**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 | |
|---|---|
| **Title of the CPA** | PV power plants project on collective housing of 2011-<2011-LH-001-01457> |
| **Scale of the CPA** | ☐ Large-scale<br>☒ Small-scale |
| **Version number of the CPA-DD** | Version 10 |
| **Completion date of the CPA-DD** | 27/09/2019 |
| **Title and UNFCCC reference number of the registered CDM PoA** | Title : Programme of Activities to introduce renewable energy system into collective housing, Republic of Korea<br>Ref No. : PoA 9247 |
| **Title and reference number of the corresponding generic CPA** | Title : PV power plants project on collective housing<br>Ref No. : Generic CPA 1 |
| **Coordinating/managing entity** | Korea Land & Housing Corporation |
| **Host Party** | Republic of Korea |
| **Applied methodologies and standardized baselines** | methodology(ies): AMS-I.F (Version 02)<br>No Standardized methodology has been selected for this PoA |
| **Sectoral scopes** | 1 Energy industries (renewable - / non-renewable sources) |
| **Estimated amount of annual average GHG emission reductions** | 1,326 $tCO_2$/yr |

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

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

>>

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 as small-scale type project.

Renewable energy system’s information is as follows:

<Table1. Photovoltaic power plant system>

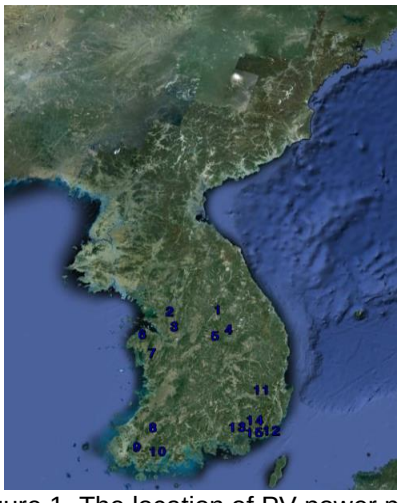
| No. | Plant name | Modules | | |
|---|---|---|---|---|
| | | Capacity(W) | Numbers | Total installed Capacity (KW) |
| 1 | Hoengseong Eupha | 240 | 252 | 60.48 |
| 2 | Anyang Gwanyang (A1BL) | 240 | 528 | 126.72 |
| 3 | Osan Cheongho(1,2BL) | 240 | 540 | 129.6 |
| 4 | Jecheon Gangjeo(A2BL) | 240 | 252 | 60.48 |
| 5 | Chungju Yeonsu(2) | 240 | 720 | 172.8 |
| 6 | Seosan Daesan | 240 | 144 | 34.56 |
| 7 | Hongseong Namjang(2BL) | 240 | 348 | 83.52 |
| 8 | Gwangju Seonun(8-1,2BL) | 240 | 1032 | 247.68 |
| 9 | Yeongam Yongang(2) | 240 | 192 | 46.08 |
| 10 | Jangheung Geonsan(2) | 240 | 168 | 40.32 |
| 11 | Yeongcheon Mangjeong | 240 | 336 | 80.64 |
| 12 | Yangsan Gachon | 240 | 324 | 77.76 |
| 13 | Changwon Bongnim(A1BL) | 240 | 456 | 109.44 |
| 14 | Changwon Bongnim(A2BL) | 240 | 384 | 92.16 |
| 15 | Busan Jisa(2) | 240 | 396 | 95.04 |
| Total | | | | 1,457 KW |

The estimated annual emission reduction amounts to 1,326 $tCO_2$/yr for the CPA. The CPA eventually contributes to total 9,282 $tCO_2$ emission reduction for this crediting period.

### A.2. Location of CPA

>>

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



< Figure 1. The location of PV power plant>

Geographic reference of this CPA is as follows:

<Table 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 | 37.411870 | 126.967333 |
| 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 | 37.121313 | 128.206828 |
| 5 | Chungju Yeonsu(2) | 24, Jugong-gil, Chungju-si, Chungcheongbuk-do | 36.988566 | 127.937102 |
| 6 | Seosan Daesan | 834-6, Mangilsan-ro, Daesan-eup, Seosan-si, Chungcheongnam-do | 36.941238 | 126.437659 |
| 7 | Hongseong Namjang(2BL) | 10, Namjangjung-ro, Hongseong-eup, Hongseong-gun, Chungcheongnam-do | 36.58829 | 126.66960 |
| 8 | Gwangju Seonun(8-1,2BL) | 68, Seonunjungang-ro, Gwangsan-gu, Gwangju | 35.146516 | 126.779424 |
| 9 | Yeongam Yongang(2) | 222, Samhojungang-ro, Samho-eup, Yeongam-gun, Jeollanam-do | 34.744688 | 126.473785 |
| 10 | Jangheung Geonsan(2) | 3, Bukbu-ro, Jangheung-eup, Jangheung-gun, Jeollanam-do | 34.684449 | 126.903669 |
| 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 | 35.323603 | 128.995823 |
| 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

>>

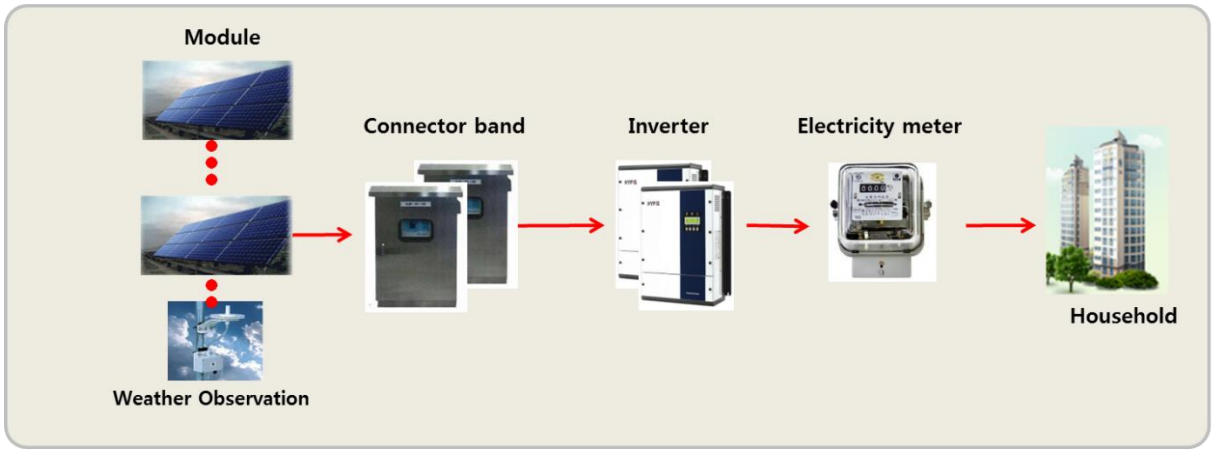
***Technologies and/or measures to be employed and/or implemented by the CPA***

This CPA comprises renewable energy generation units, such as photovoltaic power plants that supply electricity to users and will displace electricity from an electricity distribution system that is or would have been supplied by KEPCO grid.

The CPA installs photovoltaic power plant systems on collective housing. All installed solar modules shall be certificated by Korea Energy Agency (hereafter KEA as 'Act on the Promotion of the Development, Use and Diffusion of New and Renewable Energy'.[1]

The photovoltaic system converts solar radiation into electric energy and supplies electricity to the user or grid. It replaces electricity supplied from grid. The technology applied in the system is as follows:

- Solar module : Generate electricity from solar radiation
- Inverter : Invert generated DC electricity to AC electricity for use
- Electricity meter : display the amount of generated electricity




<Figure 2. Photovoltaic power plant system>

Technical feature of installed equipment for project activity, <2011-LH- 001-01457>, is as below.

| No. | Plant name | Module | | | | | Inverter | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Type | Mpp Voltage (V) | Mpp Current (A) | Efficiency (%) | Manufacturer | Type | Output (kVA) | Number | Control method | Efficiency (%) | Manufacturer |
| 1 | Hoengseong Eupha | Si | 29.7 | 8.1 | 14.9 | LG Electronics | Indoor, Vertical-mount | 11,15 | 3, 3 | PWM | 92 | Dasstech |
| 2 | Anyang Gwanyang (A1BL) | Si | 29.7 | 8.1 | 14.9 | LG Electronics | Indoor, Vertical-mount | 11,15 | 3, 9 | PWM | 92 | Dasstech |
| 3 | Osan Cheongho(1,2BL) | Si | 29.7 | 8.1 | 14.9 | LG Electronics | Indoor, Vertical-mount | 11,15 | 14, 1 | PWM | 92 | Dasstech |
| 4 | Jecheon Gangjeo(A2BL) | Si | 29.7 | 8.1 | 14.9 | LG Electronics | Indoor, Vertical-mount | 11,15 | 2, 3 | PWM | 92 | Dasstech |
| 5 | Chungju Yeonsu(2) | Si | 29.7 | 8.1 | 14.9 | LG Electronics | Indoor, Vertical-mount | 15, 25 | 1, 7 | PWM | 92 | Dasstech |
| 6 | Seosan Daesan | Si | 29.7 | 8.1 | 14.9 | LG Electronics | Indoor, Vertical-mount | 11,15 | 2, 2 | PWM | 92 | Dasstech |
| 7 | Hongseong Namjang(2BL) | Si | 29.7 | 8.1 | 14.9 | LG Electronics | Indoor, Vertical-mount | 11,15 | 3, 5 | PWM | 92 | Dasstech |
| 8 | Gwangju Seonun(8-1,2BL) | Si | 30.3 | 7.93 | 14.9 | T&Solar | Indoor, Vertical-mount | 11,15 | 3, 19 | PWM | 92 | Dasstech |

[1] Renewable energy equipment certification is based on "Act on the Promotion of the Development, Use and Diffusion of New and Renewable Energy". KEA certificates renewable energy equipment to ensure performance of the system.

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 9 | Yeongam Yongang(2) | Si | 30.3 | 7.93 | 14.9 | T&Solar | Indoor, Vertical-mount | 11,15 | 3, 2 | PWM | 92 | Dasstech |
| 10 | Jangheung Geonsan(2) | Si | 30.3 | 7.93 | 14.9 | T&Solar | Indoor, Vertical-mount | 11 | 5 | PWM | 92 | Dasstech |
| 11 | Yeongcheon Mangjeong | Si | 30.7 | 7.9 | 14.8 | Hyundai solar | Indoor, Vertical-mount | 12.5, 15 | 2, 6 | PWM | 94.6 | Hyundai solar |
| 12 | Yangsan Gachon | Si | 30.7 | 7.9 | 14.8 | Hyundai solar | Indoor, Vertical-mount | 12.5, 15 | 3, 5 | PWM | 94.6 | Hyundai solar |
| 13 | Changwon Bongnim(A1BL) | Si | 30.7 | 7.9 | 14.8 | Hyundai solar | Indoor, Vertical-mount | 12.5, 15 | 4, 7 | PWM | 94.6 | Hyundai solar |
| 14 | Changwon Bongnim(A2BL) | Si | 30.7 | 7.9 | 14.8 | Hyundai solar | Indoor, Vertical-mount | 12.5, 15 | 6, 3 | PWM | 94.6 | Hyundai solar |
| 15 | Busan Jisa(2) | Si | 30.7 | 7.9 | 14.8 | Hyundai solar | Indoor, Vertical-mount | 12.5, 15 | 3, 5 | PWM | 94.6 | Hyundai solar |

The average lifetime of these solar modules cover the crediting period of the CPA.

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

The CPA 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

>>
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 : LH Corporation | No |

### A.6. Public funding of CPA

>>
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

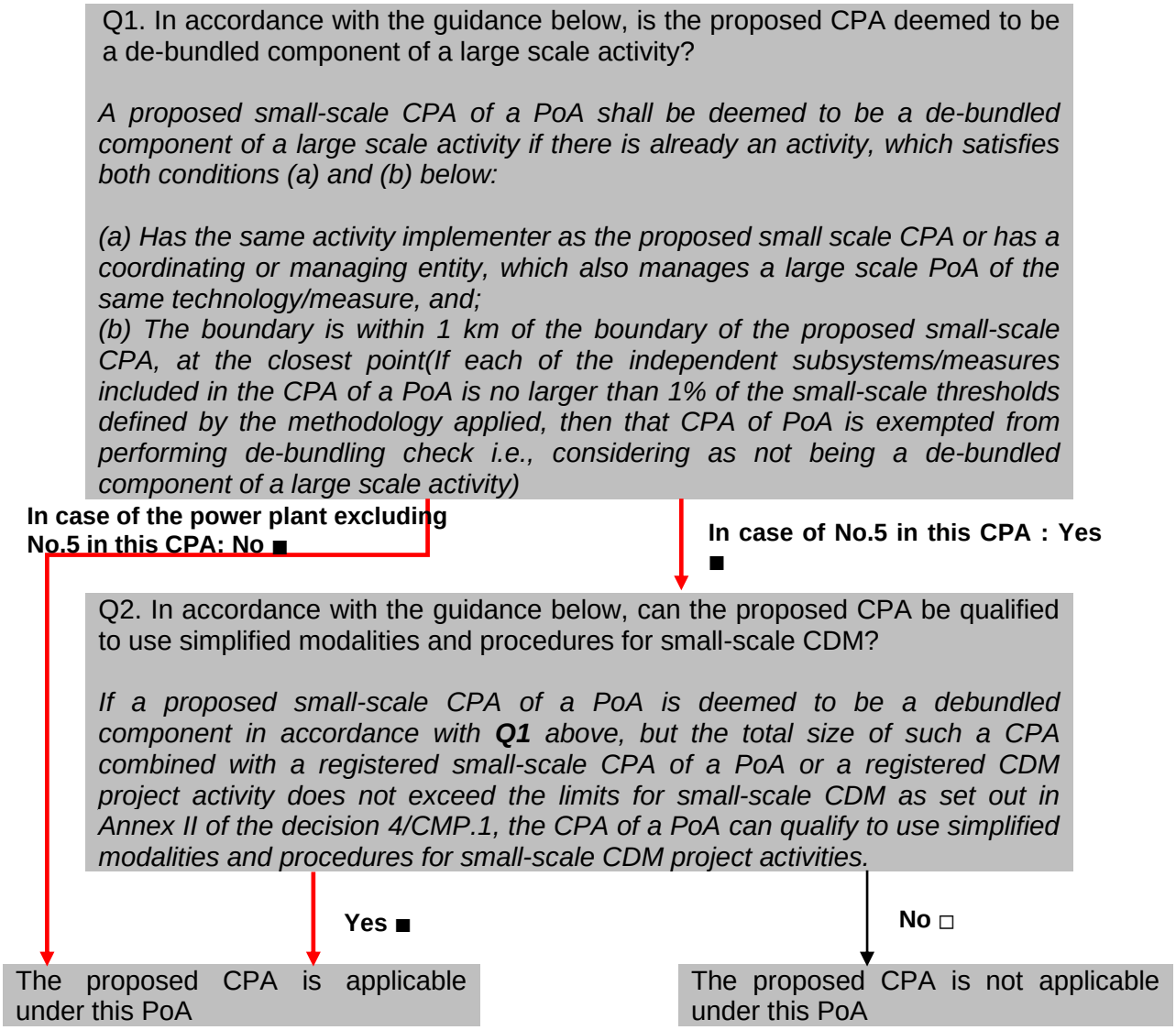
>>
LH Corporation check the eligibility criteria of PoA-DD that its photovoltaic power plants are neither parts of other component project activity nor aother CDM activities. LH Corporation will certify through the signed letter by director.

Therefore, the CPA is not involved in another photovoltaic power plants which are 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

>>




< Figure 3. De-bundling check list >

**As for Q1,**

LH Corporation is a CPA implementer and CME of the PoA. LH Corporation as CME checks other PoAs that are: (i) in the same geographical area; (ii) use the same methodology of the PoA. There are only one another registered CDM project activity which implemented by LH Corporation. The project title is "Korea Land & Housing Corporation(LH Corporation)'s National Rental House PV power plant bundling CDM project(hereafter Ref.5251). This project consists of 36 photovoltaic power plants which is located on the roof the National Rental House in Republic of Korea.

This CPA consists of 15 photovoltaic power plants and the independent subsystem are as follows :

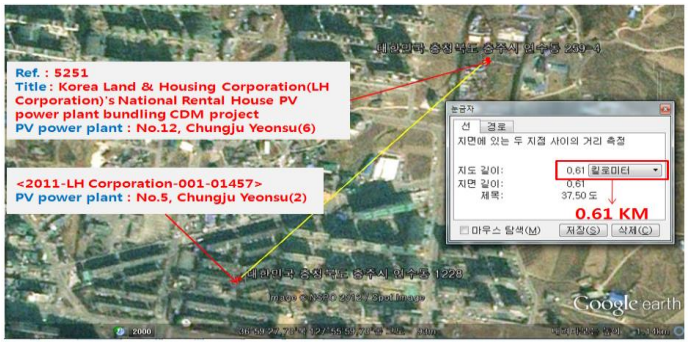
<Table 3. Independent photovoltaic power plant >

| No. | Plant name | Address | Capacity (kW) |
|---|---|---|---|
| 1 | Hoengseong Eupha | 34, Apdeulseo 2-ro, Hoengseong-eup, Hoengseong-gun, Gangwon-do | 60.48 |

| | | | |
|---|---|---|---|
| 2 | Anyang Gwanyang (A1BL) | 120, Dongpyeon-ro, Dongan-gu, Anyang-si, Gyeonggi-do | 126.72 |
| 3 | Osan Cheongho(1,2BL) | 486-23, Nambu-daero, Osan-si, Gyeonggi-do | 129.6 |
| 4 | Jecheon Gangjeo(A2BL) | 110, Cheongpungho-ro 7-gil, Jecheon-si, Chungcheongbuk-do | 60.48 |
| 5 | Chungju Yeonsu(2) | 24, Jugong-gil, Chungju-si, Chungcheongbuk-do | 172.8 |
| 6 | Seosan Daesan | 834-6, Mangilsan-ro, Daesan-eup, Seosan-si, Chungcheongnam-do | 34.56 |
| 7 | Hongseong Namjang(2BL) | 10, Namjangjung-ro, Hongseong-eup, Hongseong-gun, Chungcheongnam-do | 83.52 |
| 8 | Gwangju Seonun (8-1,2BL) | 68, Seonunjungang-ro, Gwangsan-gu, Gwangju | 247.68 |
| 9 | Yeongam Yongang(2) | 222, Samhojungang-ro, Samho-eup, Yeongam-gun, Jeollanam-do | 46.08 |
| 10 | Jangheung Geonsan(2) | 3, Bukbu-ro, Jangheung-eup, Jangheung-gun, Jeollanam-do | 40.32 |
| 11 | Yeongcheon Mangjeong | 80, Mangjeong-ro, Yeongcheon-si, Gyeongsangbuk-do | 80.64 |
| 12 | Yangsan Gachon | 155, Gachon-ro, Mulgeum-eup, Yangsan-si, Gyeongsangnam-do | 77.76 |
| 13 | Changwon Bongnim(A1BL) | 50, Sobong-ro, Uichang-gu, Changwon-si, Gyeongsangnam-do | 109.44 |
| 14 | Changwon Bongnim(A2BL) | 25, Daebong-ro, Uichang-gu, Changwon-si, Gyeongsangnam-do | 92.16 |
| 15 | Busan Jisa(2) | 35, Gwahaksandan 2-ro 20beon-gil, Gangseo-gu, Busan | 95.04 |
| Total | | | 1,457 KW |

In the above table, the power plants excluding No.5 and No.8 are less than 1% of the small-scale thresholds(i.e. 150 KW) and these are exempted from de-bundling check.[2] In case of No.8 in the CPA, any 36 photovoltaic power plants of Ref.5251 are not located within 1 km of the plant of No.8. So, the power plants excluding No.5 in this CPA are not deemed a de-bundled component of large-scale activity.

But, the distance between No.5 in this CPA and No.12 of Ref.5251 is within 1 km as follows:




< Figure 4. Distance between No.5 in this CPA and No.12 in Ref.5251 >

So, No.5 of the CPA is further analyzed and explained in the following paragraphs (Q2).

**As for Q2,**

[2] Based on "Guidelines on assessment of debundling for SSC project activities, Version 03", issued on the EB 54th meeting, although the distance between No.4(Jecheon Gangeo(A2BL)) in this CPA and No.22(Jecheon Gangeo(A3)) in Ref.5251 may be within 1 km, No.4 is exempted from de-bundling check because the capacity is less than 150 KW. Therefore, No.4 of this CPA is not a de-bundled component of a large scale project activity.

In the case of No. 5, the total size of No.5 combined with No.12 in Ref. 5251 is 232.8 KW(172.8 + 60) and does not exceed the limits for small-scale CDM as set out in Annex II of the decision 4/CMP.1. So, No.5 of this CPA is deemed to be a de-bundled component of a large scale activity but can qualify to use the simplified modalities and procedures for small-scale project activities.

Therefore, this CPA is applicable under this PoA.

## SECTION B. Application of methodologies and standardized baselines

### B.1. References to methodologies and standardized baselines

>>

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

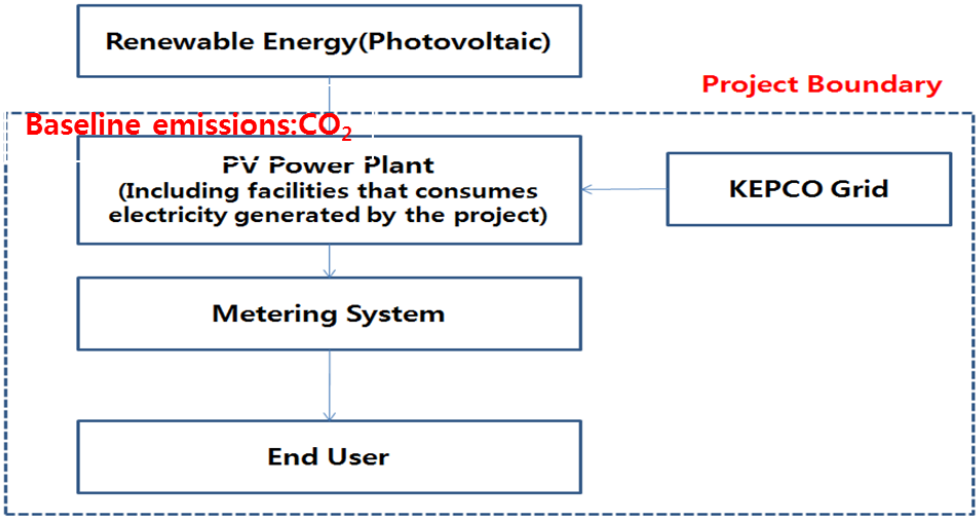
**Reference :**
Guidelines on the demonstration of additionality of small-scale project activities (EB 68, Annex 27, Version 09.0)

**Methodological tool:**
Tool to calculate the emission factor for an electricity system (Version 03.0.0)

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

>>

As per stipulated in AMS-I.F(Version 02), 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 5. Project Boundary >

In addition, the project boundary of the CPA is located within the geographical boundary of the PoA. The gases and sources relevant to the CPA are listed below based on the AMS-I.F, Version 02.

| Source | | GHG | Included? | Justification/Explanation |
|---|---|---|---|---|
| Baseline | $CO_2$ emissions from electricity generation in fossil fuel fired power plants that are displaced due to the project activity | $CO_2$ | Included | Major source of emissions in the baseline |
| | | $CH_4$ | Excluded | Excluded for simplification. This is conservative |
| | | $N_2O$ | Excluded | Excluded for simplification. This is conservative |
| Project activity | $CO_2$ emissions from on-site consumption | $CO_2$ | Excluded | Based on AMS-I.F |
| | | $CH_4$ | Excluded | Based on AMS-I.F |
| | | $N_2O$ | Excluded | Based on AMS-I.F |

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

>>

The small-scale methodologies applied to PoA defines the indicative baseline scenario as follows:

According to AMS-I.F version 02, the baseline emissions are the quantity of net electricity displaced as a result of the implementation of the CDM CPA in the year y, times the emission factor of a grid calculated as per procedures provided in AMS-I.D. i.e. the baseline emissions are calculated as follows:

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

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 of a grid calculated as per the procedures provided in AMS-I.D ($tCO_2$/MWh)

In paragraph 12 of AMS-I.D, ver.17, 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";

OR

(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.

As the PoA choose the condition (a), a combined margin(CM) is calculated in B.6.1 of Part II in PoA-DD according to "Tool to calculate the emission factor for an electricity system (version 03.0.0)"

## B.4. Estimation of emission reductions

### B.4.1. Explanation of methodological choices

>>

**1. Baseline Emissions**

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

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

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) |

Emission factor of a grid shall be calculated as per the procedures provided in AMS-I.D. The emission factor of the CPA applies the calculation in section B.6 of Part II in PoA-DD.

In Ex-ante calculations of emission reductions, $EG_{BL,y}$ will be estimated based on total installed capacity, operating days and utilization coefficient[3] of photovoltaic system using duration of sunshine.

**2. Project Activity Emissions**

According to AMS-I.F methodology, project activity emission of this system is zero because this system does not use any energy source for operation.

**3. Leakage**

As the energy generating equipment is not transferred from another activity, leakage is not to be considered.

**4. Emission Reductions**

$$ER = BE - PE - LE$$

Where:

| | |
|---|---|
| $ER_y$ | Emission reductions in year y (t $CO_{2e}$/y) |
| $BE_y$ | Baseline Emissions in year y (t $CO_2$/y) |
| $PE_y$ | Project emissions in year y (t $CO_2$/y) |
| $LE_y$ | Leakage emissions in year y (t $CO_2$/y) |

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

| **Data/Parameter** | $EF_{CO2,y}$ |
|---|---|
| Data unit | $tCO_2$ / MWh |
| Description | Emission factor |
| Source of data | Calculated |
| Value(s) applied | 0.6789 |
| 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 02.2.1)." Applied value was calculated by referring Statistics of Electric Power in KOREA (2008, 2009, 2010) (KEPCO) and Status of Generation facility (2011) (Korea Power Exchange). |

[3] The utilization coefficient is based on the data available published from public entities.

| | |
|---|---|
| Purpose of data | Calculation of baseline emissions |
| Additional comment | This data will be calculated at the time of PDD submission and will not be changed during the first crediting period.<br>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

>>

**1. Baseline Emissions**

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

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

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)

- Emission factor of a grid shall be calculated as per the procedures provided in AMS-I.D

As per described in B.6.3 of Part II in PoA-DD, in ex-ante calculation of emission reductions, $EG_{BL,y}$ is estimated as follows :

$EG_{BL,y}$ = 1,457 kW * 365 days/yr * 3.672 hours/day[4] / 1000
= 1,953 MWh/yr

**BEy** = 1,953 MWh/yr * 0.6789 tCO2/MWh
= 1,326 tCO2/yr

**2. Project Activity Emissions**

According to AMS-I.F methodology, project activity emission of this system is zero because this system does not use any energy source for operation.

**3. Leakage**

As the energy generating equipment is not transferred from another activity, leakage is not to be considered.

**4. Emission Reductions**

$$ER = BE - PE - LE$$

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)

[4] The utilization coefficient is based on the report available by KPX(Korea Power Exchange). The report specifies the average coefficient for utilization of photovoltaic power plants between 2007 and 2008.

$LE_y$ Leakage emissions in year y ($tCO_2/y$)

Therefore, $ER_y$ is 1,326 $tCO_2/yr$.

### B.4.4. 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 | 1,326 | 0 | 0 | 1,326 |
| Year 2 | 1,326 | 0 | 0 | 1,326 |
| Year 3 | 1,326 | 0 | 0 | 1,326 |
| Year 4 | 1,326 | 0 | 0 | 1,326 |
| Year 5 | 1,326 | 0 | 0 | 1,326 |
| Year 6 | 1,326 | 0 | 0 | 1,326 |
| Year 7 | 1,326 | 0 | 0 | 1,326 |
| **Total** | 9,282 | 0 | 0 | 9,282 |
| **Total number of crediting years** | 7 | | | |
| **Annual average over the crediting period** | 1,326 | 0 | 0 | 1,326 |

## B.5. Monitoring plan

### B.5.1. Data and parameters to be monitored

| **Data/Parameter** | $EG_{BL,y}$ |
|---|---|
| Data unit | MWh |
| Description | Quantity of net electricity displaced as a result of the implementation of the CDM project activity in year y |
| Source of data | Calculated |
| Value(s) applied | 1,953<br><br>The actual net electricity will be monitored during monitoring period. For the purpose of present estimation, this value is estimated based on the total installed capacity, yearly operating hours and utilization coefficient of photovoltaic system. |

| | |
|---|---|
| Measurement methods and procedures | $EG_{BL,y}$ 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.<br><br>As for the total quantity of electricity generated by this project,<br><br>Measuring equipment : Electricity meter<br>Measurement interval : Continuous<br><br>As for the auxiliary electricity consumption (of connector bands and inverters),<br><br>The auxiliary electricity consumption is calculated as follows:<br><br>The auxiliary electricity consumption = Standby power[5](of connector bands and inverters) * Numbers * 24 Hours).<br><br>The auxiliary electricity consumption will be calculated during the monitoring period and the operating hours are considered as 24 hours in conservative approach. |
| Monitoring frequency | Continuous monitoring, hourly measurement and at least monthly recording |
| QA/QC procedures | - Calibration frequency : According to local regulation(Measures Act), at least once in 8 years<br>- Accuracy of measurement equipment : within ±1.0%(According to Guideline for the support on the new & renewable energy equipment)<br>- To ensure the quantity of generated electricity as result of CDM project, facility manager shall cross-check the data in accordance with the operations manual |
| Purpose of data | Calculation of baseline emissions |
| Additional comment | - Data will be at least recorded monthly and aggregated yearly.<br>- Data will be kept at least for two years after the end of the last crediting period. |

### B.5.2. Sampling plan

>>
The CPA has not involved with procedure of sampling plan.

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

>>
Monitoring will be carried out for each individual CPA. For each CPA, all parameters will be monitored by the implementing entity of the CPA according to the procedures and monitoring framework under the PoA and will be submitted to the managing entity.

The main monitoring data are electricity supplied to households displacing electricity supplied from KEPCO grid. To check the amount of generated electricity, the measuring device 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
  - Guideline for the support on the new & renewable energy equipment
  - Measures Act

[5] 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.

< **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.

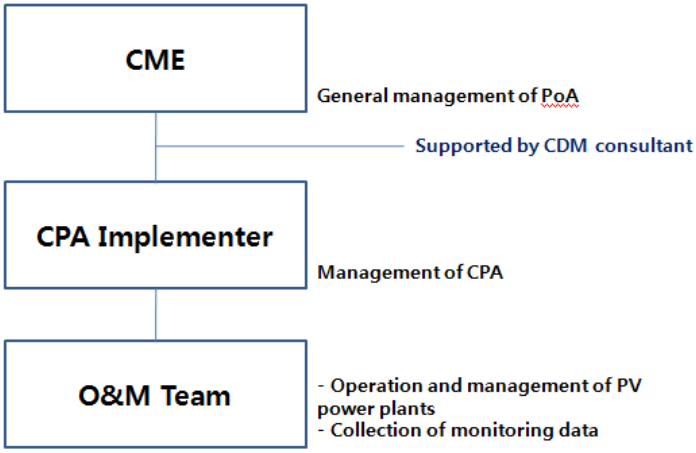
Equation : The auxiliary electricity consumption = Standby power[6] * Numbers * Hours

**< Quality Assurance and Quality Control>**

- 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.

- Calibration :
  Electricity meter should be recalibrated at appropriate intervals according to manufacturer specifications, but at least once in 8 years.

- Monitoring organization and responsibility :




< Figure 6. 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.

[6] 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.

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

### C.1. Start date of CPA

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

The start date of the CPA is no earlier than the date of commencement of PoA validation.

### 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 date of complete submission to UNFCCC or the date of commercial operation of this CPA, whichever occurs later.

### C.3.3. Duration of crediting period

>>
The length of 1st crediting period : 7 years
The number of renewal periods : 2

The duration of crediting period of the CPA shall be limited to the end date of the PoA regardless of when the CPA was added.

## SECTION D. Environmental impacts

### D.1. Analysis of environmental impacts

>>
According to the Environmental Impact Assessment Act, the project participant has to perform the environmental impact assessment if the capacity of plant facility is more than 100,000kW.

In addition, 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. In Korea, the scope of the businesses subject to prior environmental review according to the Framework Act on Environmental Policy is shown below.

| Division | Scope of business |
|---|---|
| Energy development project | In case of public announcement of designation of prearranged area for electric source development business according to the electric source development promotion act, provision 11 |

In the CPA, the each capacity is less than 100,000KW and the project is not related to electric source development business. Therefore, this project activity is excluded from the scope of businesses subject to environmental impact assessment.

### D.2. Environmental impact assessment

>>
The CPA less than 100 MW and not involved in electricity business do not need Environmental impact assessment.

## SECTION E. Local stakeholder consultation

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

>>
Stakeholder consultation is done at the CPA level.

After that from 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.

The post provided information about this CPA:

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

< Figure 7. The stakeholders' comment on CDM Project at LH Corporation web site>

### E.2. Summary of comments received

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

### E.3. Consideration of comments received

>>
No concerns or negative options were raised from the stakeholders.

## SECTION F. Eligibility for inclusion

This CPA satisfies all the eligibility criteria for inclusion in the PoA as detailed in Section B.2 of the PoA-DD:

| No. | Eligibility criterion - Category | Eligibility criterion - Required condition | Supporting evidence for inclusion | Description of this CPA in relation to the criterion and supporting evidence |
|---|---|---|---|---|

| 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 | GPS information is confirmed by DOE through desk review and on-site visit. |
| 2 | Target groups CPA and remains within SSC thresholds | The CPA applies photovoltaic power plants to collective housing and the installed capacity is less than or equal to 15MW. | Project plan document | Project plan document is confirmed by DOE through desk review and on-site visit. |
| 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 | Certificate of double counting check is confirmed by DOE through desk review and on-site visit. |
| 4 | Specifications of technology/ measure | The solar modules obtain certification for new and renewable energy facilities from facility certification institution. | Certificate from KEA | Certificate from KEA is confirmed by DOE through desk review and on-site visit. |
| 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 | Facility supply and installation contract confirmed by DOE through desk review and on-site visit. |
| 6 | Conditions that ensure applicability of the applied methodologies | The CPA meets eas described in B.2 of Part II in PoA-DD. | CPA-DD | CPA-DD is validated by DOE through desk review and on-site visit. |
| 7 | Additionality demonstration | The CPA meets the requirements pertaining to demonstration of additionality in B.5 of Part II in PoA-DD. | CPA-DD | CPA-DD is validated by DOE through desk review and on-site visit. |
| 8 | Requirements for Local stakeholder consultation | The CPA performs local stakeholder consultation before the inclusion of SSC-CPA. | Post in website of LH Corporation | The post is confirmed by DOE through desk review and on-site visit. |
| 9 | Requirements for environmental impact analysis | The CPA considers the environmental impacts analysis according to the regulation of the Republic of Korea. | CPA-DD | CPA-DD is validated by DOE through desk review and on-site visit. |
| 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 | Official notice on accounting is confirmed by DOE through desk review and on-site visit. |
| 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, cecheck of project activities under validation or registeration | Debundling check is confirmed by DOE through desk review and on-site visit. |

| No. | Eligibility criterion - Category | Eligibility criterion - Required condition | Supporting evidence for inclusion | Description of this CPA in relation to the criterion and supporting evidence |
|---|---|---|---|---|
| 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 identify CME. |

**Confirmation of additionality of the CPA for its inclusion into the PoA**

As discussed in Section B.1 of PoA, the additionality is demonstrated at the CPA level.

In case of this CPA, it can demonstrate additionality using **"Key criteria for assessing additionality"** in B.5 of Part II in PoA-DD.

Key criteria is as follow:

<Table 4. Key criteria for assessing additionality>

| Criteria | Description |
|---|---|
| 1 | Total installed capacity of photovoltaic power plants applied in the SSC-CPA is less than or equal to 15 MW. |

As for Criteria 1 :

As this CPA applies photovoltaic power plants to collective housing and the total installed capacity is less than 15MW, the criteria is satisfied as follows:

<Table 5. Installed capacity of independent photovoltaic power plant >

| No. | Plant name | Capacity(kW) |
|---|---|---|
| 1 | Hoengseong Eupha | 60.48 |
| 2 | Anyang Gwanyang (A1BL) | 126.72 |
| 3 | Osan Cheongho(1,2BL) | 129.6 |
| 4 | Jecheon Gangjeo(A2BL) | 60.48 |
| 5 | Chungju Yeonsu(2) | 172.8 |
| 6 | Seosan Daesan | 34.56 |
| 7 | Hongseong Namjang(2BL) | 83.52 |
| 8 | Gwangju Seonun(8-1,2BL) | 247.68 |
| 9 | Yeongam Yongang(2) | 46.08 |
| 10 | Jangheung Geonsan(2) | 40.32 |
| 11 | Yeongcheon Mangjeong | 80.64 |
| 12 | Yangsan Gachon | 77.76 |
| 13 | Changwon Bongnim(A1BL) | 109.44 |
| 14 | Changwon Bongnim(A2BL) | 92.16 |
| 15 | Busan Jisa(2) | 95.04 |
| Total | | 1,457 kW |

**In conclusion, this CPA is additional.**

# 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 section D.6.3. Ex-ante calculation of emission reductions.

# Appendix 4. Further background information on monitoring plan

Refer to section D.7.2. Description of the monitoring plan.

# 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 B.4.3. 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 ±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 construction and there are some slight differences on GPS coordinators and error.

## Document information

| *Version* | *Date* | *Description* |
|---|---|---|
| 09.0 | 31 May 2019 | Revision to:<br>• Ensure consistency with version 02.0 of the "CDM project standard for programmes of activities" (CDM-EB93-A07-STAN);<br>• Make editorial improvements. |
| 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:<br>• Remove appendix "Applicability of methodologies and standardized baselines" as the appendix is not relevant at the CPA level;<br>• Make editorial improvement. |
| 07.0 | 7 June 2017 | Revision to:<br>• Improve consistency with the "CDM project standard for programmes of activities" and with the PDD and PoA-DD forms;<br>• Make editorial improvement. |
| 06.0 | 24 May 2017 | Revision to:<br>• Ensure consistency with the "Standard: CDM project standard for programme of activities" (CDM-EB93-A07-STAN) (version 01.0);<br>• Incorporate the "Component project activity design document form for small-scale component project activities" (CDM-SSC-CPA-DD-FORM);<br>• Make editorial improvement. |
| 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:<br>• Include provisions related to statement on erroneous inclusion of a CPA;<br>• Include provisions related to delayed submission of a monitoring plan;<br>• Provisions related to local stakeholder consultation;<br>• Provisions related to the Host Party;<br>• Make editorial improvement. |
| 03.0 | 25 June 2014 | Revisions to:<br>• 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));<br>• Include provisions related to standardized baselines;<br>• 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; |

| *Version* | *Date* | *Description* |
|---|---|---|
| | | • Add general instructions on post-registration changes in paragraph 4 and 5 of general instructions and Appendix 6;<br>• Change the reference number from F-CDM-CPA-DD to CDM-CPA-DD-FORM;<br>• Make editorial improvement. |
| 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<br>Initial adoption. |

Decision Class: Regulatory
Document Type: Form
Business Function: Registration
Keywords: component project activity, project design document