



**Component project activity design document form**  
**(Version 09.0)**

*Complete this form in accordance with the instructions attached at the end of this form.*

**BASIC INFORMATION**

<b>Title of the CPA</b>	PV power plants project on collective housing of 2011-<2011-LH-001-01457>
<b>Scale of the CPA</b>	<input type="checkbox"/> Large-scale <input checked="" type="checkbox"/> Small-scale
<b>Version number of the CPA-DD</b>	Version 1
<b>Completion date of the CPA-DD</b>	31/12/2019
<b>Title and UNFCCC reference number of the registered CDM PoA</b>	Title : Programme of Activities to introduce renewable energy system into collective housing, Republic of Korea Ref No. : PoA 9247
<b>Title and reference number of the corresponding generic CPA</b>	Title : PV power plants project on collective housing Ref No. : Generic CPA 1
<b>Coordinating/managing entity</b>	Korea Land & Housing Corporation
<b>Host Party</b>	Republic of Korea
<b>Applied methodologies and standardized baselines</b>	Methodology(ies): AMS-I.F (Version 03) No Standardized methodology has been selected for this PoA
<b>Sectoral scopes</b>	1 Energy industries (renewable - / non-renewable sources)
<b>Estimated amount of annual average GHG emission reductions</b>	1,307 tCO <sub>2</sub> e/yr

## SECTION A. Description of component project activity (CPA)

### A.1. Purpose and general description of CPA

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This CPA is a part of “Programme of Activities to introduce renewable energy system into collective housing, Republic of Korea” (hereafter PoA). The CPA aims to mitigate GHG emissions through renewable energy project using photovoltaic power plant system on collective housing. This project activity using these systems to generate electricity(i.e. Type I) has a significant effect on reducing GHG emissions related to fossil fuel use. The CPA consists of 15 photovoltaic power plants which are located on the roof of the collective housing in Republic of Korea. Total capacity for the CPA is 1,457 KW and microscale type project.

Renewable energy system's information is as follows:

<Table A.1. Photovoltaic power plant system>

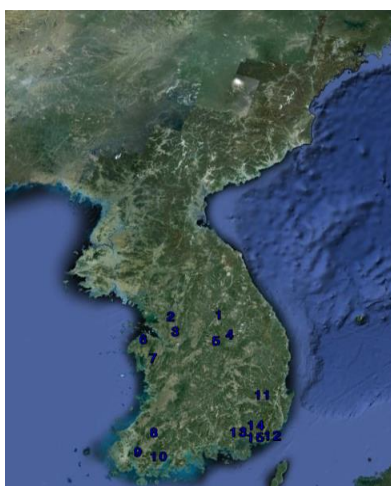
No.	Plant name	Construction date	Capacity	Etc
1	Hoengseong Eupha	2011-12-15	60.48	In-operation
2	Anyang Gwanyang (A1BL)	2011-12-08	126.72	
3	Osan Cheongho(1,2BL)	2011-12-07	129.6	
4	Jecheon Gangjeon(A2BL)	2011-12-19	60.48	
5	Chungju Yeonsu(2)	2011-12-21	172.8	
6	Seosan Daesan	2011-12-14	34.56	
7	Hongseong Namjang(2BL)	2011-12-14	83.52	
8	Gwangju Seonun(8-1,2BL)	2011-11-28	247.68	
9	Yeongam Yongang(2)	2011-12-05	46.08	
10	Jangheung Geonsan(2)	2011-12-23	40.32	
11	Yeongcheon Mangjeong	2011-12-14	80.64	
12	Yangsan Gachon	2011-12-16	77.76	
13	Changwon Bongnim(A1BL)	2011-12-20	109.44	
14	Changwon Bongnim(A2BL)	2011-12-20	92.16	
15	Busan Jisa(2)	2011-12-15	95.04	
<b>Total</b>			1,457 KW	

The estimated annual emission reduction amounts to 1,307 tCO<sub>2</sub>e/yr for the CPA. The CPA eventually contributes to total 9,149 tCO<sub>2</sub> emission reduction for this crediting period.

### A.2. Location of CPA

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The each location of 15 PV power systems is presented as follows:



< Figure A.2. The location of PV power plant>

Geographic reference of this CPA is as follows:

<Table A.2. Geographic reference>

No	Plant name	Address (Change to new address)	Geographic Reference	
			Latitude	Longitude
1	Hoengseong Eupha	34, Apdeulseo 2-ro, Hoengseong-eup, Hoengseong-gun, Gangwon-do	37.488065°	127.980440°
2	Anyang Gwanyang (A1BL)	120, Dongpyeon-ro, Dongan-gu, Anyang-si, Gyeonggi-do	37.411589°	126.965294°
3	Osan Cheongho(1,2BL)	486-23, Nambu-daero, Osan-si, Gyeonggi-do	37.129347°	127.087426°
4	Jecheon Gangjeo(A2BL)	110, Cheongpungho-ro 7-gil, Jecheon-si, Chungcheongbuk-do	37.121595°	128.204650°
5	Chungju Yeonsu(2)	24, Jugong-gil, Chungju-si, Chungcheongbuk-do	36.988275°	127.935643°
6	Seosan Daesan	834-6, Mangilsan-ro, Daesan-eup, Seosan-si, Chungcheongnam-do	36.941135°	126.435513°
7	Hongseong Namjang(2BL)	10, Namjangjung-ro, Hongseong-eup, Hongseong-gun, Chungcheongnam-do	36.588289°	126.667027°
8	Gwangju Seonun(8-1,2BL)	68, Seonunjungang-ro, Gwangsan-gu, Gwangju	35.146490°	126.777225°
9	Yeongam Yongang(2)	222, Samhojungang-ro, Samho-eup, Yeongam-gun, Jeollanam-do	34.744900°	126.473216°
10	Jangheung Geonsan(2)	3, Bukbu-ro, Jangheung-eup, Jangheung-gun, Jeollanam-do	34.683625°	126.903325°
11	Yeongcheon Mangjeong	80, Mangjeong-ro, Yeongcheon-si, Gyeongsangbuk-do	35.982678°	128.952848°
12	Yangsan Gachon	155, Gachon-ro, Mulgeum-eup, Yangsan-si, Gyeongsangnam-do	35.323804°	128.993752°
13	Changwon Bongnim(A1BL)	50, Sobong-ro, Uichang-gu, Changwon-si, Gyeongsangnam-do	35.254215°	128.670106°
14	Changwon Bongnim(A2BL)	25, Daebong-ro, Uichang-gu, Changwon-si, Gyeongsangnam-do	35.251079°	128.665657°
15	Busan Jisa(2)	35, Gwahaksandan 2-ro 20beon-gil, Gangseo-gu, Busan	35.151467°	128.834029°

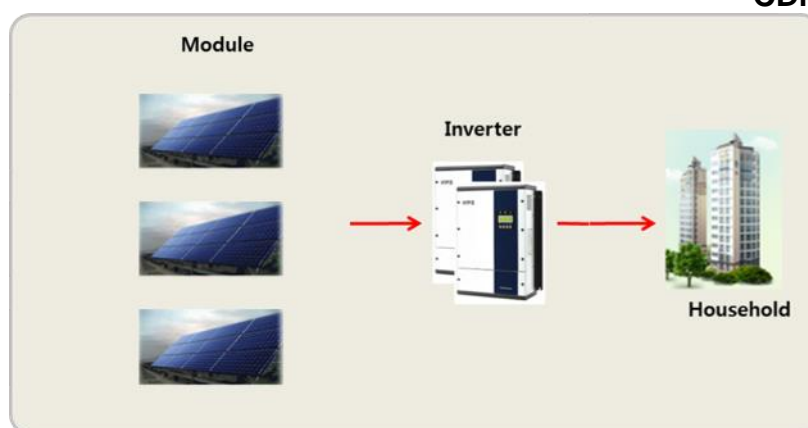
### A.3. Technologies/measures

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#### **Technologies and/or measures to be employed and/or implemented by the CPA**

The CPA is made up of micro-size 15 photovoltaic power systems on roofs of the collective buildings. The applied photovoltaic power system converts solar radiation into electric energy and supplies electricity to the user or grid(i.e. type I). It eventually replaces electricity supplied from grid. The equipment of the technologies/measure applied in each system are as follows:

- Solar module : Generate electricity from solar radiation
- Inverter : to convert DC electricity into AC electricity for use



<Figure A.3. Photovoltaic power plant system>

The photovoltaic power system operates only daylight and net electricity from the system measures continuous at electricity meter. The average lifetime of solar module of the CPA would last during the second crediting period of the CPA.

No	Plant name	Capacity	Module		Inverter	Measuring device
			Efficiency (%)	Manufacturer	Type	Type
1	Hoengseong Eupha	60.48	14.9	LG	Indoor, Vertical	Electric
2	Anyang Gwanyang (A1BL)	126.72	14.9	LG	Indoor, Vertical	Electric
3	Osan Cheongho(1,2BL)	129.6	14.9	LG	Indoor, Vertical	Electric
4	Jecheon Gangjeo(A2BL)	60.48	14.9	LG	Indoor, Vertical	Electric
5	Chungju Yeonsu(2)	172.8	14.9	LG	Indoor, Vertical	Electric
6	Seosan Daesan	34.56	14.9	LG	Indoor, Vertical	Electric
7	Hongseong Namjang(2BL)	83.52	14.9	LG	Indoor, Vertical	Electric
8	Gwangju Seonun(8-1,2BL)	247.68	14.9	T&Solar	Indoor, Vertical	Electric
9	Yeongam Yongang(2)	46.08	14.9	T&Solar	Indoor, Vertical	Electric
10	Jangheung Geonsan(2)	40.32	14.9	T&Solar	Indoor, Vertical	Electric
11	Yeongcheon Mangjeong	80.64	14.8	Hyundai	Indoor, Vertical	Electric
12	Yongsan Gachon	77.76	14.8	Hyundai	Indoor, Vertical	Electric
13	Changwon Bongnim(A1BL)	109.44	14.8	Hyundai	Indoor, Vertical	Electric
14	Changwon Bongnim(A2BL)	92.16	14.8	Hyundai	Indoor, Vertical	Electric
15	Busan Jisa(2)	95.04	14.8	Hyundai	Indoor, Vertical	Electric

**Facilities, systems and equipment in the baseline scenario (prior to the implementation of the CPA)**

The CPA is a greenfield project, displaces the electricity from KEPCO grid that is or would have been supplied by at least one fossil fuel fired generating unit prior to the implementation of the CPA.

**A.4. Coordinating/managing entity**

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Korea Land & Housing Corporation

**A.5. Parties and CPA implementers**

Parties involved	CPA implementers	Indicate if the Party involved wishes to be considered as CPA implementer (Yes/No)
Republic of Korea	• Public entity : Korea Land & Housing Corporation	No

**A.6. Public funding of CPA**

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This CPA will not receive any public funds resulting from ODA(i.e. official development assistance) from Parties included in Annex I.

**A.7. History of CPA**

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LH Corporation will check the eligibility criteria in PoA-DD that their photovoltaic power plant is neither part of any other Component project activity nor any other CDM activities. As for the above description, LH Corporation will certify through the signed letter by director.

Therefore, the CPA is not involved in another photovoltaic power plant that is registered or under validation as a CDM project activity or as a CPA under another PoA or as other GHG reduction projects.

The CPA as first CPA for the PoA has confirmed “The proposed CPA is neither registered as a CDM project activity nor included in another registered CDM PoA” and “The CPA is not a project activity that has been deregistered”.

**A.8. Debundling**

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Debundling assessment was done at the time of the CPA inclusion. So there are no needs of debundling check at the time of renewing the crediting period.

**SECTION B. Application of methodologies and standardized baselines****B.1. References to methodologies and standardized baselines**

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**Methodology:**

AMS-I.F : Renewable electricity generation for captive use and mini-grid version 03

**Methodological tool:**

Tool to calculate the emission factor for an electricity system version 07.0.

Further information for the methodology can be found at:

<http://cdm.unfccc.int/methodologies/SSCmethodologies/approved>

AMS-I.F requirements					SSC-CPA qualification Justification																														
<p>This methodology comprises renewable energy generation units, such as photovoltaic, hydro, tidal/wave, wind, geothermal and renewable biomass that supply electricity to user(s). The project activity will displace electricity from an electricity distribution system that is or would have been supplied by at least one fossil fuel fired generating unit i.e. in the absence of the project activity, the users would have been supplied electricity from one or more sources listed below:</p> <p>(a) A national or a regional grid (grid hereafter); (b) Fossil fuel fired captive power plant; (c) A carbon intensive mini-grid.</p>					<p><b><u>Satisfied</u></b></p> <p>The CPA is comprised of photovoltaic power plants supplied to households displacing electricity from grid.</p>																														
<p>Illustration of respective situations under which each of the methodology (AMS-I.D., AMS-I.F. and AMS-I.A.<sup>1</sup> ) applies is included in Table 3.</p> <p>Table 3: Applicability of AMS-I.D, AMS-I.F and AMS-I.A based on project types</p> <table><tr><th>No</th><th>Project type</th><th>AMS-I.A</th><th>AMS-I.D</th><th>AMS-I.F</th></tr><tr><td>1</td><td>Project supplies electricity to a national/regional grid</td><td></td><td>✓</td><td></td></tr><tr><td>2</td><td>Project displaces grid electricity consumption (e.g. grid import) and/or captive fossil fuel electricity generation at the user end (excess electricity may be supplied to a grid)</td><td></td><td></td><td>✓</td></tr><tr><td>3</td><td>Project supplies electricity to an identified consumer facility via national/ regional grid (through a contractual arrangement such as wheeling)</td><td></td><td>✓</td><td></td></tr><tr><td>4</td><td>Project supplies electricity to a mini grid system where in the baseline all generators use exclusively fuel oil and/or diesel fuel</td><td></td><td></td><td>✓</td></tr><tr><td>5</td><td>Project supplies electricity to household users (included in the project boundary) located in off grid areas</td><td>✓</td><td></td><td></td></tr></table>					No	Project type	AMS-I.A	AMS-I.D	AMS-I.F	1	Project supplies electricity to a national/regional grid		✓		2	Project displaces grid electricity consumption (e.g. grid import) and/or captive fossil fuel electricity generation at the user end (excess electricity may be supplied to a grid)			✓	3	Project supplies electricity to an identified consumer facility via national/ regional grid (through a contractual arrangement such as wheeling)		✓		4	Project supplies electricity to a mini grid system where in the baseline all generators use exclusively fuel oil and/or diesel fuel			✓	5	Project supplies electricity to household users (included in the project boundary) located in off grid areas	✓			<p><b><u>Satisfied</u></b></p> <p>The CPA eventually displaces grid electricity or may supply electricity to a mini grid. AMS-I.F methodology is applicable.</p>
No	Project type	AMS-I.A	AMS-I.D	AMS-I.F																															
1	Project supplies electricity to a national/regional grid		✓																																
2	Project displaces grid electricity consumption (e.g. grid import) and/or captive fossil fuel electricity generation at the user end (excess electricity may be supplied to a grid)			✓																															
3	Project supplies electricity to an identified consumer facility via national/ regional grid (through a contractual arrangement such as wheeling)		✓																																
4	Project supplies electricity to a mini grid system where in the baseline all generators use exclusively fuel oil and/or diesel fuel			✓																															
5	Project supplies electricity to household users (included in the project boundary) located in off grid areas	✓																																	

<sup>1</sup> "AMS-I.D.: Grid connected renewable electricity generation", "AMS-I.F.: Renewable electricity generation for captive use and mini-grid" and "AMS-I.A: Electricity generation by the user".

Hydro power plants with reservoirs that satisfy at least one of the following conditions are eligible to apply this methodology:	
<ul style="list-style-type: none"> <li>a. The project activity is implemented in an existing reservoir with no change in the volume of reservoir;</li> <li>b. The project activity is implemented in an existing reservoir, where the volume of reservoir is increased and the power density of the project activity, as per definitions given in the project emissions section, is greater than 4 W/m<sup>2</sup>;</li> <li>c. The project activity results in new reservoirs and the power density of the power plant, as per definitions given in the project emissions section, is greater than 4 W/m<sup>2</sup>.</li> </ul>	<p><b><u>N/A</u></b> The CPA isn't involved in hydro power plant, this condition is not applicable.</p>
This methodology is applicable for project activities that: (a) Install a new power plant at a site where there was no renewable energy power plant operating prior to the implementation of the project activity (Greenfield plant); (b) Involve a capacity addition <sup>2</sup> , (c) Involve a retrofit <sup>3</sup> of (an) existing plant(s); or (d) Involve a replacement <sup>4</sup> of (an) existing plant(s).	<p><b><u>Satisfied</u></b> The CPA will be a capacity addition or an installation for a new PV power plant at a site where there was no renewable energy power plant (Greenfield plant), this condition is applicable.</p>
In the case of project activities that involve the capacity addition of renewable energy generation units at an existing renewable power generation facility, the added capacity of the units added by the project should be lower than 15 MW and should be physically distinct <sup>5</sup> from the existing units.	<p><b><u>Satisfied</u></b> The added capacity of the units through the CPA is equal to or less than 15MW, this condition is applicable.</p>
In the case of retrofit or replacement, to qualify as a small-scale project, the total output of the retrofitted or replacement unit shall not exceed the limit of 15 MW.	<p><b><u>N/A</u></b> The CPA isn't involved in retrofit or replacement, this condition is not applicable.</p>

<sup>2</sup> A capacity addition is an increase in the installed power generation capacity of an existing power plant through: (i) The installation of a new power plant beside the existing power plant/units; or (ii) The installation of new power units, additional to the existing power plant/units. The existing power plant/units continue to operate after the implementation of the project activity.

<sup>3</sup> Retrofit (or rehabilitation or refurbishment). A retrofit is an investment to repair or modify an existing power plant/unit, with the purpose to increase the efficiency, performance or power generation capacity of the plant, without adding new power plants or units, or to resume the operation of closed (mothballed) power plants. A retrofit restores the installed power generation capacity to or above its original level. Retrofits shall only include measures that involve capital investments and not regular maintenance or housekeeping measures.

<sup>4</sup> Replacement. Investment in a new power plant or unit that replaces one or several existing unit(s) at the existing power plant. The new power plant or unit has the same or a higher power generation capacity than the plant or unit that was replaced.

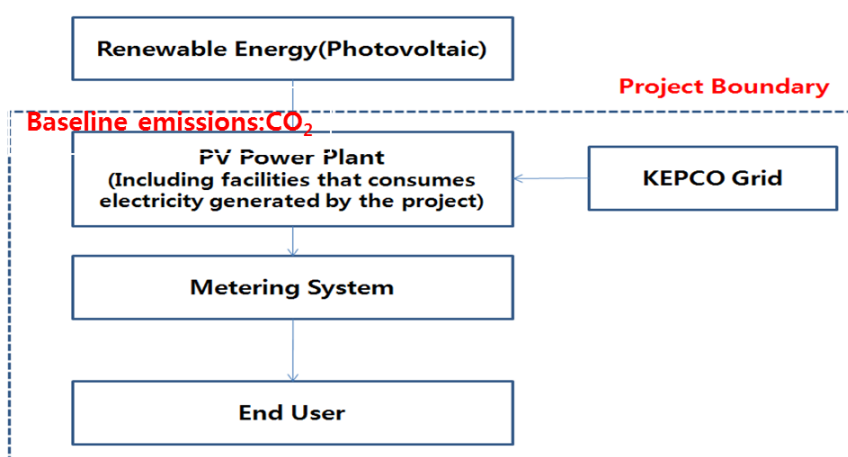
<sup>5</sup> Physically distinct units are those that are capable of generating electricity without the operation of existing units, and that do not directly affect the mechanical, thermal, or electrical characteristics of the existing facility. For example, the addition of a steam turbine to an existing combustion turbine to create a combined cycle unit would not be considered "physically distinct"

If the unit added has both renewable and non-renewable components (e.g. a wind/diesel unit), the eligibility limit of 15 MW for a small-scale CDM project activity applies only to the renewable component. If the unit added co-fires fossil fuel, <sup>6</sup> the capacity of the entire unit shall not exceed the limit of 15 MW.	<b><u>N/A</u></b> The CPA is only involved in renewable energy and its capacity is equal to or less than 15MW, this condition is not applicable.
Combined heat and power (co-generation) systems are not eligible under this category.	<b><u>N/A</u></b> The CPA isn't involved in co-generation systems, this condition is not applicable.
If electricity and/or steam/heat produced by the project activity is delivered to a third party, i.e. another facility or facilities within the project boundary, a contract between the supplier and consumer(s) of the energy will have to be entered that ensures that there is no double counting of emission reductions.	<b><u>N/A</u></b> The CPA isn't involved in production for steam/heat, this condition is not applicable.
In case biomass is sourced from dedicated plantations, the applicability criteria in the tool "Project emissions from cultivation of biomass" shall apply.	<b><u>N/A</u></b> The CPA isn't involved in biomass project activities, this condition is not applicable

## B.2. Project boundary, sources and greenhouse gases (GHGs)

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As per stipulated in AMS-I.F (Version 03), the extent of CPA boundary includes facilities consuming electricity generated by this project. The project boundary is confined to physical, geographical site of renewable generating units. The boundary also extends to the project power plant and all power plants connected physically to the electricity system of KEPCO.



< Figure D.1. Project Boundary >

<sup>6</sup> A co-fired system uses both fossil and renewable fuels, for example the simultaneous combustion of both biomass residues and fossil fuels in a single boiler. Fossil fuel may be used during a period of time when the biomass is not available and due justification are provided.



Source		GHG	Included?	Justification/Explanation
Baseline	CO <sub>2</sub> emissions from electricity generation in fossil fuel fired power plants that are displaced due to the project activity	CO <sub>2</sub>	Included	Major source of emissions in the baseline
		CH <sub>4</sub>	Excluded	Excluded for simplification. This is conservative
		N <sub>2</sub> O	Excluded	Excluded for simplification. This is conservative
Project activity	CO <sub>2</sub> emissions from on-site consumption	CO <sub>2</sub>	Excluded	Based on AMS-I.F
		CH <sub>4</sub>	Excluded	Based on AMS-I.F
		N <sub>2</sub> O	Excluded	Based on AMS-I.F

### B.3. Establishment and description of baseline scenario

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The CPA of the PoA eventually displaces electricity from national or regional grid that is or would have been supplied by at least one fossil fuel fired generating unit in the absence of the project activity.

In case of renewal of crediting period for an included CPA, data and parameter used for determining the original baseline of the CPA only assess whether they are valid or not at time of requesting renewal of the CPA as “CDM project standard for programmes of activities” and “Assessment of the validity of the original/current baseline and update of the baseline at the renewal of the crediting period(version 03.0.1)” as below:

Assessment of the validity of the original/current baseline and update of the baseline at the renewal of the crediting period (Version 03.0.1)	Justification
<b>Step 1 &gt;&gt;</b> Assess the validity of the current baseline for the next crediting period Step 1.1: Assess compliance of the current baseline with relevant mandatory national and/or sectoral policies Step 1.2: Assess the impact of circumstances Step 1.3: Assess whether the continuation of use of current baseline equipment(s) or an investment is the most likely scenario for the crediting period for which renewal is requested. Step 1.4: Assessment of the validity of the data and parameters	There are no changes on national policies and circumstances for renewable energy(i.e. photovoltaic plants). Lifetimes of the project equipment are enough to cover the renewal crediting period. Therefore, a consistent operation of the CPA are positive.  But, the CPA should update emission factors for renewal of crediting period.
<b>Step 2 &gt;&gt;</b> Update the current baseline and the data and parameters Step 2.1: Update the current baseline Step 2.2: Update the data and parameters	Emission factor for the CPA is consistent with emission factor(i.e. EF <sub>BL,y</sub> ) for its PoA-DD.

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.

$$BE_y = EG_{BL,y} \times EF_{CO_2,y}$$

Where :

$BE_y$	=	Baseline emissions in year $y$ (tCO <sub>2</sub> )
$EG_{BL,y}$	=	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 of a grid calculated as per the procedures provided in AMS-I.D (tCO <sub>2</sub> /MWh)

As per the procedures provided in AMS-I.D, the emission factor of a grid is calculated in a transparent and conservative manner as below:

- 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”;

This PoA choose the condition (a) and a combined margin (CM) is calculated as “Tool to calculate the emission factor for an electricity system (version 07.0)”.

## B.4. Estimation of emission reductions

### B.4.1. Explanation of methodological choices

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The emission reductions to be achieved as a result of each CPA under the proposed PoA are calculated according to the approved methodology AMS-I.F “Renewable electricity generation for captive use and mini-grid (version 03.0)”.

The CPA includes the installation of a new power plant at a site where there was no PV power plant operating prior to the implementation of the project activity (Greenfield plant). In the calculation of emission reductions of a CPA, the following methodological tools will be referred as suggested by the methodology:

<Table > Referred tool for ER calculation

No.	Methodological Tool	Parameters	Purpose of reference
1	Tool to calculate the emission factor for an electricity system (version 07.0)	$EF_{grid,CM,y}$	Combined margin CO2 emission factor for the project electricity system in year $y$
2		$EF_{grid,BM,y}$	Build margin CO2 emission factor for the project electricity system in year $y$
3		$EF_{grid,CM,y}$	Operating margin CO2 emission factor for the project electricity system in year $y$

### a). Baseline Emissions

According to the applied methodology, baseline emission of this system displacing KEPCO grid electricity is calculated as below:

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

Where :

$BE_y$	=	Baseline emissions in year $y$ (tCO <sub>2</sub> )
$EG_{BL,y}$	=	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 of a grid calculated as per the procedures provided in AMS-I.D (tCO <sub>2</sub> /MWh)

### b). Project Activity Emissions

Project emissions of a photovoltaic project activities are zero as the applied methodology.

### **c). Leakage**

As a photovoltaic project activities in programme of activities, leakage is not to be considered.

### **d). Emission Reductions**

$$ER = BE_y - PE_y - LE_y$$

Where:

$ER_y$  = Emission reductions in year  $y$  ( $tCO_{2e/y}$ )


$BE_y$  = Baseline Emissions in year  $y$  ( $tCO_{2/y}$ )

$PE_y$  = Project emissions in year  $y$  ( $tCO_{2/y}$ )

$LE_y$  = Leakage emissions in year  $y$  ( $tCO_{2/y}$ )

### **※ Determination of Emissions Factor of a grid:**

The emission factor of a grid is calculated in a transparent and conservative manner as below:

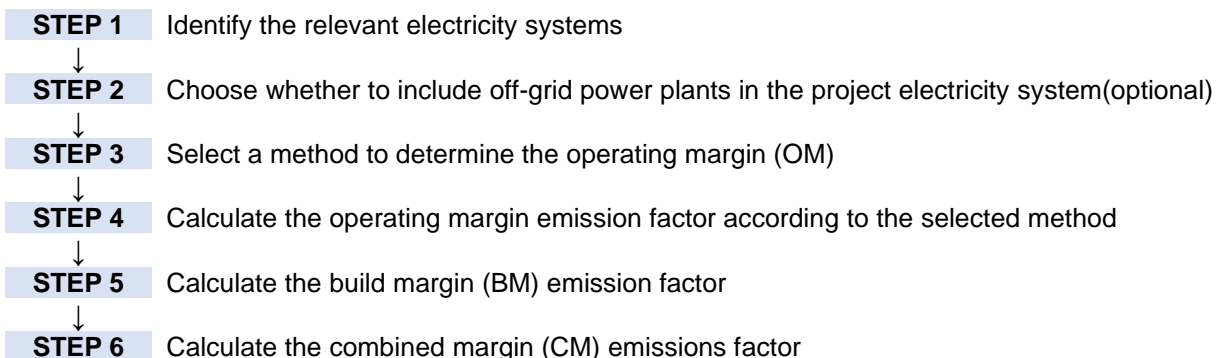
 (a) A combined margin (CM), consisting of the combination of operating margin (OM) and build margin (BM) according to the procedures prescribed in the “Tool to calculate the emission factor for an electricity system”;

(b) The weighted average emissions (in  $tCO_2/MWh$ ) of the current generation mix. The data of the year in which project generation occurs must be used.

Given the PoA and the host country, the CPA is applicable to condition (a). Emissions Factor is calculated according to “Tool to calculate the emission factor for an electricity system (version 07.0)”. Combined margin(CM) as a baseline grid emission factor is calculated, which is based on Operating Margin(OM) and Build Margin(BM).

OM(Operating Margin) and BM(Build Margin) are calculated by using the data from existing power plants that provide electricity with the current grid-connected electricity generation, and with this result, the  $EF_{grid,CM,y}$ (Baseline Emission Factor) can be calculated. The steps for the Baseline calculation methodology are as follows


The emission factor will be calculated as following six steps:



The emission factor for the CPA is calculated on “Statistics of electric power in Korea 2016~2018”, which published by Korea electric power corporation(hereafter KEPCO).

### **STEP 1 >> Identify the relevant electricity systems**

Form determining the electricity emission factors, Option 2 is selected from the option 1, 2, 3 of the “Tool to calculate the emission factor for an electricity system (version 07.0)”.

 **Option 2.** A delineation of the project electricity system defined by the dispatch area of the dispatch centre responsible for scheduling and dispatching electricity generated by the project activity. Where the dispatch area is controlled by more than one dispatch centre, i.e. layered dispatch area, the higher level area shall be used as a delineation of the project electricity system (e.g. where regional dispatch centres are required to comply with dispatch orders of the national dispatch centre then area controlled by the national dispatch centre shall be used);

The generic CPA of the PoA is implemented in Republic of Korea which is comprise a solely one grid(i.e. KEPCO grid).

## STEP 2 >> Choose whether to include off-grid power plants in the project electricity system (optional)

Option 1 is selected from two options to calculate the operating margin and build margin emission factor according to “Tool to calculate the emission factor for an electricity system”(Version 07.0),:

 **Option I :** Only grid power plants are include in the calculation

*Option II : Both grid power plants and off-grid power plants are included in the calculation*

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

As described in “Tool to calculate the emission factor for an electricity system Version 07.0”, the OM emission factor is calculated as the generation-weighted emissions per electricity unit of all generating units serving the system, excluding low-operating cost and must-run power plants. Low-operating cost and must run power plants include hydro, nuclear, low cost biomass, geothermal and domestic coal.

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

**(a) Simple OM, (b) Simple adjusted OM, (c) Dispatch data analysis OM, (d) Average OM**


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 (2014~2018) average data shows that the rate of low cost/must run is 33.7%. (Source: KEPCO) The source of low-cost/must-run plants are hydro, nuclear, group, alternatives. therefore, for the case, “**Option (a) Simple OM**” is available.

< Table > Gross electricity generation in the Republic of Korea during past 5 years (GWh)

Source \ Year	2018	2017	2016	2015	2014	LCMR
Hydro	7,270	6,995	6,633	5,796	7,820	O
Coal	241,817	238,238	213,740	204,230	203,446	
Heavy Oil	7,117	8,648	14,253	31,616	24,950	
LNG	152,867	123,232	120,852	100,783	114,654	
Nuclear	133,505	148,427	161,995	164,762	156,407	O
Alternative	28,071	27,928	22,967	20,904	14,695	O
Total	570,647	553,468	540,440	528,091	521,972	
Ratio	29.6%	33.1%	35.5%	36.3%	34.3%	

Source : Korea electric power Corporation, 2018

For the simple OM, EX ante option of the emissions factor is chosen from two data vintages:


 **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

#### STEP 4 >> Calculate the operating margin emission factor according to the selected method

(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 CO<sub>2</sub> emissions per unit net electricity generation (tCO<sub>2</sub>/MWh) of all generating power plants serving the system, not including low-cost/must-run power plants/units.

For calculation of the simple OM, Option A is chosen from two options;

 **Option A:** Based on the net electricity generation and a CO<sub>2</sub> 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.

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 CO<sub>2</sub> emission factor in year y (tCO<sub>2</sub>/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<sub>2</sub> emission factor of power unit m in year y (tCO<sub>2</sub>/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 and Option A2 is chosen as follows;

Data requirements under respective options	Simple OM	BM
Power generation per plant Option A1 prescribed under the Simple OM	✓	✓
Fuel consumption per plant Option A1 prescribed under the Simple OM	✓	✓
Fuel type and technology Option A2 prescribed under the Simple OM	✓	✓
Hourly load of the grid	✓	
Date of commissioning of power plants/units		✓

☞ 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<sub>2</sub>/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<sub>2</sub>/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

☞ Option A2, If for a power unit  $m$  data on electricity generation and the fuel type used is available, the emission factor ( $EF_{EL,m,y}$ ) should be determined as follows:

$$EF_{EL,m,y} = \frac{EF_{CO2,m,i,y} \times 3.6}{\eta_{m,y}}$$

Where:

- $EF_{EL,m,y}$  =  $CO_2$  emission factor of power unit  $m$  in year  $y$  (tCO<sub>2</sub>/MWh)
- $EF_{CO2,i,y}$  = Average  $CO_2$  emission factor of fuel type  $i$  used in power unit  $m$  in year  $y$  (t CO<sub>2</sub>/GJ)
- $\eta_{m,y}$  = Average net energy conversion efficiency of power unit  $m$  in year  $y$  (ratio)
- $m$  = 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
- 3.6 = Conversion factor (GJ/MWh)

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 gross 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 in emission factor sheet.


#### **Determination of $EG_{m,y}$**

For grid power plants,  $EG_{m,y}$  should be determined as per the provisions in the monitoring tables and 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 0.7079 (tCO<sub>2</sub>/MWh).

#### **STEP 5 >> Calculate the build margin (BM) emission factor;**

For calculating BM emission factor, **Option 1** is chosen from two options of to “Tool to calculate the emission factor for an electricity system (Version 07.0.0)”

 **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 should be used. This option does not require monitoring the emission factor during the crediting period.

The sample group of power units m used to calculate the build margin should be determined as per the following procedure as described in the methodology, consistent with the data vintage selected in the steps above:

- Identify the set of five power units, excluding power units registered as CDM project activities, that started to supply electricity to the grid most recently ( $SET_{5-units}$ ) and determine their annual electricity generation ( $AEG_{SET-5-units}$ , in MWh);
- Determine the annual electricity generation of the project electricity system, excluding power units registered as CDM project activities ( $AEG_{total}$ , in MWh). Identify the set of power units, excluding power units registered as CDM project activities, that started to supply electricity to the grid most recently and that comprise 20 percent of  $AEG_{total}$  (if 20 percent falls on part of the generation of a unit, the generation of that unit is fully included in the calculation) ( $SET_{\geq 20\%}$ ) and determine their annual electricity generation ( $AEG_{SET \geq 20\%}$ , in MWh);
- From  $SET_{5-units}$  and  $SET_{\geq 20\%}$  select the set of power units that comprises the larger annual electricity generation ( $SET_{sample}$ ); Identify the date when the power units in  $SET_{sample}$  started to supply electricity to the grid.

If none of the power units in  $SET_{sample}$  started to supply electricity to the grid more than 10 years ago, then use  $SET_{sample}$  to calculate the build margin. Ignore steps (d), (e) and (f).

Following the guidance above, the sample group of power units m is established to calculate the build margin.

The build margin emissions factor is the generation-weighted average emission factor (tCO<sub>2</sub>/MWh) of all power units m during the most recent year y for which power generation data is available, calculated 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<sub>2</sub> emission factor in year y (tCO<sub>2</sub>/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<sub>2</sub> emission factor of power unit m in year y (tCO<sub>2</sub>/MWh)

m = Power units included in the build margin

y = Most recent historical year for which power generation data is available

$EF_{BM,y}$  is 0.5537 (tCO<sub>2</sub>/MWh).



The calculation of the combined margin (CM) emission factor ( $EF_{grid,CM,y}$ ) is based on one of the following methods:

- ☞ (a) Weighted average CM; or
- (b) Simplified CM.

The weighted average CM method (option A) is used for this project .

#### (a) Weighted average CM

The combined margin emissions factor is calculated as follows:

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

Where;

$EF_{grid,BM,y}$  = Build margin CO<sub>2</sub> emission factor in year y (tCO<sub>2</sub>/MWh)

$EF_{grid,OM,y}$  = Operating margin CO<sub>2</sub> emission factor in year y (tCO<sub>2</sub>/MWh)

$w_{OM}$  = Weighting of operating margin emissions factor (percent)

$w_{BM}$  = Weighting of build margin emissions factor (percent)

#### Photovoltaic system:

According to “Tool to calculate the emission factor for an electricity system”, all other project activities are  $w_{OM}=0.75$  and  $w_{BM}=0.25$  for the first crediting period and for subsequent crediting periods. And  $EF_{grid,OM,y}$ ,  $EF_{grid,BM,y}$  are calculated as described in Steps 1 and 2 above and are expressed in tCO<sub>2</sub>/MWh.

Therefore baseline emission factor ( $EF_{grid,CM,y}$ ) for this project is = 0.6693(tCO<sub>2</sub>/MWh) as follows:

#### The second crediting period for CPAs of the PoA>>

$$\begin{aligned} EF_{grid,CM,y} &= w_{OM} \cdot EF_{grid,OM,y} + w_{BM} \cdot EF_{grid,BM,y} \\ &= 0.75 \cdot 0.7079 \text{ (tCO}_2\text{/MWh)} + 0.25 \cdot 0.5537 \text{ (tCO}_2\text{/MWh)} \\ &= \mathbf{0.6693} \text{ (tCO}_2\text{/MWh)} \end{aligned}$$

Based on the value obtained for the operating margin(0.7079 tCO<sub>2</sub>/MWh) and build margin (0.5537 tCO<sub>2</sub>/MWh) emissions factors, a **combined margin emissions factor of 0.6693 tCO<sub>2</sub>/MWh** will be used in 2<sup>nd</sup> crediting period for this PoA.

#### B.4.2. Data and parameters fixed ex ante

Data/Parameter	$EF_{CO_2,y}$
Data unit	tCO <sub>2</sub> / MWh
Description	Emission factor
Source of data	Calculated
Value(s) applied	0.6693
Choice of data or measurement methods and procedures	This value is calculated according to “Tool to calculate the emission factor for an electricity system (version 07.0.0).” Applied value was calculated by referring Statistics of Electric Power in KOREA (2016, 2017, 2018) (KEPCO) and Status of Generation facility (2018) (Korea Power Exchange).
Purpose of data	Calculation of baseline emissions
Additional comment	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.4.3. Ex ante calculation of emission reductions**

&gt;&gt;

Emission reduction for the CPA is calculated as below:

$$ER_y = BE_y - PE_y - LE_y$$

Where:

$ER_y$  = Emission reductions in year y (tCO<sub>2</sub>e/y)

$BE_y$  = Baseline Emissions in year y (tCO<sub>2</sub>e/y)

$PE_y$  = Project emissions in year y (tCO<sub>2</sub>e/y)

$LE_y$  = Leakage emissions in year y (tCO<sub>2</sub>e/y)

**a) Baseline Emissions**

According to AMS-I.F methodology, baseline emission of this system displacing KEPCO grid electricity is calculated as below:

$$BE_y = EG_{BL,y} * EF_{CO_2,y}$$

Where:

$BE_y$  = Baseline Emissions in year y (tCO<sub>2</sub>)

$EG_{BL,y}$  = Quantity of net electricity displaced as a result of the implementation of the CDM project activity in year y (MWh)

$EF_{CO_2,y}$  = Emission factor (tCO<sub>2</sub>/MWh)  
Emission factor of a grid shall be calculated as per the procedures provided in AMS-I.D

In ex-ante calculation of emission reductions,  $EG_{BL,y}$  is estimated as follows :

$$\begin{aligned} EG_{BL,y} &= 1,457 \text{ kW} \times 24 \text{ hours/day} \times 365 \text{ days/yr} \times 15.3 \% / 1000 \\ &= 1,952.788 \text{ MWh/yr} \end{aligned}$$

$$\begin{aligned} BE_y &= 1,952.788 \text{ MWh/yr} \times 0.6693 \text{ tCO}_2/\text{MWh} \\ &= 1,307 \text{ tCO}_2/\text{yr} \end{aligned}$$

**b) Project Activity Emissions**

Project emissions of a photovoltaic project activities are zero as the applied methodology.

**c) Leakage**

As a photovoltaic project activities in programme of activities, leakage is not to be considered.

Thus,

$$ER_y = BE_y - PE_y - LE_y$$

$$ER_y = BE_y - 0 - 0$$

Therefore,  $ER_y$  is 1,307 tCO<sub>2</sub>/yr.

**B.4.4. Summary of ex ante estimates of emission reductions**

Year	Baseline emissions (t CO <sub>2</sub> e)	Project emissions (t CO <sub>2</sub> e)	Leakage (t CO <sub>2</sub> e)	Emission reductions (t CO <sub>2</sub> e)
Year 1	1,307	0	0	1,307
Year 2	1,307	0	0	1,307
Year 3	1,307	0	0	1,307
Year 4	1,307	0	0	1,307
Year 5	1,307	0	0	1,307
Year 6	1,307	0	0	1,307
Year 7	1,307	0	0	1,307
<b>Total</b>	9,149	0	0	9,149
<b>Total number of crediting years</b>	7			
<b>Annual average over the crediting period</b>	1,307	0	0	1,307

**B.5. Monitoring plan****B.5.1. Data and parameters to be monitored**

<b>Data/Parameter</b>	$EG_{BL,y}$
<b>Data unit</b>	MWh
<b>Description</b>	Quantity of net electricity displaced as a result of the implementation of the CDM project activity in year y
<b>Source of data</b>	Calculated
<b>Value(s) applied</b>	1,952.788 The actual net electricity will be monitored during monitoring period.
<b>Measurement methods and procedures</b>	Measuring methods : measuring electricity meter  As for the auxiliary electricity consumption (of connector bands and inverters), the auxiliary electricity consumption is calculated as follows:  The auxiliary electricity consumption = Standby power (of connector bands or inverters) * Numbers * 24 Hours). The auxiliary electricity consumption will be calculated during the monitoring period and the operating hours are considered as 24 hours in conservative approach.
<b>Monitoring frequency</b>	Continuous monitoring, and at least monthly recording
<b>QA/QC procedures</b>	Calibration frequency and accuracy of measurement equipment : - Compliance with local regulation(Measuring Act etc) or specification from Manufacturer.  To ensure the quantity of generated electricity from CDM project, the data shall be cross-checked in accordance with the operations manual
<b>Purpose of data</b>	Calculation of baseline emissions
<b>Additional comment</b>	Data will be at least recorded monthly and aggregated yearly and will be kept at least for two years after the end of the last crediting period.

**B.5.2. Sampling plan**

&gt;&gt;

The CPA has not involved with procedure of sampling plan.

**B.5.3. Other elements of monitoring plan**

&gt;&gt;

Monitoring process will be carried out in CPA level. Monitoring data for a CPA will be monitored by the implementing entity of the CPA as the procedures and monitoring framework under the PoA and will be submitted to the managing entity.

The main monitoring data is electricity supplied to households displacing electricity supplied from KEPCO grid. To check the quantity of electricity, the electricity meter will be installed and ensure QA/QC as relevant local regulation.

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 : Measures Act or relevant regulations etc

**< Data Recording & Archiving >**

The generated electricity is continuously measured, stored and accumulated through electricity meter of PV power plants. All data collected will be kept at least for two years after the end of the last crediting period.

The net electricity generation is the difference between the total quantity of electricity generated by this project and the auxiliary electricity consumption.

The auxiliary electricity consumption will be conservatively calculated using recording annually the number of systems operating and estimating the annual hours of systems operating

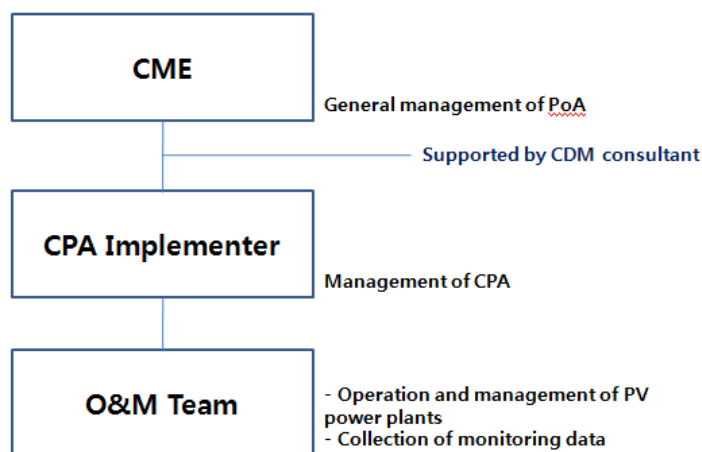
Equation: The auxiliary electricity consumption = Standby power<sup>7</sup> \* Numbers \* Hours

**< Quality Assurance and Quality Control>**

- Contingency plan :  
In case of electricity meter trouble or data error, the person in charge of monitoring is responsible for prompt grasping the problem and restoring it in due course.
- Calibration :  
Electricity meter should be recalibrated or replaced at appropriate intervals as local regulation.
- Monitoring organization and responsibility :

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<sup>7</sup> 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.



< Figure D.2. Monitoring organization >

Person in charge of O&M team in CPA implementer will operate and manage PV power plants and collect monitoring data. All collected data will reported to CME as electronically or manually manner.

#### < Training>

The person in charge of monitoring will be trained according to CDM Operation Manual.

### SECTION C. Start date, crediting period type and duration

#### C.1. Start date of CPA

>>

19/09/2011 (Facility supply and installation contract)

#### C.2. Expected operational lifetime of CPA

>>

20 years

#### C.3. Crediting period of CPA

##### C.3.1. Type of crediting period

>>

Renewable crediting period

##### C.3.2. Start date of crediting period

>>

The 2<sup>nd</sup> crediting period of the CPA starts at 27/12/2019.

##### C.3.3. Duration of crediting period

>>

The length of 1st crediting period : 7 years

The number of renewal periods : 2

## SECTION D. Environmental impacts

### D.1. Analysis of environmental impacts

&gt;&gt;

Environmental impacts was done at the time of the CPA inclusion. There are no change of its capacity and others during operation. So there are no needs of environmental impacts at the time of renewing the crediting period.

### D.2. Environmental impact assessment

&gt;&gt;

N/A

## SECTION E. Local stakeholder consultation

### E.1. Modalities for local stakeholder consultation

&gt;&gt;

Stakeholder consultation was done at the time of the requesting CPA inclusion. In 23 August 2011, the LH Corporation posted the notice of CDM project in order to take opinions from various strata of local stake holders into consideration as below.

The post provided information about this CPA:

- ◆ Background of CDM project
- ◆ Outline (the estimated emissions, project sites, etc.)
- ◆ Schedule
- ◆ Contact point



< Figure C.1. The stakeholders' comment on CDM Project at LH Corporation web site>

### E.2. Summary of comments received

&gt;&gt;

There is no comment directly related to construction of the renewable energy systems.

### E.3. Consideration of comments received

&gt;&gt;

No concerns or negative options were raised from the stakeholders.

## SECTION F. Eligibility for inclusion

This CPA satisfies all the eligibility criteria of microscale applied AMS.I-F. as below.

No.	Eligibility criterion - Category	Eligibility criterion - Required condition	Supporting evidence for inclusion	Description of this CPA in relation to the criterion and supporting evidence
1	Geographical boundary	The CPA is performed within the Republic of Korea.	GPS information, CPA-DD	PV plants of the CPA located in Republic of Korea. Evidence is GPS information and address.
2	Target groups CPA and remains within SSC thresholds	The CPA applies photovoltaic power plants to collective housing, buildings and the installed capacity is less than or equal to 5MW.	Project plan document	Total capacity of the CPA is about 1.457 MW. Evidence is each project plan document.
3	Double counting and confirmation that CPAs are not included in other PoAs or de-registered CDM project activities	The CPA is not involved in another renewable energy project that is registered or under validation as a CDM project activity or as a CPA under another PoA, in accordance with the signed certificate by CPA implementer.	Certificate of double counting check	The CPA is shown to be not a another CDM projects which are registered or under validation or CPAs of another PoAs. Evidence is Section A.8 in the CPA-DD or double counting check.
4	Specifications of technology/ measure	The solar modules and inverters applied to CPA obtain certification from Korea.	Certificate from KEA	PV plants of the CPA obtain certificate of solar module from KEA. Evidence is a certificate from KEA
5	Start date of the CPA	The CPA has the documentary evidence to check its start date and does not commence prior to the start date of validation for PoA (01/09/2011)	Facility supply and installation contract	PV plants of the CPA were contracted since Dec or Nov 2011. Evidence is facility supply and installation contract.
6	Conditions that ensure applicability of the applied methodologies	The CPA meets the applicability of AMS-I.F.	CPA-DD	The CPA meets the applicability of AMS-I.F. Evidence is a Section B.1 in the CPA-DD.
7	Additionality demonstration	The CPA meets the requirements pertaining to demonstration of additionality	CPA-DD	The CPA is demonstrated as additional. Evidence is Section F. in the CPA-DD.
8	Requirements for Local stakeholder consultation	The CPA performs local stakeholder consultation before the inclusion of CPA.	Post in website of LH Corporation	local stakeholders were carried out. Evidence is post in website of CME.
9	Requirements for environmental impact analysis	The CPA considers the environmental impacts analysis according to the regulation of the Republic of Korea.	CPA-DD	Environmental impact analysis is not applicable for the CPA.
10	Diversion of official development assistance	The CPA has the documentary evidence to check project costs and does not result in a diversion of official development assistance from Annex I.	Official notice on accounting	The CPA implementer(i.e. LH corporation) and host country is not associated with ODA from Annex I. Evidence is official notice on accounting.

**CDM-CPA-DD-FORM**

11	Debundling check	The CPA is not a de-bundled component of a large scale activity through the de-bundling check.	Check of geographical area, check of applied technology/measure, check of project activities under validation or registration	The CPA is shown to be not a de-bundled component of a large-scale projects. Evidence are address or GPS cords and other PDD.
12	Others	The CPA makes the agreement with CME to involve the CPA in PoA and obtain CERs rights. In case that CPA implementer is same with CME, the agreement is not necessary.	Agreement between CME&CPA	The CPA implementer is the same as CME.  Not applicable to this criterion.

**Confirmation of additionality of the CPA**

Additionality assessment of the CPA was already done at the time of its CPA inclusion. So there are no needs of demonstration at the time of renewing the crediting period.

## Appendix 1. Contact information of CPA implementers

Organization name	LH Corporation
Country	Republic of Korea
Address	19, Chungui-ro, Jinju-si, Gyeongsangnam-do
Telephone	82-55-922-3696
Fax	-
E-mail	birdrd77@lh.or.kr
Website	www.lh.or.kr
Contact person	Jonghyun Cho

## Appendix 2. Affirmation regarding public funding

There is no public funding from Annex I for this project.

## Appendix 3. Further background information on ex ante calculation of emission reductions

Refer to the emission reduction sheet.

## Appendix 4. Further background information on monitoring plan

Refer to relevant section of the CPA-DD.

## Appendix 5. Summary report of comments received from local stakeholders

No concerns or negative options were raised from the stakeholders.

## Appendix 6. Summary of post-registration changes

As for First PRC, refer to section of ex-ante calculation of emission reductions 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 built 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 built 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  $\pm 1.0\%$  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.



Minor change is below;

- Change in the completion date of application of methodology and contact information of responsible person.
- Change of the name of body which certified renewable energy equipment from KEMCO to KEA

Second PRC, there are changes of address because 15 PV plants of the CPA has assigned new address after its construction. And there are some slight differences on GPS coordinators.

## Document information

<i>Version</i>	<i>Date</i>	<i>Description</i>
09.0	31 May 2019	Revision to: <ul style="list-style-type: none"> <li>• Ensure consistency with version 02.0 of the “CDM project standard for programmes of activities” (CDM-EB93-A07-STAN);</li> <li>• Make editorial improvements.</li> </ul>
08.1	20 October 2017	Editorial revision to remove appendix “Applicability of methodologies and standardized baselines” from the main part of the form which had been mistakenly kept in the previous version.
08.0	28 June 2017	Revision to: <ul style="list-style-type: none"> <li>• Remove appendix “Applicability of methodologies and standardized baselines” as the appendix is not relevant at the CPA level;</li> <li>• Make editorial improvement.</li> </ul>
07.0	7 June 2017	Revision to: <ul style="list-style-type: none"> <li>• Improve consistency with the “CDM project standard for programmes of activities” and with the PDD and PoA-DD forms;</li> <li>• Make editorial improvement.</li> </ul>
06.0	24 May 2017	Revision to: <ul style="list-style-type: none"> <li>• Ensure consistency with the “Standard: CDM project standard for programme of activities” (CDM-EB93-A07-STAN) (version 01.0);</li> <li>• Incorporate the “Component project activity design document form for small-scale component project activities” (CDM-SSC-CPA-DD-FORM);</li> <li>• Make editorial improvement.</li> </ul>
05.0	15 April 2016	Revision to ensure consistency with the “Standard: Applicability of sectoral scopes” (CDM-EB88-A04-STAN) (version 01.0).
04.0	9 March 2015	Revision to: <ul style="list-style-type: none"> <li>• Include provisions related to statement on erroneous inclusion of a CPA;</li> <li>• Include provisions related to delayed submission of a monitoring plan;</li> <li>• Provisions related to local stakeholder consultation;</li> <li>• Provisions related to the Host Party;</li> <li>• Make editorial improvement.</li> </ul>
03.0	25 June 2014	Revisions to: <ul style="list-style-type: none"> <li>• Include the Attachment: Instructions for filling out the component project activity design document form for CDM component project activities (these instructions supersede the "Guidelines for completing the component project activity design document form" (Version 01.0));</li> <li>• Include provisions related to standardized baselines;</li> <li>• Add contact information on a CPA implementer and/or responsible person/ entity for completing the CDM-CPA-DD-FORM in A.13. and Appendix 1;</li> </ul>

<i>Version</i>	<i>Date</i>	<i>Description</i>
		<ul style="list-style-type: none"><li>• Add general instructions on post-registration changes in paragraph 4 and 5 of general instructions and Appendix 6;</li><li>• Change the reference number from F-CDM-CPA-DD to CDM-CPA-DD-FORM;</li><li>• Make editorial improvement.</li></ul>
02.0	13 March 2012	Revision required to ensure consistency with the "Guidelines for completing the component project activity design document form" (EB 66, Annex 16).
01.0	27 July 2007	EB 33, Annex 42 Initial adoption.
Decision Class: Regulatory Document Type: Form Business Function: Registration Keywords: component project activity, project design document		