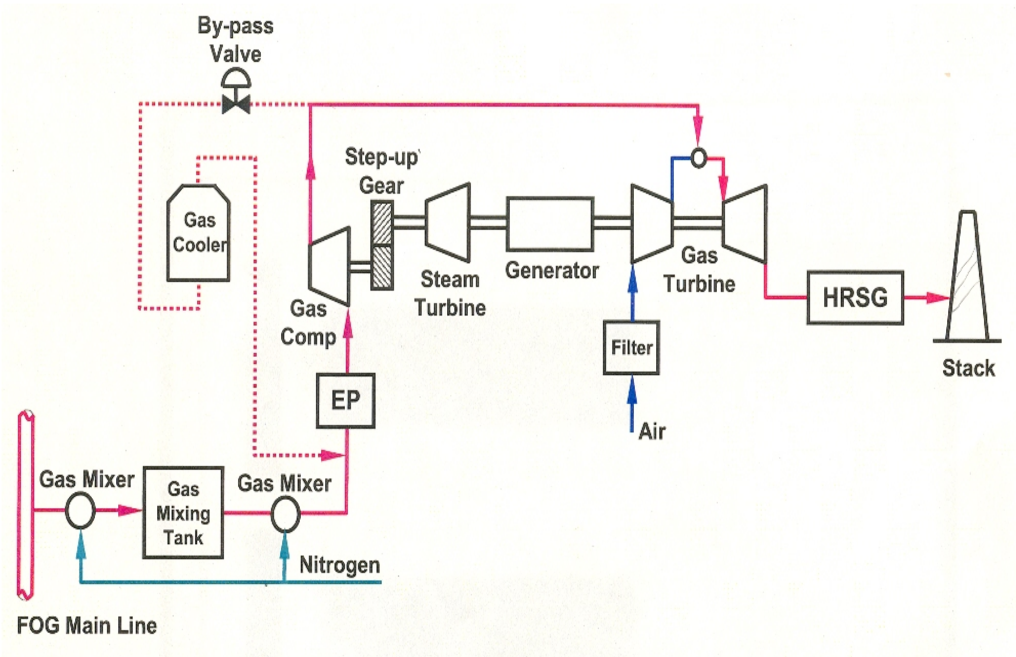
<Table 1> FINEX combined cycle power facilities

	Contents
UNIT	- Turbine: Gas Turbine 1, Steam Turbine 1 - Generator: 1 Unit - HRSG: 1 - Gas Compressor: 1
Plant capacity	- 145.9MW
Fuel	- Main Fuel: FOG - Net calorific value: 1350 kcalNm3-dry
Control system	- Diasys(Netmation): G/T, S/T, Air Compressor, Heat Recovery Steam Generator
Start up fuel	- Steam
Station TR	- OLTC(On Load Tap Changer)
Filteration	- Static Type
Plant Start Up	- Full APS(Automatic Plant Start) Mode
Remove Dust system	- EP
Remove Nox system	- Type: SCR

POSCO will introduce a combined cycle power plant of the single shaft type for this project. The combined cycle power technology of the single shaft type consist of a gas turbine, an exhaust heat

recovery boiler for generating steam using exhaust heat discharged from the gas turbine, and a steam turbine driven by steam generated from the exhaust heat recovery boiler. Rotor of the gas turbine and rotor of the steam turbine are coupled.

To use low-pressure FOG a gas compressor is needed to make highly pressurized FOG. As a result, energy loss is expected in order to operate the gas compressor which has a capacity of 37.7MW. Therefore POSCO has introduced this single shaft technology to compensate for energy loss by using the gas compressor. In Korea, there is no other case in which the combined cycle power plan with a single shaft type has been introduced and facilitated.



<Figure 2> Plant Overview

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

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Please indicate the chosen crediting period and provide the total estimation of emission reductions as well as annual estimates for the chosen crediting period. Information on the emission reductions shall be indicated using the following tabular format.

Years	Annual estimation of emission reductions in tonnes of CO2e
2008	531,697
2009	531,697
2010	531,697
2011	531,697
2012	531,697
2013	531,697
2014	531,697
2015	531,697
2016	531,697
2017	531,697
Total estimated reductions (tonnes of CO2e)	5,316,970
Total number of crediting years	10
Annual average over the crediting period of estimated reductions (tonnes of CO2e)	531,697

A.4.5. Public funding of the project activity:

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There is no public funding for this 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 project activity:

>>
Version 02 of ACM0004 "Consolidated baseline and monitoring methodology for waste gas and/or heat and/or pressure for power generation"
Version 06 of ACM0002 "Consolidated methodology for grid-connected electricity generation from renewable sources"

B.2 Justification of the choice of the methodology and why it is applicable to the project activity:

>>
The chosen methodology ACM0004 version 02 is applicable to project activities that generate electricity from waste heat or the combustion of waste gases in industrial facilities.

ACM0004 applies to electricity generation project activities:

- that displace electricity generation with fossil fuels in the electricity grid or displace captive electricity generation from fossil fuels;
- where no fuel switch is done in the process, where the waste heat or pressure or the waste gas is produced, after the implementation of the project activity

The proposed project activity satisfies applicability condition of ACM0004 version 2 as following:

- The project activity displaces electricity generation with fossil fuels in the electricity grid;
- There will be no fuel switch in the process, where the FOG is produced, after the implementation of the project activity

ACM0004 methodology covers both new and existing facilities. For existing facilities, the methodology applies to existing capacity, as well as to planned increases in capacity during the crediting period. If capacity expansion is planned, the added capacity must be treated as a new facility.

The proposed project activity satisfies applicability condition of ACM0004 version 2 as following:

- The project activity is new facility.

B.3. Description of the sources and gases included in the project boundary

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Project boundary

According to ACM0004, the project boundary is defined as follows:

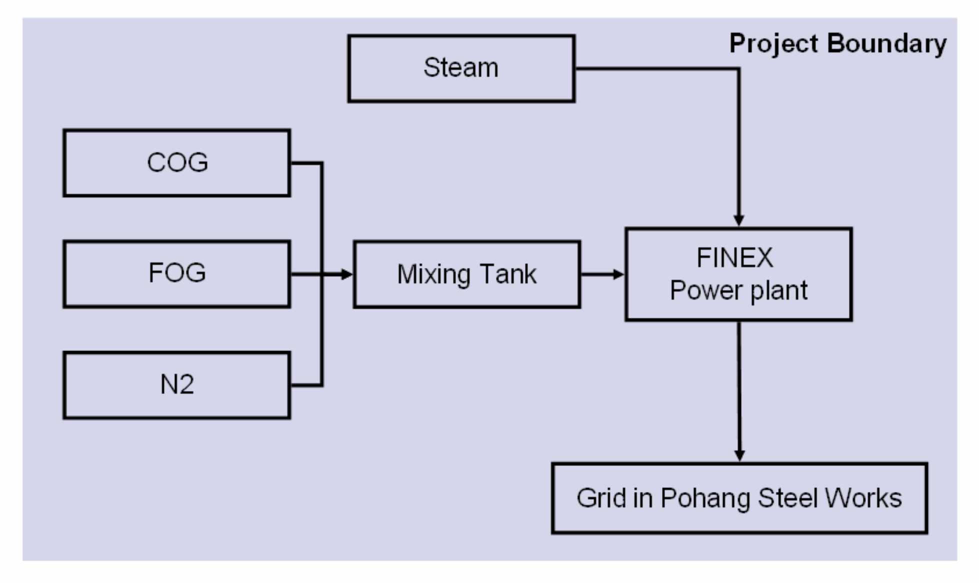
The spatial extent of the project boundary comprises the waste heat or gas sources, captive power generating equipment, any equipment used to provide auxiliary heat to the waste heat recovery process, and the power plants connected physically to the electricity grid that the proposed project activity will affect.

The combined margin will be calculated as described in ACM0002, both in terms of the relevant grid definitions and the emissions factors. To determine baseline emission, statistical information on electricity grid in Korea has been used. Emission factor has been selected by using operational margin and build margin as stated in ACM0002.

The project boundary comprises the waste heat or gas sources, captive power generating equipment, any equipment used to provide auxiliary heat to the waste heat recovery process, and the power plants connected physically to the electricity grid that the proposed project activity including fossil fuel use in generating process from waste gas according to ACM0004. The power generated in this project is only for internal use. No electricity from this project will be supplied to the grid in Korea. Therefore the project boundary of FINEX power plants connected physically to the electricity grid includes the grid within Pohang Steel Works. Also the waste gas sources of this project, FOG and COG will be included in the project boundary.

Currently, in this project the steam produced from LNG power plant is planned to be used as a start-up fuel. Therefore the project boundary includes steam used in the FINEX waste gas combined cycle project. Project emission includes GHG emission from fossil fuel use to produce steam that is used as a start up.

In addition, N2 will be supplied to the FINEX power plant to control the calorific value of FOG. To supply N2 to the FINEX power plant, some power will be consumed. However, this power will be supplied from auxiliary electricity of the FINEX power plant. Thus power consumption due to N2 supply is not included in the source of project emission.



<Figure 3> Project boundary

Description of the source and gases included in the project boundary

Based on the ACM0004 version 2, the project boundary includes the following.

For the purpose of determining GHG emissions of the project activity, includes the following.

- CO2 emissions from combustion from auxiliary fossil fuels

For the purpose of determining baseline emissions, includes the following.

- CO2 emissions from fossil fuel fired power plant connected to the electricity system;
- CO2 emissions from fossil fuel fired captive power plants supplying the project site facility;

	Source	Gas	Included?	Justification / Explanation
Baseline	Grid electricity generation	CO_2	Included	Main emission source
		CH_4	Excluded	Excluded for simplification. This is conservative.
		N_2O	Excluded	Excluded for simplification. This is conservative.
	Captive electricity generation	CO_2	Excluded	Main emission source. But, not applicable for this project.
		CH_4	Excluded	Excluded for simplification. This is conservative. Not applicable for this project.
		N_2O	Excluded	Excluded for simplification. This is conservative. Not applicable for this project.

Project Activity	On-site fossil fuel consumption due to the project activity	CO_2	Included	May be an important emission source
		CH_4	Excluded	Excluded for simplification.
		N_2O	Excluded	Excluded for simplification.
	Combustion of waste gas for electricity generation	CO_2	Excluded	It is assumed that this gas would have been burned in the baseline scenario.
		CH_4	Excluded	Excluded for simplification.
		N_2O	Excluded	Excluded for simplification.

B.4. Description of how the baseline scenario is identified and description of the identified baseline scenario:

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Based on ACM0004 version 2, the baseline scenario alternative should include all possible options that provide or produce electricity for in-house consumption and/or sale to grid and/or other consumers.

The possible alternative scenarios in absence of the CDM project activity would be as follows:

1. The proposed activity not undertaken as a CDM project activity
2. Import of electricity from the grid
3. Existing or new captive power generation on-site, using other energy sources than waste heat and/or gas, such as coal, diesel, natural gas, hydro, wind, etc;
4. A mix of options (2) and (3), in which case the mix of grid and captive power should be specified
5. Other uses of the waste heat and waste gas
6. The continuation of the current situation, whether this is captive or grid-based power supply (if not already included in the options above)

project participant shall exclude baseline options that:

- do not comply with legal and regulatory requirements; or
- depend on key resources such as fuels, materials or technology that are not available at the project site

The project participant shall provide evidence and supporting documents to exclude baseline options that meet the above mentioned criteria.

In this project, possible alternative scenarios are follows:

1. The proposed activity not undertaken as a CDM project activity
2. Import of electricity from the grid
3. Existing or new captive power generation on-site, using other energy sources than waste heat and/or gas, such as coal, diesel, natural gas, hydro, wind, etc;
4. A mix of options (2) and (3), in which case the mix of grid and captive power should be specified
5. Other uses of the waste heat and waste gas

6. The continuation of the current situation, whether this is captive or grid-based power supply (if not already included in the options above)

All alternatives comply with legal and regulatory requirements and do not depend on key resources such as fuels, materials or technology that are not available at the project site. Therefore all alternatives can be selected.

Scenario 1

Scenario 1 is the case of the proposed activity not undertaken as a CDM project activity. According to this alternative, power is generated by using FOG. This process complies with legal and regulatory requirements.

This project is not economically attractive. Also technological risk is high for POSCO to undertake this project. Due to its low economic attractiveness and technological barriers, the project is very difficult to be carried out without being registered as a CDM project. One of the barriers is the use of FOG from the FINEX process. For FOG, the kind and proportional composition and calorific value differs from the former waste gas (BFG, COG, LDG) POSCO have been using. Unless POSCO can develop a new advanced technology it cannot be used in power generation. In addition, in order to enhance energy efficiency, this project will introduce single shaft type combined cycle facility. This type of facility has never been introduced in Korea. Thus POSCO lacks both manpower and resources to run and maintain this type of facility.

According to the economic analysis result shown below, the proposed activity, not undertaken as a CDM project activity, turns out to be less economically attractive compared to other alternative scenario. Therefore by considering low economic attractiveness and technological barriers, this scenario cannot be a baseline scenario.

Scenario 2

Scenario 2 in the case of importing electricity from the grid (KEPCO: Korea Electricity Power Corporation)”. According to this alternative, power is supplied by the external grid in Korea. This process complies with legal and regulatory requirements.

POSCO has purchased power from KEPCO to meet the needs of the power demand in Pohang Steels Works. Currently the capacity of import electricity from KEPCO is 800MW. Since POSCO received 254.9MW of power from KEPCO in 2006, it is possible to receive power as much as the amount of power which can be produced by FINEX combined cycle power project without additional installation for power transmission from KEPCO. Therefore this scenario “import of electricity 150MW from the grid” can be selected as a baseline scenario.

Scenario 3

Scenario 3 is the case of installing a new captive power generation plant on-site, using LNG. This alternative scenario complies with legal and regulatory requirements. Because POSCO already installed LNG power plant and there is no regulation about prohibiting this type of facility.

The reason why LNG is selected as a fuel for the captive power plant when establishing this alternative is as follows:.

- Captive power plant currently running in Pohang Steel Works consists of thermal power plant by using waste gas(BFG, COG, LDG) and heavy oil, LNG gas turbine power, waste heat recovery plant such as CDQ, TRT
- 747 MW of power from captive power plant has been supplied to Pohang Steel Works in 2004. Therefore the addition of the captive power plant facility to meet the power demand is a possible option.
- No other waste heat and gas other than waste gas from the FINEX power plant can be used. Therefore there is possibility of introducing the power plant using fossil fuel later on.
- The best option is to install the LNG power plant since POSCO already has the LNG terminal in Gwangyang and purchasing and storing the LNG is easy for POSCO because POSCO already has been operating the LNG combined cycle power plant in Pohang Steel Works. This scenario of installing the new captive power generation on-site using LNG, can be an alternative for this project.

According to the economic analysis result shown below, new captive power generation on-site, using LNG turned out to be economically low compared to other alternative scenario. Therefore by considering low economic attractiveness, the scenario of installing a new captive power generation on-site using LNG cannot be a baseline scenario.

Scenario 4

Scenario 4 is the case of mixing scenario 2 and 3 to a portion of 20% and 80%. This process complies with legal and regulatory requirements similar to scenario 2 and 3.

The reason why mixing scenario 2 and 3 to a portion of 20% and 80% is selected when establishing this alternative is as follows:.

- Currently Pohang Steel Works runs the captive power plant and at the same time imports power from KEPCO
- In 2004, the amount of LNG captive power generation and power import recorded 747MW and 197MW for each. The portion of each power from the whole is 80% and 20%.
- It is possible for POSCO to use the same type of method when additional demand for power is needed.

To evaluate the economic attractiveness of this scenario, the results are calculated by adding the results of 80% of scenario 2 and addition of 20% of scenario 3. This is a conservative approach because there is little difference between the investment cost between the LNG 120MW facility and the LNG 150MW facility.

According to the economic analysis result shown below, this scenario turned out to be economically low compared to other alternative scenario. Therefore by considering the low economic attractiveness of the scenario 2 and 3, it cannot be considered as a baseline scenario.

Scenario 5

Scenario 5 is the case of using waste gas for other uses. There are two options to use FOG other than power generation. The first is producing steam only by using FOG and the second is to recover and use FOG as an auxiliary fuel for the steel making process. Because there is no regulation for prohibiting this type of facility, this scenario complies with legal and regulatory requirements.

For the first option, POSCO have no plan of producing steam from FOG due to the lack of demand for steam. Therefore the first option cannot be a baseline scenario.

For the second option, it is possible to use FOG as a fuel in the steel making process. However, POSCO has no infrastructure for using FOG as a fuel in the steel making process. The FINEX process and FINEX power plant is located far from the existing steel making process. To supply FOG as a fuel in the steel making process, high investment costs would be needed to establish infrastructure in Pohang Steel Works. Also additional costs would be needed to supply FOG as a fuel in the steel making process since the existing steel making process is not fit to use the calorific value of FOG. Therefore using FOG for other purpose other than power generation is not possible option for POSCO due to internal affair. In conclusion the scenario of using waste gas for other purpose cannot be selected as a baseline scenario.

Scenario 6

Scenario 6 is the case of maintaining of the current situation. Since the captive power plant of POSCO has not been always able to meet all the power demand, so far all shortage of the electricity has been purchased from the grid. If FINEX power plant project was not implemented, POSCO would have purchased the power from the grid. Thus, Scenario 6 is identical with Scenario 2.

Determination of baseline scenario

ACM0004 regulates that among the alternatives that do not face any prohibitive barriers, the most economically attractive alternative should be considered as the baseline scenario.

Because the scenario 5 is not realistic and the scenario 6 is identical with the scenario 2, they (scenario 5 and 6), thus, are not included in the process of determination of baseline scenario. The most economically attractive alternative has been selected by economic evaluation of alternative scenarios 1,2,3,4. Net present Value(NPV) method has been used to perform economic evaluation. Baseline scenario with the highest net present value has been selected by comparing net present values of each alternative scenario. The table below shows the result of NPV calculation.

<Table 2> NPV calculation for alternative scenarios

	Content	NPV(KRW)
Scenario 1	The proposed activity not undertaken as a CDM project activity	-359,243,035,476
Scenario 2	Import of electricity from the grid	-315,944,255,321
Scenario 3	new captive power generation on-site, using LNG	-639,594,025,066

Scenario 4	the scenario 2 and 3 to portion of 20% and 80%	-574,864,071,117

By NPV calculation, scenario 2 turned out to be the most economically attractive alternative. Therefore Import of electricity from the KEPCO has been selected as the baseline scenario. All relevant data including NPV calculation was submitted to DOE.

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 CDM project activity (assessment and demonstration of additionality): >>

To prove the additionality of this project, "Tool for the demonstration and assessment of additionality(version 03)" is applied.

Step 1. Identification of alternatives to the project activity consistent with current laws and regulations

Sub-step 1a. Define alternatives to the project activity:

As stated in section B.4, alternative scenarios are defined as follows:

1. The proposed activity not undertaken as a CDM project activity
2. Import of electricity from the grid
3. Existing or new captive power generation on-site, using other energy sources than waste heat and/or gas, such as coal, diesel, natural gas, hydro, wind, etc;
4. A mix of options (2) and (3), in which case the mix of grid and captive power should be specified
5. Other uses of the waste heat and waste gas
6. The continuation of the current situation, whether this is captive or grid-based power supply (if not already included in the options above)

Sub-step 1b. Consistency with mandatory laws and regulations:

There are six alternative scenarios for this project. All alternatives are in compliance with all mandatory applicable legal and regulatory requirements in Korea.

In addition, scenario 5 and 6 are excluded from the selection of the baseline scenario because POSCO was unable to undertake them. As seen from B.4, the most economically attractive alternative "Import of electricity from KEPCO" has been selected as the baseline scenario.

Step 2. Investment analysis

Sub-step 2a. Determine appropriate analysis method

According to "Tool for the demonstration and assessment of additionality(version 03)" to determine the appropriate analysis method, the project developer can choose from simple cost analysis, investment comparison analysis, benchmark analysis.

If the FINEX combined cycle plant has not been installed, POSCO would have to purchase power from KEPCO. Therefore the cost of purchasing power from KEPCO is regarded as income for POSCO. Investment analysis has been performed by considering the income stated above. Among analysis methods, benchmark analysis is used.

Sub-step 2b – Option III. Apply benchmark analysis

Benchmark analysis is defined as stated in “Tool for the demonstration and assessment of additionality(version 03)”

Identify the financial indicator, such as IRR, NPV, cost benefit ratio, or unit cost of service (e.g., levelized cost of electricity production in $/kWh or levelized cost of delivered heat in $/GJ) most suitable for the project type and decision context. Identify the relevant benchmark value, such as the required rate of return (RRR) on equity. The benchmark is to represent standard returns in the market, considering the specific risk of the project type, but not linked to the subjective profitability expectation or risk profile of a particular project developer. Benchmarks can be derived from:

- Government bond rates, increased by a suitable risk premium to reflect private investment and/or the project type, as substantiated by an independent (financial) expert;
- Estimates of the cost of financing and required return on capital (e.g. commercial lending rates and guarantees required for the country and the type of project activity concerned), based on bankers views and private equity investors/funds’ required return on comparable projects;
- A company internal benchmark(weighted average capital cost of the company) if there is only one potential project developer (e.g. when the project activity upgrades an existing process). The project developers shall demonstrate that this benchmark has been consistently used in the past, i.e. that project activities under similar conditions developed by the same company used the same benchmark.

The benchmark was selected as a POSCO investment decision benchmark (IRR 10%) in 2006. The result IRR of this project was 6.63%, which is lower than the benchmark in 2006. After the investment analysis, the project IRR was lower than company internal benchmark IRR. This means the economic attractiveness of this project is lower than the company internal benchmark. In conclusion this shows that this project has the additionality. All relevant data was submitted to DOE.

Sub-step 2d. Sensitivity analysis

To analyze sensitivity of this project, financial analyses were performed altering the amount of power generation from FINEX combined cycle power plant and operation cost by ±10 % due to little possibility that the investment cost of this project can be changed, and then the impact on the IRR of this project was assessed compared to the POSCO benchmark IRR of 2006. As it is shown, the IRR of this project remains lower than the benchmark IRR.

<Table 3> Sensitivity analysis

	IRR
10% Increase Electric Generation	8.06%
10% Decrease Electric Generation	5.10%
10% Increase Operation Cost	6.24%
10% Decrease Operation Cost	7.00%

Step 3. Barrier analysis

According to “Tool for the demonstration and assessment of additionality(version 03), barrier analysis can be passed if the project activity satisfies the conditions for investment analysis. Since this project satisfies the conditions for investment analysis barrier analysis is not needed.

Step 4. Common practice analysis

Sub-step 4a. Analyze other activities similar to the proposed project activity

Among steel companies in the world as well as Korea, POSCO is the only one that is planning to introduce the FINEX process. The FINEX process is the first project developed by POSCO throughout the world. Therefore this is the only project for producing power by using FOG in the FINEX process.

The purpose of this project is to use waste gas in a combined cycle. Currently there are no steel companies in Korea using waste gas in a combined cycle. Due to its high cost of investment and the maintenance of the combined cycle facilities, there are no other cases in Korea. Listed below are the statistics of power plant facilities for steel companies from KPX(Korea Power Exchange) in 2006.

<Table 4> Statistics of power facility for steel company in Korea, 2006

Company	Capacity(kW)	Type	Fuel
Pohang Steel Works(POSCO)	1,018,800	One cycle steam turbine	BFG, COG, LDG
		Combined cycle	LNG
Gwangyang Works(POSCO)	1,432,000	One cycle steam turbine	BFG, COG, LDG
		Combined cycle	LNG
Union Steel	6,300	One cycle steam turbine	Diesel

As seen from above there is no case in Korea for the project activity generating power by using FOG and COG in combined cycle before this project activity. In addition POSCO introduced single shaft type to increase power efficiency in combined cycle power generation. Introducing single shaft type in combined cycle is the first case in Korea.

Sub-step 4b. Discuss any similar options that are occurring:

There are no other activities similar to the proposed project activity. Therefore this project is not common practice.

POSCO seriously considered this project as CDM in the decision making process before the start of construction, and the evidences related to this can be confirmed by "FINEX power plant energy planning report" published in the year 2005.

B.6. Emission reductions:

B.6.1. Explanation of methodological choices:

>>
Emission reduction

Because this project is applicable to ACM0004, ACM0004 methodology is applied for the calculation of emission reduction. Emission reduction can be calculated by subtracting the project emission and leakage from the baseline emission. In ACM0004, baseline emission, the project emission and leakage are calculated as below.

$$ER_y = BE_y - PE_y$$

- ER_y : Emission Reduction in year y (tCO2)
- BE_y : Baseline emissions in year y (tCO2)
- PE_y : Project emissions in year y (tCO2)

Project emission

According to ACM0004, the project emissions are calculated as follows:

Project Emissions are applicable only if auxiliary fuels are fired for generation startup, in emergencies, or to provide additional heat gain before entering the Waste Heat Recovery Boiler.

Project Emissions are given as:

$$PE_y = Q_i \times NCV_i \times EF_i$$

- PE_y : Project emissions in year y (tCO2)
- Q_i : Mass or volume unit of fuel i consumed (t or m3)
- NCV_i : Net calorific value per mass or volume unit of fuel i (TJ/t or m3)
- EF_i : CO2 emissions factor per unit of energy of the fuel i (tCO2/TJ)

The CO2 emission factor is taken from 2006 Revised IPCC Guidelines for default values. For the other factors, local values should be used wherever possible. If no such values are available, country-specific values (see, e.g., IPCC Good Practice Guidance) are preferable to IPCC worldwide default values.

Baseline emission

According to ACM0004, project emissions are calculated as follows:

$$BE_{electricity,y} = EG_y \times EF_{electricity,y}$$

- $BE_{electricity,y}$: Baseline emission during the year y in MWh
- EG_y : Net quantity of electricity supplied to the manufacturing facility by the project during the year y in MWh
- $EF_{electricity,y}$: CO2 baseline emission factor for the electricity displaced due to the project activity during the year y (tCO2/MWh)

In determining the net quantity of electricity supplied, project participants shall subtract the quantity of electricity required for the operation of the power plant.

If the baseline scenario is determined to be grid power supply, the emissions factor for displaced electricity is calculated as in ACM0002. According to ACM0002, the choice between ex-ante and ex-post vintage should be specified. In this project, ex-ante vintage was selected because the ex-ante the full generation-weighted average for the most recent 3 years for which data are available in Korea. To calculate the emission factor of Korean grid, KEPCO(Korea Electricity Power Corporation) electricity statistics in 2005,2006,2007 was used. The details are described in Annex 3

Leakage

According to ACM0004, No leakage is considered.

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

Data and parameters relevant to project emissions

Data / Parameter:	Q_{LNG}
Data unit:	Nm3/year
Description:	LNG consumption in steam production to be supplied to FINEX power plant
Source of data used:	Data from POSCO
Value applied:	55,062
Justification of the choice of data or description of measurement methods and procedures actually applied :	LNG consumption in production of steam to be supplied to FINEX power plant is calculated by following: LNG consumption in production of steam to be supplied to FINEX power plant(Nm3/year) = LNG consumption in LNG power plant(Nm3/year) × energy consumption in production of steam to be supplied to FINEX power plant(kcal/year) ÷ total energy consumption in LNG power plant(Mcal/year) LNG consumption in LNG power plant in 2006: 335,421,456 Nm3/year

	Energy consumption in production of steam to be supplied to FINEX power plant: – Energy consumption for steam use per kg: 777.6 kcal/kg – Annual steam use: 673.33 ton/year Energy consumption in LNG power plant in 2006: 3,189,505,351 Mcal/year To calculate energy consumption in the production of steam to be supplied to the FINEX power plant, relevant data was derived from data of Mitsubishi. All data related with LNG and energy consumption in the LNG power plant in 2006 was measured automatically by meters. The data was recorded, stored in DCS(Distribution Control System) of Pohang Steel Works. Secondary, the recorded data in DCS was transferred to UCC(Utility Control Center) in Pohang Steel Work. Finally, all data related with LNG and energy consumption in the LNG power plant in 2006 was collected and recorded in the POSCO energy system.
Any comment:	-

Data / Parameter:	NCV_{LNG}
Data unit:	kcal /Nm3
Description:	Average net calorific value of the natural gas combusted during the year y
Source of data used:	POSCO
Value applied:	9508.9
Justification of the choice of data or description of measurement methods and procedures actually applied :	Average net calorific value of the natural gas combusted in LNG power plant in POSCO, 2006.
Any comment:	-

Data / Parameter:	EF_{LNG}
Data unit:	tCO2/TJ
Description:	CO_2 emission factor of the natural gas combusted in all element processes in the year y
Source of data used:	IPCC 2006 Guideline
Value applied:	56.1
Justification of the choice of data or description of measurement methods and procedures actually applied :	IPCC value will be used since there is no reference for CO_2 emission factor in Korea.

Any comment:	-

Data and parameters relevant to baseline emissions

Data / Parameter:	EG_{GEN}
Data unit:	MWh/yr
Description:	Total Electricity Generated
Source of data used:	Data from POSCO
Value applied:	952,034
Justification of the choice of data or description of measurement methods and procedures actually applied :	Total Electricity generated is calculated as below. Total electricity generated = Plant capacity(MW)×365 days×24 Hours × Plant load factor(%) The value applied for plant capacity is 145.9MW was derived from the data of Mitsubishi. The plant load factor of FINEX combined cycle power plant was derived from the data of POSCO.
Any comment:	

Data / Parameter:	EG_{AUX}
Data unit:	MWh/yr
Description:	Auxiliary Electricity
Source of data used:	Data from POSCO
Value applied:	30,016
Justification of the choice of data or description of measurement methods and procedures actually applied :	Auxiliary electricity is calculated as below. Auxiliary electricity = Auxiliary capacity(MW)×365 days×24 Hours × Plant load factor(%) The value applied for plant capacity is 4.6MW was derived from the data of Mitsubishi. The plant load factor of FINEX combined cycle power plant was derived from the data of POSCO.
Any comment:	

Data / Parameter:	EG_y
Data unit:	MWh/yr
Description:	Net Electricity supplied to facility
Source of data used:	Calculation
Value applied:	922,018
Justification of the	Net Electricity supplied to facility is calculated as below.

choice of data or description of measurement methods and procedures actually applied :	Net Electricity supplied to facility = Total Electricity Generated - Auxiliary Electricity
Any comment:	-

Data / Parameter:	EF_y
Data unit:	tCO_2/MWh
Description:	CO_2 emission factor(combined margin)
Source of data used:	KEPCO electricity statistics
Value applied:	0.5768
Justification of the choice of data or description of measurement methods and procedures actually applied :	Calculated according to methodology ACM0002 (ver.6). Used data for the year 2004, 2005 and 2006 are the most recent data available at the time of the validation.
Any comment:	The details are described in annex 3.

Data / Parameter:	$EF_{OM,y}$
Data unit:	tCO_2/MWh
Description:	CO_2 emission factor(operation margin)
Source of data used:	KEPCO electricity statistics
Value applied:	0.7344
Justification of the choice of data or description of measurement methods and procedures actually applied :	Calculated according to methodology ACM0002 (ver.6). Used data for the year 2004, 2005 and 2006 are the most recent data available at the time of the validation.
Any comment:	The details are described in annex 3.

Data / Parameter:	$EF_{BM,y}$
Data unit:	tCO_2/MWh
Description:	CO_2 emission factor(build margin)
Source of data used:	KEPCO electricity statistics
Value applied:	0.4191
Justification of the choice of data or description of measurement methods and procedures actually applied :	Calculated according to methodology ACM0002 (ver.6). Used data for the year 2004, 2005 and 2006 are the most recent data available at the time of the validation.
Any comment:	The details are described in annex 3.

B.6.3 Ex-ante calculation of emission reductions:

>>

Ex-ante baseline emissions

According to ACM0004, project emissions are calculated as follows:

$$BE_{electricity,y} = EG_y \times EF_{electricity,y}$$

- $BE_{electricity,y}$: Baseline emission during the year y in MWh
- EG_y : Net quantity of electricity supplied to the manufacturing facility by the project during the year y in MWh
- $EF_{electricity,y}$: CO2 baseline emission factor for the electricity displaced due to the project activity during the year y (tCO2/MWh)

Net Electricity supplied to facility is calculated as below.

Net Electricity supplied to facility(Capacity: 141.3MW) = Total Electricity Generated(Capacity: 145.9MW) - Auxiliary Electricity(Capacity: 4.6MW)

Since the baseline scenario of this project is grid power imports, CO2 baseline emission factor for the emission factor of Korean grid was applied. To calculate the emission factor of Korean grid, KEPCO(Korea Electricity Power Corporation) electricity statistics in 2005, 2006, 2007 was used for calculation. The details are described in Annex 3.

<Table 5> Calculation for baseline emission

Net quantity of electricity supplied to the manufacturing facility (MWh)	CO2 baseline emission factor (tCO2/MWh)	Baseline emission (tCO2)
922,018	0.5768	531,820

Ex-ante project emissions

Project Emissions are given as:

$$PE_y = Q_{LNG} \times NCV_{LNG} \times EF_{LNG}$$

- PE_{LNG} : Project emissions in year y (tCO2)
- Q_{LNG} : Mass or volume unit of LNG consumed (t or m3)
- NCV_{LNG} : Net calorific value per mass or volume unit of LNG (TJ/t or m3)
- EF_{LNG} : CO2 emissions factor per unit of energy of the LNG (tCO2/TJ)

ACM0004 rules that project emissions are applicable only if auxiliary fuels are fired for generation start up, in emergencies, or to provide additional heat gain before entering the waste heat recovery boiler. In this project, steam generated in the LNG power plant will be supplied as auxiliary fuels for start up for FINEX combined cycle power plant generation. Since steams from the LNG power plant are fired for generation start up is generated by firing LNG, steam supply to FINEX combined cycle power plant will

be included to project emissions. Relevant factor with calculating emission from LNG consumption was chosen IPCC 2006 guideline and the data from POSCO. The values for calculating project emissions from steam production are listed below:

<Table 6> Values for calculating project emission

	Value	Sources
LNG consumption of LNG power plant in 2006	335,421,456 Nm3	Data from POSCO
Net calorific value of LNG in 2006	9508.9 kcal/Nm3	Data from POSCO
CO2 emission coefficient factor of LNG	56.1 tCO2/TJ	IPCC 2006 Guideline
The ratio of energy consumption in production of steam to be supplied to FINEX power plant to total energy consumption in LNG power plant	0.0164%	Data from POSCO
Project emissions for steam	123 tCO2/year	

Ex-ante leakage emissions

According to ACM0004, no leakage is considered.

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

>>

Year	Estimation of project activity emissions (tonnes of CO2e)	Estimation of baseline emissions (tonnes of CO2e)	Estimation of leakage (tonnes of CO2e)	Estimation of overall emission reductions (tonnes of CO2e)
2008	123	531,820	0	531,697
2009	123	531,820	0	531,697
2010	123	531,820	0	531,697
2011	123	531,820	0	531,697
2012	123	531,820	0	531,697
2013	123	531,820	0	531,697
2014	123	531,820	0	531,697
2015	123	531,820	0	531,697
2016	123	531,820	0	531,697
2017	123	531,820	0	531,697
Total (tonnes of CO2e)	1,230	5,318,200	0	5,316,970

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

B.7.1 Data and parameters monitored:

Data / Parameter:	Q_{LNG}
Data unit:	Nm3/year

Description:	Volume of the auxiliary fuel(LNG) used by project activity
Source of data to be used:	Data from POSCO
Value of data applied for the purpose of calculating expected emission reductions in section B.5	6,352
Description of measurement methods and procedures to be applied:	LNG consumption in production of steam to be supplied to FINEX power plant is calculated by following: LNG consumption in production of steam to be supplied to FINEX power plant(Nm3/year) = LNG consumption in LNG power plant(Nm3/year) × energy consumption in production of steam to be supplied to FINEX power plant(Mcal/year) ÷ total energy consumption in LNG power plant(Mcal/year) The monitoring plan for LNG consumption in production of steam to be supplied to FINEX power plant is described in Annex 4. Power Generation Sec of Environment & Energy Dept in Pohang Steel Works is in charge of data collection, recording, monitoring, and storage.
QA/QC procedures to be applied:	All meters used in measuring will be approved by KLAS(Korea Laboratory Accreditation Scheme). Before using the meters, they will be calibrated and verified by KESCO(Korea electric safety corporation) and also after using the meters, they will be calibrated and verified once in every two years. In addition, Electrical Maintenance Sec in Electric & Control Maintenance Dept. of POSCO will maintain them once every year.
Any comment:	

Data / Parameter:	NCV_{LNG}
Data unit:	Kcal/Nm3
Description:	Average net calorific value of the natural gas combusted
Source of data to be used:	Data from POSCO
Value of data applied for the purpose of calculating expected emission reductions in section B.5	9,508.9
Description of measurement methods and procedures to be applied:	Average net calorific value of the natural gas combusted will be measured automatically by meters every minute. The data will be recorded, stored in DCS(Distribution Control System) of Pohang Steel Works. Secondary, the recorded data in DCS will be transferred to UCC(Utility Control Center) at Pohang Steel Work. Finally, all data for the Average net calorific value of the natural gas combusted will be collected and recorded in the POSCO energy system.

	Power Generation Sec of Environment & Energy Dept in Pohang Steel Works is in charge of data collection, recording, monitoring, and storage.
QA/QC procedures to be applied:	All meters used in measuring will be approved by KLAS(Korea Laboratory Accreditation Scheme). Before using the meters, they will be calibrated and verified by KESCO(Korea electric safety corporation) and also after using the meters, they will be calibrated and verified once in every two years. In addition, Electrical Maintenance Sec in Electric & Control Maintenance Dept. of POSCO will maintain them once every year.
Any comment:	

Data / Parameter:	EF_{LNG}
Data unit:	tCO2/TJ
Description:	Carbon emissions factor of LNG
Source of data to be used:	IPCC 2006 guideline
Value of data applied for the purpose of calculating expected emission reductions in section B.5	56.1
Description of measurement methods and procedures to be applied:	IPCC value will be used since there is no reference for CO_2 emission factor in Korea.
QA/QC procedures to be applied:	Not Applicable
Any comment:	

Data / Parameter:	EG_{GEN}
Data unit:	MWh/yr
Description:	Total Electricity generated
Source of data to be used:	Data from POSCO
Value of data applied for the purpose of calculating expected emission reductions in section B.5	952,034
Description of measurement methods and procedures to be applied:	Total electricity generated will be measured automatically by meters every minute. The data will be recorded, stored in DCS(Distribution Control System) at Pohang Steel Works. Secondary, the recorded data in DCS will be transferred to UCC(Utility Control Center) at Pohang Steel Work. Finally, all data of total electricity generated will be collected and recorded in the POSCO energy system.

	Power Generation Sec of Environment & Energy Dept at Pohang Steel Works is in charge of data collection, recording, monitoring, and storage.
QA/QC procedures to be applied:	All meters used in measuring will be approved by KLAS(Korea Laboratory Accreditation Scheme). Before using the meters, they will be calibrated and verified by KESCO(Korea electric safety corporation) and also after using the meters, they will be calibrated and verified once in every two years. In addition, Electrical Maintenance Sec in Electric & Control Maintenance Dept. at POSCO will maintain them once every year.
Any comment:	

Data / Parameter:	EG_{AUX}
Data unit:	MWh/yr
Description:	Auxiliary Electricity
Source of data to be used:	Data from POSCO
Value of data applied for the purpose of calculating expected emission reductions in section B.5	30,016
Description of measurement methods and procedures to be applied:	Auxiliary electricity will be measured automatically by meters every minute. The data will be recorded, stored in DCS(Distribution Control System) at Pohang Steel Works. Secondary, the recorded data in DCS will be transferred to UCC(Utility Control Center) at Pohang Steel Work. Finally, all data of total electricity generated will be collected and recorded in the POSCO energy system. Power Generation Sec of Environment & Energy Dept at Pohang Steel Works is in charge of data collection, recording, monitoring, and storage.
QA/QC procedures to be applied:	All meters used in measuring will be approved by KLAS(Korea Laboratory Accreditation Scheme). Before using the meters, they will be calibrated and verified by KESCO(Korea electric safety corporation) and also after using the meters, they will be calibrated and verified once in every two years. In addition, Electrical Maintenance Sec in Electric & Control Maintenance Dept. at POSCO will maintain them once every year.
Any comment:	

Data / Parameter:	EG_y
Data unit:	MWh/yr
Description:	Net Electricity supplied to facility
Source of data to be used:	Data from POSCO
Value of data applied for the purpose of	922,018

calculating expected emission reductions in section B.5	
Description of measurement methods and procedures to be applied:	Net Electricity supplied to facility is calculated as below. Net Electricity supplied to facility = Total Electricity Generated - Auxiliary Electricity
QA/QC procedures to be applied:	Not Applicable
Any comment:	

Data / Parameter:	Q_{FOG}
Data unit:	Nm3/h
Description:	Flow rate of waste gas, FOG
Source of data to be used:	Data from POSCO
Value of data applied for the purpose of calculating expected emission reductions in section B.5	184,000
Description of measurement methods and procedures to be applied:	Flow rate of FOG will be measured automatically by meters every minute. The data will be recorded, stored in DCS(Distribution Control System) at Pohang Steel Works. Secondary, the recorded data in DCS will be transferred to UCC(Utility Control Center) at Pohang Steel Work. Finally, all data of total electricity generated will be collected and recorded in the POSCO energy system. Power Generation Sec of Environment & Energy Dept at Pohang Steel Works is in charge of data collection, recording, monitoring, and storage.
QA/QC procedures to be applied:	All meters used in measuring will be approved by KTL(Korea testing laboratory). Before using the meters, they will be calibrated and verified by KESCO(Korea electric safety corporation) and also after using the meters, they will be calibrated and verified once in every two years. In addition, Electrical Maintenance Sec in Electric & Control Maintenance Dept. at POSCO will maintain them once every year.
Any comment:	

Data / Parameter:	NCV_{FOG}
Data unit:	kcal/Nm3
Description:	Net calorific value of the waste gas, FOG
Source of data to be used:	Data from POSCO
Value of data applied for the purpose of	1,350

calculating expected emission reductions in section B.5	
Description of measurement methods and procedures to be applied:	Net calorific value of FOG will be measured automatically by meters every minute. The data will be recorded, stored in DCS(Distribution Control System) at Pohang Steel Works. Secondary, the recorded data in DCS will be transferred to UCC(Utility Control Center) at Pohang Steel Work. Finally, all data of total electricity generated will be collected and recorded in the POSCO energy system. Power Generation Sec of Environment & Energy Dept at Pohang Steel Works is in charge of data collection, recording, monitoring, and storage. Power Generation Sec of Environment & Energy Dept in Pohang Steel Works is in charge of data collection, recording, monitoring, and storage.
QA/QC procedures to be applied:	All meters used in measuring will be approved by KTL(Korea testing laboratory). Before using the meters, they will be calibrated and verified by KESCO(Korea electric safety corporation) and also after using the meters, they will be calibrated and verified once in every two years. In addition, Electrical Maintenance Sec in Electric & Control Maintenance Dept. at POSCO will maintain them once every year.
Any comment:	

Data / Parameter:	Q_{COG}
Data unit:	Nm3/h
Description:	Flow rate of waste gas, COG
Source of data to be used:	Data from POSCO
Value of data applied for the purpose of calculating expected emission reductions in section B.5	7,400
Description of measurement methods and procedures to be applied:	Flow rate of COG will be measured automatically by meters every minute. The data will be recorded, stored in DCS(Distribution Control System) at Pohang Steel Works. Secondary, the recorded data in DCS will be transferred to UCC(Utility Control Center) at Pohang Steel Work. Finally, all data of total electricity generated will be collected and recorded in the POSCO energy system. Power Generation Sec of Environment & Energy Dept at Pohang Steel Works is in charge of data collection, recording, monitoring, and storage.
QA/QC procedures to be applied:	All meters used in measuring will be approved by KTL(Korea testing laboratory). Before using the meters, they will be calibrated and verified by KESCO(Korea electric safety corporation) and also after using the meters, they will be calibrated and verified once in every two years. In addition, Electrical Maintenance Sec in Electric & Control Maintenance Dept. at

	POSCO will maintain them once every year.
Any comment:	

Data / Parameter:	NCV_{COG}
Data unit:	kcal/Nm3
Description:	Net calorific value of the waste gas, COG
Source of data to be used:	Data from POSCO
Value of data applied for the purpose of calculating expected emission reductions in section B.5	4,400
Description of measurement methods and procedures to be applied:	Net calorific value of COG will be measured automatically by meters every minute. The data will be recorded, stored in DCS(Distribution Control System) at Pohang Steel Works. Secondary, the recorded data in DCS will be transferred to UCC(Utility Control Center) at Pohang Steel Work. Finally, all data of total electricity generated will be collected and recorded in the POSCO energy system. Power Generation Sec of Environment & Energy Dept at Pohang Steel Works is in charge of data collection, recording, monitoring, and storage.
QA/QC procedures to be applied:	All meters used in measuring will be approved by KTL(Korea testing laboratory). Before using the meters, they will be calibrated and verified by KESCO(Korea electric safety corporation) and also after using the meters, they will be calibrated and verified once in every two years. In addition, Electrical Maintenance Sec in Electric & Control Maintenance Dept. at POSCO will maintain them once every year.
Any comment:	

B.7.2 Description of the monitoring plan:

>>

<Description of monitoring plan>

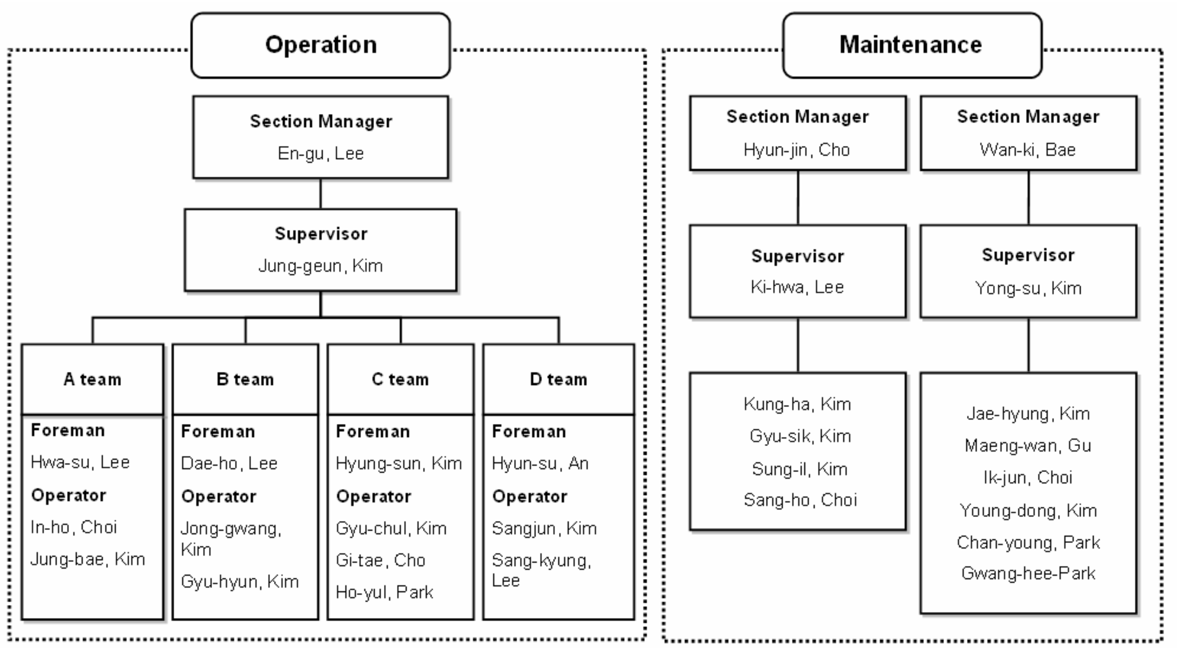
Monitoring plan for this project is as follows:

All data will be measured automatically and continuously by meters every minute. The data will be recorded, stored in DCS(Distribution Control System) at Pohang Steel Works. Secondary, the recorded

data in DCS will be transferred to UCC(Utility Control Center) at Pohang Steel Work. Finally, all data will be collected and recorded automatically in the POSCO energy system.

<Operational and management structure>

The proposed project will be operated and managed by Power Generation Sec. of Environment & Energy Dept of POSCO. The operation team will conduct all work related to the calculation of all emission reductions parameters and monitoring project activity.



<Figure 4> Monitoring structure

<Training>

Operation and maintenance team of this project was trained for operation of single shaft type of combined cycle. This training was undertaken by Mitsubishi corporation in Japan,.05.Feb.2006 ~ 04.Mar.2006 After the completion of construction in 2007, the operating and maintenance team will be trained for operation management education once per quarter every year.

<Responsibilities for and institutional arrangements for data collection and archiving>

Power Generation Sec. of Environment & Energy Dept. is in charge of data collection and its storage.

- Data storage and collection method

All data will be measured automatically and continuously by meters every minute. The data will be recorded, stored in DCS(Distribution Control System) at Pohang Steel Works. Secondary, the recorded

data in DCS will be transferred to UCC(Utility Control Center) at Pohang Steel Work. Finally, all data will be collected and recorded in the POSCO energy system.

- Data modification method

If any error of data is founded in DCS, the FINEX combined cycle power plant will be stopped. In this case Electrical Maintenance Sec in Electric & Control Maintenance Dept. of POSCO will calibrate all meters and record data related to this error.

<Quality Assurance and Quality control>

POSCO obtained ISO14001 certification in December, 1996 and is operating continuous and systematic Environment management system. POSCO obtained monitoring and QA/QC process for all parameters related to proposed project activity monitoring through ISO14001 certification. Monitoring plan of the proposed project activity will be managed in integration and continuation with Environment management system through ISO14001.

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

>>
Date of completion: April 2, 2007
Contact information:

The baseline and monitoring study has been determined by Ecofrontier, together with support from the staff of Energy Business Planning Group of POSCO. Ecofrontier is not participant of this project.

Mr. Sungwoo Kim(ssungwoo@posco.co.kr) / POSCO

Posco Center, 892 Daechi4-dong, Gangnam-gu Seoul, 135-777 Korea, Gangnam P.O. Box 777
Tel: +82-2-3457-1616 Fax: +82-2-3457-1960 Homepage: www.posco.com

Mr. Kyungrak Kwon(krkwon@ecofrontier.co.kr) / Ecofrontier

11th Floor, DMC R&D Center, E3-2. Sangam dong Mapo gu, Seoul
Tel: +82-2-380-3584 Fax: +82-2-380-3501 Homepage: www.ecofrontier.co.kr

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:

>>
The starting date of the construction: June/29/2005

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

>>
25 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:

>>
01.01.2008

C.2.2.2. Length:

>>
10 years

SECTION D. Environmental impacts

>>

D.1. Documentation on the analysis of the environmental impacts, including transboundary impacts:

>>

According to national regulation on environment, transportation and hazards, environmental impact assessment has been carried out in Dec. 2003. The results are as follows;

Topography, Geological feature

Promotion of green zone is planned in this project. The source of soil used in this plan will be from residual soil from new household construction undertaken by POSCO. Therefore there will be no negative effect on the environment.

Flora and fauna

At the borders of the project boundary a buffer green belt will be installed. This will reduce air pollution and will act as a forest reserve. Therefore there will be no negative effect on the environment.

Land use

A buffer green belt will be installed at the borders of the project boundary. Therefore there will be no negative effect on the environment.

Atmosphere

Emission of SOx and NOx gases are predicted. To solve this problem a dust chamber and Sox and NOx reducing facility was introduced. The impact of these actions on the environment was minimal.

Aquatic environment

The effect of warm wastewater from power plant on aquatic environment was proved to be at minimum according to the environmental impact assessment. Therefore the effect of this project on aquatic environment is minimal.

Environmental effect monitoring

Additional monitoring will be executed after the environment impact assessment. The items and the duration are listed below. The results will be informed to all related organization.

<Table 7> Environmental effect monitoring plan

	Contents	Monitoring points	Frequency
Atmosphere	SO2, NOx, CO, TSP	2	Once every 3 months
Water Quality	temperature, pH, COD, SS, N,P, Heavy	4	Once every 3

	metals		months
Aquatic environment	phytoplankton, zooplankton, benthic organism	4	Once every 3 months

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:

>>

No significant negative environmental impact is expected from the project activities.

SECTION E. Stakeholders' comments

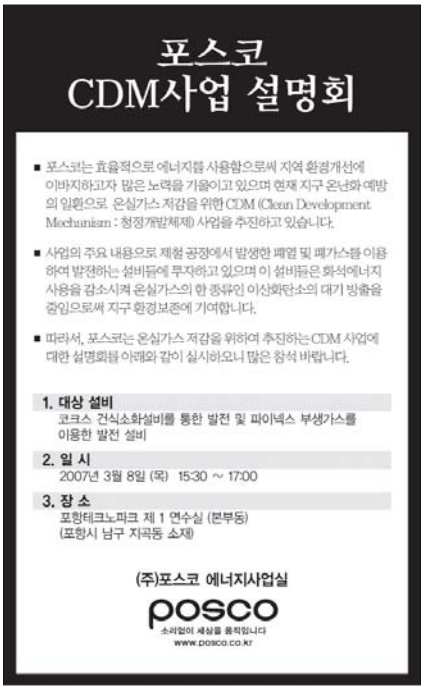
>>

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

>>

Stakeholder comments of the project activity were carried out through a public hearing for the local stakeholders and residents. Stakeholders for this project include residents of Pohang city, labour of POSCO, consultant, NGO, regional officer of environmental and pollution division from Pohang city hall.

The public hearing was held on Mar/8/2007 at Pohang Technopark building located in Pohang City, Korea. To announce to local stakeholders, POSCO announced this hearing in the local newspapers(Kyungbuk ilbo, Kyungbuk domin ilbo, The Kyungbuk Maeil Shinmun) on Mar/02/2007 before the public hearing.



<Figure 5> Newspaper Announcement

The brief message of the newspaper announcement was to introduce the purpose of this project, time, date and venue. The translation of this announcement is as below:

> "By using energy efficiently, POSCO is making great efforts to improve the local environment and currently implementing CDM (Clean Development Mechanism) projects to mitigate greenhouse gases as a prevention of global warming. POSCO has been investing in facilities using waste heat and waste gas produced in the iron-making process and these facilities contribute to the protection of the environment, in that they reduce the use of fossil fuel and decrease carbon dioxide, one of the greenhouse gases, released in the air. POSCO is, accordingly, going to make a public hearing regarding CDM implementation to mitigate greenhouse gases and would like to invite you to attend the public hearing"

At the public hearing, about 30 attendants were present. There were three questions and one suggestion from the public.

<Figure 6> Public hearing (08/03/2007)

E.2. Summary of the comments received:

>>
All attendants understood and agreed that the project would contribute to sustainable development and environmental safety. The questions and suggestions from the public comment are listed below;

<Table 8> Summary of the comments received

	Question/Suggestion
POSCO labour	Is there any power generation project using waste gas from Pohang Steel Works at POSCO currently developed as a CDM project?
Resident 1	How many projects does POSCO consider to develop as a CDM project?
Resident 2	What are the differences of CO2 emission and the composition of waste gas from the furnace between FINEX process and existing steel making process?
Regional officer	Suggestions for sharing waste heat generated from POSCO with local residents and local companies near POSCO.

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

>>

All comments which have been received to this date were very positive for project implementation. POSCO would invite comments from other stakeholders by website of validator. Depending on the comments, proper account will be taken.

Annex 1

CONTACT INFORMATION ON PARTICIPANTS IN THE PROJECT ACTIVITY

Organization:	POSCO
Street/P.O.Box:	Daechi4-dong, Gangnam-gu, 135-777 Korea
Building:	Posco Center
City:	Seoul
State/Region:	Seoul
Postfix/ZIP:	Gangnam P.O. Box 777
Country:	Republic of Korea
Telephone:	
FAX:	
E-Mail:	
URL:	www.posco.com
Represented by:	
Title:	Manager
Salutation:	Mr.
Last Name:	Kim
Middle Name:	
First Name:	Sungwoo
Department:	Energy Business Dept. Energy Business Planning Group
Mobile:	
Direct FAX:	82-2-3457-1988
Direct tel:	82-2-3457-1616
Personal E-Mail:	ssungwoo@posco.com

Annex 2

INFORMATION REGARDING PUBLIC FUNDING

No funds from public national or international sources were used in any aspect of the proposed project.

Annex 3

BASELINE INFORMATION

According to ACM0002, the operational margin and the build margin can be calculated as below:

the baseline is the kWh produced by the renewable generating unit multiplied by an emission coefficient (measured in kg CO2equ/kWh) calculated in a transparent and conservative manner as a combined margin (CM), consisting of the combination of operating margin (OM) and build margin (BM) according to the procedures prescribed in the approved methodology ACM0002. Any of the four procedures to calculate the operating margin can be chosen, but the restrictions to use the Simple OM and the Average OM calculations must be considered..

According to ACM0002, dispatch data analysis should be the first methodological choice for OM emission factor. But, in Korea, dispatch data of the grid is not available. Thus this dispatch data analysis is not selected as a emission factor. Here, Simple OM method is selected for calculating emission factor. As indicated in ACM0002, the Simple OM method can only be used where low-cost/must run resources constitute less than 50% of total grid generation in: 1) average of the five most recent years, or 2) based on long-term normals for hydroelectricity production.

The ratio must run/low cost resources constitute of total grid

	2002	2003	2004	2005	2006
Total net generation(MWh)	292,746,000	308,225,887	326,879,672	348,187,780	365,368,969
Net generation of must run/low cost resources	124,379,580	136,622,857	135,253,646	149,934,596	153,215,358
Anthracite generation(MWh)	5,991,495	6,236,623	5,130,890	5,117,963	5,466,562
Hydro generation(MWh)	5,266,907	6,830,016	5,802,167	5,135,032	5,144,991
Nuclear generation(MWh)	113,070,088	123,280,502	123,970,409	139,286,513	142,114,439
Renewable energy generation (MWh)	51,090	275,716	350,180	395,088	489,366
The ratio must run/low cost resources constitute of total grid	42.49%	44.33%	41.38%	43.06%	41.93%

As above, the average of the five most recent years, low-cost/must run resources constitute less than 50% of total grid generation in Korea. Thus Simple OM is appropriate method for OM emission factor.

According to ACM0002, Build Margin emission factor $EF_{BM,y}$ can be calculated ex-ante based on the most recent information available on plants already built for sample group m at the time of PDD submission. The sample group m consists of either the five power plants that have been built most recently, or the power plant capacity additions in the electricity system that comprise 20% of the system generation (in MWh) and that have been built most recently. Project participants should use from these two options that sample group that comprises the larger annual generation.

	The power plant capacity additions in the electricity system that comprise 20% of the system generation	Capacity of five power plants that have been built most recently
Net generation(MWh)	74,536,000	22,522

In calculating the BM, emission factor of the power plant capacity additions in the electricity system that comprise 20% of the system generation is selected because the power plant capacity additions in the electricity system that comprise 20% of the system generation is larger than plant capacity five power plants that have been built most recently.

Key Parameter and data sources

No.	Key parameter	Data Source
1	Generation data for all plants for the year 2003-2005	KEPCO 2005, Statistics of Electric Power in 2004 KEPCO 2006, Statistics of Electric Power in 2005 KEPCO 2007, Statistics of Electric Power in 2006
2	fuel consumption data	KEPCO 2005, Statistics of Electric Power in 2004 KEPCO 2006, Statistics of Electric Power in 2005 KEPCO 2007, Statistics of Electric Power in 2006
3	Calorific value of fuel	KEPCO 2005, Statistics of Electric Power in 2004 KEPCO 2006, Statistics of Electric Power in 2005 KEPCO 2007, Statistics of Electric Power in 2006
4	Generation facility of Korea	KPX 2007, Statistics of Electricity Generation facility.

The below are results from calculation OM and BM using the statistics.

Operation Margin 2004

No	Plants	Net generation	Coal Consumption	Heavy oil Consumption	Diesel oil consumption	LNG consumption	Coal caloric value	heavy oil caloric value	diesel oil caloric value	LNG caloric value	CO2 Emission	Emission factor
		MWh	ton	kilo liter	kilo liter	ton	Kcal/kg	kcal/l	Kcal/l	kcal/kg	tCO2	tCO2/MWh
1	Honam #1	1,855,554	885,758	606	300	0	5,218	9,323	8,406	0	1,832,763	0.9877
2	Honam #2	1,625,399	783,300	1,714	335	0	5,159	9,326	8,408	0	1,605,942	0.9880
3	Samchonpo #1	3,974,202	1,624,500	0	1,674	0	5,251	0	8,561	0	3,381,758	0.8509
4	Samchonpo #2	3,839,080	1,564,986	0	744	0	5,961	0	8,560	0	3,695,885	0.9627
5	Samchonpo #3	3,652,769	1,467,177	0	814	0	6,204	0	8,556	0	3,605,936	0.9872
6	Samchonpo #4	3,811,371	1,538,768	0	785	0	6,182	0	8,554	0	3,768,392	0.9887
7	Samchonpo #5	4,147,957	1,707,777	0	230	0	4,588	0	8,550	0	3,102,672	0.7480
8	Samchonpo #6	4,185,213	1,734,977	0	652	0	4,534	0	8,550	0	3,116,651	0.7447
9	youngheung #1	2,986,382	1,114,254	0	27,916	0	5,597	0	8,481	0	2,542,926	0.8515
10	youngheung #2	1,172,450	459,217	0	18,314	0	5,559	0	8,284	0	1,057,898	0.9023
11	Boryeong #1	4,014,109	1,599,557	0	311	0	5,628	0	8,332	0	3,565,125	0.8881
12	Boryeong #2	3,915,285	1,555,055	0	616	0	5,626	0	8,465	0	3,465,604	0.8851
13	Boryeong #3	3,746,265	1,427,263	0	574	0	5,646	0	8,312	0	3,192,076	0.8521
14	Boryeong #4	4,097,489	1,560,014	0	179	0	5,648	0	8,312	0	3,488,991	0.8515
15	Boryeong #5	3,660,240	1,397,343	0	422	0	5,634	0	8,312	0	3,118,491	0.8520
16	Boryeong #6	4,093,207	1,559,785	0	350	0	5,640	0	8,312	0	3,484,226	0.8512
17	Taean #1	3,780,097	1,438,094	0	999	0	5,681	0	8,327	0	3,237,403	0.8564
18	Taean #2	3,975,123	1,509,379	0	310	0	5,678	0	8,264	0	3,394,262	0.8539
19	Taean #3	3,732,363	1,415,585	0	390	0	5,676	0	8,554	0	3,182,564	0.8527
20	Taean #4	4,048,258	1,539,502	0	254	0	5,669	0	8,285	0	3,456,053	0.8537
21	Taean #5	4,091,406	1,547,217	0	329	0	5,696	0	8,466	0	3,490,458	0.8531
22	Taean #6	4,056,835	1,531,751	0	230	0	5,696	0	8,364	0	3,455,309	0.8517
23	Hadong #1	3,688,313	1,389,739	0	533	0	5,730	0	8,552	0	3,154,651	0.8553
24	Hadong #2	4,028,529	1,515,681	0	145	0	5,724	0	8,526	0	3,435,385	0.8528
25	Hadong #3	3,997,064	1,501,027	0	670	0	5,744	0	8,534	0	3,415,421	0.8545
26	Hadong #4	3,724,757	1,397,482	0	737	0	5,792	0	8,543	0	3,206,927	0.8610
27	Hadong #5	4,013,845	1,501,672	0	318	0	5,683	0	8,534	0	3,379,806	0.8420
28	Hadong #6	3,685,698	1,379,396	0	689	0	5,638	0	8,534	0	3,081,264	0.8360
29	Dangjin #1	3,986,406	1,502,885	0	294	0	5,710	0	8,436	0	3,398,857	0.8526
30	Dangjin #2	4,038,457	1,523,605	0	211	0	5,700	0	8,445	0	3,439,185	0.8516

31	Dangjin #3	3,711,787	1,404,465	0	605	0	5,677	0	8,452	0	3,158,651	0.8510
32	Dangjin #4	3,801,495	1,434,844	0	528	0	5,668	0	8,453	0	3,221,341	0.8474
33	Ulsan #1	271,544	0	73,408	114	0	0	9,398	8,560	0	223,806	0.8242
34	Ulsan #2	244,246	0	65,316	82	0	0	9,406	8,560	0	199,244	0.8158
35	Ulsan #3	268,231	0	71,305	554	0	0	9,401	8,560	0	218,637	0.8151
36	Ulsan #4	1,759,376	0	420,739	1,238	0	0	9,473	8,664	0	1,294,567	0.7358
37	Ulsan #5	2,141,162	0	513,497	931	0	0	9,465	8,664	0	1,576,992	0.7365
38	Ulsan #6	2,196,344	0	527,083	1,603	0	0	9,461	8,664	0	1,619,806	0.7375
39	Youngnam #1	973,872	0	347,107	837	0	0	7,060	8,422	0	796,114	0.8175
40	Youngnam #2	665,973	0	248,049	274	0	0	7,295	8,432	0	586,928	0.8813
41	Yosu #1	723,968	0	181,712	571	0	0	9,510	8,478	0	561,353	0.7754
42	Yosu #2	1,304,109	0	316,523	436	0	0	9,509	8,508	0	976,158	0.7485
43	Pyongtaek #1	850,533	0	204,664	247	2,095	0	9,383	8,471	11,628	628,495	0.7389
44	Pyongtaek #2	880,646	0	209,664	232	2,515	0	9,385	8,494	11,616	644,925	0.7323
45	Pyongtaek #3	751,633	0	179,921	240	3,791	0	9,407	8,462	11,619	559,271	0.7441
46	Pyongtaek #4	800,854	0	192,294	225	3,217	0	9,408	8,469	11,660	595,462	0.7435
47	Namjeju #1	50,294	0	16,510	6	0	0	9,405	8,866	0	50,320	1.0005
48	Namjeju #2	48,714	0	16,040	13	0	0	9,406	8,404	0	48,910	1.0040
49	Jeju #1	44,659	0	15,306	7	0	0	9,402	8,513	0	46,639	1.0443
50	Jeju #2	486,401	0	118,473	73	0	0	9,416	8,489	0	361,596	0.7434
51	Jeju #3	509,330	0	124,160	41	0	0	9,423	8,482	0	379,127	0.7444
52	Seoul #4	90,322	0	0	1	22,409	0	0	8,617	11,710	61,618	0.6822
53	Seoul #5	480,919	0	0	3	117,908	0	0	8,617	11,713	324,278	0.6743
54	Incheon #1	47,491	0	0	0	10,523	0	0	0	11,734	28,994	0.6105
55	Incheon #2	49,144	0	0	0	11,094	0	0	0	11,735	30,569	0.6220
56	Incheon #3	19,018	0	0	149	4,235	0	0	8,503	11,734	12,062	0.6342
57	Namjeju D/P	274,089	0	57,808	80	0	0	9,406	8,424	0	176,357	0.6434
58	Jeju G/T	3,016	0	0	2,232	0	0	0	8,501	0	5,884	1.9511
59	Pyongtaek C/C	596,001	0	0	21	98,846	0	0	8,320	11,730	272,297	0.4569
60	Ilsan C/C	3,281,407	0	0	0	593,548	0	0	0	11,715	1,632,749	0.4976
61	Bundang C/C	3,650,122	0	0	0	653,880	0	0	0	11,723	1,799,956	0.4931
62	Ulsan C/C	2,329,524	0	0	0	347,076	0	0	0	11,628	947,632	0.4068
63	Seoincheon C/C	8,353,619	0	0	88	1,209,806	0	0	8,750	11,709	3,326,419	0.3982
64	Shinincheon C/C	11,596,955	0	0	0	1,587,638	0	0	0	11,715	4,367,321	0.3766
65	Boryeong C/C	6,979,928	0	0	0	988,548	0	0	0	11,723	2,720,998	0.3898
66	Busan C/C	9,884,075	0	0	2,687	1,298,418	0	0	0	11,704	3,568,159	0.3610

67	Hallim C/C	96,435	0	0	28,796	0	0	0	8,523	0	76,122	0.7894
68	Anyang C/C	1,506,070	0	0	0	270,559	0	0	0	11,723	744,719	0.4945
69	Bucheon C/C	1,425,073	0	0	0	258,596	0	0	0	11,712	711,135	0.4990
70	KIE Co.	2,809,983	0	0	0	467,583	0	0	0	11,721	1,286,834	0.4580
71	LG Bugog	1,894,996	0	0	0	260,653	0	0	0	11,725	717,618	0.3787
72	Yulchon	36,366	0	0	596	7,388	0	0	11,144	11,713	22,378	0.6154
Total		**187,513,847**									**135,335,319**	**0.7217**

Operation Margin 2005

No	Plants	Net generation	Coal Consumption	Heavy oil Consumption	Diesel oil consumption	LNG consumption	Coal caloric value	heavy oil caloric value	diesel oil caloric value	LNG caloric value	CO2 Emission	Emission factor
		MWh	ton	kilo liter	kilo liter	ton	Kcal/kg	kcal/l	Kcal/l	kcal/kg	tCO2	tCO2/MWh
1	Honam #1	1,787,715	870,214	961	278	0	5,122	9,343	8,369	0	1,768,603	0.9893
2	Honam #2	1,875,790	912,497	338	185	0	5,107	9,361	8,364	0	1,846,745	0.9845
3	Samchonpo #1	3,810,079	1,534,223	0	1,220	0	5,617	0	8,399	0	3,415,566	0.8965
4	Samchonpo #2	4,323,618	1,731,265	0	626	0	5,628	0	8,439	0	3,859,447	0.8926
5	Samchonpo #3	4,343,666	1,723,152	0	377	0	5,602	0	8,550	0	3,823,230	0.8802
6	Samchonpo #4	4,112,297	1,632,334	0	1,029	0	5,603	0	8,496	0	3,624,106	0.8813
7	Samchonpo #5	3,542,728	1,516,654	0	1,415	0	5,080	0	8,183	0	3,054,005	0.8620
8	Samchonpo #6	3,643,969	1,546,663	0	1,001	0	5,107	0	8,550	0	3,130,296	0.8590
9	youngheung #1	5,623,299	2,081,972	0	4,541	0	5,824	0	8,488	0	4,813,359	0.8560
10	youngheung #2	4,658,862	1,761,395	0	2,903	0	5,750	0	8,500	0	4,018,070	0.8625
11	Boryeong #1	3,547,140	1,440,343	0	761	0	5,539	0	8,496	0	3,160,619	0.8910
12	Boryeong #2	3,433,608	1,388,532	0	551	0	5,525	0	8,496	0	3,039,134	0.8851
13	Boryeong #3	4,124,745	1,589,150	0	90	0	5,588	0	8,303	0	3,516,257	0.8525
14	Boryeong #4	3,698,705	1,421,343	0	603	0	5,596	0	8,311	0	3,150,580	0.8518
15	Boryeong #5	4,121,314	1,587,999	0	156	0	5,588	0	8,312	0	3,513,881	0.8526
16	Boryeong #6	3,283,477	1,260,305	0	627	0	5,606	0	8,312	0	2,799,073	0.8525
17	Taean #1	3,992,112	1,508,570	0	621	0	5,700	0	8,257	0	3,406,290	0.8533
18	Taean #2	3,484,251	1,323,078	0	395	0	5,709	0	8,250	0	2,991,552	0.8586
19	Taean #3	3,957,054	1,494,175	0	650	0	5,707	0	8,242	0	3,377,807	0.8536
20	Taean #4	3,653,534	1,383,297	0	365	0	5,699	0	8,270	0	3,122,386	0.8546
21	Taean #5	3,744,413	1,411,398	0	742	0	5,730	0	8,242	0	3,204,277	0.8557
22	Taean #6	3,999,847	1,504,962	0	417	0	5,716	0	8,256	0	3,407,248	0.8518
23	Hadong #1	3,997,914	1,513,930	0	284	0	5,703	0	8,493	0	3,419,253	0.8553
24	Hadong #2	3,732,583	1,410,099	0	792	0	5,697	0	8,482	0	3,182,952	0.8527
25	Hadong #3	3,769,077	1,422,196	0	472	0	5,698	0	8,533	0	3,209,941	0.8517
26	Hadong #4	3,989,315	1,511,054	0	567	0	5,699	0	8,491	0	3,411,231	0.8551
27	Hadong #5	3,553,901	1,345,648	0	614	0	5,695	0	8,526	0	3,036,093	0.8543
28	Hadong #6	4,037,763	1,520,774	0	331	0	5,695	0	8,482	0	3,430,253	0.8495
29	Dangjin #1	3,797,307	1,438,702	0	637	0	5,664	0	8,392	0	3,228,108	0.8501
30	Dangjin #2	3,798,078	1,437,473	0	632	0	5,664	0	8,469	0	3,225,354	0.8492

31	Dangjin #3	4,081,017	1,549,041	0	141	0	5,638	0	8,402	0	3,458,533	0.8475
32	Dangjin #4	4,079,557	1,544,010	0	134	0	5,644	0	8,387	0	3,450,767	0.8459
33	Dangjin #5	1,318,670	499,714	0	5,701	0	5,809	0	8,459	0	1,164,380	0.8830
34	Dangjin #6	96,365	38,671	0	1,779	0	5,910	0	10,540	0	96,307	0.9994
35	Ulsan #1	262,393	0	70,183	750	0	0	9,405	8,660	0	215,850	0.8226
36	Ulsan #2	255,812	0	67,296	585	0	0	9,408	8,657	0	206,672	0.8079
37	Ulsan #3	200,518	0	53,085	662	0	0	9,413	8,663	0	163,650	0.8161
38	Ulsan #4	1,549,091	0	375,417	1,971	0	0	9,501	8,666	0	1,160,796	0.7493
39	Ulsan #5	1,500,935	0	363,992	1,676	0	0	9,493	8,666	0	1,123,942	0.7488
40	Ulsan #6	1,454,644	0	352,776	1,708	0	0	9,480	8,662	0	1,088,011	0.7480
41	Youngnam #1	1,022,470	0	359,910	844	0	0	7,108	8,495	0	830,974	0.8127
42	Youngnam #2	531,006	0	190,085	584	0	0	7,343	8,496	0	453,689	0.8544
43	Yosu #1	430,310	0	106,919	434	0	0	9,462	8,443	0	328,874	0.7643
44	Yosu #2	904,597	0	218,356	346	0	0	9,447	8,442	0	669,155	0.7397
45	Pyongtaek #1	1,258,662	0	293,214	118	3,553	0	9,408	8,496	11,608	903,637	0.7179
46	Pyongtaek #2	1,376,342	0	321,188	140	2,641	0	9,410	8,513	11,585	986,651	0.7169
47	Pyongtaek #3	1,321,167	0	308,042	132	1,784	0	9,412	8,502	11,648	944,440	0.7149
48	Pyongtaek #4	1,338,204	0	311,245	138	2,047	0	9,414	8,502	11,604	955,111	0.7137
49	Namjeju #1	44,602	0	14,628	15	0	0	9,384	8,852	0	44,511	0.9980
50	Namjeju #2	44,654	0	15,031	12	0	0	9,385	8,842	0	45,733	1.0242
51	Jeju #1	36,266	0	12,564	12	0	0	9,435	8,441	0	38,435	1.0598
52	Jeju #2	532,700	0	129,516	0	0	0	9,433	0	0	395,768	0.7429
53	Jeju #3	502,189	0	122,866	48	0	0	9,429	8,491	0	375,423	0.7476
54	Seoul #4	207,498	0	0	0	49,143	0	0	0	11,702	135,028	0.6507
55	Seoul #5	444,324	0	0	1	108,761	0	0	8,617	11,707	298,979	0.6729
56	Incheon #1	16,450	0	0	0	4,365	0	0	0	11,729	12,021	0.7308
57	Incheon #2	37,727	0	0	0	8,505	0	0	0	11,723	23,410	0.6205
58	Incheon #3	29,202	0	0	400	6,620	0	0	8,506	11,723	19,278	0.6602
59	Namjeju D/P	268,073	0	56,727	37	0	0	9,383	8,526	0	172,533	0.6436
60	Jeju G/T	5,069	0	0	2,869	0	0	0	8,473	0	7,539	1.4874
62	Pyongtaek C/C	659,932	0	0	1	110,953	0	0	8,503	11,727	305,520	0.4630
63	Ilsan C/C	2,873,958	0	0	0	533,188	0	0	0	11,710	1,466,033	0.5101
64	Bundang C/C	3,742,073	0	0	0	671,944	0	0	0	11,723	1,849,539	0.4943
65	Ulsan C/C	3,131,075	0	0	0	470,131	0	0	0	11,475	1,266,723	0.4046
66	Seoincheon C/C	7,001,031	0	0	335	989,645	0	0	8,740	11,708	2,721,579	0.3887
67	Shinincheon C/C	10,543,280	0	0	0	1,458,763	0	0	0	11,712	4,011,575	0.3805

68	Boryeong C/C	8,221,926	0	0	0	1,161,510	0	0	0	11,727	3,198,307	0.3890
69	Incheon	2,055,016	0	0	0	281,813	0	0	0	11,711	774,922	0.3771
70	Busan C/C	9,076,327	0	0	0	1,211,144	0	0	0	11,700	3,327,299	0.3666
71	Hallim C/C	100,346	0	0	29,686	0	0	0	8,524	0	78,484	0.7821
72	Anyang C/C	1,433,978	0	0	0	261,202	0	0	0	11,723	718,964	0.5014
73	Bucheon C/C	1,404,160	0	0	0	261,705	0	0	0	11,703	719,131	0.5121
74	POSCO Power	2,571,095	0	0	0	445,253	0	0	0	11,722	1,225,474	0.4766
75	GS Bugog	2,189,808	0	0	0	297,976	0	0	0	12,380	866,216	0.3956
76	Yulchon	1,300,627	0	0	159	194,534	0	0	10,384	11,721	535,889	0.4120
Total		**194,893,307**									**141,021,467**	**0.7236**

Operation Margin 2006

No	Plants	Net generation	Coal Consumption	Heavy oil Consumption	Diesel oil consumption	LNG consumption	Coal caloric value	heavy oil caloric value	diesel oil caloric value	LNG caloric value	CO2 Emission	Emission factor
		MWh	ton	kilo liter	kilo liter	ton	Kcal/kg	kcal/l	Kcal/l	kcal/kg	tCO2	tCO2/MWh
1	Honam #1	1,622,639	781,139	1,113	279	0	5,436	9,809	8,917	0	1,685,499	1.0387
2	Honam #2	1,782,016	859,736	1,251	359	0	5,407	9,823	8,870	0	1,845,708	1.0357
3	Samchonpo #1	4,161,219	1,696,271	0	860	0	5,937	0	8,814	0	3,989,624	0.9588
4	Samchonpo #2	3,703,880	1,508,082	0	1,362	0	5,942	0	8,814	0	3,552,085	0.9590
5	Samchonpo #3	3,779,585	1,519,385	0	457	0	5,858	0	8,814	0	3,525,615	0.9328
6	Samchonpo #4	3,816,997	1,521,263	0	1,818	0	5,861	0	8,803	0	3,535,515	0.9263
7	Samchonpo #5	3,761,205	1,665,339	0	977	0	5,236	0	9,000	0	3,455,231	0.9187
8	Samchonpo #6	4,065,091	1,770,348	0	428	0	5,255	0	9,000	0	3,685,033	0.9065
9	youngheung #1	5,337,432	2,004,193	0	2,548	0	6,072	0	8,891	0	4,825,422	0.9041
10	youngheung #2	5,727,937	2,129,118	0	2,545	0	6,086	0	8,899	0	5,137,868	0.8970
11	Boryeong #1	3,988,848	1,638,140	0	306	0	5,768	0	8,855	0	3,741,882	0.9381
12	Boryeong #2	3,423,101	1,389,425	0	1,137	0	5,766	0	8,943	0	3,175,468	0.9277
13	Boryeong #3	3,409,486	1,323,779	0	514	0	5,845	0	8,943	0	3,064,831	0.8989
14	Boryeong #4	4,133,946	1,610,928	0	82	0	5,824	0	8,943	0	3,715,060	0.8987
15	Boryeong #5	3,364,148	1,296,455	0	541	0	5,845	0	8,749	0	3,001,675	0.8923
16	Boryeong #6	3,987,488	1,553,273	0	518	0	5,834	0	8,749	0	3,589,147	0.9001
17	Taean #1	3,556,797	1,354,832	0	514	0	5,982	0	8,749	0	3,210,656	0.9027
18	Taean #2	4,035,753	1,532,209	0	162	0	5,978	0	8,371	0	3,627,272	0.8988
19	Taean #3	3,528,613	1,338,967	0	575	0	5,983	0	8,649	0	3,173,409	0.8993
20	Taean #4	4,069,820	1,548,909	0	133	0	5,979	0	8,665	0	3,667,258	0.9011
21	Taean #5	4,013,235	1,542,775	0	544	0	5,934	0	8,665	0	3,626,573	0.9037
22	Taean #6	3,381,867	1,294,577	0	1,113	0	5,960	0	8,665	0	3,058,226	0.9043
23	Taean #7	159,677	61,910	0	4,799	0	5,965	0	8,558	0	158,959	0.9955
24	Hadong #1	3,607,063	1,373,049	0	515	0	5,969	0	8,838	0	3,246,352	0.9000
25	Hadong #2	4,068,036	1,543,074	0	293	0	5,959	0	8,928	0	3,641,920	0.8953
26	Hadong #3	4,079,158	1,549,094	0	153	0	5,958	0	8,928	0	3,654,938	0.8960
27	Hadong #4	3,631,374	1,376,612	0	796	0	5,969	0	8,825	0	3,255,763	0.8966
28	Hadong #5	4,092,625	1,554,524	0	242	0	5,963	0	8,911	0	3,671,244	0.8970
29	Hadong #6	3,610,222	1,371,801	0	690	0	5,967	0	8,901	0	3,243,107	0.8983
30	Dangjin #1	3,598,820	1,380,527	0	966	0	5,882	0	8,975	0	3,218,102	0.8942

31	Dangjin #2	4,115,891	1,570,077	0	161	0	5,906	0	8,978	0	3,672,134	0.8922
32	Dangjin #3	3,666,490	1,402,916	0	433	0	5,886	0	9,007	0	3,270,704	0.8921
33	Dangjin #4	3,610,984	1,386,317	0	1,549	0	5,875	0	9,015	0	3,229,222	0.8943
34	Dangjin #5	3,946,931	1,456,458	0	745	0	6,046	0	8,955	0	3,488,554	0.8839
35	Dangjin #6	3,392,395	1,216,582	0	3,051	0	6,120	0	8,895	0	2,956,234	0.8714
36	Dangjin #7	1,474	1,008	0	505	0	5,818	0	8,984	0	3,729	2.5307
37	Ulsan #1	275,016	0	72,243	605	0	0	9,915	9,120	0	233,753	0.8500
38	Ulsan #2	306,668	0	80,187	469	0	0	9,923	9,120	0	259,090	0.8449
39	Ulsan #3	376,132	0	96,459	518	0	0	9,919	9,120	0	311,422	0.8280
40	Ulsan #4	1,511,557	0	360,919	3,729	0	0	10,030	9,120	0	1,183,312	0.7828
41	Ulsan #5	1,583,846	0	375,985	3,678	0	0	10,033	9,120	0	1,232,462	0.7781
42	Ulsan #6	1,589,838	0	378,331	3,694	0	0	10,035	9,120	0	1,240,334	0.7802
43	Youngnam #1	359,205	0	107,090	1,016	0	0	10,138	8,845	0	354,502	0.9869
44	Youngnam #2	323,595	0	95,127	1,494	0	0	10,110	8,862	0	315,666	0.9755
45	Yosu #1	403,547	0	99,129	281	0	0	9,963	8,798	0	320,714	0.7947
46	Yosu #2	906,849	0	215,957	291	0	0	9,954	8,796	0	697,160	0.7688
47	Pyongtaek #1	1,123,948	0	261,458	141	3,997	0	9,707	8,943	12,941	834,759	0.7427
48	Pyongtaek #2	1,198,620	0	277,025	166	5,687	0	9,719	8,943	12,941	889,994	0.7425
49	Pyongtaek #3	1,304,568	0	303,858	134	3,891	0	9,747	8,949	12,859	971,591	0.7448
50	Pyongtaek #4	1,052,228	0	245,602	103	3,473	0	9,693	8,949	12,963	782,081	0.7433
51	Namjeju #1	34,448	0	11,406	17	0	0	9,908	8,974	0	36,656	1.0641
52	Namjeju #2	28,686	0	9,772	14	0	0	9,908	8,952	0	31,403	1.0947
53	Namjeju #3	179,033	0	46,504	2,509	0	0	9,898	8,938	0	156,070	0.8717
54	Jeju #1	24,748	0	8,603	23	0	0	9,870	8,873	0	27,573	1.1142
55	Jeju #2	462,023	0	113,679	64	0	0	9,952	8,973	0	366,681	0.7936
56	Jeju #3	479,676	0	117,464	67	0	0	9,953	8,973	0	378,917	0.7899
57	Seoul #4	306,558	0	0	1	69,383	0	0	9,070	13,018	212,082	0.6918
58	Seoul #5	685,011	0	0	1	152,891	0	0	9,070	12,882	462,479	0.6751
59	Incheon #1	32,932	0	0	0	6,945	0	0	0	13,036	21,258	0.6455
60	Incheon #2	24,366	0	0	0	5,223	0	0	0	13,028	15,977	0.6557
61	Incheon #3	78,669	0	0	311	15,426	0	0	8,982	13,018	48,017	0.6104
62	Incheon #4	62,414	0	0	311	12,454	0	0	8,981	13,024	38,951	0.6241
63	Namjeju D/P	239,690	0	51,347	111	0	0	10,246	8,907	0	170,738	0.7123
64	Jeju G/T	15,986	0	0	8,264	0	0	0	8,792	0	22,532	1.4095
65	Jeju D/P	252,764	0	52,907	0	0	0	9,617	0	0	164,836	0.6521
66	Pyongtaek C/C	497,441	0	0	45	84,054	0	0	8,950	13,030	257,280	0.5172

67	Ilsan C/C	3,038,165	0	0	1,384	556,504	0	0	8,989	13,017	1,704,763	0.5611
68	Bundang C/C	4,059,300	0	0	0	720,381	0	0	0	13,025	2,203,212	0.5428
69	Ulsan C/C	3,608,435	0	0	0	536,196	0	0	0	12,646	1,592,146	0.4412
70	Seoincheon C/C	8,726,521	0	0	1,066	1,199,196	0	0	9,200	13,025	3,670,714	0.4206
71	Shinincheon C/C	11,797,500	0	0	0	1,641,038	0	0	0	13,025	5,018,962	0.4254
72	Boryeong C/C	7,089,662	0	0	0	998,683	0	0	0	13,034	3,056,387	0.4311
73	Incheon	3,648,288	0	0	0	484,606	0	0	0	12,998	1,479,040	0.4054
74	Busan C/C	10,455,401	0	0	0	1,396,417	0	0	0	13,017	4,268,253	0.4082
75	Hallim C/C	175,356	0	0	48,475	0	0	0	8,954	0	134,610	0.7676
76	Anyang C/C	1,286,480	0	0	0	230,969	0	0	0	13,028	706,568	0.5492
77	Bucheon C/C	1,241,795	0	0	215	225,713	0	0	10,927	13,013	690,392	0.5560
78	POSCO Power	2,338,128	0	0	0	408,018	0	0	0	13,031	1,248,403	0.5339
79	GS Bugog	2,911,683	0	0	0	389,811	0	0	0	13,030	1,192,626	0.4096
80	Yulchon	2,276,276	0	0	0	315,132	0	0	0	13,376	989,772	0.4348
Total		206,605,293									156,594,159	0.7579

Build Margin

No	plant	year	Net generation	Coal Consumption	Heavy oil Consumption	Diesel oil consumption	LNG consumption	CO2 Emission	Emission factor
			MWh	ton	kilo liter	kilo liter	ton	tCO2	tCO2/MWh
1	cheongsong pumping #2	2006. 12	21,542	0	0	0	0	-	0.0000
2	Bundang fuel cell	2006. 10	290	0	0	0	0	-	0.0000
3	solar park	2006. 10	106	0	0	0	0	-	0.0000
4	Namhae Solar	2006. 10	297	0	0	0	0	-	0.0000
5	Hanla Jeunggong Solar	2006. 10	287	0	0	0	0	-	0.0000
6	Enepark	2006. 09	85	0	0	0	0	-	0.0000
7	Yongheng solar	2006. 09	242	0	0	0	0	-	0.0000
8	Cheongsong pumping #1	2006. 09	39,965	0	0	0	0	-	0.0000
9	Namjeju #3	2006. 09	179,033	0	46,504	2,509	0	156,072	0.8717
10	Yangyang pumping #4	2006. 08	62,801	0	0	0	0	-	0.0000
11	Hadongho	2006. 06	1,294	0	0	0	0	-	0.0000
12	Yangyang pumping #3	2006. 06	93,471	0	0	0	0	-	0.0000
13	Goheung Solar	2006. 06	619	0	0	0	0	-	0.0000
14	Jangseong	2006.05	514	0	0	0	0	-	0.0000
15	Yangyang pumping #2	2006.04	97,896	0	0	0	0	-	0.0000
16	Danjin #6	2006. 04	3,392,395	1,216,582	0	3,051	0	2,956,443	0.8715
17	Sinchang-Wind power	2006. 03	2,969	0	0	0	0	-	0.0000
18	Yangyang pumping #1	2006. 02	129,063	0	0	0	0	-	0.0000
19	Suncheon Solar	2005. 12	215	0	0	0	0	-	0.0000
20	Samcheonpo solar	2005. 12	37	0	0	0	0	-	0.0000
21	Danjin #5	2005. 10	1,318,670	499,714	0	5,701	0	1,164,380	0.8830
22	Taean solar	2005. 10	43	0	0	0	0	-	0.0000
23	Incheon C/C #1	2005. 7	2,055,016	0	0	0	281,813	774,922	0.3771
24	Daegok	2005. 7	522	0	0	0	0	-	0.0000
25	Donghwa	2005. 7	2,399	0	0	0	0	-	0.0000
26	Ulchin #6	2005. 4	7,085,820	0	0	0	0	-	0.0000
27	Hanrye LFG	2005. 4	4,774	0	0	0	0	-	0.0000
28	Busan- Biogas #1,2	2005. 3	120	0	0	0	0	-	0.0000
29	Yongdam smallhydro	2004. 12	21,649	0	0	0	0	-	0.0000
30	Maebongsan-wind power	2004. 12	5,543	0	0	0	0	-	0.0000

31	Daegwanryung-wind power	2004. 12	4,137	0	0	0	0	-	0.0000
32	Yongheng #2	2004. 11	4,658,862	1,761,395	0	2,903	0	4,018,070	0.8625
33	Gunsan-wind power	2004. 11	6,582	0	0	0	0	-	0.0000
34	New solar energy	2004. 11	209	0	0	0	0	-	0.0000
35	Ulchin #5	2004. 7	7,313,595	0	0	0	0	-	0.0000
36	Yongheng #1	2004. 7	5,623,299	2,081,972	0	4,541	0	4,813,359	0.8560
37	Yulchon C/C	2004. 7	1,300,627	0	0	159	194,534	535,889	0.4120
38	Busan C/C	2004. 3	9,076,327	0	0	0	1,211,144	3,327,299	0.3666
39	Hankyung-wind power	2004. 3	18,265	0	0	0	0	-	0.0000
40	Chunsang	2004. 2	40	0	0	0	0	-	0.0000
41	Cheongju LFG	2004. 2	6,168	0	0	0	0	-	0.0000
42	Wunjeong LFG	2003. 12	13,166	0	0	0	0	-	0.0000
43	Daejon Geumgodong	2003. 6	12,794	0	0	0	0	-	0.0000
44	Hoicheon ENC	2003.5	3,650	0	0	0	0	-	0.0000
45	Muju	2003. 4	569	0	0	0	0	-	0.0000
46	Seohee-ENC	2003. 4	31,360	0	0	0	0	-	0.0000
47	Sangwon ENC	2003. 3	39,309	0	0	0	0	-	0.0000
48	Yonggwang #6	2002. 12	7,776,138	0	0	0	0	-	0.0000
49	Taean #6	2002. 5	3,999,847	1,504,962	0	417	0	3,407,248	0.8518
50	Yonggwang #5	2002. 5	7,748,431	0	0	0	0	-	0.0000
51	Sanchong small hydro	2001.12	1,607	0	0	0	0	-	0.0000
52	Sanchong pumping #2	2001.11	138,862	0	0	0	0	-	0.0000
53	Milyang	2001.1	6,147	0	0	0	0	-	0.0000
54	Taean #5	2001.1	3,744,413	1,411,398	0	742	0	3,204,277	0.8557
55	Sanchong pumping #1	2001.9	224,274	0	0	0	0	-	0.0000
56	Yongdam	2001.9	150,617	0	0	0	0	-	0.0000
57	Yeongcheon	2001.8	1,708	0	0	0	0	-	0.0000
58	Hadong #6	2001.7	4,037,763	1,520,774	0	331	0	3,430,253	0.8495
59	Dangjin #4	2001.3	4,079,557	1,544,010	0	134	0	3,450,767	0.8459
total			**74,536,000**					**31,238,978**	**0.4191**

Annex 4

MONITORING INFORMATION

The monitoring plan for calculating of LNG consumption in steam production to be supplied to FINEX power plant (Q_{LNG}) is as below.

(1) The calculation of energy consumption of steam use in FINEX power plant (E_{steam})

To calculate energy consumption of steam use as a start up fuel in FINEX power plant, it is needed to check the steam enthalpy before use and the amount of steam supply. The steam enthalpy before use will be calculated by measuring the temperature and pressure of steam. The temperature and pressure will be monitored and collected by using meter on the log sheet paper at every start up. And the amount of steam supply will be recorded, stored in DCS at Pohang Steel Works. Finally, the energy consumption of steam use in FINEX power plant will be calculated with multiplying the steam enthalpy by the amount of steam supply. Power generation sec of POSCO is in charge of all monitoring process.

(2) The measurement of total energy consumption in LNG power plant (E_{total})

The steam supplied as a start up fuel in the FINEX power plant will be entirely produced in the LNG power plant located in the Pohang steel works. To calculate the project emission for using steam as a start up fuel, total energy consumption in LNG power plant should be checked. The data will be recorded, stored in DCS at Pohang Steel Works.

(3) The measurement of LNG consumption in LNG power plant (Q_{total})

To calculate the project emission for using steam as a start up fuel LNG consumption in LNG power plant should be checked. The data will be recorded, stored in DCS at Pohang Steel Works.

(4) The calculation of LNG consumption in steam production to be supplied to FINEX power plant (Q_{LNG})

Because LNG consumption in steam production to be supplied to FINEX power plant cannot be measured directly, it should be calculated by using relevant variable. The LNG consumption for this project will be calculated in every monitoring period.

$$Q_{LNG} = Q_{total} \times \frac{E_{steam}}{E_{total}}$$

Q_{LNG} = LNG consumption in steam production to be supplied to FINEX power plant(Nm^3/year)

Q_{total} = LNG consumption in LNG power plant(Nm^3/year)

E_{total} = Total energy consumption in LNG power plant(Mcal/year)

E_{steam} = The energy consumption of steam use in FINEX power plant (Mcal/year)