Project design document form for small-scale CDM project activities

(Version 08.0)

Complete this form in accordance with the Attachment "Instructions for filling out the project design document form for small-scale CDM project activities" at the end of this form.

PROJECT DESIGN DOCUMENT (PDD)	
Title of the project activity	Korea Land & Housing Corporation (LH Corporation)'s National Rental House PV power plant bundling CDM project
Version number of the PDD	10
Completion date of the PDD	10/10/2016
Project participant(s)	LH Corporation Ecoeye Co., Ltd.
Host Party	Republic of Korea
Applied methodology(ies) and, where applicable, applied standardized baseline(s)	Sectoral Scope : 1 Energy industries (renewable - / non-renewable sources)
Sectoral scope(s) linked to the applied methodology(ies)	Methodology : AMS I.F Renewable electricity generation for captive use and mini-grid(version 02)
Estimated amount of annual average GHG emission reductions	2,420 tCO2/yr

SECTION A. Description of project activity

A.1. Purpose and general description of project activity

>>

- Purpose of the project

Korea Land & Housing Corporation(hereinafter referred to as LH Corporation)'s National Rental House PV power plant CDM project is 36 photovoltaic power plants which is located on the roof of the National Rental House. LH Corporation is one of the largest Korean Public Enterprise which has the role of improving national house life and efficient use of the country land with proper development, maintenance and management.

The PV power plant generates electricity utilizing photovoltaic which emits zero greenhouse gas(GHG) into the atmosphere or water system without any natural resources depletion.

- Summary of the project

LH Corporation's project is to install photovoltaic generation facility in National Rental House of 2009(the 1st stage) and of 2010(the 2nd stage)

The project will generate 3,771MWh/yr and all the electricity will be supplied to households displacing electricity supplied from KEPCO [1] (Korea Electric Power Corporation, hereinafter referred to as KEPCO) grid. So approximately 2,420 tCO2e/yr of GHG emission reduction will be realized on average during the crediting period.

Korea has given high concerns on the renewable energies including solar power and make efforts to reduce fossil fuel usage in various ways. As those fossil fuel based power plants cover 64.21% of electricity generation in Korea based on 2009(Korea Electric Power Statistics[2]), the proposed project is expected to contribute to decrease the usage of fossil fuels and also serve to development and diffusion of renewable energy technologies in the country.

- Contribution to sustainable development

The proposed project will contribute to sustainable development such as acquaintance of advanced technological experiences and maintenance know-how, creation of job opportunities in the country as follows:

• Social/ Technological aspects
- The proposed project can diversify sources of electric generation and be a model case as a PV power plant that utilizes solar energy.
- The proposed project will contribute to revitalization of local energy industry under the corporation of a local government.

• Economical aspects
- The proposed project will supply households with the available electric power and contribute to national energy supply.
- The proposed project will create job opportunities directly and indirectly through construction and operation of the plant.
- The proposed project will improve the local residents' living standard.

• Environmental and National aspects

[1] KEPCO is a national electric power company in Korea.

[2] Korea Electric Power Statistics("KEPCO in brief, 31 Dec 2009", http://www.kepco.co.kr)

- The photovoltaic power plant replaces coal-fired power plants and contributes to reduce GHG emissions of the nation.
- The plant will contribute toward improvement of air quality and better living conditions of the country by reducing the air pollution.

A.2. Location of project activity

A.2.1. Host Party

>>
Republic of Korea

A.2.2. Region/State/Province etc.

>>
Gangwon-do, Gyeonggi-do, Gyeongsangnam-do, Gyeongsangbuk-do, Jeollanam-do, Jeollabuk-do, Chungcheongnam-do, Chungcheongbuk-do

A.2.3. City/Town/Community etc.

>>
36 PV power plants are established in 8 provinces which is located in Republic of Korea.

No.	PV power plant	Cities or towns
1	Icheon Galsan(2)	630-1, Galsan-dong, Icheon-Si
2	Chuncheon Mancheon	824-1, Mancheon-ri, Dong-myeon, Chuncheon-si
3	Gunsan Guam	417-1, Guam-dong, Gunsan-si
4	Nonsan Daegyo	279-2, Daegyo-dong, Nonsan-si
5	Gimcheon Daesin	793-1, Sineum-dong, Gimcheon-si
6	Gyeongsan Sadong(1)	696, Pyeongsan-dong, Gyeongsan-si
7	Gyeongsan Sadong(2)	Taekji 1-2BL, Sa-dong, Gyeongsan-si
8	Sacheon Yonggang(2)	568-2, Yonggang-dong, Sacheon-si
9	Goseong Dongoe	572, Dongoe-ri, Goseong-eup, Goseong-gun
10	Yangsan Daesuk	797-1, Sangbuk-myeon, Yangsan-si
11	Gongju Singwan(6)	San 30-21, Singwan-dong, Gongju-si
12	Chungju Yeonsu (6)	259-4, Yeonsu-dong, Chungju-si
13	Jecheon Gangjeo(A1)	Jecheon gangjeo national rental house A-1BL, Gangje-dong, Jecheon-si
14	Cheongyang Eumnae	300-1, Eumnae-ri, Cheongyang-eup, Cheongyang-gun
15	Gochang Eumnae	686, Eumnae-ri, Gochang-eup, Gochang-gun
16	Gimje Hadong	366-33, Ha-dong, Gimje-si
17	Yeongam Yongang	190-4, Yongang-ri, Samho-eup,Yeongam-gun
18	Geoje Irun	341, Sodong-ri, Irun-myeon, Geoje-si
19	Wonju Musil(2)	Taekji 2-1BL, Musil-dong, Wonju-si
20	Eumseong Maengdong(1)	130-5, Ssangjeong-ri, Maengdong-myeon, Eumseong-gun
21	Eumseong Gamgok	624, Ohyang-ri, Gamgok-myeon, Eumseong-gun
22	Jecheon Gangjeo(A3)	Hyumeonsia 2-danji, 2053, Yeongcheon-dong, Jecheon-si
23	Taean Pyeongchun(1)	735-1, Pyeongcheon-ri, Taean-eup, Taean-gun
24	Asan Inju	283-1, Mildu-ri, Inju-myeon, Asan-si
25	Iksan Hamyeol	208-13, Wa-ri, Hamyeol-eup, Iksan-si
26	Sunchang Pungsan	725, Daega-ri, Pungsan-myeon, Sunchang-gun
27	Iksan Baesan(1)	399, Mohyeon-dong 1-ga, Iksan-si
28	Iksan Baesan(3)	Baesan taekji 1 BL,Mohyeon-dong 1-ga, Iksan-si

29	Yeosu Jungnim(A1)	Jungnim taekji A-1BL, Jungnim-ri, Sora-myeon, Yeosu-si
30	Yeosu Jungnim(A2)	Jungnim taekji A-2BL, Jungnim-ri, Sora-myeon, Yeosu-si
31	Uiseong Sangni	560-1, Sangni-ri, Uiseong-eup, Uiseong-gun
32	Goryeong Dasan(3)	129-8, Gwakchon-ri, Dasan-myeon, Goryeong-gun
33	Yangsan Pyeongsan	352-7, Pyeongsan-dong, Yangsan-si
34	Pohang Jangnyang	San 118-3, Yangdeok-dong, Buk-gu, Pohang-si
35	Sacheon Yonghyeon	Yonghyeon taekji 1BL, Deokgok-ri, Yonghyeon-myeon, Sacheon-si
36	Dangjin Chaeun	522-10, Chaeun-ri, Dangjin-eup, Dangjin-gun

A.2.4. Physical/Geographical location

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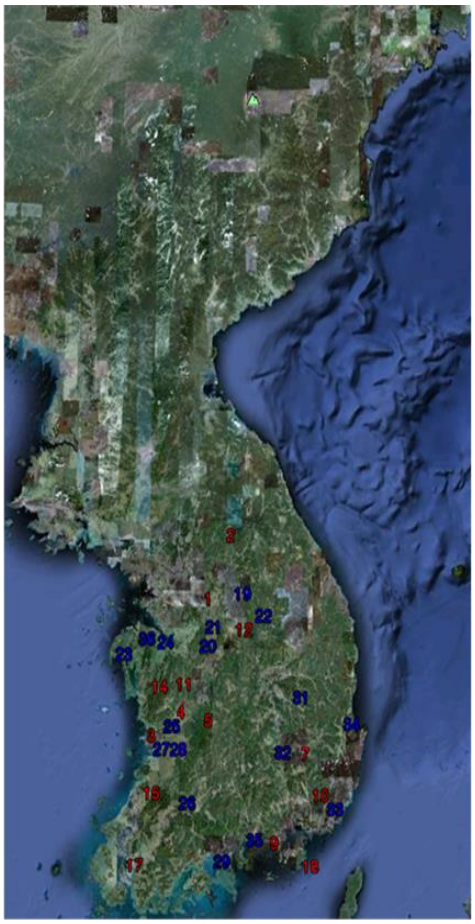
The each location of 36 PV power plants is presented as follows:



▪ 1 ~ 18(red color) : PV Power Plant of 2009(1st stage)

▪ 19 ~ 36(blue color) : PV Power Plant of 2010(2nd stage)

No	PV power plant	Latitude	Longitude
1	Icheon Galsan(2)	37.281571˚	127.457187˚
2	Chuncheon Mancheon	37.883509˚	127.759113˚
3	Gunsan Guam	35.987072˚	126.744486˚
4	Nonsan Daegyo	36.211532˚	127.090417˚
5	Gimcheon Daesin	36.137000˚	128.115900˚
6	Gyeongsan Sadong(1)	35.808700˚	128.759200˚
7	Gyeongsan Sadong(2)	35.808000˚	128.761700˚
8	Sacheon Yonggang(2)	34.946700˚	128.082700˚
9	Goseong Dongoe	34.967897˚	128.330410˚
10	Yangsan Daesuk	35.391700˚	129.051900˚
11	Gongju Singwan(6)	36.475914˚	127.133849˚
12	Chungju Yeonsu (6)	36.992622˚	127.939589˚
13	Jecheon Gangjeo(A1)	37.124100 ˚	128.205100˚
14	Cheongyang Eumnae	36.448415˚	126.799072˚
15	Gochang Eumnae	35.438900˚	126.694200˚
16	Gimje Hadong	35.813299˚	126.896025˚
17	Yeongam Yongang	34.745161˚	126.474091˚
18	Geoje Irun	34.837800˚	128.695529˚
19	Wonju Musil(2)	37.335800˚	127.931700˚
20	Eumseong Maengdong(1)	36.928814˚	127.564455˚
21	Eumseong Gamgok	37.109571˚	127.646473˚
22	Jecheon Gangjeo(A3)	37.121100˚	128.200400˚
23	Taean Pyeongcheon(1)	36.750828˚	126.310357˚
24	Asan Inju	36.869449˚	126.880600˚
25	Iksan Hamyeol	36.076500˚	126.963700˚
26	Sunchang Pungsan	35.349127˚	127.172862˚
27	Iksan Baesan(1)	35.956800˚	126.936400˚
28	Iksan Baesan(3)	35.953800˚	126.937400˚
29	Yeosu Jungnim(A1)	34.768800˚	127.634800˚
30	Yeosu Jungnim(A2)	34.765100˚	127.639600˚
31	Uiseong Sangni	36.350654˚	128.708868˚
32	Goryeong Dasan(3)	35.829500˚	128.452800˚
33	Yangsan Pyeongsan	35.378368˚	129.146564˚
34	Pohang Jangnyang	36.091490˚	129.381909˚
35	Sacheon Yonghyeon	35.009100˚	128.063000˚
36	Dangjin Chaeun	36.899546˚	126.623115˚

<Figure A-1> View of Icheon Galsan(2) PV power plant

<Figure A-2> View of Chuncheon Mancheon PV power plant

<Figure A-3> View of Gunsan Guam PV power plant

<Figure A-4> View of Nonsan Daegyo PV power plant

<Figure A-5> View of Gimcheon Daesin PV power plant

<Figure A-6> View of Gyeongsan Sadong(1) PV power plant

<Figure A-7> View of Gyeongsan Sadong(2) PV power plant

<Figure A-8> View of Sacheon Yonggang(2) PV power plant

<Figure A-9> View of Goseong Dongoe PV power plant

<Figure A-10> View of Yangsan Daesuk PV power plant

<Figure A-11> View of Gongju Singwan(6) PV power plant

<Figure A-12> View of Chungju Yeonsu (6) PV power plant

<Figure A-13> View of Jecheon Gangjeo(A1) PV power plant

<Figure A-14> View of Cheongyang Eumnae PV power plant

<Figure A-15> View of Gochang Eumnae PV power plant

<Figure A-16> View of Gimje Hadong PV power plant

<Figure A-17> View of Yeongam Yongang PV plant

<Figure A-18> View of Geoje Irun PV power plant

<Figure A-19> View of Wonju Musil(2) PV power plant

<Figure A-20> View of Eumseong Maengdong(1) PV power plant

<Figure A-21> View of Eumseong Gamgok PV power plant

<Figure A-22> View of Jecheon Gangjeo(A3) PV power plant

<Figure A-23> View of Taean Pyeongcheon(1) PV power plant

<Figure A-24> View of Asan Inju PV power plant

<Figure A-25> View of Iksan Hamyeol PV power plant

<Figure A-26> View of Sunchang Pungsan PV power plant

<Figure A-27> View of Iksan Baesan(1) PV power plant

<Figure A-28> View of Iksan Baesan(3) PV power plant

<Figure A-29> View of Yeosu Jungnim(A1) PV power plant

<Figure A-30> View of Yeosu Jungnim(A2) PV power plant

<Figure A-31> View of Uiseong Sangni PV power plant

<Figure A-32> View of Goryeong Dasan(3) PV power plant

<Figure A-33> View of Yangsan Pyeongsan PV power plant

<Figure A-34> View of Pohang Jangnyang PV power plant

<Figure A-35> View of Sacheon Yonghyeon PV power plant

<Figure A-36> View of Dangjin Chaeun PV power plant

A.3. Technologies and/or measures

>>

This project is a small-scale CDM project activity and according to the Appendix B of *"the simplified modalities and procedures for small-scale CDM project activities"* of UNFCCC, type and category of the project can be confirmed as follows;

- Type : I – Renewable Energy Projects
- Category : I.F – Renewable electricity generation for captive use and mini-grid

2 weather observation panels (thermometer, pyreheliometer, level meter) were connected to stanchion part of solar cells for remote operation and monitoring of photovoltaic generation facility, and the connector band of solar cells sends signal of weather condition to main communication part of inverter.

The communication board of inverter sends various data such as generation quantity, voltage, current, frequency, power factor etc of photovoltaic generation to control room (monitoring computer) for observation and measuring. The system should constitute in a way that above observation and measuring could be possible through LAN or modem and a fast action could be

done understanding defects quickly even in remote place, KEMCO[3] (Korea Energy Management Corporation, hereinafter referred to as KEMCO) by installing RTU(Remote Terminal Unit).

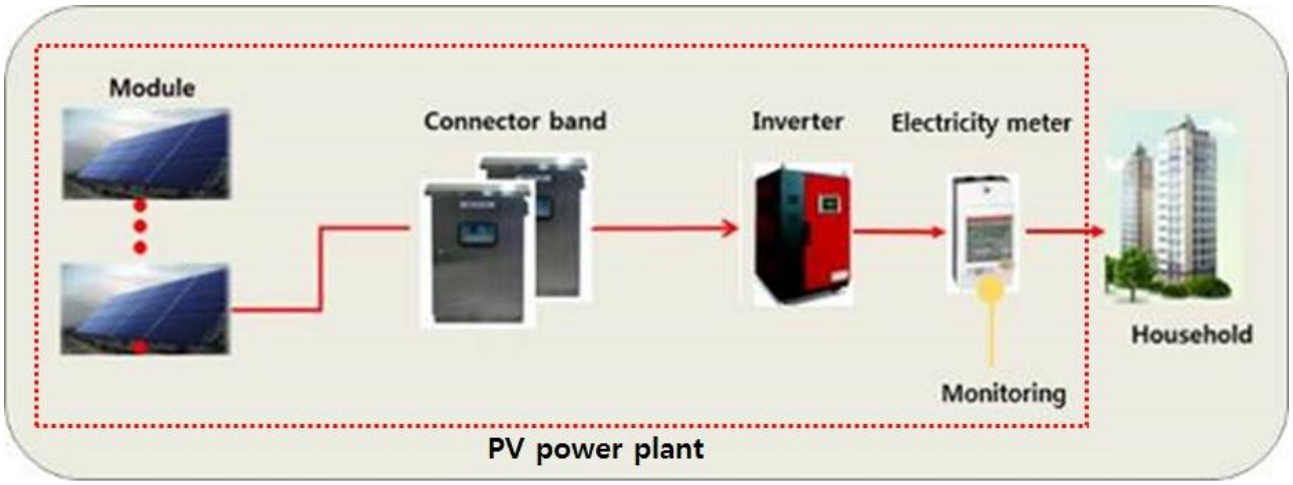
Solar cells, main technology of the project, are produced by CU Electronics, S-Energy, Canadian Solar, LG Electronics and Kyung Won Co., LTD.

DOPCO Corp. /Ilkwang Synthesis Technique Corp. /KEPID Corp./WOOJIN Corp./ Kolon Corp. which provide solar cells from CU Electronics, S-Energy, Canadian Solar, LG Electronics, Kyung Won Co., LTD will install the PV power plant and guarantee maintenance and repairs of solar cells for 3 years after the installation. Through this process, DOPCO Corp. /Ikwang Synthesis Technique Corp. /KEPID Corp./WOOJIN Corp./ Kolon Corp. will acquire the technology and mechanism of solar cells. Based on acquired technology, the study for photovoltaic generation will continuously progress.

The project generates electricity utilizing renewable energy, photovoltaic power and all generated electricity will be supplied to households displacing electricity supplied from KEPCO grids.

Furthermore, purpose of the project is to build up a power plant with 2.876 MW of installed capacity which is less than 15MW. Therefore the project is eligible for type I.F. project activity.

The project activity generates electricity by using countless insolation from the sun, there are no severe impact on environment. Accordingly, technology applied to this project is environmentally safe and sound. Photovoltaic system feature that displaces electricity supplied from grid is as follows:



[3] KEMCO seeks to implement projects efficiently for the rationalization of energy use, thereby reducing carbon dioxide emission and contributing to the sound development of the national economy.

No.	PV power plant	Solar cells					Inverter						Number of Electricity meters
		Type	Capacity (kW)	Module maximum output power (w)	Number of module	Source of imports	Type	Output (kW)	Rated voltage (DC V)	Control method	Node form (phase-wire)	Number of units	
1	Icheon Galsan(2)	Si	76.80	200	384	S-Energy	Indoor, Vertical-mount	20, 15, 11	380 V	PWM	3-4	1, 4, 1	6
2	Chuncheon Mancheon	Si	86.40	200	432	CU Electron	Indoor, Vertical-mount	15, 10	380 V	PWM	3-4	3, 6	9
3	Gunsan Guam	Si	45.60	200	228	S-Energy	Indoor, Vertical-mount	20, 15, 11	380 V	PWM	3-4	1, 1, 2	4
4	Nonsan Daegyo	Si	91.20	200	456	Canadian Solar	Indoor, Vertical-mount	20, 15,10	380 V	PWM	3-4	3, 2, 2	7
5	Gimcheon Daesin	Si	84.00	200	420	CU Electron	Indoor, Vertical-mount	15	380 V	PWM	3-4	6	6
6	Gyeongsan Sadong(1)	Si	158.40	200	792	S-Energy	Indoor, Vertical-mount	20, 15	380 V	PWM	3-4	6, 4	10
7	Gyeongsan Sadong(2)	Si	88.80	200	444	S-Energy	Indoor, Vertical-mount	20, 15	380 V	PWM	3-4	2, 4	6
8	Sacheon Yonggang(2)	Si	55.20	200	276	Canadian Solar	Indoor, Vertical-mount	15, 10	380 V	PWM	3-4	1, 6	7
9	Goseong Dongoe	Si	72.00	200	360	Canadian Solar	Indoor, Vertical-mount	15	380 V	PWM	3-4	5	5
10	Yangsan Daesuk	Si	100.80	200	504	Canadian Solar	Indoor, Vertical-mount	15, 10	380 V	PWM	3-4	6, 4	10
11	Gongju Singwan(6)	Si	67.20	200	336	CU Electron	Indoor, Vertical-mount	20, 10	380 V	PWM	3-4	3, 2	5

12	Chungju Yeonsu (6)	Si	60.00	200	300	CU Electron	Indoor, Vertical-mount	20, 10	380 V	PWM	3-4	2, 4	6
13	Jecheon Gangjeo(A1)	Si	88.80	200	444	Canadian Solar	Indoor, Vertical-mount	15, 11	380 V	PWM	3-4	6, 2	8
14	Cheongyang Eumnae	Si	40.80	200	204	S-Energy	Indoor, Vertical-mount	15	380 V	PWM	3-4	3	3
15	Gochang Eumnae	Si	81.60	200	408	S-Energy	Indoor, Vertical-mount	15, 11	380 V	PWM	3-4	4, 5	9
16	Gimje Hadong	Si	38.40	200	192	Canadian Solar	Indoor, Vertical-mount	30, 15	380 V	PWM	3-4	1, 1	2
17	Yeongam Yongang	Si	81.60	200	408	Canadian Solar	Indoor, Vertical-mount	15	380 V	PWM	3-4	6	6
18	Geoje Irun	Si	52.80	200	264	Canadian Solar	Indoor, Vertical-mount	20, 15, 10	380 V	PWM	3-4	1, 2, 2	5
19	Wonju Musil(2)	Si	59.80	230	260	LG Electronics	Indoor, Vertical-mount	10.5	380 V	PWM	3-4	10	10
20	Eumseong Maengdong(1)	Si	28.98	230	126	LG Electronics	Indoor, Vertical-mount	10.5	380 V	PWM	3-4	4	4
21	Eumseong Gamgok	Si	52.44	230	228	LG Electronics	Indoor, Vertical-mount	10.5, 15	380 V	PWM	3-4	5, 1	6
22	Jecheon Gangjeo(A3)	Si	110.86	230	482	LG Electronics	Indoor, Vertical-mount	10.5, 15	380 V	PWM	3-4	3, 6	9
23	Taean Pyeongcheon(1)	Si	91.08	230	396	LG Electronics	Indoor, Vertical-mount	10.5, 15, 20	380 V	PWM	3-4	2, 4, 1	7
24	Asan Inju	Si	94.30	230	410	LG Electronics	Indoor, Vertical-mount	15, 20	380 V	PWM	3-4	2, 4	6

25	Iksan Hamyeol	Si	74.75	230	325	LG Electronics	Indoor, Vertical-mount	15, 20	380 V	PWM	3-4	4, 1	5
26	Sunchang Pungsan	Si	28.75	230	125	LG Electronics	Indoor, Vertical-mount	15	380 V	PWM	3-4	2	2
27	Iksan Baesan(1)	Si	92.00	230	400	LG Electronics	Indoor, Vertical-mount	10.5, 15, 20	380 V	PWM	3-4	4, 2, 2	8
28	Iksan Baesan(3)	Si	139.38	230	606	LG Electronics	Indoor, Vertical-mount	10.5, 15, 20	380 V	PWM	3-4	6, 2, 4	12
29	Yeosu Jungnim(A1)	Si	31.28	230	136	LG Electronics	Indoor, Vertical-mount	10.5	380 V	PWM	3-4	4	4
30	Yeosu Jungnim(A2)	Si	69.92	230	304	LG Electronics	Indoor, Vertical-mount	10.5 ,15	380 V	PWM	3-4	6, 1	7
31	Uiseong Sangni	Si	55.20	230	240	Kyung Won Co., LTD	Indoor, Vertical-mount	10.5, 15	380 V	PWM	3-4	3, 2	5
32	Goryeong Dasan(3)	Si	57.96	230	252	Kyung Won Co., LTD	Indoor, Vertical-mount	10.5, 15	380 V	PWM	3-4	3, 3	6
33	Yangsan Pyeongsan	Si	184.92	230	804	Kyung Won Co., LTD	Indoor, Vertical-mount	10.5, 15, 20	380 V	PWM	3-4	2, 5, 6	13
34	Pohang Jangnyang	Si	151.34	230	658	Kyung Won Co., LTD	Indoor, Vertical-mount	20, 25	380 V	PWM	3-4	6, 2	8
35	Sacheon Yonghyeon	Si	96.14	230	418	Kyung Won Co., LTD	Indoor, Vertical-mount	10.5, 15	380 V	PWM	3-4	1, 7	8
36	Dangjin Chaeun	Si	86.94	230	378	LG Electronics	Indoor, Vertical-mount	15, 20	380 V	PWM	3-4	3, 3	6

※ In case of an equipment failure, it can be replaced to an equipment of the same or similar specification.
Electricity meters are installed at PV power plants.

A.4. Parties and project participants

Party involved (host) indicates host Party	Private and/or public entity(ies) project participants (as applicable)	Indicate if the Party involved wishes to be considered as project participant (Yes/No)
Republic of Korea (host)	- Public entity : Korea Land & Housing Corporation (LH Corporation) - Private entity : Ecoeye Co., Ltd.	No

A.5. Public funding of project activity

>>
This project doesn't involve any public funding from parties included in Appendix 2. This project is funded by only the developer

A.6. Debundling for project activity

>>
According to the '*Appendix C of the simplified Modalities and Procedures for Small-Scale CDM project*', the project proponents confirm that the proposed activity is not a deboundled component of a large project activity.

This CDM project is 2.876MW power plant, and it is not a part of any larger project activity.

A proposed small-scale project activity shall be deemed to be a debundled component of a large project activity if there is a registered small-scale CDM project activity or an application to register another small-scale CDM project activity:

With the same project participants;

In the same project category and technology/measure; and Registered within the previous 2 year; and Whose project boundary is within 1 km of the project boundary of the proposed small-scale activity at the closest point.

The project does not belong in above 4 things. Therefore, this is not a debundled part of large-scale project activities.

SECTION B. Application of selected approved baseline and monitoring methodology and standardized baseline

B.1. Reference of methodology and standardized baseline

>>
Methodology Title :
AMS-I.F : Renewable electricity generation for captive use and mini-grid(Version 02)

Reference :
Appendix B of the simplified modalities and procedures for small-scale CDM project activities (UNFCCC)

Methodological Tool :
Tool to calculate the emission factor for an electricity system (Version 02.2.0)
Further information for the methodology can be found at :
http://cdm.unfccc.int/methodologies/DB/KF5L4WZW5RIIUY57M7B4KPOPPYNOBR

B.2. Project activity eligibility

>>

Electricity generated by renewable energy source is supplied to households displacing electricity supplied from grid. Additionally, renewable energy is to be generated by 2.876MW photovoltaic power plants, whose capacity is under 15MW. Therefore, adopted category in this project should be I.F. Individual capacity of PV power plant is indicated as follows.

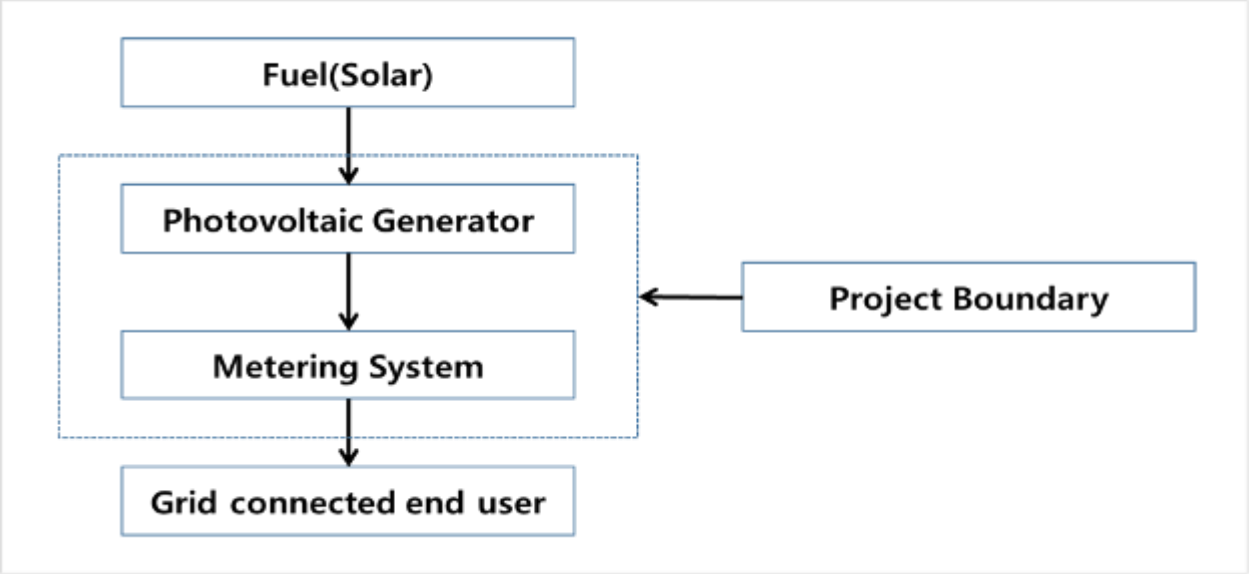
Participant	No.	PV power plant	Capacity(kW)
LH Corporation	1	Icheon Galsan(2)	76.80
	2	Chuncheon Mancheon	86.40
	3	Gunsan Guam	45.60
	4	Nonsan Daegyo	91.20
	5	Gimcheon Daesin	84.00
	6	Gyeongsan Sadong(1)	158.40
	7	Gyeongsan Sadong(2)	88.80
	8	Sacheon Yonggang(2)	55.20
	9	Goseong Dongoe	72.00
	10	Yangsan Daesuk	100.80
	11	Gongju Singwan(6)	67.20
	12	Chungju Yeonsu (6)	60.00
	13	Jecheon Gangjeo(A1)	88.80
	14	Cheongyang Eumnae	40.80
	15	Gochang Eumnae	81.60
	16	Gimje Hadong	38.40
	17	Yeongam Yongang	81.60
	18	Geoje Irun	52.80
	19	Wonju Musil(2)	59.80
	20	Eumseong Maengdong(1)	28.98
	21	Eumseong Gamgok	52.44
	22	Jecheon Gangjeo(A3)	110.86
	23	Taean Pyeongcheon(1)	91.08
	24	Asan Inju	94.30
	25	Iksan Hamyeol	74.75
	26	Sunchang Pungsan	28.75
	27	Iksan Baesan(1)	92.00
	28	Iksan Baesan(3)	139.38
	29	Yeosu Jungnim(A1)	31.28
	30	Yeosu Jungnim(A2)	69.92
	31	Uiseong Sangni	55.20
	32	Goryeong Dasan(3)	57.96
	33	Yangsan Pyeongsan	184.92
	34	Pohang Jangnyang	151.34
	35	Sacheon Yonghyeon	96.14
	36	Dangjin Chaeun	86.94
Sum in all capacities			2.876 MW

The capacity of the proposed project is 2.876MW that has not exceeded the limits (15MW) of small-scale project activity.

B.3. Project boundary

As referred to in Appendix B for small-scale project activities, the project boundary; renewable electricity generation for a grid, encompasses the physical, geographical site of the renewable generation source.

For the baseline determination, project boundary is related to CO_2 emissions from power generation in a fossil fuel power plant replaced by this project activity. The spatial extent of the project boundary includes the project sites and all the power plants connected physically to the electricity system of KEPCO.



For calculation of baseline GHG emissions from the project boundary are not included emissions during plant construction, leakage from electricity transfer, and emission from transportation, mining, and pumping.

B.4. Establishment and description of baseline scenario

>>

Baseline methodology for project category I.F has been detailed in Para 13-18 of the approved small scale methodology AMS- I.F(Version 02). Para 14 of the approved methodology is applied to this project activity, which states that:

Baseline emissions for other systems are the product of amount electricity displaced with the electricity produced by the renewable generating unit and an emission factor.

$BE_y = EG_{BL,y} * EF_{CO2,y}$

Where :

BE_y : Baseline Emissions in year y(tCO_2)
$EG_{BL,y}$: Quantity of net electricity displaced as a result of the implementation of the CDM project activity in year y(MWh)
$EF_{CO2,y}$: Emission factor(tCO_2/MWh)

The methodology says that, emission factor of a grid shall be calculated as per the procedures provided in AMS-I.D.

As per para 12 of AMS I.D, version 16, the emission factor can be calculated in a transparent and conservative manner as follows:

(a) A combined margin (CM), consisting of the combination of operating margin (OM) and build margin (BM) according to the procedures prescribed in the 'Tool to calculate the emission factor for an electricity system'.

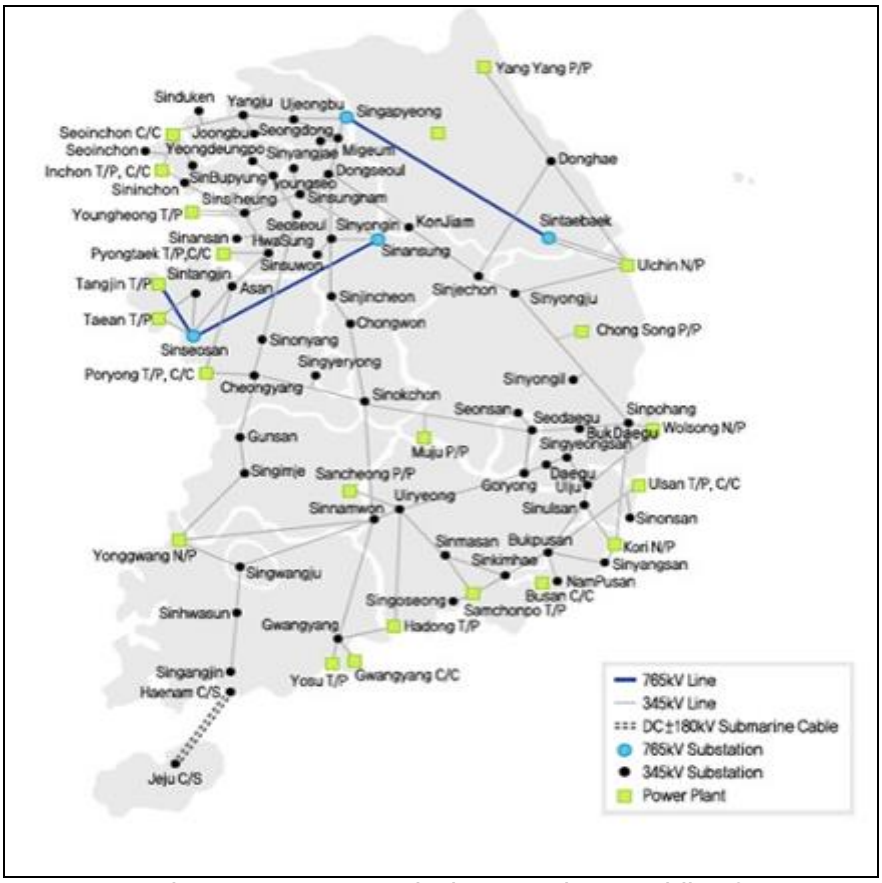
(b) The weighted average emissions (in kg CO_2e/kWh) of the current generation mix. The data of the year in which project generation occurs must be used.

Therefore the baseline for this project was calculated according to "Tool to calculate the emission factor for an electricity system (version 02.2.0)", on the authority of (a) as mentioned above. The baseline emission factor (EF_y) was calculated as a combined margin (CM), consisting of the combination of operating margin (OM) and build margin (BM) factors according to the following seven steps. Intend to calculating this combined margin (CM), it was applied that the data originated from existing power plants that provide electricity to the current grid-connected electricity generation. Here, these data were collected from the "Statistics of Electric Power in KOREA published at the most recent 3-years (KEPCO 2006-2008), and should be proper because the host country of this project, Republic of Korea, does not import/export electricity from/to other countries.

STEP 1. Identify the relevant electricity systems

The electricity from the project activities is connected to KEPCO grid, which is the only one in Korea and relevant electric power system is KEPCO grid.

Therefore the KEPCO grid has been chosen as relevant electricity power system for the purpose of determining the electricity emission factors.



<Figure B-1> Transmission map in Republic of Korea
Source: www.kpx.or.kr, KOREA POWER EXCHANGE

STEP 2. Choose whether to include off-grid power plants in the project electricity system

Project participants may choose between the following two options to calculate the operating margin and build margin emission factor:

Option I: Only grid power plants are included in the calculation.
Option II: Both grid power plants and off-grid power plants are included in the calculation.

For this project, option I is chosen and only grid power plants are included in the calculation.

STEP 3. Select a method to determine the operating margin (OM)

The calculation of the Operating Margin emission factor ($EF_{grid,OM,y}$) shall be calculated based on one of the four following methods:

Option (a) Simple OM
Option (b) Simple adjusted OM
Option (c) Dispatch Data Analysis OM
Option (d) Average OM

If low-cost/must-run resources constitute less than 50% of total grid generation in average of the five most recent years, simple OM can be chosen.

Referring to the gross electricity generation rate by energy sources of the host country, Republic of Korea, the rate of low-cost/must-run power generation does not exceed 50% of the total grid. Actually, the most recent 5-year (2004~2008) average data shows that the rate of low-cost/must-run is 40.40%. (Source: KEPCO)

Therefore, for this project case, "Option (a) Simple OM" is available. <Table B-2> is shown the yearly proportion of the generation of electricity based on the source of energy (Source: KEPCO).

<Table B-1> Gross generation by energy sources

(Unit: million kWh)

Item \ Year		2004	2005	2006	2007	2008
Hydro*		5,861	5,189	5,219	5,042	5,563
Thermal	Domestic Coal*	4,603	4,484	4,312	4,470	5,010
	Bituminous Coal	122,556	129,174	134,894	150,204	168,498
	Heavy Oil	21,591	20,079	18,596	20,769	15,033
	Diesel Oil	474	412	599	446	392
	Gas	55,999	58,118	68,302	78,427	75,809
Nuclear*		130,715	146,779	148,749	142,937	150,958
Alternative*		350	404	511	829	1,092
Total		342,148	364,638	381,181	403,124	422,355
The rate of low cost/must run power generation (%)		40.40				

Source: Electricity statistics on Electricity quantity from Korea Electric Power Corporation, 2008
(* low-operating cost and must-run power plants)

And the Simple OM emission factor can be calculated using either of the two following data vintages for years(s) *y*:

- Ex ante option: If the ex ante option is chosen, the emission factor is determined once at the validation stage, thus no monitoring and recalculation of the emissions factor during the crediting period is required. For grid power plants, use a 3-year generation-weighted average, based on the most recent data available at the time of submission of the CDM-PDD to the DOE for validation. For off-grid power plants, use a single calendar year within the 5 most recent calendar years prior to the time of submission of the CDM-PDD for validation.

- Ex post option: If the ex post option is chosen, the emission factor is determined for the year in which the project activity displaces grid electricity, requiring the emissions factor to be updated annually during monitoring. If the data required calculating the emission factor for year y is usually only available later than six months after the end of year y, alternatively the emission factor of the previous year (y-1) may be used. If the data is usually only available 18 months after the end of year y, the emission factor of the year proceeding the previous year (y-2) may be used. The same data vintage (y, y-1 or y-2) should be used throughout all crediting periods.

For this project, Ex-*ante* option is chosen.

STEP 4. Calculate the Operating Margin emission factor ($EF_{grid,OM,y}$)

(a) Simple OM option is chosen for the project as described in STEP 3 above.

The simple OM emission factor is calculated as the generation-weighted average CO2 emissions per unit net electricity generation (tCO2/MWh) of all generating power plants serving the system, not including low-cost/must-run power plants/units.

The simple OM may be calculated using one of the following options;

Option A: Based on the net electricity generation and a CO2 emission factor of each power unit; or

Option B: Based on the total net electricity generation of all power plants serving the system and the fuel types and total fuel consumption of the project electricity system.

For this project, option A is chosen to calculate the simple OM.

Where Option A is used, the simple OM emission factor is calculated as follows:

$$EF_{grid,OMsimple,y} = \frac{\sum_{m} EG_{m,y} \cdot EF_{EL,m,y}}{\sum_{m} EG_{m,y}}$$

Where:
$EF_{grid,OMsimple,y}$: Simple operating margin CO2 emission factor in year *y* (tCO2/MWh)
$EG_{m,y}$: Net quantity of electricity generated and delivered to the grid by power unit *m* in year *y* (MWh)
$EF_{EL,m,y}$: CO2 emission factor of power unit *m* in year *y* (tCO2/MWh)
m : All power units serving the grid in year *y* except low-cost / must-run power units
y : The relevant year as per the data vintage chosen in Step 3

Determination of $EF_{EL,m,y}$

For calculating $EF_{EL,m,y}$, Option A1 is chosen as follows;

Option A1. If for a power unit *m* data on fuel consumption and electricity generation is available, the emission factor (*EF*$_{EL,m,y}$) should be determined as follows:

$$EF_{EL,m,y} = \frac{\sum_i FC_{i,m,y} \cdot NCV_{i,y} \cdot EF_{CO2,i,y}}{EG_{m,y}}$$

Where:
$EF_{EL,m,y}$: CO_2 emission factor of power unit *m* in year *y* (tCO_2/MWh)
$FC_{i,m,y}$: Amount of fossil fuel type *i* consumed by power unit *m* in year *y* (Mass or volume unit)
$NCV_{i,y}$: Net calorific value (energy content) of fossil fuel type *i* in year *y* (GJ/mass or volume unit)
$EF_{CO2,i,y}$: CO_2 emission factor of fossil fuel type *i* in year *y* (tCO_2/GJ)
$EG_{m,y}$: Net quantity of electricity generated and delivered to the grid by power unit *m* in year *y* (MWh)
m : All power units serving the grid in year *y* except low-cost/must-run power units
i : All fossil fuel types combusted in power unit *m* in year *y*
y : The relevant year as per the data vintage chosen in Step 3

In the case of this project, the applied values of $EF_{CO2,i,y}$ are based on using conversion factor suggested in the 2006 IPCC Guidelines. And those of $NCV_{i,y}$ and $EF_{CO2,i,y}$ are country-specific. Actually, the calorific values are indicated as country-specific data of gloss calorific value (GCV), and this was recalculated for this PDD as net calorific value (NCV) using conversion factor suggested in the 2006 Revised IPCC Guidelines.The detailed information used in the calculation is presented at tables in Appendix 4.

Determination of $EG_{m,y}$

For grid power plants, $EG_{m,y}$ should be determined as per the provisions in the monitoring tables.

Off-grid power plants are not considered in determination of $EG_{m,y}$.

As a result, the OM emission factor (*EF $_{grid,OM,simple,y}$*) is 0.6816 (tCO_2/MWh).

STEP 5. Identify the group of power units to be included in the Build Margin emission factor (*EF$_{grid,BM,y}$*)

There are two options available for deciding the vintage of data to calculate the BM emission factor in accordance of “Tool to calculate the emission factor for an electricity system Ver.02”.

Option 1: For the first crediting period, calculate the build margin emission factor *ex ante* based on the most recent information available on units already built for sample group *m* at the time of CDM-PDD submission to the DOE for validation. For the second crediting period, the build margin emission factor should be updated based on the most recent information available on units already built at the time of submission of the request for renewal of the crediting period to the DOE. For the third crediting period, the build margin emission factor calculated for the second crediting period should be used. This option does not require monitoring the emission factor during the crediting period.

Option 2: For the first crediting period, the build margin emission factor shall be updated annually, *ex post*, including those units built up to the year of registration of the project activity or, if information up to the year of registration is not yet available, including those units built up to the latest year for which information is available. For the second crediting period, the build margin emissions factor shall be calculated *ex ante*, as described in Option 1 above. For the third crediting period, the build margin emission factor calculated for the second crediting period should be used.

For the project, option 1 is chosen for ex-ante estimation of build margin emission factor.

The sample group of power units *m* used to calculate the build margin consists of either:

(a) The set of five power units that have been built most recently; or
(b) The set of power 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 one of either (a) or (b) above that comprises the larger annual generation.

For the project, (a) is used for sample group determination as described in <Table B-3>.

<Table B-2> Sample Plant group(m) for determining Build margin Emission factor

Sample group(m) Classification	**"The five power plants that have been built most recently"**	**"The power plants capacity additions in the electricity system that comprise 20% of the system generation (in MWh) and that have been built most recently."**	**Comments**
Electricity quantity	4,813,540 MWh	82,412,683 MWh	Total generation is 404,424,813MWh in Korea (based on KEPCO's data of the year 2008) CDM registered Power plants generation is 399,594MWh.
Proportion (ratio to total generation in Korea)	1.19%	20.378%	
Selected Group		**O**	

The annual generation of "the five power plants that have been built most recently" was 4,813,540MWh (1.19% of total generation of the grid system), and the annual generation of "the power plants capacity additions in the electricity system that comprise 20.378% of the system generation and that have been built most recently" was 82,412,683 MWh. Therefore, the latter was chosen for this project as a lager figure than the other one. It is presented at <Table Annex-4> in Appendix 4 that the sample group of plants used in the Build Margin emission factor ($EF_{grid,BM,y}$).

STEP 6. Calculate the build margin emission factor ($EF_{grid,BM,y}$)

According to the "Tool to calculate the emission factors for electricity system (Version 02)", build margin emissions factor is the generation-weighted average emission factor (tCO2/MWh) of all power units *m* during the most recent year y for which power generation data is available, calculate as follows:

$$EF_{grid,BM,y} = \frac{\sum_{m} EG_{m,y} \times EF_{EL,m,y}}{\sum_{m} EG_{m,y}}$$

where :

$EF_{grid,BM,y}$	Build margin CO_2 emission factor in year y (tCO_2/MWh)
$EG_{m,y}$	Net quantity of electricity generated and delivered to the grid by power unit m in year y (MWh)
$EF_{EL,m,y}$	CO_2 emission factor of power unit m in year y (tCO_2/MWh)
m	Power units included in the build margin
y	Most recent historical year for which power generation data is available

According to the BM calculation formula and variables of above tables, $EF_{grid,BM,y}$ is 0.5221 tCO_2 e/MWh

STEP 7. Calculate the combined margin emissions factor ($EF_{grid,CM,y}$)

Based on the results derived from Steps, $EF_{grid,CM,y}$ has been calculated using the following formula:

$$EF\ grid,CM,y = w_{OM} \cdot EF_{grid,OM,y} + w_{BM} \cdot EF_{grid,BM,y}$$

$EF_{grid,BM,y}$	Build margin CO2 emission factor in year y (tCO2/MWh)
$EF_{grid,OM,y}$	Operating margin CO2 emission factor in year y (tCO2/MWh)
w_{OM}	Weighting of operating margin emissions factor (75% for solar power project)
w_{BM}	Weighting of build margin emissions factor (25% for solar power project)

Therefore baseline emission factor ($EF_{grid,CM,y}$) for this project is = 0.6417 (tCO_2/MWh) as follows :

$$EF_{grid,CM,y} = w_{OM} \cdot EF_{grid,OM,y} + w_{BM} \cdot EF_{grid,BM,y}$$
$$= 0.75 \cdot 0.6816(tCO_2/MWh) + 0.25 \cdot 0.5221\ (tCO_2/MWh)$$
$$= 0.6417\ (tCO_2/MWh)$$

Calculation of the baseline emission (BE_y)

Baseline emissions should be obtained by the below equation.

$$BE_y = EG_{BL,y} * EF_{CO2,y}$$

Where:

BE_y	is the baseline emissions (in tCO_2)
EG_y	is the quantity of net electricity displaced by the project activity (in MWh)
EF_y	is the emission factor as per the procedures provided in AMS-I.D (in tCO_2/MWh)

The net electricity is the difference between the total quantity of electricity generated by this project and the auxiliary electricity consumption (of connector band and inverter). The auxiliary electricity consumption is calculated using on recording annually the number of systems operating and

estimating the annual hours of systems operating (Refer to Section B.7.3).

Therefore, EG_y is expected to be as 3,771 MWh/yr and BE_y is 2,420tCO_2/yr.

B.5. Demonstration of additionality

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The table below is only applicable if the proposed project activity is a type of project activity which is deemed automatically additional, as defined by the applied approved methodology, tool, standardized baseline or specific renewable technologies/measures conferring automatic additional microscale CDM project activities proposed by a DNA and approved by the Board.

Specify the methodology, tool, standardized baseline or specific renewable technologies/measures conferring automatic additional microscale CDM project activities proposed by DNAs and approved by the Board, that establish automatic additionality for the proposed project activity (including the version number and the specific paragraph, if applicable).	Not applicable
Describe how the proposed project activity meets the criteria for automatic additionality in the relevant methodology, tool, standardized baselines or specific renewable technologies/measures conferring automatic additional microscale CDM project activities proposed by a DNA and approved by the Board.	Not applicable

This project activity is not a type of project activity that is deemed automatic additional.

According to "*GUIDELINES FOR DEMONSTRATING ADDITIONALITY OF MICROSCALE PROJECT ACTIVITIES(VERSION 02)*", project activities up to 5 megawatts that employ renewable energy as their primary technology are additional if any one of the below conditions are satisfied;

(a) The geographic location of the project activity is in one of the Least Developed Countries or the Small Island Countries (LDCs/SIDs) or in a special underdeveloped zone of the host country identified by the Government before 28 May 2010;

(b) The project activity is an off grid activity supplying energy to households/communities (less than 12 hrs grid availability per 24 hrs day is also considered as 'off grid' for this assessment);

(c) The project activity is designed for distributed energy generation (not connected to a national or regional grid) with both conditions (i) and (ii) satisfied;

(i) Each of the independent subsystems/measures in the project activity is smaller than or equal to 1500kW electrical installed capacity;
(ii) End users of the subsystems or measures are households/communities/SMEs.

(d) The project activity employs specific renewable energy technologies/measures recommended by the host country DNA and approved by the Board to be additional in the host country (conditions apply: the total installed capacity of the technology/measure contributes less than or equal to 5% to national annual electricity generation).

The proposed project activity satisfies the condition (c) as follows:

- The installed capacity of PV power plant is less than 1500kW as follows:

No.	Power Plant	Capacity (kW)
1	Icheon Galsan(2)	76.80
2	Chuncheon Mancheon	86.40
3	Gunsan Guam	45.60
4	Nonsan Daegyo	91.20
5	Gimcheon Daesin	84.00
6	Gyeongsan Sadong(1)	158.40
7	Gyeongsan Sadong(2)	88.80
8	Sacheon Yonggang(2)	55.20
9	Goseong Dongoe	72.00
10	Yangsan Daesuk	100.80
11	Gongju Singwan(6)	67.20
12	Chungju Yeonsu (6)	60.00
13	Jecheon Gangjeo(A1)	88.80
14	Cheongyang Eumnae	40.80
15	Gochang Eumnae	81.60
16	Gimje Hadong	38.40
17	Yeongam Yongang	81.60
18	Geoje Irun	52.80
19	Wonju Musil(2)	59.80
20	Eumseong Maengdong(1)	28.98
21	Eumseong Gamgok	52.44
22	Jecheon Gangjeo(A3)	110.86
23	Taean Pyeongcheon(1)	91.08
24	Asan Inju	94.30
25	Iksan Hamyeol	74.75
26	Sunchang Pungsan	28.75
27	Iksan Baesan(1)	92.00
28	Iksan Baesan(3)	139.38
29	Yeosu Jungnim(A1)	31.28
30	Yeosu Jungnim(A2)	69.92
31	Uiseong Sangni	55.20
32	Goryeong Dasan(3)	57.96
33	Yangsan Pyeongsan	184.92
34	Pohang Jangnyang	151.34
35	Sacheon Yonghyeon	96.14
36	Dangjin Chaeun	86.94

- End users of the electricity generated by the project activity are households. (i.e. All generated electricity will be supplied to households displacing electricity supplied from grids.)

Therefore, the proposed project activity is concluded to be additional.

Prior Consideration of the CDM

The project participant, LH Corporation, has considered CDM seriously prior to starting date. How the project has been proceed to CDM project has been listed in the following table.

<Table B-3> The timeline of LH Corporation's CDM Project Activity

Date	Implementation	Note
2008.11.06	Planning of PV power plant supply, 2009(the 1st stage)	
2009.03.19	Decision to proceed a project to install PV power plant facility in National Rental House of 2009(the 1st stage) as CDM	
2009.04.02	Planning of PV power plant supply, 2010(the 2nd stage)	
2009.04.24 ~ 2009.05.07	Facility supply and installation contract of 2009(the 1st stage)	
2009.07.08	Decision to proceed a project to install PV power plant facility in National Rental House of 2010(the 2nd stage) as CDM	
2009.09.10	Contract with a CDM consultant corporation, Ecoeye Co., Ltd.	
2010.03.30	Several changes in applicable areas of 2010(the 2nd stage) PV power plant - The PV power plants which had been decided in 8 July 2009 were changed by the implementation of plant design service.	
2010.05.28	Contract with DOE, KSA for validation	
2010.06.04 ~ 2010.07.03	UNFCCC web-hosting for Public comment - PDD ver.1 was used AMS-I.D, ver.15	
2010.06.30	Several changes in applicable areas of 2010 (the 2nd stage) PV power plant - The PV power plants which had been decided by the implementation of plant design service in 30 March 2010 were changed again by the implementation of plant installation service.	
2010.07.01 ~ 2010.07.07	1st On-site investigation with DOE	
2010.08.02 ~ 2010.08.20	Facility supply and installation contract of 2010 (the 2nd stage)	
2010.09.13	Additional change in applicable areas of 2010(the 2nd stage) PV power plant - PV power plant of Dangjin Chaeun was added.	
2010.11.04	Facility supply contract of PV power plant, Dangjin Cheun	
2010.02.08 ~ 2011.03.09	UNFCCC web-hosting due to methodology change of PDD ver.1 - AMS-I.F(ver.1) is used due to validity period of AMS-I.D(ver.15). - As the ver.16 of AMS-I.D is distinguished the projects that solely supply electricity to a grid from the projects that	

	displace electricity from a grid, the ver.1 of AMS-I.F is applied in the project.	
2011.03.08 ~ 2011.03.10	2nd On-site investigation with DOE	
2011.04.21	DNA approval	

LH Corporation proceeds a project to install PV power plant facility in National Rental House of 2009(the 1st stage) and of 2010(the 2nd stage) as the CDM project.

As for the 1st stage, LH Corporation has decided to proceed the CDM project with 18 areas which were designated as objects of PV power plant project for National Rental House of 2009 on March 2009 and signed the contract for procurement of facilities for PV power plant in April - May 2009.

As for the 2nd stage, LH Corporation has decided to proceed the CDM project with 15 areas which were designated as objects of PV power plant project for National Rental House of 2010 on July 2009.

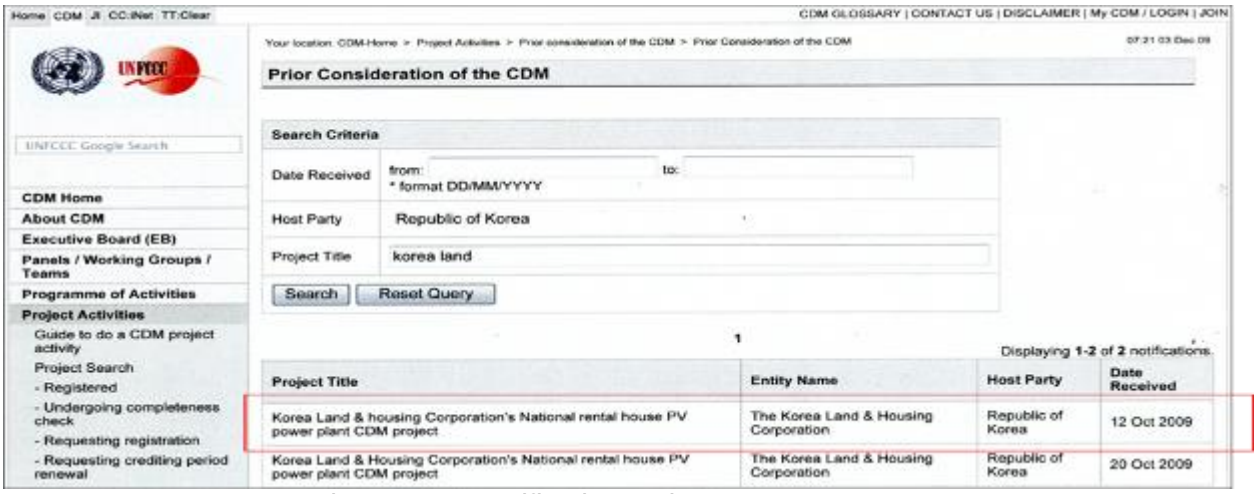
The number of total PV power plant was changed to 36 areas from 33 areas because of the implementation of plant design and installation service of 2010 (the 2nd stage) PV power plant in April-September 2010. Further details will submit to DOE. The contract for procurement of facilities for PV power plant has been signed in August - November 2010.

According to the above statement, before the starting date of 2009 (the 1st stage) and of 2010 (the 2nd stage) project, LH Corporation has seriously considered CDM. LH Corporation's consideration about the CDM project includes GHG reduction and CER revenue from this CDM project.

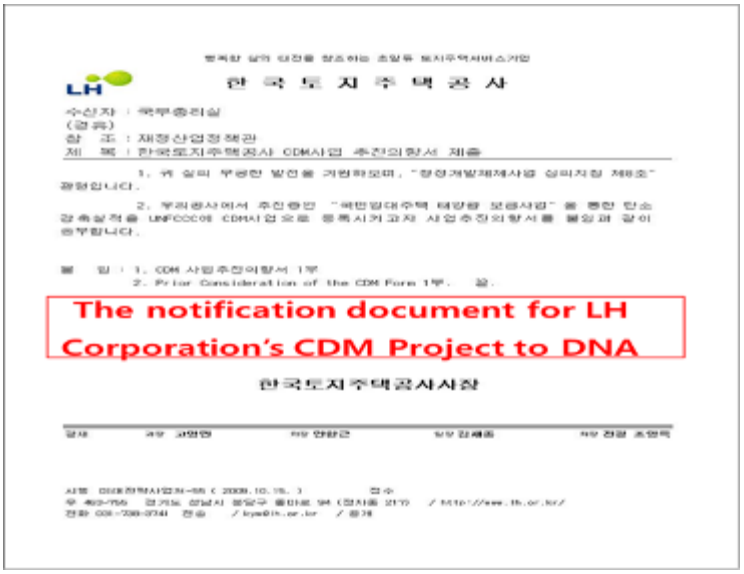
Notification of prior consideration of the CDM project

According to "Guidelines on the demonstration and assessment of prior consideration of the CDM", the project activities with a starting date on or after 02 August 2008, the project participant must inform a Host Party DNA and the UNFCCC secretariat in writing of the commencement of the project activity and of their intention to seek CDM status. Such notification must be made within six months of the project activity start date and shall contain the precise geographical location and a brief description of the proposed project activity, using the standardized form F-CDM-Prior Consideration.

LH Corporation informed the DNA of Korea and the UNFCCC secretariat in writing for this project.



<Figure B-2> Notification to the UNFCCC secretariat



<Figure B-3> Notification to the DNA of Korea

As such notifications to UNFCCC and Korean DNA has been prepared and submitted as above, the CDM is regarded to be seriously considered in the decision to implement the project activity.

B.6. Emission reductions

B.6.1. Explanation of methodological choices

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Baseline emissions

The baseline emissions are the MWh produced by the renewable generating unit multiplied by an emission factor.

BE = EG× EF

Where,
BE = Baseline Emissions (tCO2/yr)
EG = Net Electricity (MWh/yr)
EF = Emission Factor (=0.6417 tCO2/MWh)

For more details on calculation procedure of emission factor, refer to section B.4.

Project emission

Project emission due to the project activity is not occurred.

Leakage

Leakage due to the project activity does not occur.

Emission reduction

ER (Emission reduction) = BE (Baseline emissions) – PE (Project emissions) – LE (Leakage emissions)

B.6.2. Data and parameters fixed ex ante

Data / Parameter	$EF_{grid,CM,y}$
Unit	tCO2/MWh
Description	CO2 emissions intensity of the electricity displaced
Source of data	Calculated
Value(s) applied	0.6417 tCO2/MWh
Choice of data or Measurement methods and procedures	This value was calculated according to "Tool to calculate the emission factor for an electricity system (version 02)." Applied value was calculated by referring Statistics of Electric Power in KOREA (2006, 2007, 2008) (KEPCO) and Status of Generation facility (2009) (KPX).
Purpose of data	
Additional comment	The same value will be applied during the first crediting period without updating. - For detail calculation method, refer to Appendix 4.

Data / Parameter	$EF_{grid,OM_{simple},y}$
Unit	tCO2/MWh
Description	Operating Margin emission factor
Source of data	Calculated
Value(s) applied	0.6816 tCO2/MWh
Choice of data or Measurement methods and procedures	This value was calculated according to "Tool to calculate the emission factor for an electricity system (version 02)." Applied value was calculated by referring Statistics of Electric Power in KOREA (2006, 2007, 2008) (KEPCO) and Status of Generation facility (2009) (Korea Power Exchange).
Purpose of data	
Additional comment	-This data will be calculated at the time of PDD submission and will not be changed during the first crediting period. - This value is ex-ante value which is calculated at the time of PDD submission and will be applied during the crediting period without update.

Data / Parameter	$EF_{grid,BM,y}$
Unit	tCO2/MWh
Description	Build Margin emission factor
Source of data	Calculated
Value(s) applied	0.5221 tCO2/MWh
Choice of data or Measurement methods and procedures	This value was calculated according to "Tool to calculate the emission factor for an electricity system (version 02)." Applied value was calculated by referring Statistics of Electric Power in KOREA (2006, 2007, 2008) (KEPCO) and Status of Generation facility (2009) (Korea Power Exchange).
Purpose of data	
Additional comment	-This data will be calculated at the time of PDD submission and will not be changed during the first crediting period. - This value is ex-ante value which is calculated at the time of PDD submission and will be applied during the crediting period without update.

B.6.3. Ex ante calculation of emission reductions

>>

Baseline emission

According to the Step 7 ("Calculate the CM emission factor") of B.4.("Establishment and description of baseline scenario") , the equation is as follows :

$$BE_y = EG_y \times EF_y$$

Where :
BE_y : Baseline emissions (in tCO_2)
EG_y : Net Electricity displaced from grid by the project activity (in MWh)
EF_y : Baseline emissions factor (in tCO_2/MWh)

In accordance with equation, emission reduction calculation for each of the component as follows:

PV power plant	EG_y	EF_y	BE_y
LH Corporation's 36 PV Power Plants	3,771	0.6417	2,420
Total amount	3,771		2,420

Additional background information and data in **Appendix 4.**

Project emission

The project activity generates electricity by utilizing photovoltaic power and it means that no greenhouse gas is emitted by performing this project activity. Therefore, the project emission is zero.

Ex-ante calculation of emission reductions

Emission reduction = Baseline emission – Project emission
= 2,420 tCO_2e/yr – 0 tCO_2e/yr
= 2,420 tCO_2e/yr

B.6.4. Summary of ex ante estimates of emission reductions

Year	Baseline emissions (t CO_2e)	Project emissions (t CO_2e)	Leakage (t CO_2e)	Emission reductions (t CO_2e)
Year 1	2,420	0	0	2,420
Year 2	2,420	0	0	2,420
Year 3	2,420	0	0	2,420
Year 4	2,420	0	0	2,420
Year 5	2,420	0	0	2,420
Year 6	2,420	0	0	2,420
Year 7	2,420	0	0	2,420
Year 8	2,420	0	0	2,420
Year 9	2,420	0	0	2,420
Year 10	2,420	0	0	2,420
Total	24,200	0	0	24,200
Total number of crediting years	10 year			
Annual average over the crediting period	2,420	0	0	2,420

B.7. Monitoring plan

B.7.1. Data and parameters to be monitored

Data / Parameter	$EG_{y,LH\ corp.}$
Unit	MWh
Description	Quantity of net electricity supplied to grid connected end users as a result of the implementation of the CDM project activity
Source of data	Calculated
Value(s) applied	3,771 MWh/yr
Measurement methods and procedures	EGy means the quantity of net electricity supplied to households. The net electricity generation is the difference between the total quantity of electricity generated by this project and the auxiliary electricity consumption. As for the total quantity of electricity generated by this project, Measuring equipment : Electricity meter Procedure : refer to B.7.3 Calibration frequency : 8 year Meter accuracy: Rank 1.0 (±1 %) Responsible person : Refer B.7.3 Measurement interval : Continuously As for the auxiliary electricity consumption (of connector bands and inverters), The auxiliary electricity consumption is calculated according to the Section B.7.3.
Monitoring frequency	Monthly
QA/QC procedures	QA/QC procedure : Refer to B.7.3
Purpose of data	
Additional comment	Data will be at least recorded monthly and aggregated yearly. Data will be kept at least for two years after the end of the last crediting period.

B.7.2. Sampling plan

>>
No sampling is required for this project activity

B.7.3. Other elements of monitoring plan

>>
The main monitoring data are electricity supplied to households displacing electricity supplied from KEPCO grid. To check the amount of generated electricity, the electricity meter will be installed.

The monitoring plan has been developed based on approved methodology AMS- I.F. and more details are as follows:

- Monitoring equipment : Electricity meter
- Relevant laws and standards of Korea :

  - Electric Utility Act
  - Measures Act
  - Guideline for the support on the new & renewable energy equipment

Quality Assurance and Quality Control

- Measure and Archive :

  - In accordance with Article 63 of Electric Utility Act, photovoltaic generation electrical equipment (electrical equipment for self-use) will be used after they have passed an Inspection Prior to Operation that is conducted by the Minister of Trade, Industry & Energy or the Mayor or/Do governor.
  - Regarding the monitoring equipment, Electricity meter will be installed in accordance with Table 2, "Monitoring system equipment installation standard" of "Guideline for the support on the new & renewable energy equipment".
  - The net electricity generation is the difference between the total quantity of electricity generated by this project and the auxiliary electricity consumption.
  - The quantity of generated electricity will be measured continuously and recorded monthly.
  - The auxiliary electricity consumption(of connector bands and inverters) will be very small; however, the auxiliary electricity consumption will be conservatively calculated using recording annually the number of systems operating and estimating the annual hours of systems operating(Equation : The auxiliary electricity consumption = Standby power[4](of connector bands and inverters) * Numbers * Hours).
  - The data archived will be kept at least for two years after the end of the last crediting period.
  - The electricity data of PV power plant will be saved in storage device and submitted to LH Corporation's Office in a paper.

- Contingency Plan :

  - In case of electricity meter trouble or data transferring error, the person in charge of monitoring is responsible for prompt grasping the problem and restoring it in due course. Also the person will report progress to each regional headquarter.

- Calibration of equipment :

  - Electricity meter will be calibrated every 8 years in accordance with *"Measures Act"*

- Management of monitoring and electricity safety :

  - The person in charge of monitoring and electricity safety will be trained according to the LH Corporation's guideline. LH Corporation will prepare a plan on staff training for monitoring.

Monitoring organization and responsibility :

LH Corporation's Office
: General duty of whole management

Gangwon-do headquarter	**Gyeonggi-do headquarter**
Chuncheon Mancheon Wonju Musil(2)	Icheon Galsan(2)

Gyeongsangnam-do headquarter	**Gyeongsangbuk-do headquarter**

[4] Standby power is the electric power consumed by electronic appliances while they are switched off or in a standby mode and is based on the letter (or evidence) from manufacturers.

Sacheon Yonggang(2)
Goseong Dongoe
Geoje Irun
Yangsan Pyeongsan
Yangsan Daesuk
Sacheon Yonghyeon

Gimcheon Daesin
Gyeongsan Sadong(1)
Gyeongsan Sadong(2)
Uiseong Sangni
Goryeong Dasan(3)
Pohang Jangnyang

Jeollanam-do headquarter
Yeongam Yongang
Yeosu Jungnim(A1)
Yeosu Jungnim(A2)

Jeollabuk-do headquarter
Gunsan Guam
Gochang Eumnae
Gimje Hadong
Iksan Hamyeol
Sunchang Pungsan
Iksan Baesan(1)
Iksan Baesan(3)

Chungcheongnam-do headquarter
Nonsan Daegyo
Gongju Singwan(6)
Cheongyang Eumnae
Taean Pyeongcheon(1)
Asan Inju
Dangjin Chaeun

Chungcheongbuk-do headquarter
Chungju Yeonsu(6)
Jecheon Gangjeo(A1)
Eumseong Maengdong(1)
Eumseong Gamgok
Jecheon Gangjeo(A3)

: General management of electricity, monitoring Practical operation and maintenance

: General management of electricity, monitoring Practical operation and maintenance

- Persons in charge of monitoring from 36 regions will report general contents of operation such as running photovoltaic generation facilities, monitoring, emergency response, etc. to each regional headquarter of LH Corporation. Each regional headquarter will then report each of contents to LH Corporation's Office.

All records will be documented and maintained by LH Corporation for certification.

B.8. Date of completion of application of methodology and standardized baseline and contact information of responsible persons/ entities

>>
Date of Completion of the application of the methodology : 15/04/2015
Responsible person / entity : Jun Ho Cha / LH Corporation

SECTION C. Duration and crediting period

C.1. Duration of project activity

C.1.1. Start date of project activity

>>
24/04/2009(the earliest date)

Table C-1. Starting date of the LH Corporation's 36 PV power plant

No	PV Power Plant	Starting date	Note	
1	Icheon Galsan(2)	2009.05.07	Facility supply and installation contract	2009(the 1st stage) PV power plant
2	Chuncheon Mancheon	2009.04.24	Facility supply and installation contract	
3	Gunsan Guam	2009.05.07	Facility supply and installation contract	
4	Nonsan Daegyo	2009.04.24	Facility supply and installation contract	
5	Gimcheon Daesin	2009.04.24	Facility supply and installation contract	
6	Gyeongsan Sadong(1)	2009.05.07	Facility supply and installation contract	
7	Gyeongsan Sadong(2)	2009.05.07	Facility supply and installation contract	
8	Sacheon Yonggang(2)	2009.04.24	Facility supply and installation contract	
9	Goseong Dongoe	2009.04.24	Facility supply and installation contract	
10	Yangsan Daesuk	2009.04.24	Facility supply and installation contract	
11	Gongju Singwan(6)	2009.04.24	Facility supply and installation contract	
12	Chungju Yeonsu (6)	2009.04.24	Facility supply and installation contract	
13	Jecheon Gangjeo(A1)	2009.04.24	Facility supply and installation contract	
14	Cheongyang Eumnae	2009.05.07	Facility supply and installation contract	
15	Gochang Eumnae	2009.05.07	Facility supply and installation contract	
16	Gimje Hadong	2009.04.24	Facility supply and installation contract	
17	Yeongam Yongang	2009.04.24	Facility supply and installation contract	
18	Geoje Irun	2009.04.24	Facility supply and installation contract	
19	Wonju Musil(2)	2010.08.02	Facility supply and installation contract	2010(the 2nd stage) PV power plant
20	Eumseong Maengdong(1)	2010.08.02	Facility supply and installation contract	
21	Eumseong Gamgok	2010.08.02	Facility supply and installation contract	
22	Jecheon Gangjeo(A3)	2010.08.02	Facility supply and installation contract	
23	Taean Pyeongcheon(1)	2010.08.02	Facility supply and installation contract	
24	Asan Inju	2010.08.02	Facility supply and installation contract	
25	Iksan Hamyeol	2010.08.02	Facility supply and installation contract	
26	Sunchang Pungsan	2010.08.02	Facility supply and	

			installation contract	
27	Iksan Baesan(1)	2010.08.02	Facility supply and installation contract	
28	Iksan Baesan(3)	2010.08.02	Facility supply and installation contract	
29	Yeosu Jungnim(A1)	2010.08.02	Facility supply and installation contract	
30	Yeosu Jungnim(A2)	2010.08.02	Facility supply and installation contract	
31	Uiseong Sangni	2010.08.20	Facility supply and installation contract	
32	Goryeong Dasan(3)	2010.08.20	Facility supply and installation contract	
33	Yangsan Pyeongsan	2010.08.20	Facility supply and installation contract	
34	Pohang Jangnyang	2010.08.20	Facility supply and installation contract	
35	Sacheon Yonghyeon	2010.08.20	Facility supply and installation contract	
36	Dangjin Chaeun	2010.11.04	Facility supply and installation contract	

C.1.2. Expected operational lifetime of project activity

>>
20 years

C.2. Crediting period of project activity

C.2.1. Type of crediting period

>>
Fixed 10 year crediting year

C.2.2. Start date of crediting period

>>
The crediting period will begin on 01/10/2010 or the date of request for registration.

C.2.3. Length of crediting period

>>
10 years

SECTION D. Environmental impacts

D.1. Analysis of environmental impacts

>>
The analysis of the environmental impact related to this project is prior environmental review and environmental impact assessment.

According to the Framework Act on Environmental Policy, prior environmental review shall be enforced on the development project executed within the region needed for administrative plans

and conservation with content of environmental effects evaluation projects according to the provisions of Environmental Impact Assessment Act.

In Korea, the scope of the businesses subject to environmental impact assessment according to Environmental Impact Assessment Act is shown below.

Division	Scope of businesses
Urban development project	According to Rental Housing Act Art. 16, Housing constructions or Site development with a project area of over 300,000 m²
Energy development project	In case of solar power, wind power or a fuel cell plant, projects with a plant facilities capacity of over 100,000KW

In case of this project, each development area and capacity of PV power plant are as follows:

No.	PV power plant	Development Area(m^2)	Capacity(KW)
1	Icheon Galsan(2)	27,706	76.80
2	Chuncheon Mancheon	34,285	86.40
3	Gunsan Guam	20,745	45.60
4	Nonsan Daegyo	26,667	91.20
5	Gimcheon Daesin	17,067	84.00
6	Gyeongsan Sadong(1)	37,435	158.40
7	Gyeongsan Sadong(2)	23,422	88.80
8	Sacheon Yonggang(2)	24,931	55.20
9	Goseong Dongoe	21,256	72.00
10	Yangsan Daesuk	40,669	100.80
11	Gongju Singwan(6)	25,240	67.20
12	Chungju Yeonsu (6)	22,767	60.00
13	Jecheon Gangjeo(A1)	38,938	88.80
14	Cheongyang Eumnae	13,583	40.80
15	Gochang Eumnae	29,089	81.60
16	Gimje Hadong	9,729	38.40
17	Yeongam Yongang	26,747	81.60
18	Geoje Irun	24,486	52.80
19	Wonju Musil(2)	38,400	59.80
20	Eumseong Maengdong(1)	12,521	28.98
21	Eumseong Gamgok	26,701	52.44
22	Jecheon Gangjeo(A3)	38,135	110.86
23	Taean Pyeongcheon(1)	25,349	91.08
24	Asan Inju	24,974	94.30
25	Iksan Hamyeol	29,217	74.75
26	Sunchang Pungsan	8,119	28.75
27	Iksan Baesan(1)	35,844	92.00
28	Iksan Baesan(3)	51,779	139.38
29	Yeosu Jungnim(A1)	38,225	31.28
30	Yeosu Jungnim(A2)	35,592	69.92
31	Uiseong Sangni	21,575	55.20
32	Goryeong Dasan(3)	19,162	57.96
33	Yangsan Pyeongsan	52,327	184.92
34	Pohang Jangnyang	39,573	151.34
35	Sacheon Yonghyeon	31,467	96.14
36	Dangjin Chaeun	27,350	86.94

According to the Environmental Impact Assessment Act, the project participant has to perform the environmental effects evaluation if the capacity of photovoltaic power plant is more than

100,000KW and the developed size is more than 300,000m^2. Since the each capacity is less than 100,000KW and development area is less than 300,000m^2, this project activity is excluded from the scope of businesses subject to environmental impact assessment.

SECTION E. Local stakeholder consultation

E.1. Solicitation of comments from local stakeholders

>>

LH Corporation has completed discussion with concerned government organization of each project area who is charged in licensing and approval for National Rental House and PV power plant's installation project before making above decisions.

LH Corporation has conducted a presentation with interested parties of PV power plant's installation area of 2009 (the 1st stage) and of 2010 (the 2nd stage).

The presentation was conducted with following purposes.

- Explaining about PV power plant facility of National Rental House and collecting opinions of interested parties of each project area on its utilized CDM project.

Details of presentation of 2009 (the 1st stage) and 2010 (the 2nd stage) are as follows.

Classification	2009 (the 1st stage)	2010 (the 2nd stage)
Date	1st April ~ 18th Sept.	5th April ~ 23rd April
Place	Separate place of each project area	Separate place of each project area
Participants	Regional residents, Installers etc	Regional residents, Installers etc
Details	- Outline and application skill of PV power plant - Facilities for PV power plant and its installation - Social, economic and environmental influences -Contents of PV power plant for National Rental House	- Contents of CDM project for National Rental House PV power plant - Outline and application skill of PV power plant - Facilities for PV power plant and its installation -Process of LH Corporation's project -Plan for completion and future monitoring
Pictures		










Also, LH Corporation has additionally collected residents' opinions through After Service survey after installation by each of 18 project areas for the project of 2009 (the 1st stage) in Jan 2010, and plans to collect additional opinions through After Service survey with 18 areas which are applicable for PV power plant facility of 2010 (the 2nd stage).

E.2. Summary of comments received

>>

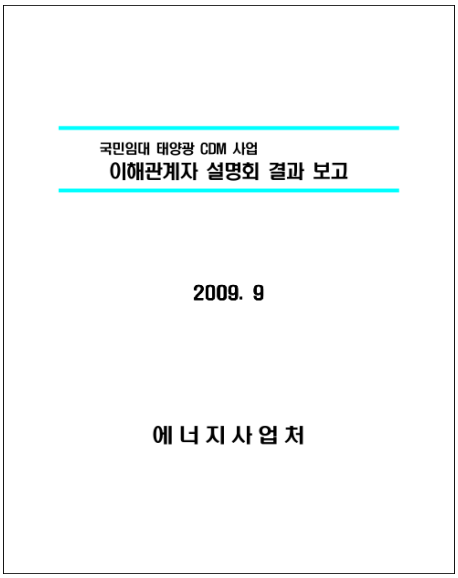
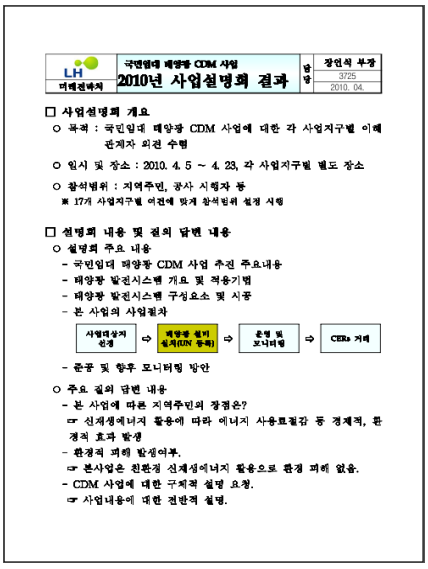
Interested parties who participated in this project presentation have raised following opinions.

Classification	2009 (the 1st stage)	2010 (the 2nd stage)
Opinions	1. Whether or not resident's damage shall occur with the project? 2. What's the benefit for residents with this project? 3. What CDM project to be utilized? 4. How is process after registering this project?	1. What's the benefit for residents with this project? 2. Whether or not environmental damage shall occur? 3. Need detailed explanation about CDM project.

E.3. Report on consideration of comments received

>>

LH Corporation has written a report on result of presentation with interested parties of PV power plant CDM project for National Rental House of 2009(the 1st stage) and 2010(the 2nd stage).

Classification	2009(the 1st stage)	2010(the 2nd stage)
Report		

As a result of the opinion collection, opinions showed generally positive effect on this project because no environmental, economic, social damages shall be expected.

LH Corporation shall solve problems by continuous investment in After Service and monitoring of any economic and environmental problems caused by possible poor maintenance.

SECTION F. Approval and authorization

>>
Letter of approval from the host party DNA was reissued in 21 April 2011.

Appendix 1. Contact information of project participants and responsible persons/ entities

Project participant and/or responsible person/ entity	☒ Project participant ☒ Responsible person/ entity for application of the selected methodology (ies) and, where applicable, the selected standardized baselines to the project activity
Organization name	LH Corporation
Street/P.O. Box	19, Chungui-ro
Building	
City	Jinju-si
State/Region	Gyeongsangnam-do
Postcode	660-031
Country	Republic of Korea
Telephone	
Fax	
E-mail	
Website	www.LH.or.kr
Contact person	
Title	Manager
Salutation	Mr.
Last name	Cha
Middle name	
First name	Jun Ho
Department	Complex Technology Standard Office
Mobile	
Direct fax	
Direct tel.	82-055-922-5275
Personal e-mail	chajh@lh.or.kr

Project participant and/or responsible person/ entity	☒ Project participant ☒ Responsible person/ entity for application of the selected methodology (ies) and, where applicable, the selected standardized baselines to the project activity
Organization name	Ecoeye Co., Ltd.
Street/P.O. Box	70, Dusan-ro, Geumcheon-Gu
Building	B dong
City	Seoul
State/Region	
Postcode	153-813
Country	Republic of Korea
Telephone	+82-2-6480-7300
Fax	+82-2-6480-7398
E-mail	sangsun_ha@ecoeye.com
Website	http://www.ecoeye.com
Contact person	
Title	Consultant
Salutation	Mr.
Last name	Lee
Middle name	
First name	Jeong-hwan
Department	
Mobile	82-10-2547-9960
Direct fax	82-31-716-1848
Direct tel.	82-31-710-7367
Personal e-mail	leejh@ecoeye.com

Appendix 2. Affirmation regarding public funding

No public funding is involved in this project activity.

Appendix 3. Applicability of methodology and standardized baseline

Mentioned in the concerned section of the PDD.

Appendix 4. Further background information on ex ante calculation of emission reductions

<Table Annex-1> Data on fuel consumption for plants in the Operating Margin

Year	Plant		Amount of fossil fuel($FC_{i,m,y}$)			
			Coal (t)	Heavy oil (kl)	Diesel oil (kl)	L. N. G (t)
2006	Honam	#1	781,139	1,113	279	-
		#2	859,736	1,251	359	-
	Samcheonpo	#1	1,696,271	-	860	-
		#2	1,508,082	-	1,362	-
		#3	1,519,385	-	457	-
		#4	1,521,263	-	1,818	-
		#5	1,665,339	-	977	-
		#6	1,770,348	-	428	-
	Yonghung	#1	2,004,193	-	2,548	-
		#2	2,129,118	-	2,545	-
	Boryeong	#1	1,638,140	-	306	-
		#2	1,389,425	-	1,137	-
		#3	1,323,779	-	514	-
		#4	1,610,928	-	82	-
		#5	1,296,455	-	541	-
		#6	1,553,273	-	518	-
	Taean	#1	1,354,832	-	514	-
		#2	1,532,209	-	162	-
		#3	1,338,967	-	575	-
		#4	1,548,909	-	133	-
		#5	1,542,775	-	544	-
		#6	1,294,577	-	1,113	-
		#7	61,910	-	4,799	-
	Hadong	#1	1,373,049	-	515	-
		#2	1,543,074	-	293	-
		#3	1,549,094	-	153	-
		#4	1,376,612	-	796	-
		#5	1,554,524	-	242	-
		#6	1,371,801	-	690	-
	Dangjin	#1	1,380,527	-	966	-
		#2	1,570,077	-	161	-
		#3	1,402,916	-	433	-
		#4	1,386,317	-	1,549	-

Year	Plant		Amount of fossil fuel($FC_{i,m,y}$)			
			Coal (t)	Heavy oil (kl)	Diesel oil (kl)	L. N. G (t)
		#5	1,456,458	-	745	-
		#6	1,216,582	-	3,051	-
		#7	1,008	-	505	-
	Ulsan	#1	-	72,243	605	-
		#2	-	80,187	469	-
		#3	-	96,459	518	-
		#4	-	360,919	3,729	-
		#5	-	375,985	3,678	-
		#6	-	378,331	3,694	-
	Yeongnam	#1	-	107,090	1,016	-
		#2	-	95,127	1,494	-
	Yeosu	#1	-	99,129	281	-
		#2	-	215,957	291	-
	Pyongtaek	#1	-	261,458	141	3,997
		#2	-	277,025	166	5,687
		#3	-	303,858	134	3,891
		#4	-	245,602	103	3,473
	Namjeju	#1	-	11,406	17	-
		#2	-	9,772	14	-
		#3	-	46,504	2,509	-
	Jeju	#1	-	8,603	23	-
		#2	-	113,679	64	-
		#3	-	117,464	67	-
	Seoul	#4	-	-	1	69,383
		#5	-	-	1	152,891
	Incheon	#1	-	-	-	6,945
		#2	-	-	-	5,223
		#3	-	-	311	15,426
		#4	-	-	311	12,454
	Pyongtaek C/C	C/C	-	-	45	84,054
	Ilsan	C/C	-	-	1,384	556,504
	Bundang	C/C	-	-	-	720,381
	Ulsan	C/C	-	-	-	536,196
	Seoincheon	C/C	-	-	1,066	1,199,196
	Shinincheon	C/C	-	-	-	1,641,038
	Boryeong	C/C	-	-	-	998,683
	Incheon	C/C	-	-	-	484,606
	Busan	C/C	-	-	-	1,396,417
	Hallim	C/C	-	-	48,475	-
	Anyang	C/C	-	-	-	230,969
	Bucheon	C/C	-	-	215	225,713

Year	Plant		Amount of fossil fuel($FC_{i,m,y}$)			
			Coal (t)	Heavy oil (kl)	Diesel oil (kl)	L. N. G (t)
	POSCO POWER	C/C	-	-	-	408,018
	G S Bugog	C/C	-	-	-	389,811
	Yulchon	C/C	-	-	-	315,132
	Namjeju	D/P	-	51,347	111	-
	Jeju	G/T	-	-	8,264	-
	Jeju	D/P	-	52,907	-	-
2006 Total			**50,123,092**	**3,383,417**	**111,869**	**9,466,086**
2007	Honam	#1	866,853	889	281	-
		#2	846,931	811	262	-
	Samcheonpo	#1	1,631,706	-	296	-
		#2	1,804,695	-	384	-
		#3	1,755,374	-	434	-
		#4	1,543,140	-	677	-
		#5	1,850,764	-	315	-
		#6	1,714,320	-	619	-
	Yonghung	#1	1,902,557	-	3,320	-
		#2	2,296,289	-	1,779	-
		#3	119,883	-	3,964	-
		#4		-	-	-
	Boryeong	#1	1,466,761	-	811	-
		#2	1,655,488	-	169	-
		#3	1,648,008	-	187	-
		#4	1,347,303	-	646	-
		#5	1,629,904	-	195	-
		#6	1,490,809	-	387	-
	Taean	#1	1,524,391	-	410	-
		#2	1,434,221	-	374	-
		#3	1,521,349	-	350	-
		#4	1,320,380	-	422	-
		#5	1,342,358	-	676	-
		#6	1,535,931	-	491	-
		#7	1,430,171	-	2,321	-
		#8	919,055	-	3,636	-
	Hadong	#1	1,582,726	-	178	-
		#2	1,396,830	-	637	-
		#3	1,424,033	-	375	-
		#4	1,572,409	-	292	-
		#5	1,486,776	-	452	-
		#6	1,585,307	-	109	-
	Dangjin	#1	1,512,904	-	269	-
		#2	1,358,316	-	543	-

Year	Plant		Amount of fossil fuel($FC_{i,m,y}$)			
			Coal (t)	Heavy oil (kl)	Diesel oil (kl)	L. N. G (t)
		#3	1,516,065	-	119	-
		#4	1,519,231	-	342	-
		#5	1,279,796	-	1,038	-
		#6	1,281,318	-	878	-
		#7	1,059,612	-	6,681	-
		#8	467,807	-	4,873	-
	Ulsan	#1	-	107,844	406	-
		#2	-	108,381	483	-
		#3	-	120,571	576	-
		#4	-	341,170	3,525	-
		#5	-	370,712	4,711	-
		#6	-	216,409	3,021	-
	Yeongnam	#1	-	174,082	1,232	-
		#2	-	122,249	796	-
	Yeosu	#1	-	121,572	332	-
		#2	-	257,420	367	-
	Pyongtaek	#1	-	269,284	114	3,316
		#2	-	359,870	140	6,339
		#3	-	349,481	157	4,874
		#4	-	255,443	117	4,047
	Namjeju	#1	-	-	-	-
		#2	-	-	-	-
		#3	-	124,559	225	-
		#4	-	127,900	341	-
	Jeju	#1	-	1,049	4	-
		#2	-	70,122	112	-
		#3	-	98,846	34	-
	Seoul	#4	-	-	1	75,080
		#5	-	-	1	206,908
	Incheon	#1	-	-	-	30,402
		#2	-	-	-	31,528
		#3	-	-	354	41,270
		#4	-	-	201	18,892
	Pyongtaek C/C	C/C	-	-	67	151,414
	Ilsan	C/C	-	-	-	635,260
	Bundang	C/C	-	-	3	660,899
	Ulsan	C/C	-	-	-	649,494
	Seoincheon	C/C	-	-	-	1,495,687
	Shinincheon	C/C	-	-	-	1,761,001
	Boryeong	C/C	-	-	-	1,121,251
	Incheon	C/C	-	-	-	494,690

Year	Plant		Amount of fossil fuel($FC_{i,m,y}$)			
			Coal (t)	Heavy oil (kl)	Diesel oil (kl)	L. N. G (t)
	Busan	C/C	-	-	-	1,552,997
	Hallim	C/C	-	-	17,753	-
	Anyang	C/C	-	-	-	289,384
	Bucheon	C/C	-	-	-	269,651
	POSCO POWER	C/C	-	-	-	660,445
	G S Bugog	C/C	-	-	-	371,586
	Yulchon	C/C	-	-	-	292,336
	Namjeju	D/P	-	35,297	238	-
	Jeju	G/T	-	-	850	-
	Jeju	D/P	-	49,613	-	-
2007 Total			**55,641,771**	**3,683,575**	**76,359**	**10,829,064**
2008	Honam	#1	793,048	808	177	-
		#2	887,772	1,225	167	-
	Samcheonpo	#1	1,759,936	-	137	-
		#2	1,628,693	-	1,065	-
		#3	1,635,809	-	614	-
		#4	1,662,981	-	726	-
		#5	1,718,759	-	874	-
		#6	1,844,647	-	448	-
	Yonghung	#1	1,894,596	-	5,594	-
		#2	1,881,013	-	3,033	-
		#3	1,694,625	-	2,173	-
		#4	1,217,547	-	769	-
	Boryeong	#1	1,697,622	-	566	-
		#2	1,328,646	-	196	-
		#3	1,528,112	-	233	-
		#4	1,694,212	-	339	-
		#5	1,503,611	-	642	-
		#6	1,704,157	-	301	-
		#7	1,102,498	-	2,696	-
		#8	227,312	-	1,060	-
	Taean	#1	1,493,418	-	589	-
		#2	1,570,393	-	146	-
		#3	1,442,632	-	551	-
		#4	1,582,461	-	122	-
		#5	1,566,721	-	363	-
		#6	1,419,495	-	626	-
		#7	1,285,747	-	1,224	-
		#8	1,553,992	-	635	-
	Hadong	#1	1,478,000	-	355	-
		#2	1,551,832	-	311	-

Year	Plant		Amount of fossil fuel($FC_{i,m,y}$)			
			Coal (t)	Heavy oil (kl)	Diesel oil (kl)	L. N. G (t)
		#3	1,573,892	-	474	-
		#4	1,469,828	-	495	-
		#5	1,592,246	-	256	-
		#6	1,525,471	-	521	-
		#7	310,138	-	2,900	-
	Dangjin	#1	1,559,086	-	60	-
		#2	1,621,753	-	136	-
		#3	1,474,550	-	751	-
		#4	1,457,994	-	771	-
		#5	1,490,658	-	250	-
		#6	1,509,171	-	132	-
		#7	1,264,913	-	645	-
		#8	1,494,311	-	314	-
	Ulsan	#1	-	30,689	565	-
		#2	-	29,228	562	-
		#3	-	32,541	480	-
		#4	-	228,138	4,016	-
		#5	-	163,748	2,965	-
		#6	-	225,645	3,757	-
	Yeongnam	#1	-	59,763	1,476	-
		#2	-	40,030	802	-
	Yeosu	#1	-	32,576	202	-
		#2	-	111,854	341	-
	Pyongtaek	#1	-	91,937	77	2,562
		#2	-	125,789	90	4,744
		#3	-	135,720	145	4,232
		#4	-	86,454	100	3,020
	Namjeju	#1	-	-	-	-
		#2	-	-	-	-
		#3	-	132,984	146	-
		#4	-	119,301	127	-
	Jeju	#1	-	-		-
		#2	-	84,258	81	-
		#3	-	89,652	101	-
	Seoul	#4	-	-	1	55,095
		#5	-	-	0	138,068
	Incheon	#1	-	-	-	28,582
		#2	-	-	-	30,186
		#3	-	-	292	32,472
		#4	-	-	238	27,637
	Pyongtaek	C/C	-	-	-	150,276

Year	Plant		Amount of fossil fuel($FC_{i,m,y}$)			
			Coal (t)	Heavy oil (kl)	Diesel oil (kl)	L. N. G (t)
	Ilsan	C/C	-	-	-	636,633
	Bundang	C/C	-	-	-	651,005
	Ulsan	C/C	-	-	-	655,938
	Seoincheon	C/C	-	-	721	1,436,788
	Shinincheon	C/C	-	-	-	1,607,180
	Boryeong	C/C	-	-	-	894,790
	Incheon	C/C	-	-	-	459,923
	Busan	C/C	-	-	-	1,456,370
	Hallim	C/C	-	-	6,883	-
	Anyang	C/C	-	-	-	292,931
	Bucheon	C/C	-	-	-	302,746
	POSCO POWER	C/C	-	-	-	587,956
	GS Bugog	C/C	-	-	-	709,116
	Yulchon	C/C	-	-	-	347,123
	Namjeju	D/P	-	19,875	482	-
	Jeju	G/T	-	-	503	-
	Jeju	D/P	-	46,728	-	-
2008 Total			**62,694,298**	**1,888,943**	**59,590**	**10,515,372**

Source: Statistics of Electric Power in KOREA (2006, 2007, 2008) (KEPCO)

<Table Annex-2> Net Caloric Value

year	Plant		Net Caloric value($NCV_{i,y}$)			
			Coal (kcal/kg)	Heavy oil (kcal/l)	Diesel oil (kcal/l)	L. N. G (kcal/kg)
2006	Honam	#1	5,164	9,318	8,472	
		#2	5,137	9,332	8,426	
	Samcheonpo	#1	5,640		8,373	
		#2	5,645		8,373	
		#3	5,565		8,373	
		#4	5,568		8,363	
		#5	4,974		8,550	
		#6	4,993		8,550	
	Yonghung	#1	5,768		8,447	
		#2	5,782		8,454	
	Boryeong	#1	5,479		8,412	
		#2	5,478		8,496	
		#3	5,552		8,496	
		#4	5,533		8,496	
		#5	5,552		8,312	
		#6	5,542		8,312	
	Taean	#1	5,683		8,312	
		#2	5,679		7,952	
		#3	5,684		8,216	
		#4	5,680		8,232	
		#5	5,638		8,232	
		#6	5,662		8,232	
		#7	5,667		8,130	
	Hadong	#1	5,670		8,396	
		#2	5,662		8,482	
		#3	5,660		8,481	
		#4	5,671		8,384	
		#5	5,665		8,466	
		#6	5,669		8,456	
	Dangjin	#1	5,588		8,526	
		#2	5,611		8,529	
		#3	5,592		8,556	

year	Plant		Net Caloric value($NCV_{i,y}$)			
			Coal (kcal/kg)	Heavy oil (kcal/l)	Diesel oil (kcal/l)	L. N. G (kcal/kg)
		#4	5,581		8,564	
		#5	5,743		8,507	
		#6	5,814		8,450	
		#7	5,527		8,535	
	Ulsan	#1		9,419	8,664	
		#2		9,427	8,664	
		#3		9,423	8,664	
		#4		9,529	8,664	
		#5		9,531	8,664	
		#6		9,533	8,664	
	Yeongnam	#1		9,631	8,403	
		#2		9,605	8,419	
	Yeosu	#1		9,465	8,358	
		#2		9,456	8,356	
	Pyongtaek	#1		9,222	8,496	11,647
		#2		9,233	8,496	11,647
		#3		9,260	8,501	11,573
		#4		9,208	8,501	11,667
	Namjeju	#1		9,413	8,525	
		#2		9,412	8,504	
		#3		9,403	8,491	
	Jeju	#1		9,377	8,429	
		#2		9,454	8,524	
		#3		9,455	8,524	
	Seoul	#4			8,617	11,716
		#5			8,617	11,594
	Incheon	#1				11,733
		#2				11,725
		#3			8,533	11,716
		#4			8,532	11,722
	Pyongtaek C/C	C/C			8,503	11,727
	Ilsan	C/C			8,540	11,715
	Bundang	C/C				11,723
	Ulsan	C/C				11,381
	Seoincheon	C/C			8,740	11,723
	Shinincheon	C/C				11,723
	Boryeong	C/C				11,730
	Incheon	C/C				11,698
	Busan	C/C				11,716
	Hallim	C/C			8,506	
	Anyang	C/C				11,726

year	Plant		Net Caloric value($NCV_{i,y}$)			
			Coal (kcal/kg)	Heavy oil (kcal/l)	Diesel oil (kcal/l)	L. N. G (kcal/kg)
	Bucheon	C/C			10,381	11,711
	POSCO POWER	C/C				11,728
	G S Bugog	C/C				11,727
	Yulchon	C/C				12,039
	Namjeju	D/P		9,734	8,462	
	Jeju	G/T			8,352	
	Jeju	D/P		9,136		
2007	Honam	#1	5,186	9,311	8,497	
		#2	5,190	9,311	8,493	
	Samcheonpo	#1	5,545		8,373	
		#2	5,537		8,373	
		#3	5,525		8,349	
		#4	5,540		8,349	
		#5	4,865		8,550	
		#6	4,864		8,550	
	Yonghung	#1	5,745		8,391	
		#2	5,739		8,457	
		#3	5,822		7,878	
		#4				
	Boryeong	#1	5,519		8,496	
		#2	5,515		8,496	
		#3	5,518		8,655	
		#4	5,513		8,944	
		#5	5,520		8,655	
		#6	5,518		8,655	
	Taean	#1	5,733		8,174	
		#2	5,733		8,387	
		#3	5,734		8,388	
		#4	5,727		7,963	
		#5	5,686		8,361	
		#6	5,695		8,347	
		#7	5,717		8,044	
		#8	5,722		7,256	
	Hadong	#1	5,647		8,492	
		#2	5,645		8,456	
		#3	5,627		8,469	
		#4	5,639		8,519	
		#5	5,652		8,492	
		#6	5,640		8,495	
	Dangjin	#1	5,660		8,610	

year	Plant		Net Caloric value($NCV_{i,y}$)			
			Coal (kcal/kg)	Heavy oil (kcal/l)	Diesel oil (kcal/l)	L. N. G (kcal/kg)
		#2	5,663		8,606	
		#3	5,657		8,617	
		#4	5,659		8,635	
		#5	5,713		8,620	
		#6	5,737		8,613	
		#7	5,725		8,621	
		#8	5,742		8,596	
	Ulsan	#1		9,413	8,664	
		#2		9,420	8,664	
		#3		9,360	8,664	
		#4		9,508	8,664	
		#5		9,511	8,664	
		#6		9,502	8,664	
	Youngnam	#1		9,643	8,402	
		#2		9,643	8,403	
	Yosu	#1		9,464	8,368	
		#2		9,462	8,370	
	Pyongtaek	#1		9,445	8,534	11,650
		#2		9,448	8,530	11,653
		#3		9,447	8,518	11,650
		#4		9,460	8,517	11,651
	Namjeju	#1				
		#2				
		#3		9,411	8,201	
		#4		9,410	8,515	
	Jeju	#1		9,412	8,458	
		#2		9,420	7,906	
		#3		9,419	8,490	
	Seoul	#4			7,411	11,727
		#5			8,617	11,727
	Incheon	#1				11,727
		#2				11,730
		#3			8,514	11,730
		#4			8,483	11,730
	Pyongtaek C/C	C/C			8,503	11,739
	Ilsan	C/C				11,725
	Bundang	C/C			8,716	11,728
	Ulsan	C/C				11,610
	Seoincheon	C/C				11,739
	Shinincheon	C/C				11,735

year	Plant		Net Caloric value($NCV_{i,y}$)			
			Coal (kcal/kg)	Heavy oil (kcal/l)	Diesel oil (kcal/l)	L. N. G (kcal/kg)
	Boryeong	C/C				11,735
	Incheon	C/C				11,726
	Busan	C/C				11,727
	Hallim	C/C			8,533	
	Anyang	C/C				11,741
	Bucheon	C/C				11,898
	POSCO POWER	C/C				11,756
	G S Bugog	C/C				11,734
	Yulchon	C/C				11,732
	Namjeju	D/P		9,419	8,323	
	Jeju	G/T			8,447	
	Jeju	D/P		9,396		
2008	Honam	#1	5,089	9,311	8,484	
		#2	5,105	9,312	8,492	
	Samcheonpo	#1	5,524		4,577	
		#2	5,506		8,373	
		#3	5,506		8,349	
		#4	5,524		8,349	
		#5	4,839		8,550	
		#6	4,836		8,550	
	Yonghung	#1	5,871		8,246	
		#2	5,870		8,446	
		#3	5,767		9,564	
		#4	5,771		8,416	
	Boryeong	#1	5,402		8,496	
		#2	5,442		8,496	
		#3	5,377		10,876	
		#4	5,387		8,558	
		#5	5,380		9,208	
		#6	5,386		8,655	
		#7	5,451		8,139	
		#8	5,401		4,824	
	Taean	#1	5,636		8,366	
		#2	5,639		8,398	
		#3	5,632		8,396	
		#4	5,638		8,224	
		#5	5,660		8,226	
		#6	5,662		8,341	
		#7	5,700		8,355	
		#8	5,666		8,393	

year	Plant		Net Caloric value($NCV_{i,y}$)			
			Coal (kcal/kg)	Heavy oil (kcal/l)	Diesel oil (kcal/l)	L. N. G (kcal/kg)
	Hadong	#1	5,579		8,377	
		#2	5,569		8,344	
		#3	5,575		8,475	
		#4	5,572		8,466	
		#5	5,573		8,487	
		#6	5,572		8,419	
		#7	5,798		7,546	
	Dangjin	#1	5,520		8,555	
		#2	5,501		8,537	
		#3	5,513		8,554	
		#4	5,503		8,464	
		#5	5,570		8,596	
		#6	5,562		8,537	
		#7	5,581		7,678	
		#8	5,566		8,543	
	Ulsan	#1		9,439	8,635	
		#2		9,444	8,664	
		#3		9,440	8,664	
		#4		9,516	8,662	
		#5		9,530	8,662	
		#6		9,513	8,662	
	Yeongnam	#1		9,674	8,446	
		#2		9,676	8,450	
	Yeosu	#1		9,449	8,352	
		#2		9,447	8,352	
	Pyongtaek	#1		9,423	8,525	11,592
		#2		9,430	8,532	11,663
		#3		9,426	8,456	11,615
		#4		9,418	8,522	11,661
	Namjeju	#1				
		#2				
		#3		9,415	8,555	
		#4		9,356	8,557	
	Jeju	#1				
		#2		9,423	8,490	
		#3		9,421	8,490	
	Seoul	#4			8,617	11,739
		#5			8,609	11,734
	Incheon	#1				11,736
		#2				11,737

year	Plant		Net Caloric value($NCV_{i,y}$)			
			Coal (kcal/kg)	Heavy oil (kcal/l)	Diesel oil (kcal/l)	L. N. G (kcal/kg)
		#3			8,470	11,739
		#4			8,470	11,734
	Pyongtaek	C/C				11,744
	Ilsan	C/C				11,732
	Bundang	C/C				11,737
	Ulsan	C/C				11,648
	Seoincheon	C/C			-	11,739
	Shinincheon	C/C				11,739
	Boryeong	C/C				11,733
	Incheon	C/C				11,697
	Busan	C/C				11,730
	Hallim	C/C			8,536	
	Anyang	C/C				11,816
	Bucheon	C/C				11,191
	POSCO POWER	C/C				11,740
	GS Bugog	C/C				12,084
	Yulchon	C/C				11,737
	Namjeju	D/P		9,392	8,546	
	Jeju	G/T			8,457	
	Jeju	D/P		9,407		

Source: Statistics of Electric Power in KOREA (2006, 2007, 2008) (KEPCO)

<Table Annex-3> Electricity delivered to the grid by power plants ($EG_{m,y}$) and *EF* for each plant

Year	Plant		Net electricity generated $EG_{m,y}$ (MWh)	EF for each plant ($tonCO_2/MWh$)
2006	Honam	#1	1,622,639	0.9340
		#2	1,782,016	0.9313
	Samcheonpo	#1	4,161,219	0.8620
		#2	3,703,880	0.8622
		#3	3,779,585	0.8387
		#4	3,816,997	0.8328
		#5	3,761,205	0.8259
		#6	4,065,091	0.8150
	Yonghung	#1	5,337,432	0.8129
		#2	5,727,937	0.8065
	Boryeong	#1	3,988,848	0.8434
		#2	3,423,101	0.8341
		#3	3,409,486	0.8082
		#4	4,133,946	0.8080
		#5	3,364,148	0.8022
		#6	3,987,488	0.8093
	Taean	#1	3,556,797	0.8116
		#2	4,035,753	0.8081
		#3	3,528,613	0.8086
		#4	4,069,820	0.8101
		#5	4,013,235	0.8125
		#6	3,381,867	0.8131
		#7	159,677	0.8976
	Hadong	#1	3,607,063	0.8092
		#2	4,068,036	0.8049
		#3	4,079,158	0.8056
		#4	3,631,374	0.8061
		#5	4,092,625	0.8065
		#6	3,610,222	0.8077
	Dangjin	#1	3,598,820	0.8040
		#2	4,115,891	0.8021
		#3	3,666,490	0.8020
		#4	3,610,984	0.8041
		#5	3,946,931	0.7947
		#6	3,392,395	0.7836
		#7	1,474	2.3058
	Ulsan	#1	275,016	0.7879
		#2	306,668	0.7832
		#3	376,132	0.7675
		#4	1,511,557	0.7257
		#5	1,583,846	0.7213

Year	Plant		Net electricity generated $EG_{m,y}$ (MWh)	EF for each plant ($tonCO_2/MWh$)
		#6	1,589,838	0.7232
	Yeongnam	#1	359,205	0.9149
		#2	323,595	0.9043
	Yeosu	#1	403,547	0.7367
		#2	906,849	0.7126
	Pyongtaek	#1	1,123,948	0.6879
		#2	1,198,620	0.6875
		#3	1,304,568	0.6899
		#4	1,052,228	0.6884
	Namjeju	#1	34,448	0.9864
		#2	28,686	1.0148
		#3	179,033	0.8082
	Jeju	#1	24,748	1.0328
		#2	462,023	0.7357
		#3	479,676	0.7323
	Seoul	#4	306,558	0.6028
		#5	685,011	0.5883
	Incheon	#1	32,932	0.5625
		#2	24,366	0.5714
		#3	78,669	0.5325
		#4	62,414	0.5446
	Pyongtaek C/C	C/C	497,441	0.4507
	Ilsan	C/C	3,038,165	0.4890
	Bundang	C/C	4,059,300	0.4730
	Ulsan	C/C	3,608,435	0.3845
	Seoincheon	C/C	8,726,521	0.3666
	Shinincheon	C/C	11,797,500	0.3707
	Boryeong	C/C	7,089,662	0.3757
	Incheon	C/C	3,648,288	0.3533
	Busan	C/C	10,455,401	0.3557
	Hallim	C/C	175,356	0.7147
	Anyang	C/C	1,286,480	0.4786
	Bucheon	C/C	1,241,795	0.4845
	POSCO POWER	C/C	2,338,128	0.4653
	G S Bugog	C/C	2,911,683	0.3569
	Yulchon	C/C	2,276,276	
	Namjeju	D/P	239,690	0.6603
	Jeju	G/T	15,986	1.3123
	Jeju	D/P	252,764	0.6045
2006 Total			**206,605,293**	**0.6791**
2007	Honam	#1	1,806,765	0.9343
		#2	1,773,852	0.9303

Year	Plant		Net electricity generated $EG_{m,y}$ (MWh)	EF for each plant ($tonCO_2/MWh$)
	Samcheonpo	#1	3,903,591	0.8687
		#2	4,398,382	0.8515
		#3	4,311,704	0.8431
		#4	3,840,729	0.8345
		#5	4,074,103	0.8284
		#6	3,823,174	0.8177
	Yonghung	#1	5,020,901	0.8174
		#2	6,081,490	0.8128
		#3	320,502	0.8457
		#4		
	Boryeong	#1	3,604,642	0.8421
		#2	4,120,511	0.8303
		#3	4,214,892	0.8086
		#4	3,438,773	0.8099
		#5	4,162,530	0.8101
		#6	3,817,024	0.8078
	Taean	#1	4,055,394	0.8078
		#2	3,796,670	0.8118
		#3	4,039,811	0.8094
		#4	3,504,214	0.8089
		#5	3,523,988	0.8121
		#6	4,036,733	0.8123
		#7	3,868,817	0.7934
		#8	2,528,587	0.7824
	Hadong	#1	4,140,667	0.8089
		#2	3,681,670	0.8030
		#3	3,727,907	0.8056
		#4	4,115,014	0.8075
		#5	3,905,190	0.8067
		#6	4,158,792	0.8057
	Dangjin	#1	3,968,103	0.8088
		#2	3,595,927	0.8019
		#3	4,010,715	0.8014
		#4	4,009,178	0.8037
		#5	3,443,482	0.7965
		#6	3,497,359	0.7882
		#7	2,904,680	0.7886
		#8	1,297,925	0.7853
	Ulsan	#1	406,685	0.7916
		#2	407,321	0.7955
		#3	458,584	0.7812
		#4	1,418,034	0.7296

Year	Plant		Net electricity generated $EG_{m,y}$ (MWh)	EF for each plant ($tonCO_2/MWh$)
		#5	1,540,400	0.7316
		#6	899,604	0.7314
	Yeongnam	#1	688,935	0.7748
		#2	474,475	0.7896
	Yeosu	#1	497,053	0.7334
		#2	1,071,405	0.7195
	Pyongtaek	#1	1,147,515	0.7085
		#2	1,553,162	0.7031
		#3	1,502,099	0.7037
		#4	1,095,986	0.7070
	Namjeju	#1		
		#2		
		#3	484,459	0.7661
		#4	500,222	0.7623
	Jeju	#1	3,019	1.0379
		#2	280,454	0.7455
		#3	396,186	0.7430
	Seoul	#4	357,572	0.5598
		#5	962,861	0.5729
	Incheon	#1	148,821	0.5446
		#2	157,042	0.5354
		#3	205,530	0.5399
		#4	95,143	0.5350
	Pyongtaek C/C	C/C	909,449	0.4445
	Ilsan	C/C	3,506,350	0.4830
	Bundang	C/C	3,741,296	0.4710
	Ulsan	C/C	4,383,453	0.3911
	Seoincheon	C/C	10,895,505	0.3664
	Shinincheon	C/C	12,533,994	0.3748
	Boryeong	C/C	7,839,371	0.3816
	Incheon	C/C	3,696,784	0.3567
	Busan	C/C	11,616,221	0.3564
	Hallim	C/C	61,752	0.7457
	Anyang	C/C	1,615,090	0.4783
	Bucheon	C/C	1,523,068	0.4789
	POSCO POWER	C/C	3,788,598	0.4659
	G S Bugog	C/C	2,767,811	0.3581
	Yulchon	C/C	2,083,451	0.3743
	Namjeju	D/P	164,390	0.6430
	Jeju	G/T	1,294	1.6864
	Jeju	D/P	235,626	0.6254
2007 Total			**230,642,413**	**0.6779**

Year	Plant		Net electricity generated $EG_{m,y}$ (MWh)	EF for each plant ($tonCO_2/MWh$)
2008	Honam	#1	1,614,014	0.9388
		#2	1,816,464	0.9371
	Samcheonpo	#1	4,230,470	0.8612
		#2	3,931,527	0.8554
		#3	4,024,666	0.8389
		#4	4,118,892	0.8362
		#5	3,779,114	0.8253
		#6	4,071,070	0.8213
	Yonghung	#1	5,137,490	0.8141
		#2	5,112,704	0.8107
		#3	4,535,951	0.8087
		#4	3,193,481	0.8251
	Boryeong	#1	4,017,302	0.8558
		#2	3,247,137	0.8346
		#3	3,733,602	0.8249
		#4	4,162,971	0.8217
		#5	3,677,963	0.8247
		#6	4,170,094	0.8250
		#7	2,878,738	0.7846
		#8	748,005	0.6171
	Taean	#1	3,894,659	0.8103
		#2	4,093,884	0.8106
		#3	3,763,910	0.8092
		#4	4,119,808	0.8116
		#5	4,089,287	0.8127
		#6	3,711,227	0.8119
		#7	3,482,731	0.7894
		#8	4,186,293	0.7885
	Hadong	#1	3,827,102	0.8076
		#2	4,012,667	0.8072
		#3	4,074,310	0.8073
		#4	3,804,790	0.8069
		#5	4,114,218	0.8084
		#6	3,953,083	0.8061
		#7	870,781	0.7814
	Dangjin	#1	3,991,074	0.8080
		#2	4,162,369	0.8032
		#3	3,800,792	0.8020
		#4	3,737,406	0.8050
		#5	3,908,658	0.7961
		#6	4,006,307	0.7852
		#7	3,336,619	0.7933

Year	Plant		Net electricity generated $EG_{m,y}$ (MWh)	EF for each plant ($tonCO_2/MWh$)
		#8	3,992,732	0.7807
	Ulsan	#1	114,753	0.8109
		#2	108,931	0.8146
		#3	123,706	0.7952
		#4	945,479	0.7370
		#5	678,426	0.7386
		#6	937,531	0.7343
	Yeongnam	#1	229,316	0.8135
		#2	149,357	0.8336
	Yeosu	#1	130,854	0.7475
		#2	454,052	0.7376
	Pyongtaek	#1	386,361	0.7268
		#2	534,121	0.7260
		#3	576,432	0.7216
		#4	365,269	0.7272
	Namjeju	#1		
		#2		
		#3	559,817	0.7077
		#4	517,866	0.6819
	Jeju	#1		
		#2	336,676	0.7461
		#3	357,666	0.7472
	Seoul	#4	258,052	0.5698
		#5	596,641	0.6173
	Incheon	#1	141,085	0.5405
		#2	152,576	0.5279
		#3	162,092	0.5393
		#4	139,637	0.5324
	Pyongtaek	C/C	903,201	0.4442
	Ilsan	C/C	3,491,175	0.4864
	Bundang	C/C	3,748,232	0.4634
	Ulsan	C/C	4,454,326	0.3900
	Seoincheon	C/C	10,308,626	0.3720
	Shinincheon	C/C	11,531,252	0.3720
	Boryeong	C/C	6,126,641	0.3896
	Incheon	C/C	3,420,631	0.3575
	Busan	C/C	10,848,484	0.3580
	Hallim	C/C	23,547	0.7584
	Anyang	C/C	1,638,638	0.4802
	Bucheon	C/C	1,657,898	0.4646
	POSCO POWER	C/C	3,328,129	0.4715
	GS Bugog	C/C	5,509,092	0.3536

Year	Plant		Net electricity generated $EG_{m,y}$ (MWh)	EF for each plant ($tonCO_2/MWh$)
	Yulchon	C/C	2,488,267	0.3722
	Namjeju	D/P	93,201	0.6465
	Jeju	G/T	643	2.0096
	Jeju	D/P	223,630	0.6214
2008 Total			**237,888,670**	**0.6874**

Source: Statistics of Electric Power in KOREA (2006, 2007, 2008) (KEPCO)

<Table Annex-4> Sample group plants used in the Build Margin calculation and CO_2 Emission Factor of the Build Margin

Year	No.	Plant name		Technology	Type of Fossile Fue	year operation	Net electricity generated (EGm,y)	CO_2 emission factor ($EF_{EL,m,y}$)	Results
							MWh in 2008	tCO2/MWh	EF for each plant (tonCO2eq./MWh)
2 0 0 8	1	Boryeong	#8	steam power	Bituminous coal	2008.12	748,005	0.6171	0.0056
	2	Hadong	#7	steam power	Bituminous coal	2008.12	870,781	0.7814	0.0083
	3	Yeongheung	#4	steam power	Bituminous coal	2008.12	3,193,481	0.8252	0.0320
	4	Kyeongcheon		small hydro power		2008.11	1,273		
	5	Seongnam 2		small hydro power		2008.10			
	6	Nulokdo solar		solar		2008.09			
	7	Jeju solar		solar		2008.09	11		
	8	Boryeong fuel cell		fuel cell		2008.09			
	9	Naebyeong solar		solar		2008.08			
	10	Yulhyeon		small hydro power		2008.07	144		
	11	Busan C/C solar		solar		2008.07	167		
	12	Hadong solar		solar		2008.07	554		
	13	Hongikdongjin		small hydro power		2008.06			
	14	Daecheongdaem		small hydro power		2008.06			
	15	Boryeong	#7	steam power	Bituminous coal	2008.06	2,878,738	0.7846	0.0274
	16	Kori-wind power		wind		2008.05			
	17	Samlangjin solar				2008.04			
	18	Boryeong solar		solar		2008.04	449		
	19	Boryeong		small hydro power		2008.03			
	20	Yeongheung		small hydro power		2008.03			
	21	Yeonggwang solar park				2008.03			
	22	POSCO fuel cell		fuel cell		2008.03			
	23	Gunjang heat & power		combined		2008.01			
	24	Seocheon solar		solar		2008.01	1,550		
	25	New solar energy and others		solar		2008	222,779		

	1	Yeongheung	#3	steam power	Bituminous coal	2007	4,535,951	0.8087	0.0445
	2	Taean		small hydro power		2007	3,924		
	3	Hanbit Sungsan the second solar		solar		2007.12			
	4	Taein gangjin solar		solar		2007.12			
	5	Suni gangjin solar		solar		2007.12			
	6	Korea yeongcheon solar		solar		2007.12			
	7	Solar yungam solar		solar		2007.12			
	8	Changwhan yeongduk solar		solar		2007.12			
	9	Samsung jindo		solar		2007.12			
	10	Hwaseong heat & power		combined		2007.12			
	11	Dangjin	#8	steam power	Bituminous coal	2007.12	3,992,732	0.7807	0.0378
	12	SP solar yonggwang		solar		2007.11			
	13	Dongyang energy sinan		solar		2007.11	4,698		
	14	Ef yungam solar		solar		2007.11			
	15	Dongwon gangjin solar		solar		2007.11			
	16	Solec yonggwang solar		solar		2007.11			
	17	Solar jungeub solar		solar		2007.11			
	18	Sinbuk yungam solar		solar		2007.11			
	19	Hyein haenam solar		solar		2007.11			
2	20	Samlangjin solar		solar		2007.11			
	21	Hyosung daegi-wind power		wind		2007.11	409		
	22	Nonhyun heat & power		combined		2007.10			
0	23	Wuriyungam solar		solar		2007.08			
	24	Hwasung solar		solar		2007.08			
	25	Yeongju the first solar		solar		2007.08			
	26	Muan solar		solar		2007.08			
0	27	Jangheung solar		solar		2007.08			
	28	Gomun		small hydro power		2007.08			
	29	Taean	#8	steam power	Bituminous coal	2007.08	4,186,293	0.7885	0.0401
7	30	Dangjin	#7	steam power	Bituminous coal	2007.06	3,336,619	0.7933	0.0321
	31	Munkyung solar		solar		2007.06			
	32	Younggwang solar park		solar		2007.06			
	33	Yungam Solar		solar		2007.06			
	34	Wonjungsu		small hydro power		2007.05			
	35	Baekgok		small hydro power		2007.05	518		
	36	damyangho		small hydro power		2007.05	1,048		
	37	Juam		small hydro power		2007.05			
	38	Namjeju	#4	thermal	heavy oil	2007.03	517,866	0.6819	0.0043
	39	Eco energy		solar		2007.03	357,529		
	40	hapcheon		small hydro power		2007.02	6,442		
	41	Jeonju-resource recovery facility				2007.02	12,682		
	42	Seoul Marin(suncheon)		solar		2007.02	1,271		
	43	Mirae energy		solar		2007.02			
	44	Seomjingang		small hydro power		2007.02	122,714		
	45	samcheonpo		small hydro power		2007.02			
	46	dalbang		small hydro power		2007.02			
	47	Taean	#7	steam power	Bituminous coal	2007.02	3,482,731	0.7894	0.0334
	48	Yeongju the second solar		solar		2007.01	2,272		
	49	Hyundaedaesan		combined		2007.01			

2	1	Cheongsong pumping	#2	pumping		2006.12	276,444		
	2	S&P Solar		solar		2006.10			
	3	Bundang fuel cell		fuel cell	LNG	2006.10			
	4	Namhae Solar		solar		2006.10			
	5	HanlaJeunggong Solar		solar		2006.10			
	6	Yungam Solar		solar		2006.09			
	7	Enepark		solar		2006.09	460		
	8	Yeongheung solar		solar		2006.09	1,290		
	9	Cheongsong pumping	#1	pumping		2006.09	206,291		
0	10	Namjeju	#3	thermal	heavy oil	2006.09	559,817	0.7077	0.0048
	11	yangyang(pumping)	#4	pumping		2006.08	163,281		
	12	Donghae Solar		solar		2006.08			
0	13	Kangwon-wind power		wind		2006.07			
	14	Woljeong-wind power		wind		2006.07	3,445		
	15	yangyang pump windpower		wind		2006.06			
6	16	Hadongho		small hydro power		2006.06	996		
	17	yangyang (pumping)	#3	pumping		2006.06	169,538		
	18	Goheung Solar		solar		2006.06			
	19	Jangseong		small hydro power		2006.05	1,937		
	20	yangyang (pumping)	#2	pumping		2006.04	210,031		
	21	Dangjin	#6	thermal	Bituminous coal	2006.04	4,006,307	0.7852	0.0382
	22	Sinchang-wind power		wind		2006.03	3,561		
	23	yangyang (pumping)	#1	pumping		2006.02	141,700		

	1	Janghengdam		small hydro power		2005.12		
	2	Suncheon Solar		solar		2005.12		
	3	Samcheonpo solar energy		solar		2005.12	135	
	4	Dangjin	#5	steam power	Bituminous coal	2005.10	3,908,658	0.7961	0.0378
	5	yangyang pump small hydro		small hydro power		2005.10		
	6	Taean solar energy		solar		2005.10	130	
	7	Jeju DP		internal combustion	heavy oil	2005.07	223,630	0.6214	0.0017
2	8	WunjeongLFG		internal combustion	LFG	2005.07	7,701		
	9	Yulchon		combined	LNG	2005.07	2,488,267	0.3722	0.0112
	10	Incheon		combined	LNG	2005.07	3,420,631	0.3575	0.0148
0	11	Daegok		small hydro power		2005.07	1,635		
	12	Donghwa		small hydro power		2005.07	1,853		
	13	Ulchin	#6	nuclear		2005.04	8,107,887		
0	14	Hanrye		LFG	LFG	2005.04	21,265		
	15	Busan Bio-gas		internal combustion	LFG	2005.03	2,884		
	16	Sungnam		small hydro power		2004.12			
5	17	Yungduk-wind power		wind		2004.12			
	18	Yongdam		small hydro power		2004.12	110,934		
	19	Maebongsan-wind power		wind		2004.12	20,896		
	20	Daegwanryeong-wind power		wind		2004.12	4,949		
	21	Yeongheung	#2	steam power	Bituminous coal	2004.11	5,112,704	0.8107	0.0503
	22	Yeongheung	#1	steam power	Bituminous coal	2004.07	5,137,490	0.8141	0.0507
	23	Ulchin	#5	nuclear		2004.07	8,763,822		
	24	Busan		combined combustion	LNG	2003.05/2004.03	10,848,484	0.3580	0.0471
Total							82,412,683		0.5221

Source: Statistics of Electric Power in KOREA (2008) (KEPCO), CurRental status of power generating facility (2008, Korea power exchange)

<Table Annex-5> Fuels CO_2 Emission factor

Fuel Type	$EF_{CO2,i,y}$ (tCO2/TJ)
Gasoline	67.5
Diesel oil	72.6
residual fuel oil	75.5
LNG	54.3
bituminous coal	89.5
Anthracite	94.6

Source: 2006 IPCC Guidelines (IPCC default value at the lower limit of the uncertainty at a 95% confidence interval data)

Appendix 5. Further background information on monitoring plan

Refer to Section the B.7

Appendix 6. Summary of post registration changes

Description of the Monitoring plan on the prior Project Design Document had some errors and was not sufficient for monitoring plan and monitoring equipment.

A prior Project Design Document defined a measuring device in inverter as measuring equipment. However, there are other electricity meters installed separately on project sites. Those electricity meters belong to one of the legal meters on Measures Act and are appropriate rather than measuring device in inverter.

Therefore, monitoring devices are changed from measuring devices in inverter to electricity meters installed separately and monitoring plan is complemented. Accuracy of level and frequency of calibration is consistent with Measures Act and domestic guideline.

The electricity meters are required to be calibrated or recalibrated every 8 years and the accuracy of level is ±1.0% in accordance with “Measures Act” and “Guideline for the support on the new & renewable energy equipment”. The quantity of generated electricity will be continuously measured and recorded monthly.

There is the difference specification of the inverters between basic design and actual installation. The difference is the output of inverters and there is no changes of these numbers.
Identified the difference is as below;

No.	PV power plant	Description of PDD		Actual installation	
		Output (kVA)	Number of units	Output (kW)	Number of units
12	Chungju Yeonsu (6)	15, 10	2, 4	20, 10	2, 4
19	Wonju Musil(2)	10	10	10.5	10
20	Eumseong Maengdong(1)	10	4	10.5	4
21	Eumseong Gamgok	10, 15	5, 1	10.5, 15	5, 1
22	Jecheon Gangjeo(A3)	10, 15	4, 5	10.5, 15	4, 5
23	Taean Pyeongcheon(1)	10, 15, 20	2, 4, 1	10.5, 15, 20	2, 4, 1
27	Iksan Baesan(1)	10, 15, 20	4, 2, 2	10.5, 15, 20	4, 2, 2
28	Iksan Baesan(3)	10, 15, 20	6, 2, 4	10.5, 15, 20	6, 2, 4
29	Yeosu Jungnim(A1)	10	4	10.5	4
30	Yeosu Jungnim(A2)	10, 15	6, 1	10.5,15	6, 1

There are slightly differences on GPS of 16 photovoltaic plant sites among total 36 bundling PV power plants. The detail information on changes of GPS is as below.

No.	PV Power plant	PDD (ver.09)		PDD (ver.10)	
		Latitude	Longitude	Latitude	Longitude
5	Gimcheon Daesin	36.137251˚	127.457187˚	36.137000	128.115900
6	Gyeongsan Sadong(1)	35.808066˚	128.761637˚	35.808700	128.759200
7	Gyeongsan Sadong(2)	35.811552˚	128.755755˚	35.808000	128.761700
8	Sacheon Yonggang(2)	34.948195˚	128.085365˚	34.946700	128.082700
10	Yangsan Daesuk	35.418364˚	129.064869˚	35.391700	129.051900
13	Jecheon Gangjeo(A1)	37.117533˚	128.218473˚	37.124100	128.205100
15	Gochang Eumnae	35.439775˚	126.693864˚	35.438900	126.694200
19	Wonju Musil(2)	37.330040˚	127.922954˚	37.335800	127.931700
22	Jecheon Gangjeo(A3)	37.123397˚	128.204219˚	37.121100	128.200400
25	Iksan Hamyeol	36.077435˚	126.965468˚	36.076500	126.963700
27	Iksan Baesan(1)	35.951114˚	126.943630˚	35.956800	126.936400
28	Iksan Baesan(3)	35.948977˚	126.941032˚	35.953800	126.937400
29	Yeosu Jungnim(A1)	34.792271˚	127.634558˚	34.768800	127.634800
30	Yeosu Jungnim(A2)	34.761004˚	127.633354˚	34.765100	127.639600
32	Goryeong Dasan(3)	35.831669˚	128.451462˚	35.829500	128.452800
35	Sacheon Yonghyeon	35.000093˚	128.065847˚	35.009100	128.063000