



**CLEAN DEVELOPMENT MECHANISM
SMALL-SCALE PROGRAMME OF ACTIVITIES DESIGN DOCUMENT FORM
(CDM-SSC-PoA-DD) Version 01**

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NOTE:

- (i) This form is for the submission of a CDM PoA whose CPAs apply a small scale approved methodology.
- (ii) At the time of requesting registration this form must be accompanied by a CDM-SSC-CPA-DD form that has been specified for the proposed PoA, as well as by one completed CDM-SSC-CPA-DD (using a real case).



SECTION A. General description of small-scale programme of activities (PoA)

A.1 Title of the small-scale programme of activities (PoA):

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The programme to introduce renewable energy system into Jeju Island

Version number: 03

Revised date: 24 June 2012

A.2. Description of the small-scale programme of activities (PoA):

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Jeju Special Self-Governing Province (hereafter JGP) is an island region in Republic of Korea¹. Because of this geographical environment, energy supply of JGP depends on marine transportation from mainland of Korea (hereafter Korea). JGP consumed 1,708 KTOE of oil (100% from marine transportation) and 3,038 GWh of electricity (32.7% from mainland through submarine cable, 67.3% from own fire power plant) as of 2007. This energy supply structure is a barrier to development of JGP, so JGP planned to enhance energy independence by utilizing renewable energy source. JGP as an island region has poor geographic condition to supply fuel and national grid electricity, but JGP has fine environmental condition to utilize renewable energy, especially wind power. Therefore, renewable energy is the best solution to enhance energy independence. Moreover, it will contribute to reduction of national GHG emission.

In this background, JGP established vision as “Carbon free Island Jeju” and promotes to introduce renewable energy system to Jeju Island. JGP also set up the goal to enhance the proportion of renewable energy (1% as of 2007) to 10% by 2013, 20% by 2020 and 30% by 2030.²

Jeju Island has renewable energy potential as below.³

[Table 1] renewable energy potential of Jeju Island

Energy source	Potential	Unit
Solar heat	1,287,185,168	Gcal/Year
Photovoltaic	1,497,283	GWh/Year
Hydro power	4,082	GWh/Year
Biomass	1,704,287,719	Gcal/Year

As above data, JGP has various renewable energy potential and this potential varies with region. Each region in JGP has different renewable energy potential because of its environment, so each place should introduce appropriate renewable energy system considering its environment to utilize potential renewable energy.

¹ Korea in this document only means Republic of Korea, does not mean Democratic People's Republic of Korea.

² Jeju Special Self-Governing Province Renewable energy dissemination action plan, Jeju Special Self-Governing Province, 2009

³ Korea renewable energy resource data centre, <http://kredc.kier.re.kr>, May 2009 (Wind power and geothermal data have not been gathered yet.)



General operating and implementing framework of PoA

The programme of activities involves application of photovoltaic system, wind power plant and small hydro power plant to Jeju Island. These renewable energy systems will replace existing electricity supply based on fossil fuel and reduce GHG emission.

Photovoltaic system, wind power plant and small hydro power plant supply electricity and replace existing supply from grid. It contributes to reduction of GHG emission from grid electricity generation. Photovoltaic system, wind power plant and small hydro power plant generate electricity and this electricity would be used for captive use of installed building or delivered to grid. It depends on each CPA.

Each CPA is comprised of places in Jeju Island which apply this program. Each place included in a CPA will introduce one or more system above mentioned.

Korean government promotes subsidy program for renewable energy supply of local area. Local government which has renewable energy diffusion plan for public sector can apply to this subsidy program. If it is accepted, maximum 50% of project budget would be subsidized by the central government. This subsidy program is ‘renewable energy diffusion program for local area’ and implemented since 2007⁴, so it is regarded as E- policy.⁵ This PoA includes subsidized projects by this subsidy program, JGP or other public entities apply this subsidy program for public sector.

This PoA is not limited to public entity/sector. Private entity can participate in this PoA. JGP intends diffusion of renewable energy from public sector to private sector by this PoA.

Contribution to sustainable development

- Social aspect
 - This program will contribute to revitalization of renewable energy system industry by public purchasing.
 - This program will contribute to enhance energy independence of JGP.
 - This program will be a good example to enhance energy independence and invigorate other similar sustainable activities in Korea.
- Environmental aspect
 - Photovoltaic system, wind power plant and small hydro power plant are natural renewable energy source and do not emit any GHG for operation. It contributes to reduction of GHG emission from grid electricity use.
- Economic aspect
 - Building which installed renewable energy system for captive use can save energy cost for operation.

Policy/measure or stated goal of the PoA

The objective of the PoA is supplying renewable energy system to Jeju Island. JGP and other participants will install photovoltaic system, wind power plant and small hydro power plant to Jeju Island. This PoA

⁴ - Act on the Promotion of the Development, Use and Diffusion of New and Renewable Energy, Government of Republic of Korea, April 2010
- Guideline for the support, install and management of new and renewable energy system, Government of Republic of Korea, January 2011

⁵ E- Policy is that which give comparative advantage to less emission intensive technologies or fuels. The impacts of these policies can be excluded in establishing a baseline scenario if they have been implemented since the adoption of the Marrakesh Accords (11/11/2001). EB 22, Annex 3



will enhance energy independence of JGP and reduce GHG emission through avoidance of fossil fuel based electricity use.

This PoA utilizes several kinds of renewable energy system to make the best use of renewable energy and disseminate widely considering various condition of project place. This PoA contributes to not only GHG emission reduction but also improvement of energy independence of JGP. Utilizing several kinds of renewable energy, JGP can secure various energy sources and be a clean province at the same time. For this purpose, JGP promotes to introducing renewable energy system to Jeju Island with this PoA.

Confirmation that the proposed PoA is a voluntary action by the coordinating/managing entity

This PoA is a scheme developed by JGP to introduce natural renewable energy to Jeju Island. There are no mandatory enforcements in Korea that enforces introduction of renewable energy system to existing public buildings or other place to use for this project.

A.3. Coordinating/managing entity and participants of SSC-POA:

1. Coordinating or managing entity of the PoA as the entity which communicates with the Board
: Jeju Special Self-Governing Province. (JGP)
2. Project participants being registered in relation to the PoA. Project participants may or may not be involved in one of the CPAs related to the PoA.
: No any other participants

Name of Party involved(*) ((host)indicates a host party)	Private and/or public entity(ies) project participants(*) (as applicable)	Kindly indicate if the Party involved wishes to be considered as project participant (Yes/No)
Republic of Korea	Public entity : Jeju Special Self-Governing Province Private entity : Ecoeye Co.,Ltd (Consulting company)	No

A.4. Technical description of the small-scale programme of activities:

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A.4.1. Location of the programme of activities:

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Jeju special self-governing province in Republic of Korea

A.4.1.1. Host Party(ies):

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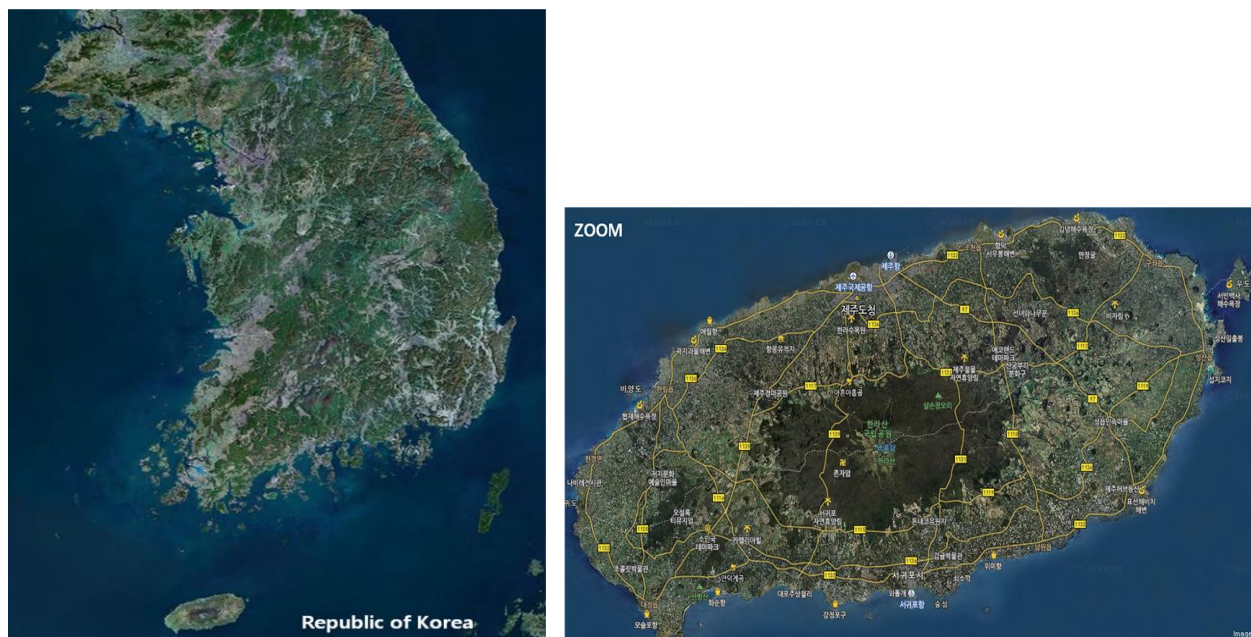
Republic of Korea

A.4.1.2. Physical/ Geographical boundary:

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All CPAs associated with this PoA will be implemented within the geographical boundary of Jeju special self-governing province in Republic of Korea.

Jeju island is situated from 126.141667°-126.972222° in longitude. The center longitude is 126.550000°. Excluding subsidiary islands; it ranges from 33.190833°- 33.563889° in latitude. Its center latitude is 33.374722°.



[Figure 1] geographical boundary of PoA

A.4.2. Description of a typical small-scale CDM programme activity (CPA):

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Each CPA will install renewable energy system to JGP. Photovoltaic system, wind power plant and small hydro power plant will be installed by each CPA and these systems will replace fossil fuel based energy use. Each CPA is comprised of place in JGP which apply this program and these places will introduce one or more system above mentioned. Renewable energy system which is used for captive use should correspond to AMS-I.F methodology. Renewable energy system which delivers to grid should correspond to AMS-I.D methodology. The total generation capacity of systems under each CPA is limited to 15MW.

A.4.2.1. Technology or measures to be employed by the SSC-CPA:

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All introduced renewable energy system should be certificated by Korea Energy Management Corporation (hereafter KEMCO) as a renewable energy system.⁶ It ensures the performance and reliability of a renewable energy system in Korea.

[Table 2] Combinations of introduced technologies and methodologies

	Technology	Type	Methodology
1	Photovoltaic	- Captive use of generated electricity	AMS-I.F.
2	Photovoltaic	- Send(Sell) the generated electricity to the national grid	AMS-I.D.
3	Wind power	- Send(Sell) the generated electricity to the national grid	AMS-I.D.
4	Small-hydro power	- Send(Sell) the generated electricity to the national grid	AMS-I.D.

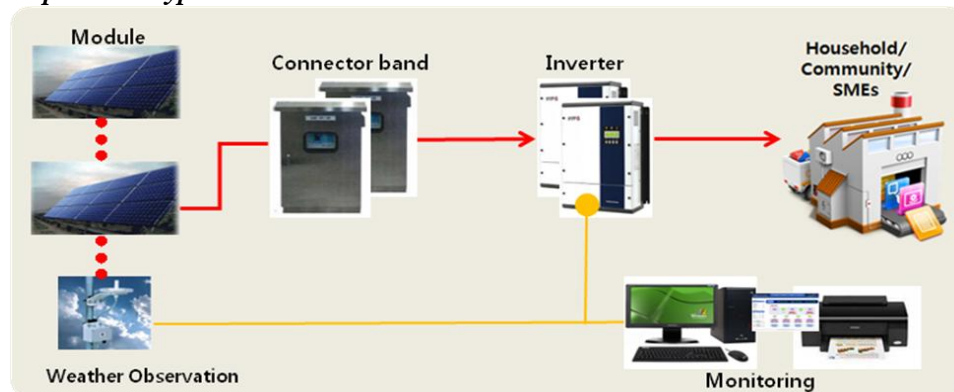
⁶ Renewable energy system certification is based on “Act on the Promotion of the Development, Use and Diffusion of New and Renewable Energy” Government of Republic of Korea, April 2010. KEMCO certifies renewable energy system to ensure performance of the system.

Photovoltaic system

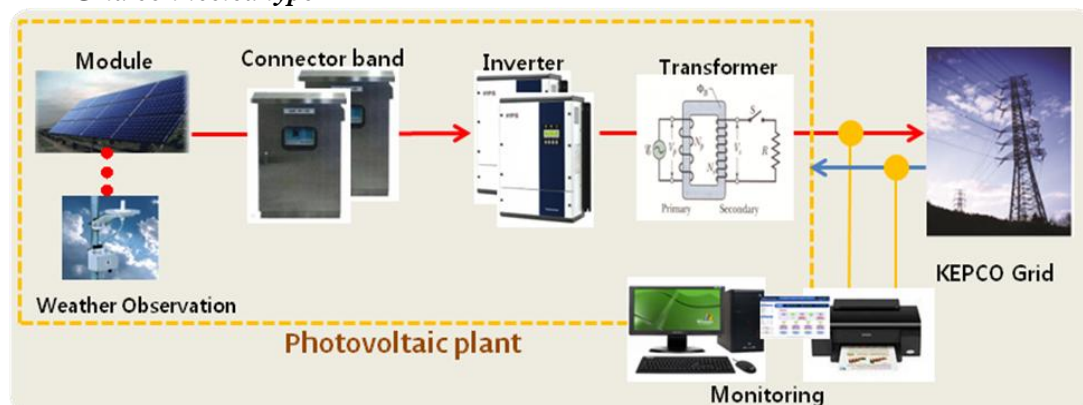
Photovoltaic system converts solar radiation into electric energy and supplies electricity to the user or grid. It replaces existing electricity supply from grid. This system is comprised of below devices.

- Solar module (Photovoltaic generator): generate electricity from solar radiation
- Inverter: invert generated DC electricity to AC electricity for use

Captive use type



Grid connected type

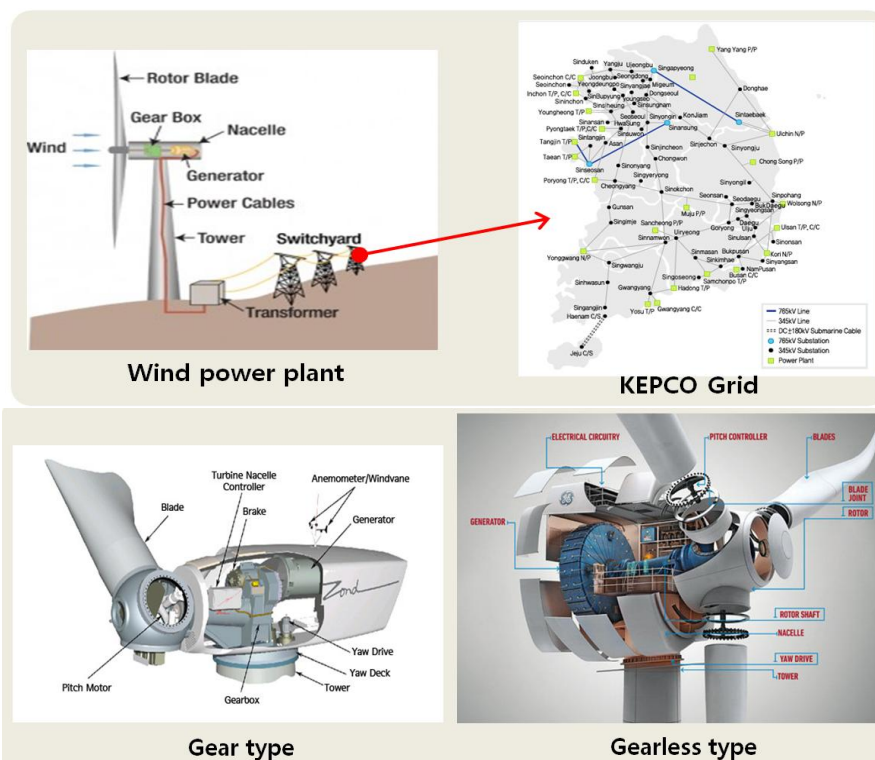


[Figure 2] Photovoltaic system

Wind power plant

Wind power plant convert wind power into mechanical energy and generate electricity. Generated electricity is supplied to grid. This system is comprised of below devices.

- Rotor blade: convert wind power to rotator power
- Gear box: adjust rotation speed for generation (it depend on the equipment)
- Generator: generate electricity using rotator mechanical energy
- Tower: support generating units and blade
- Transformer: transform generated electricity for grid



[Figure 3] Wind power plant

Small hydro power plant

Small hydro power plant convert potential energy of water into mechanical energy and generate electricity. It replaces existing electricity supply from grid. This system is applied to reservoir, river and other place which has enough water and appropriate environment. There are three types of small hydro power plant which depending on the environment. Appropriate type will be applied considering the project site in Jeju Island.

- *Run of river type*

Run-of-the-river type is a type of hydroelectric generation whereby considerably smaller water storage called pondage or none is used to supply a power station. This type is ideal for streams or rivers with a minimum dry weather flow or those regulated by a much larger dam and reservoir upstream. In general, projects divert some or most of a river's flow through a pipe and/or tunnel leading to electricity generating turbines, then return the water back to the river downstream, and this type is applied to upstream of river.

- *Storage type*

Storage type uses a dam to store river water in a reservoir. Water released from the reservoir flows through a turbine, spinning it, which in turn activates a generator to produce electricity. The water may be released either to meet changing electricity needs or to maintain a constant reservoir level. In general, this type is applied middle or down-stream of river which has plenty of water.

- *Tunnel type*

Tunnel type is a combination of run of river type and storage type. Water flows along the underground tunnel (waterway) and spins a turbine which generates electricity. In general, this type is applied indented river.



Small hydro power plant is comprised of two main components.

- Water turbine: generate rotator power from water flow
- Generator: generate electricity using rotator mechanical energy

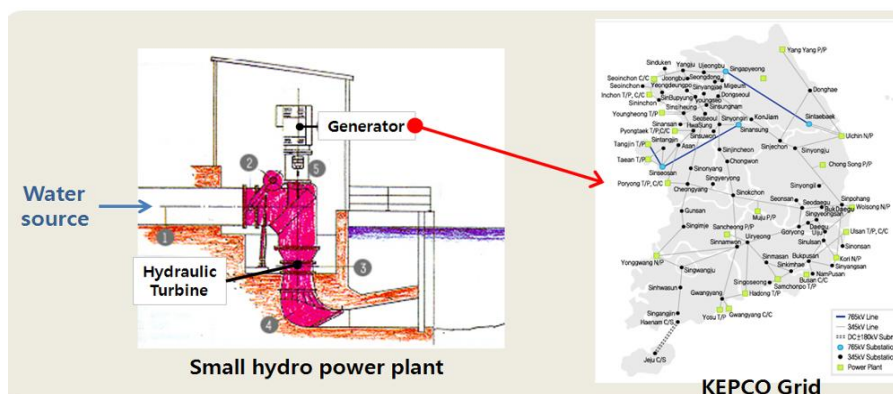
There are two main types of hydro turbines. Appropriate type will be applied considering project condition.

- *Impulse turbine*

Impulse turbine generally uses the velocity of the water to move the runner and discharges to atmospheric pressure. The water stream hits each bucket on the runner. There is no suction on the down side of the turbine, and the water flows out the bottom of the turbine housing after hitting the runner. An impulse turbine is generally suitable for high head, low flow applications.

- *Reaction Turbine*

Reaction turbine develops power from the combined action of pressure and moving water. The runner is placed directly in the water stream flowing over the blades rather than striking each individually. Reaction turbines are generally used for sites with lower head and higher flows than compared with the impulse turbines.



[Figure 4] Small hydro power plant

A.4.2.2. Eligibility criteria for inclusion of a SSC-CPA in the PoA:

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Eligibility Criteria⁷: CPA should result all assessment as ‘yes’ and submits evidence.

[Table 3] Eligibility criteria for CPA inclusion

No	Eligibility Criteria		Compliance		Mean of Proof/ Evidence document (to be check at CPA inclusion)
	Category	Description	Yes	No	
1	Voluntary action	Is CPA a voluntary coordinated action without any mandatory policy or regulation of the Korean Government? ⁸	<input type="checkbox"/>	<input type="checkbox"/>	It is stated in section A.4.3 of PoA-DD
2	Boundary and location of CPA	Is the CPA performed within the geographical boundary of the Jeju Special Self-Governing Province in the Korea?	<input type="checkbox"/>	<input type="checkbox"/>	Geographical coordinates of CPA project site (longitude and latitude)

⁷ Refer to ‘Standard for demonstration of additionality, development of eligibility criteria and application of multiple methodologies for programme of activities (EB 65, Annex 3)’; UNFCCC

⁸ “Act on the Promotion of the Development, Use and Diffusion of New and Renewable Energy”, Government of Republic of Korea, April 2010



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3	Avoid double-counting of CPA	The CPA is a new project which is not registered other CDM or CPA in the other PoA or other carbon off-set program. (The CPA is neither registered as an individual CDM project activity nor is it part of another registered PoA.)	<input type="checkbox"/>	<input type="checkbox"/>	Document: Declaration Letter from CPA implementer
4	Avoid double-counting of each project in the CPA	A unique numbering or identification system for the renewable energy equipment disseminated is applied.	<input type="checkbox"/>	<input type="checkbox"/>	All appliances disseminated under this CPA shall have a unique serial number, allowing to doubtlessly identifying the appliance. Serial number: <i>'JGP – Renewable energy source –Inclusion order'</i>
5	Debundling check	Confirmation that CPA is a single project which is not a debundled component of another large-scale CDM or PoA as per the latest guidance given in CDM EB.	<input type="checkbox"/>	<input type="checkbox"/>	Reference: Section A.4.4.1 of PoA-DD
6	Technological requirements	The applied equipment for CPA gets a Renewable energy system certification of KEMCO or passes a KS standard .	<input type="checkbox"/>	<input type="checkbox"/>	Document: Renewable energy system certification of KEMCO or KS standard.
7	CPA start date	CPA start date shall not be before PoA webhosting date, i.e. 15 April 2011 . In case any installed project facility will be found not in line with CPA start date requirement, those project will not be counted for emission reduction calculation.	<input type="checkbox"/>	<input type="checkbox"/>	Document: The document for Sales (or Order) contract of Renewable energy equipment under the CPA.
8	CPA crediting period	Starting date of CPA crediting period is date of inclusion into registered PoA or any date thereafter (e.g. operating date of project facility) and crediting period not to exceed the PoA end date.	<input type="checkbox"/>	<input type="checkbox"/>	A statement is included in the CPA-DD that the crediting period starting date is date of CPA inclusion into registered PoA or any date thereafter and crediting period not to exceed the PoA end date
9	Applicability	Confirmation that the CPA is appropriate for methodology AMS-1.D or AMS-1.F .	<input type="checkbox"/>	<input type="checkbox"/>	Reference: Section E.2 of PoA-DD
10	additionality	Additionality of each CPA is demonstrated in accordance with section E.5.2 of PoA-DD.	<input type="checkbox"/>	<input type="checkbox"/>	Reference: Section E.5.2 of PoA-DD
11	Stakeholder consultant	Local stakeholder consultants shall be performed before inclusion of CPA in the PoA (<i>Stakeholder consultant will be done at CPA level</i>)	<input type="checkbox"/>	<input type="checkbox"/>	Document: Result report of stakeholder consultants
12	Environmental Impact Analysis	EIA shall be performed as per requirements of the CDM modalities and comply with the related law (EIA will be done at CPA level) <i>Reference: Environmental Impact Analysis Act</i>	<input type="checkbox"/>	<input type="checkbox"/>	Document: Result report of Environmental Impact Analysis
13	Project scale threshold	CPA should have an installed capacity lower than 15MW to apply small-scale methodology.	<input type="checkbox"/>	<input type="checkbox"/>	Document: Evidence that can check the Capacity
14	Sampling method	This PoA and CPA do not use the sampling method for monitoring.	<input type="checkbox"/>	<input type="checkbox"/>	Monitoring system that installed at every and each CPA project site
15	Funding from Annex I parties	Confirmation that official development assistance (ODA) is not being diverted to the implementation of the PoA and CPA.	<input type="checkbox"/>	<input type="checkbox"/>	Document: Statement of CME and CPA implementer



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16	Approval of CPA by CME	CME approved each CPA to be included into its registered PoA (contractual agreement)	<input type="checkbox"/>	<input type="checkbox"/>	Document: Statement of CME giving approval for the CPA inclusion
17	CER ownership	CPA implementer under the specific CPA contractually cede their right to claim and own emission reductions under the Clean Development Mechanism of the UNFCCC to the CME of the PoA (JGP).	<input type="checkbox"/>	<input type="checkbox"/>	Document: Contract between CPA implementer and CME <i>** A contract contains terms and conditions about CER ownership and investment.</i>

Eligibility criteria above table should comply with basically to include CPA into its registered PoA. This *PoA includes three(3) of technologies*, such as Photovoltaic system, Wind power plant, and Small-hydro power plant and it involves *three(3) of project type*, such as Installation of New power plant (Greenfield plants), Capacity addition, and Replacement of (an) existing plant(s). Therefore, it should check the specific eligibility criteria as below table to include the CPA by technology-project type combinations.

[Table 4] Guidelines to choose the specific eligibility criteria by technology-project type combinations

	Methodology	Greenfield plants	Capacity addition	Replacement
Photovoltaic	AMS-IF.	A	B	-
	AMS-ID.	C	D	-
Wind power	AMS-ID.	E	F	G
Small hydro power	AMS-ID.	H	-	-

[Table 5] Specific Eligibility criteria by technology-project type combinations.

Classify	Eligibility Criteria (Description)	Compliance		Mean of Proof/Evidence document (to be check at CPA inclusion)
		Yes	No	
photovoltaic system (A,B,C,D)	In case of CPA introduce photovoltaic system; it can involve (a) Fixed type or (b) non-fixed type.	<input type="checkbox"/>	<input type="checkbox"/>	Check the facility type by inviting the CPA project site.
A, B	Generated electricity from CPA displaces grid electricity consumption at the end users.	<input type="checkbox"/>	<input type="checkbox"/>	Document: Information about end users of electricity generated by this CPA (Inspection prior to use)
C, D	Generated electricity from CPA is supplied to a national grid.	<input type="checkbox"/>	<input type="checkbox"/>	Document: Electric utility business License
B, D	The electricity produced by the added power plant(s) or unit(s) could be directly metered and separately metered.	<input type="checkbox"/>	<input type="checkbox"/>	Document: Status of Existing and Newly installed Metering equipment
wind power plant (E,F,G)	In case of CPA introduce wind power plant; it can involve (a) gear type or (b) gearless type.	<input type="checkbox"/>	<input type="checkbox"/>	Check the facility type by inviting the CPA project site.
	Generated electricity from CPA is supplied to a national grid.	<input type="checkbox"/>	<input type="checkbox"/>	Document: Electric utility business License
F	The electricity produced by the added power plant(s) or unit(s) could be directly metered and separately metered.	<input type="checkbox"/>	<input type="checkbox"/>	Document: Status of Existing and Newly installed Metering equipment
G	CPA implementer shall monitor the scrapping of replaced equipment. The monitoring should include a check if the number of project activity equipment distributed by the project and the number of scrapped equipment correspond with each other.	<input type="checkbox"/>	<input type="checkbox"/>	Document: Records for scrapped equipment <i>* Scrapped equipment should be stored until such correspondence has been checked and should be documented and independently verified.</i>



	The existing facility was operated before the implementation of this CDM project activity.	<input type="checkbox"/>	<input type="checkbox"/>	Document: Operation data of Three(3) last calendar years prior to the implementation of the project activity
Small-hydro power plant (H)	In case of CPA introduces small hydro power plant; it can involve (a) Run of river type or (b) Storage type or (c) Tunnel type.	<input type="checkbox"/>	<input type="checkbox"/>	Check the facility type by inviting the CPA project site
	Generated electricity from CPA is supplied to a national grid.	<input type="checkbox"/>	<input type="checkbox"/>	Document: Electric utility business License

A.4.3. Description of how the anthropogenic emissions of GHG by sources are reduced by a SSC-CPA below those that would have occurred in the absence of the registered PoA (assessment and demonstration of additionality):

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(i) The proposed PoA is a voluntary coordinated action;

There is no mandatory policy/regulation in Korea that requires JGP to introduce renewable energy systems to regional place.

Mandatory policy/regulation for Public institutes

Korean government promotes some programs to propagate renewable energy system. There are “Act on the Promotion of the Development, Use and Diffusion of New and Renewable Energy” in Korea to promote about renewable energy. Two Articles of introduce renewable energy systems to public sector are in this Act. It is the paragraph that excerpt from pertinent article of related law⁹ as following.

Article 12 (Investment Recommendation and Mandatory Use, etc. of New and Renewable Energy)
(2) Where the Minister of Knowledge Economy deems it necessary to facilitate the use or distribution of new and renewable energy, and to activate the new and renewable energy industry, he/she may require any of the following persons to **mandatorily install new and renewable energy facilities in a building¹⁰ newly built, extended, or remodelled** by such person in order to use energy supplied utilizing new or renewable energy over a certain percentage of the estimated volume of energy use computed as at the time of its design, as prescribed by Presidential Decree:

1. **The State and a local government;**
2. A public corporation under Article 5 of the Act on the Management of Public Institutions (hereinafter referred to as "public corporation");
3. A government-contributed institution to which the Government has contributed an amount equivalent to or more than that prescribed by Presidential Decree;
4. A government-invested corporation under subparagraph 6 of Article 2 of the State Property Act;
5. A corporation to which a local government, or public corporation, government-contributed institution or government-invested corporation under subparagraphs 2 through 4 has invested at a ratio or amount equivalent to or more than that prescribed by Presidential Decree;
6. A corporation established pursuant to special Acts.

Article 12-5 (Mandatory Supply, etc. of New and Renewable Energy)

⁹ Act on the Promotion of the Development, Use and Diffusion of New and Renewable Energy, Government of Republic of Korea, April 2010

¹⁰ CME of this PoA is Jeju special self-governing province which is public institute. In this contents, therefore, ‘building’ is mean ‘Public building’ which built by public institute. Example of public building is community centre, sport centre, office building, culture centre, training centre and etc.



- (1) Where the Minister of Knowledge Economy deems it necessary to facilitate the use and distribution of new and renewable energy, and to activate the new and renewable energy industry, he/she may require **a person prescribed by Presidential Decree (hereinafter referred to as "mandatory supplier")**, among the following persons, to mandatorily supply not less than a certain percentage of the volume of electricity generation by using new and renewable energy:
1. An operator of an electric generation business under Article 2 of the Electric Utility Act;
 2. A person deemed to have obtained a license for an electric generation business under Article 7 (1) of the Electric Utility Act pursuant to Articles 9 and 48 of the Integrated Energy Supply Act;
 3. **A public institution¹¹.**

But, according to the guidance about E+/E-policies¹², the impacts of these policies can be excluded in establishing a baseline scenario if they have been implemented since the adoption of the Marrakesh Accords (11 November 2001). These policies implemented since April 2010, so it could be regarded as if the policies did not exist.

Mandatory policy/regulation for Private entities.

There is no policy/regulation in Korea that requires private entity to introduce renewable energy systems to regional place. Private entity which developed own project voluntarily can participate in this PoA.

- (ii) If the PoA is implementing a voluntary coordinated action, it would not be implemented in the absence of the PoA;**

The proposed PoA as a CDM activity was developed as a voluntary coordinated action. At no stage were public or private announcements made regarding the project proceeding without use of the CDM. The Renewable energy project (that is the proposed project type introduced to this PoA) has to be spent much of initial investment. There are profits from sales the electricity generated from renewable energy project but profits are too few to cover initial investment.

So the renewable energy project is unable to attract any sources of revenue other than through the sale of CERs. CDM has been always considered as central of its development of PoA.

- (iii) If the PoA is implementing a mandatory policy/regulation, this would/is not enforced;**
(iv) If mandatory a policy/regulation is enforced, the PoA will lead to a greater level of enforcement of the existing mandatory policy/regulation.

There is no mandatory policy/regulation regarding this PoA.

¹¹ Public institute : National and local governments, government agencies, public enterprises

¹² Reference:

- (1) EB 22, Annex3 – Clarifications on the consideration of national and/or sectoral policies and circumstances in baseline scenarios.
- (2) EB 53, Annex 32 – Information note on the implementation of E+/E- in the context of projects on the agenda of the fifty-third meeting of the CDM executive board
 - E+Policy is that which give comparative advantage to more emissions intensive technologies or fuels.
 - E-Policy is that which give comparative advantage to less emission intensive technologies or fuels.

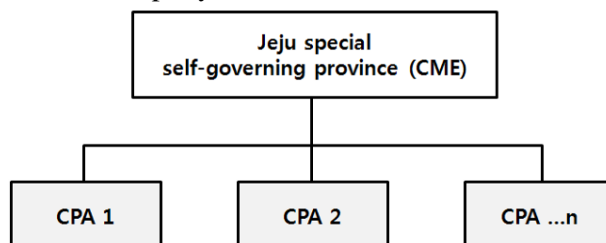


A.4.4. Operational, management and monitoring plan for the programme of activities (PoA):

A.4.4.1. Operational and management plan:

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Operational structure and task of each party is as below.



[Figure 5] Structure of the proposed Programme of Activities

- Coordinating/managing entity (JGP):
 - Manage the PoA registration process: validation and registration of PoA and CPA
 - Inclusion of new CPAs
 - Check CPA eligibility criteria
 - Establish monitoring plan and system
 - Verification and storage of monitoring data
 - Make the monitoring report
 - CER allocation with CPA implementer according to agreement
- CPA implementer (JGP or other organization):
 - Implement and manage the CPA (renewable energy system and monitoring system)
 - Prove additionality of CPA
 - Collect and Store the monitoring data

(i) A record keeping system for each CPA under the PoA,

Detailed monitoring manual will be provided to JGP and CPA implementers, and they will follow the manual for their monitoring work. The manual includes description as below, for monitoring and more details for each CPA project characteristics.

Coordinating/managing entity (JGP)

JGP manages the whole monitoring process and takes the responsibility.

JGP designates a department for CDM data which is qualified to manage data and records as it is part of its normal assignment. JGP collects monitoring data from each CPA, verifies the data whether all variables are valid or not, and develops a monitoring report. Electronic records will be kept during the entire crediting period of each CPA (10 years) and the following two years.

Records will be kept in the monitoring task computer unit. JGP ensures reliability of data storage system and secures alternative storing unit for accidental situation. JGP should be noticed when an accident occurs in CPA level.

CPA implementer (JGP or other organization)

CPA implementer performs monitoring process.

Each introduced system include output data meter. These systems should be available for recording its all monitoring variables. CPA implementer collects monitoring data for CPA and store as above described.



CPA implementer secures measure for accidental situation. If accident is happened, CPA implementer should apply appropriate solution. Each CPA will follow the requirement for record keeping and monitoring stipulated in applied methodologies and detailed in Section E below.

Each CPA can introduce three types of systems applying two methodologies.

Renewable energy system which is used for captive use should correspond to AMS-I.F. (ver.02) methodology. Renewable energy system which delivers to grid should correspond to AMS-I.D. (ver.17) methodology. (Refer to Table 2 in Section A.4.2.1 as above)

In summary, the coordinating entity (JGP) will ensure that each CPA will maintain appropriate records documenting the following variables:

[Table 6] Sample of data-set

Data type	List of data
System information	<ul style="list-style-type: none"> ✓ A serial number ✓ system type ✓ location ✓ introduced date
Energy production	Generated electricity quantity

- (ii) A system/procedure to avoid double accounting e.g. to avoid the case of including a new CPA that has been already registered either as a CDM project activity or as a CPA of another PoA,**

Double counting could occur if the CPA is already registered as an individual CDM project activity or is part of another registered PoA. To prevent such instances, CME will check whether there is any double-counting case using UNFCCC website or other statistical documents with the confirmation from each CPA that the CPA is neither registered as an individual CDM project activity nor is part of another registered PoA. (CPA implementers will submit declaration letter to ensure that their proposed project activity is new one.)

In the periodic monitoring report, CME will report the result of its investigation on the CPAs about this issue specifying the location, capacity, developer information, etc. of each CPA

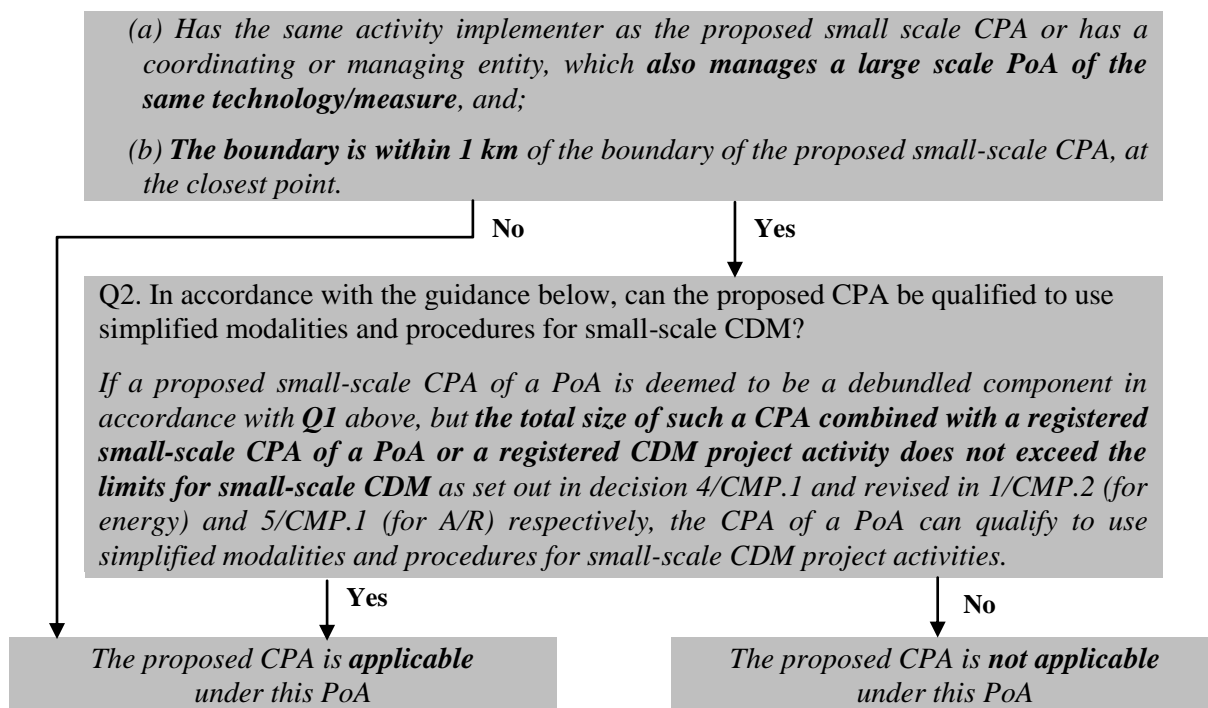
- (iii) The SSC-CPA included in the PoA is not a de-bundled component of another CDM programme activity (CPA) or CDM project activity.**

Debundling is defined as the fragmentation of a large project activity into smaller parts. A small-scale project activity that is part of a large project activity is not eligible to use the simplified modalities and procedures for small-scale CDM project activities. CME will investigate whether there is any such case in accordance with 'Guidance for determining the occurrence of de-bundling under a PoA (EB 54, Annex13)' or its update.

To make sure de-bundling check, CME checks accurate location of CPA using GPS information and serial number of a renewable system. CME will match GPS location information and serial number of a renewable system, and this information will be stored.

Q1. In accordance with the guidance below, is the proposed CPA deemed to be a de-bundled component of a large scale activity?

A proposed small-scale CPA of a PoA shall be deemed to be a de-bundled component of a large scale activity if there is already an activity, which satisfies both conditions (a) and (b) below:



[Figure 6] De-bundling Check List

- (iv) **The provisions to ensure that those operating the CPA are aware of and have agreed that their activity is being subscribed to the PoA;**

As every CPA implementer will make a written contract with CME on the terms and responsibilities prior to their CDM promotion. That means all the CPAs will be aware and will have agreed that their activity is subscribed to the proposed PoA before its participation into the PoA. Legal agreements have been put in place with PoA distribution partners clearly stipulating that their activities are subscribed to the SSC-PoA. In addition, CME will maintain the database of CME-CPA contract documents.

A.4.4.2. Monitoring plan:

>>

- (i) *Description of the proposed statistically sound sampling method/procedure to be used by DOEs for verification of the amount of reductions of anthropogenic emissions by sources or removals by sinks of greenhouse gases achieved by CPAs under the PoA.*

Not applicable for the proposed PoA.

This PoA does not use sampling method but will verify every each CPA. In addition, any sampling method or procedure is not utilized to implement the monitoring activity of the CPAs under the PoA

- (ii) *In case the coordinating/managing entity opts for a verification method that does not use sampling but verifies each CPA (whether in groups or not, with different or identical verification periods) a transparent system is to be defined and described that ensures that no double accounting occurs and that the status of verification can be determined anytime for each CPA;*

All introduced system by this PoA has input/output data and monitoring equipment will be installed at each project system to check the input/output data of this project. Each CPA will report its monitoring



data to CME and CME manages the monitoring data. The CPA project database includes the following data-set that can unambiguously determine the emission reductions attributable to each CPA:

[Table 7] Sample of data-set

Data type	List of data
System information	<ul style="list-style-type: none"> ✓ Serial number ✓ System type ✓ Location ✓ Introduced date
Energy production	<ul style="list-style-type: none"> ✓ Generated electricity quantity

The CME will produce a monitoring report and sent to the DOE to verify corresponding to the preceding monitoring period of each CPA. This report will unambiguously set-out the data related to the emission reductions generated by that specific CPA during the monitoring period.

PoA record keeping procedures will prevent double counting across CPAs. The data-set corresponding to each CPA will be mutually exclusive of the data-set of another CPA under the PoA.

Verification of each CPA will be performed at the end of each monitoring period. The project database will record the start and end dates of each monitoring period and record the emission reductions attributable to each monitoring period. Appropriate record keeping procedures will be implemented to ensure that each monitoring period can be transparently attributed to its corresponding CPA, preventing any occurrences of double counting. An audit of the project data base will be able to determine the current status of each CPA – the duration of previous monitoring periods, groups delivering monitoring data and current verification activities.

A.4.5. Public funding of the programme of activities (PoA):

>>

There is no public funding of the PoA

SECTION B. Duration of the programme of activities (PoA)

B.1. Starting date of the programme of activities (PoA):

>>

2nd May 2011

B.2. Length of the programme of activities (PoA):

>>

28 years

SECTION C. Environmental Analysis

>>

C.1. Please indicate the level at which environmental analysis as per requirements of the CDM modalities and procedures is undertaken. Justify the choice of level at which the environmental analysis is undertaken:

1. Environmental Analysis is done at PoA level
2. Environmental Analysis is done at SSC-CPA level

☐
☒



C.2. Documentation on the analysis of the environmental impacts, including transboundary impacts:

>>

Not applicable. Environmental Impact Analysis is done at the CPA level.

C.3. Please state whether in accordance with the host Party laws/regulations, an environmental impact assessment is required for a typical CPA, included in the programme of activities (PoA);

>>

Not applicable. Environmental Impact Analysis is done at the CPA level.

SECTION D. Stakeholders' comments

>>

D.1. Please indicate the level at which local stakeholder comments are invited. Justify the choice:

1. Local stakeholder consultation is done at PoA level ☐
2. Local stakeholder consultation is done at SSC-CPA level ☒

D.2. Brief description how comments by local stakeholders have been invited and compiled:

>>

Not applicable. Stakeholder consultation is done at the CPA level.

D.3. Summary of the comments received:

>>

Not applicable. Stakeholder consultation is done at the CPA level.

D.4. Report on how due account was taken of any comments received:

>>

Not applicable. Stakeholder consultation is done at the CPA level.

SECTION E. Application of a baseline and monitoring methodology

E.1. Title and reference of the approved SSC baseline and monitoring methodology applied to a SSC-CPA included in the PoA:

>>

The approved small-scale baseline and monitoring methodologies used are:

- AMS I.D. (version 17); Grid connected renewable electricity generation
- AMS I.F. (version 02); Renewable electricity generation for captive use and mini-grid

E.2. Justification of the choice of the methodology and why it is applicable to a SSC-CPA:

>>

This PoA applies several types of renewable energy system, because each project site or building in JGP has different condition to utilize renewable energy source. To disseminate renewable energy widely, appropriate system for each condition should be introduced. For this reason, this PoA includes three types of renewable energy system. Photovoltaic system is applicable to a place which can take enough sunlight. Small hydro power plant is applicable to a place which has enough water resource. Wind power plant is applicable to a place which has enough wind power resource.



If these conditions are not satisfied, these systems are not applicable. Beside this technical condition, economic condition and the other conditions are different to each place (that means project site) and they need appropriate renewable energy system considering various conditions.

To apply these multiple type of renewable energy system, multiple methodologies are needed. Use of generated electricity by each renewable energy system is different. Because of this difference, different methodology should be applied. The combination of two methodologies will be applied for baseline and monitoring. Applying multiple methodologies is essential to promote this PoA which introducing several kinds of renewable energy system. In other word, it is for effective utilization of several types of renewable energy source.

AMS I.D states:

This category comprises renewable energy generation units, such as photovoltaic, hydro, tidal/wave, wind, geothermal and renewable biomass that supply electricity to a national or a regional grid.

This methodology is applicable to CPAs which introduce renewable energy system which generate electricity and deliver to grid. Introducing these systems replaces existing grid electricity and brings reduction of GHG emission. This process is described in AMS-I.D methodology.

[Table 8] Applicability in AMS-I.D

	Applicability Criteria (AMS I.D. ver.17)	PoA Scenario
1	This methodology comprises renewable energy generation units, such as photovoltaic, hydro, tidal/wave, wind, geothermal and renewable biomass: (a) Supplying electricity to a national or a regional grid; or (b) Supplying electricity to an identified consumer facility via national/regional grid through a contractual arrangement such as wheeling	The project which supplies electricity to a national grid will apply AMS-I.D. - Photovoltaic system; - Wind power plant; or - Small-hydro power plant
2	Illustration of respective situation under which each of the methodology (i.e. AMS-I.D, AMS-I.F, AMS-I.A) applies is included in Table 2	The CPA should supply electricity 1) to a national grid; or 2) to an identified consumer facility via national grid (through a contractual arrangement such as wheeling)
3	This methodology is applicable to 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; (c) involve a retrofit of (an) existing plant(s); or (d) involve a replacement of (an) existing plant(s).	The CPA includes the project type per technologies, (A) Photovoltaic System ; (a) Greenfield plant, (b) Capacity addition (B) Wind power plant ; (a) Greenfield plant, (b) Capacity addition, (c) Replacement (C) Small-hydro power plant (a) Greenfield plant
4	Hydro power plants with reservoirs that satisfy at least one of the following conditions are eligible to apply this methodology: - The project activity is implemented in an existing reservoir with no change in the volume of reservoir; - 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 4W/m ² ; - 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 4W/m ² .	In case that the project activity result in new reservoirs, the power density should be greater than 4W/m ² . In case that the project activity is implemented in an existing reservoir, it can be divided to two (2) types; One is that the volume of reservoir is increased and the other is that the volume of reservoir is not changed. If the volume is increased, the power density of power plant should be greater than 4W/m ² and if the volume is not changed, power density is not considered.



5	If the new unit 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 new unit co-fires fossil fuel, the capacity of the entire unit shall not exceed the limit of 15MW.	The new project unit by CPA will introduce only renewable energy. Capacity of renewable components will be up to 15MW to satisfy the small-scale project criteria.
6	Combined heat and power (co-generation) systems are not eligible under this category.	Combine heat and power plant will be excluded from this PoA.
7	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 15MW and should be physically distinct from the existing units. [Reference] <i>Physically distinct</i> 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.	In the case that CPA involves capacity addition of renewable energy generation units at an existing renewable power generation facility, it will ensure that the capacity of the units added by the CPA is lower than 15MW and be physically distinct from the existing units. That means If CPA involves the capacity addition project, PP should install the monitoring equipment separately with the existing equipments.
8	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 15MW.	In the case of CPA involves replacement of existing renewable power generation facility, it will ensure that the capacity of replacement unit is lower than 15MW. <i>(This PoA do not include Retrofit project)</i>

AMS I.F states:

This category comprises renewable energy generation units, such as photovoltaic, hydro, tidal/wave, wind, geothermal and renewable biomass that supply electricity to user(s).

This methodology is applicable to CPAs which introduce renewable energy system which generate electricity and replace grid electricity for captive use. Introducing this system replaces existing electricity supply from grid and brings reduction of GHG emission. This process is described in AMS-I.F methodology.

[Table 9] Applicability in AMS-I.F

	Applicability Criteria (AMS I.F. ver.02)	PoA Scenario
1	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: (a) A national or a regional grid (grid hereafter); (b) Fossil fuel fired captive power plant; (c) A carbon intensive mini-grid.	The project which supplies electricity to end users will apply AMS-I.F. ; <i>Photovoltaic system</i> The generated electricity through photovoltaic system will displace electricity supplied from a national grid. In other word, in the absence of the CPA, the users supplied electricity from a national grid.
2	For the purpose of this methodology, a mini-grid is defined as small-scale power system with a total capacity not exceeding 15 MW (i.e. the sum of installed capacities of all generators connected to the mini-grid is equal to or less than 15 MW) which is not connected to a national or a regional grid.	Generally, at CPA project site, the users would have been supplied electricity from a national grid. That mean, project site is connected to a national grid. But the project facility and the electricity generated by CPA will not be exported to a national grid. So it can be considered that it does not connect to a national grid. And Total capacity of



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		the introduced renewable energy facility by CPA will be lower than 15MW of course.
3	Illustration of respective situations under which each of the methodology (AMS-I.D, AMS-I.F and AMS-I.A) applies is included in Table 2.	The electricity generated from CPA displaces grid electricity consumption (e.g. grid import)
4	Hydro power plants with reservoirs that satisfy at least one of the following conditions are eligible to apply this methodology: ... [ellipsis]	CPAs that introduce Small-hydro power plant will not apply AMS-I.F. In case that CPA include the project which applies small-hydro power plant, it will supply the generated electricity to the national grid
5	For biomass power plants, no other biomass other than renewable biomass are to be used in the project plant.	Biomass power plants will not be included in this PoA.
6	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, (c) Involve a retrofit of (an) existing plant(s); or (d) Involve a replacement of (an) existing plant(s).	The CPA that introduce Photovoltaic system for the purpose of captive-use will involves two (2) type; (a) Greenfield plant, (b) Capacity addition.
7	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 from the existing units. [Reference] 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.	In the case that CPA involves capacity addition of renewable energy unit at an existing renewable energy unit, it will ensure that the capacity of the unit added by the CPA is lower than 15MW and be physically distinct from the existing unit. That means If CPA involves the capacity addition project, PP should install monitoring equipment separately with the existing equipments.
8	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.	In case that the project has a purpose of use the electricity generated by project activity for captive use and should apply the methodology AMS-I.F., Replacement or Retrofit type is excluded.
9	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, the capacity of the entire unit shall not exceed the limit of 15 MW.	The new project unit by CPA will introduce only renewable energy. Capacity of renewable components will be up to 15MW to satisfy the small-scale project criteria.
10	Combined heat and power (co-generation) systems are not eligible under this category.	Combine heat and power plant will be excluded from this PoA.
11	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.	In case that electricity produced by CPAs is delivered to another facility or facilities within the project boundary, CPA implementers (JGP or other project owners) will ensure that emission reduction from displacing electricity will be only claimed by CPA implementers through contract between the supplier and consumer(s)



E.3. Description of the sources and gases included in the SSC-CPA boundary

>>

[Table 10] Emission Sources and gases

	Source	Gas	Included	Justification
Baseline	CO2 emissions from electricity generation in fossil fuel fired power plants	CO ₂	Yes	Main Source
		CH ₄	No	Minor Source
		N ₂ O	No	Minor Source
Project activity	For photovoltaic system and wind power plant, No emission of GHG	CO ₂	No	Minor Source
		CH ₄	No	Minor Source
		N ₂ O	No	Minor Source
	For hydro power plant, emission of CH ₄ from the reservoir.	CO ₂	No	Minor Source
		CH ₄	Yes	Main Source
		N ₂ O	No	Minor Source

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

>>

This PoA will be applied two of methodologies AMS-I.D. and AMS-I.F.

(1) In case that CPA will be applied the AMS-I.D.

- The baseline scenario is that the electricity delivered to the grid by the project activity would have otherwise been generated by the operation of grid-connected power plants and by the addition of new generation sources into the grid.
- If the project activity is a capacity addition or the replacement of an existing grid-connected renewable power plant/unit, the baseline scenario is the following:
 - In the absence of the CDM project activity, the existing facility would continue to supply electricity to the grid at historical levels, until the time at which the generation facility would likely be replaced or retrofitted. From that point of time onwards, the baseline scenario is assumed to correspond to the project activity, and no emission reductions are assumed to occur.

(2) In case that CPA will applied the AMS-I.F.

- The baseline scenario is that the electricity delivered to the end users by the project activity would have otherwise been generated by the operation of grid-connected power plants and supplied to the end users.
- If the project activity is a capacity addition to an existing renewable power plant/unit to increase the quantity of generated electricity by project activity, the baseline scenario is the following:
 - In the absence of the CDM project activity, the existing facility would continue to supply electricity to the end user for captive use at historical levels, until the time at which the generation facility would likely be replaced or retrofitted. From that point of time onwards, the baseline scenario is assumed to correspond to the project activity, and no emission reductions are assumed to occur.



E.5. Description of how the anthropogenic emissions of GHG by sources are reduced below those that would have occurred in the absence of the SSC-CPA being included as registered PoA (assessment and demonstration of additionality of SSC-CPA): >>

E.5.1. Assessment and demonstration of additionality for a typical SSC-CPA:

>>

[Table 11] Guidelines to choice the method for demonstrating the additionality

Technology	Project Type (=Methodology)	Capacity	Result
Photovoltaic	AMS-I.D.	≤ 5MW	B (positive list)
		6MW~15MW	B (positive list)
	AMS-I.F.	≤ 5MW	A (Simple Check)
		6MW~15MW	C (Investment barrier)
Wind power	AMS-I.D.	≤ 5MW	A (Simple Check); or C (Investment barrier)
		6MW~15MW	C (Investment barrier)
Small-hydro power	AMS-I.D.	≤ 5MW	A (Simple Check); or C (Investment barrier)
		6MW~15MW	C (Investment barrier)

CPA implementer should check the type of CPA and choice the appropriate method depending on the situation of CPA to assess additionality.

Method A. Application of simple criteria for assessing additionality.¹⁴

This PoA is the GHG emission reduction project by introducing renewable energy system, so additionality of CPA can be demonstrated as below.

Precondition to use this tool:

This tool can apply to the project activities that employ renewable energy technology **up to 5 megawatts** of capacity.

If any one of the conditions below is satisfied, the proposed project activities are additional:

- The geographic location of the project activity is in one of the **least developed countries** or the **small island developing States (LDCs/SIDS)** or in **a special underdeveloped zone of the host country** identified by the government before 28 May 2010;
- The project activity is **an off-grid activity supplying energy to households/communities** (less than 12 hours grid availability per 24 hrs is also considered .off-grid. for this assessment);
- The project activity is designed for distributed energy generation (not connected to a national or regional grid) with both conditions (i) and (ii) satisfied;
 - Each of the independent subsystems/measures in the project activity is smaller than or equal to 1,500kW electrical installed capacity;*
 - End users of the subsystems or measures are households/communities/small and medium enterprises (SMEs).*

¹⁴ Reference: Guidelines for demonstrating additionality of micro scale project activities (EB 63, Annex 23), UNFCCC.



- (d) The project activity employs specific renewable energy technologies/measures *recommended by the host country designated national authority (DNA) and approved by the Board* to be additional in the host country. The following conditions shall apply for DNA recommendations:
- (i) *Specific renewable energy technologies/measures. refers to grid connected renewable energy technologies of installed capacity equal to or smaller than 5 MW;*
 - (ii) *The ratio of installed capacity of the specific grid connected renewable energy technology in the total installed grid connected power generation capacity in the host country shall be equal to or less than 3 per cent;*
 - (iii) *Most recent available data on the percentage of contributions of specific renewable energy technologies shall be provided to demonstrate compliance with the 3 per cent threshold. In no case shall data older than three years from the date of submission be used;*
 - (iv) *Technologies/measures recommended by DNAs and approved by the Board to be additional in the host country remain valid for three years from the date of approval. However, additionality of eligible project activities applying the guidelines remains valid for the entire crediting period;*
 - (v) *DNA submissions shall include the specific grid connected renewable electricity generation technologies that are being recommended and provide the required data as indicated above (e.g. wind power, biomass power, geothermal power, and hydropower).*

Method B. Positive list¹⁵ for assessing additionality

‘Attachment A of Appendix B, Version 8’ suggests that *the positive list of grid-connected renewable electricity generation technologies are automatically defined as additional, without further documentation of barriers*. The list includes the photovoltaic power generation activities that are grid-connected with the installed capacity up to 15 MW, which corresponds to the typical CPA of this PoA.

Method C. Barrier analysis for assessing additionality.

The additionality of a typical CPA will be determined based on a simple cost and income analysis according to “Attachment A to Appendix B of the simplified modalities and procedures for SSC CDM project activities.” which takes into account the costs and the income expected to be derived from the following items and activities:

Project participants shall provide an explanation to show that the project activity would not have occurred anyway due to at least one of the following barriers:

- (a) **Investment barrier:** *a financially more viable alternative to the project activity would have led to higher emissions;*
- (b) **Technological barrier:** *a less technologically advanced alternative to the project activity involves lower risks due to the performance uncertainty or low market share of the new technology adopted for the project activity and so would have led to higher emissions;*
- (c) **Barrier due to prevailing practice:** *prevailing practice or existing regulatory or policy requirements would have led to implementation of a technology with higher emissions;*
- (d) **Other barriers:** *Without the project activity, for another specific reason identified by the project participant, such as institutional barriers or limited information, managerial resources, organizational capacity, financial resources, or capacity to absorb new technologies, emissions would have been higher.*

¹⁵ Reference: Attachment A of Appendix B (version 08), (EB 63, Annex 24), UNFCCC.



E.5.2. Key criteria and data for assessing additionality of a SSC-CPA:

>>

The CPA follows below process for assessing additionality.

Method A. Application of simple criteria for assessing additionality.

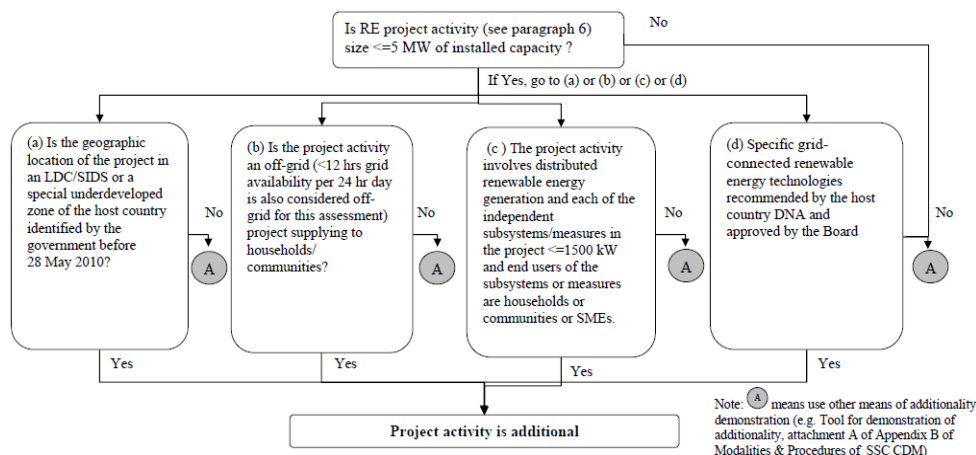
Preferentially, applying method in EB 63, Annex 23, and the CPA should be consistent with below additionality criteria as below.

Precondition to use this tool:

The project activities employ renewable energy technology and installed capacity is **up to 5 megawatts**

**** To determine additionality of project activities, any one of the conditions below has to be satisfied.**

- (a) *The geographic location of the project activity is in one of the least developed countries or the small island developing States (LDCs/SIDS) or in a special underdeveloped zone of the host country identified by the government before 28 May 2010;*
- (b) *The project activity is an off-grid activity supplying energy to households/communities (less than 12 hours grid availability per 24 hrs is also considered 'off-grid' for this assessment);*
- (c) *The project activity is designed for distributed energy generation (not connected to a national or regional grid) with both conditions (i) and (ii) satisfied;*
 - (i) Each of the independent subsystems/measures in the project activity is smaller than or equal to 1500kW electrical installed capacity;
 - (ii) End users of the subsystems or measures are households/communities/small and medium enterprises (SMEs).
- (d) *The project activity employs specific renewable energy technologies/measures recommended by the host country designated national authority (DNA) and approved by the Board to be additional in the host country. The following conditions shall apply for DNA recommendations:*
 - (i) Specific renewable energy technologies/measures. refers to grid connected renewable energy technologies of installed capacity equal to or smaller than 5 MW;
 - (ii) The ratio of installed capacity of the specific grid connected renewable energy technology in the total installed grid connected power generation capacity in the host country shall be equal to or less than 3 per cent;
 - (iii) Most recent available data on the percentage of contributions of specific renewable energy technologies shall be provided to demonstrate compliance with the 3 percent threshold. In no case shall data older than three years from the date of submission be used;
 - (iv) Technologies/measures recommended by DNAs and approved by the Board to be additional in the host country remain valid for three years from the date of approval. However, additionality of eligible project activities applying the guidelines remains valid for the entire crediting period;
 - (v) DNA submissions shall include the specific grid connected renewable electricity generation technologies that are being recommended and provide the required data as indicated above (e.g. wind power, biomass power, geothermal power, and hydropower).



[Figure 7] Micro-scale additionality test for RE project activities

[Table 12] Data for criteria (Method A)

Criteria	Data
(a)	Not applicable (<i>Korea is not included as LDCs, SIDS and does not have underdevelopment zone</i>)
(b)-(i)	Evidence document to determine the usage of off-grid; or Daily operation time of energy generation system in the CPA (<i>less than 12 hours grid availability per 24 hrs is also considered 'off-grid'</i>)
(b)-(ii)	Information of end user (<i>Households/Communities</i>)
(c)-(i)	Maximum capacity of a renewable energy system in the CPA
(c)-(i)	Information of End user that is supplied the generated electricity through introduced renewable energy system by the CPA (<i>Households/Communities/Small and Medium Enterprises (SMEs)</i>)
(d)	Information of introducing technology for contribution to national electricity generation Approval by the Board about the specific renewable energy technologies/measures recommended by the host country designated national authority (DNA)

If the CPA satisfies above criteria and PP can submit all the evidence data for criteria, the CPA is additional.

If the CPA does not satisfy the above criteria, the CPA should be consistent with following additionality criteria.

Method B. Positive list for assessing additionality

Grid connected photovoltaic system project with the installed capacity up to 15MW can consider as positive list. So, it can be automatically define as additional, without further documentation of barriers.

- * Positive list:
- (a) Solar technologies (photovoltaic and solar thermal electricity generation);
 - (b) Off-shore wind technologies;
 - (c) Marine technologies (wave, tidal)

[Table 13] Data for criteria (Method B)

Criteria	Data
Positive list	Information of introducing technology for contribution to national electricity generation
	Capacity of a renewable energy system in the CPA (Specification)



Method C. Barrier analysis for assessing additionality.

Applying “Attachment A to Appendix B of the simplified modalities and procedures for SSC CDM project activities”, the CPA should be consistent with least one of below additionality criteria. (Refer above E.5.1)

CPA would demonstrate investment barrier.

(a) Investment barrier¹⁶

This CPA applies the simple cost analysis.

- Outflow :
 - Initial investment for introduction of system (purchase & install)
- Inflow :
 - Profit from power sale to grid
 - Quantity of generated electricity (In case of Photovoltaic system project that is captive-use type)¹⁷

[Table 14] Cash flow analysts without CER income (Method C)

(unit: KRW, won)

year	1	2	3	4	5	6	7	8	9	10	Total
Cash inflow											
1.1 Revenue from power											
Outflow											
2.1 Total investment											
2.2 Total O&M cost											
2.3 Construction and education surtax											
2.4 Income tax											
Net Cash flow											

CPA will calculate Net Present Value (NPV) of project.

If NPV is smaller than zero ($NPV < 0$), CPA income without CER (Cash inflow) is financially infeasible and unattractive than alternative which maintaining current state. Maintaining current state would be a financially more viable alternative than CPA, and this alternative would lead higher emission. Therefore, investment barrier to CPA is demonstrated and CPA has additionality.

If NPV is larger than zero ($NPV > 0$), CPA is financially feasible without CDM. So investment barrier cannot be demonstrated and CPA has not additionality.

E.6. Estimation of Emission reductions of a CPA:

E.6.1. Explanation of methodological choices, provided in the approved baseline and monitoring methodology applied, selected for a typical SSC-CPA:

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This project activity replaces existing fossil fuel based grid electricity with renewable energy. Each type of system has own baseline scenario as below.

¹⁶ Guidelines on the assessment of investment analysis (EB 61, Annex 13), UNFCCC

¹⁷ In case that the generated electricity is supplied for captive use to the PV project site, it can substitute the electricity bought from nation grid. So, it can save the electricity charge. Therefore, CPA implementer should consider the quantity of generated electricity which used to captive use as profit.



[Table 15] Type of project activity

Type	Producing energy	Replacing energy source	Energy source for operation
Photovoltaic	Electricity	National grid electricity	None
Wind power	Electricity	National grid electricity	None
Small hydro	Electricity	National grid electricity	None

Renewable energy systems would be used for two ways. One is captive use and the other is delivering to grid. AMS I.D methodology is applicable to renewable energy system which delivers to grid. This methodology requires that baseline emission is calculated by multiplying the generated electricity quantity by the grid emission factor. AMS I.F methodology is applicable to renewable energy system which is used for captive use. This methodology requires that baseline emission is calculated by multiplying the produced electricity quantity by the grid emission factor.

E.6.2. Equations, including fixed parametric values, to be used for calculation of emission reductions of a SSC-CPA:

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1. Determination of Grid Emissions Factor:

The baseline scenario is that the electricity generated by the project activity would have otherwise been generated by the operation of grid-connected power plants and by the addition of new generation sources into the grid.

In accordance with the methodology, project and leakage emission of this project corresponds to zero and baseline emissions correspond to power generated by the project activity multiplied by the baseline emission factor. There are two options for the baseline emission factor 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 tCO₂/MWh) of the current generation mix. The data of the year in which project generation occurs must be used.

The PoA choose (a) approach, each CPA will calculate the emission factor in accordance with the latest version of ‘Tool to calculate the Emission Factor for an electricity system’. Calculations will be based on data from an official source (where available) and made publicly available.

2. Baseline Emissions

Baseline emissions include only CO₂ emission from electricity generation in fossil fuel fired power plants that are displaced due to the project activity.

The methodology applied to this project activity assumes that all project electricity generation above baseline levels would have been generated by existing grid-connected power plants.

The baseline emissions are to be calculated as follows:

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

Where:

BE_y = Baseline emissions in year y (tCO₂)

$EG_{BL,y}$ = Quantity of net electricity supplied to the grid or end users as a result of the implementation of the CDM project activity in year y (MWh)



$EF_{CO_2, grid, y}$ = CO₂ emission factor of the grid in year y (tCO₂/MWh)

Calculation of $EG_{BL,y}$

The calculation of $EG_{BL,y}$ is different depending on the combinations of project type (Greenfield plants, Capacity additions, and replacements) and technology (photovoltaic, wind power and small hydro power). It can be chosen the option to calculate the $EG_{BL,y}$ depend on the project type and technology.

[Table 16] Guidelines to choose the option of the $EG_{BL,y}$ calculation method

Project type Technology	Methodology	Greenfield plants	Capacity addition	Replacement
Photovoltaic	AMS-I.F.	(a)	(c)	-
	AMS-I.D.	(b)	(c)	-
Wind power	AMS-I.D.	(b)	(c)	(d)
Small hydro power	AMS-I.D.	(b)	-	-

Option (a) : ‘AMS-I.F(Captive use type) – Greenfield plants’

$$EG_{BL,y} = EG_{BL_Captive,y}$$

Where:

$EG_{BL,y}$ = Quantity of net electricity supplied to the grid (or end users) as a result of the implementation of the CDM project activity in year y (MWh)

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

In the case that CPA will introduce the photovoltaic system, electricity generated by the project plant/unit will supply to the end user for captive use.

*** In accordance with the methodology AMS-I.F. (ver. 02), $EF_{CO_2,y}$ which is a emission factor of a grid calculated as per the procedures provided in AMS-I.D. so, it is same with $EF_{CO_2,grid,y}$*

Ex-ante calculation for $EG_{BL_captive,y}$ is as below:

$$EG_{BL_captive,y} = C_{facility_captive} * H * UC_{renewable\ energy}$$

Where:

$C_{facility_captive}$ = Capacity of Renewable energy equipment introduced by project activity (MW)

H = Yearly operating hours, 8760 (=365*24) (hr/yr)

$UC_{renewable\ energy}$ = Utilization coefficient of Renewable energy power plant (%)

Option (b) : ‘AMS-I.D(Grid connected type) – Greenfield plants’

$$EG_{BL,y} = EG_{BL_grid,y}$$

Where:

$EG_{BL,y}$ = Quantity of net electricity supplied to the grid (or end users) as a result of the implementation of the CDM project activity in year y (MWh)

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

In the case that CPA will introduce the photovoltaic system, wind power plant or small hydro power plant, electricity generated by the project plant/unit will supply to the national grid.

Ex-ante calculation for $EG_{BL_grid,y}$ is as below:

$$EG_{BL_grid,y} = C_{facility_grid} * H * UC_{renewable\ energy}$$

Where:



$C_{facility_grid}$	= Capacity of Renewable energy equipment introduced by project activity (MW)
H	= Yearly operating hours, 8760 (=365*24) (hr/yr)
$UC_{renewable\ energy}$	= Utilization coefficient of Renewable energy power plant (%)

Option (c) : ‘AMS-I.D(Grid connected type) & AMS-I.F(Captive use type) – Capacity addition’

In the case where the addition of new capacity of photovoltaic system or wind power plant, it does not affect the electricity generated by the existing plant(s) or unit(s), *the following approach can be used provided that the electricity generated (fed into the grid or supplied to end users) by the added power plant(s)/unit(s) addition is separately metered:*

$$EG_{BL,y} = EG_{BL_ADD,y}$$

Where:

$EG_{BL,y}$ = Quantity of net electricity supplied to the grid (or end users) as a result of the implementation of the CDM project activity in year y (MWh)

$EG_{BL_ADD,y}$ = Quantity of net electricity generation supplied to the grid or end users in year y by the project plant/unit that has been added under the project activity (MWh)

In the case where the addition of new capacity of photovoltaic system, electricity generated by the project plant/unit will supply to either the end-user for captive use or the national grid.

In the case where the addition of new capacity of the wind power plant, electricity generated by the project plant/unit will supply to the national grid.

Ex-ante calculation for $EG_{BL_ADD,y}$ is as below:

$$EG_{BL_ADD,y} = C_{facility_ADD} * H * UC_{renewable\ energy}$$

Where:

$C_{facility_ADD}$ = Capacity of renewable energy equipment that added under the project (MW)

H = Yearly operating hours, 8760 (=365*24) (hr/yr)

$UC_{renewable\ energy}$ = Utilization coefficient of Renewable energy power plant (%)

Option (d) : ‘AMS-I.D(Grid connected type) – Replacement’

According to the Methodology AMS-I.D., it use historical data to determine the electricity generation by the existing plant in the baseline scenario, assuming that the historical situation observed prior to the implementation of the project activity would continue.

$$EG_{BL,y} = EG_{BL,retrofit,y}$$

Where:

$EG_{BL,retrofit,y} = EG_{PJ,facility,y} - (EG_{historical} + O_{historical}) ; \text{ until } DATE_{BaselineRetrofit} ; \text{ and}$

$EG_{BL,retrofit,y} = 0 ; \text{ on/after } DATE_{BaselineRetrofit}$

Where;

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

$EG_{PJ,facility,y}$ = Quantity of net electricity supplied to the grid by the project plant/unit in year y (MWh)

$EG_{historical}$ = Annual average historical net electricity generation delivered to the grid by the existing renewable energy plant that was operated at the project site prior to the implementation of the project activity (MWh)

$O_{historical}$ = Standard deviation of the annual average historical net electricity generation delivered to the grid supplied to the grid by the existing renewable energy plant that was operated at the project site prior to the



$DATE_{BaselineRetrofit}$ = implementation of the project activity (MWh)
= Point in time when the existing equipment would need to be replaced in the absence of the project activity (date)

To determine $EG_{historical}$, project participants may choose between the following two historical periods. This allows some flexibility; the use of the longer time period may result in a lower standard deviation and the use of the shorter period may allow a better reflection of the (technical) circumstances observed during the more recent years.

CPA implementer may choose among the following two time spans of historical data to determine $EG_{historical}$:

- (a) The three last calendar years prior to the implementation of the project activity; or
- (b) The time period from the calendar year following $DATE_{hist}$, up to the last calendar year prior to the implementation of the project, as long as this time span includes at least three calendar years, where $DATE_{hist}$ is latest point in time between:
 - (i) The commercial commissioning of the plant/unit;
 - (ii) If applicable: the last capacity addition to the plant/unit; or
 - (iii) If applicable: the last retrofit of the plant/unit

Ex-ante calculation for $EG_{PJ, facility, y}$ is as below:

$$EG_{PJ, facility, y} = C_{facility_replacement} * H * UC_{renewable\ energy}$$

Where:

$C_{facility_replacement}$ = Capacity of Renewable energy equipment introduced by project for the purpose of Replacement of existing facilities (MW)

H = Yearly operating hours, 8760 (=365*24) (hr/yr)

$UC_{renewable\ energy}$ = Utilization coefficient of Renewable energy power plant (%)

3. Project Activity Emissions

3-1. Photovoltaic system

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

$$PE_{PV, y} = 0$$

3-2. Wind power plant

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

$$PE_{WD, y} = 0$$

3-3. Small-hydro power plant

For hydro power project activities that result in new single or multiple reservoirs and hydro power project activities that result in the increase of single or multiple existing reservoirs, project proponents shall account for CH_4 and CO_2 emissions from the reservoirs, estimated as follows:

- (a) If the power density of the single or multiple reservoirs (PD) is greater than 4 W/m² and less than or equal to 10 W/m²:

$$PE_{HP, y} = \frac{EF_{Res} * TEG_y}{1000}$$

Where,



- $PE_{HP,y}$ = Project emissions from water reservoirs (tCO₂e/yr)
 EF_{Res} = Default emission factor for emissions from reservoirs of hydro power plants in year y (kgCO₂e/MWh)
 TEG_y = Total electricity produced by the project activity, including the electricity supplied to the grid and the electricity supplied to internal loads, in year y (MWh)

(b) If the power density of the project activity (PD) is greater than 10 W/m²:

$$PE_{HP,y} = 0$$

The power density of the project activity (PD) is calculated as follows:

$$PD = \frac{Cap_{PJ} - Cap_{BL}}{A_{PJ} - A_{BL}}$$

Where,

- PD = Power density of project activity (W/m²)
 Cap_{PJ} = Installed capacity of the hydro power plant after implementation of the project activity (W)
 Cap_{BL} = Installed capacity of the hydro power plant before the implementation of the project activity (W) For new hydro power plants, this value is zero
 A_{PJ} = Area of the single or multiple reservoirs measured in the surface of the water, after the implementation of the project activity, when the reservoir is full (m²)
 A_{BL} = Area of the single or multiple reservoirs measured in the surface of the water, before the implementation of the project activity, when the reservoir is full (m²).
 For new reservoirs, this value is zero.

3-4. Total project emission

$$PE_y = PE_{PV,y} + PE_{WD,y} + PE_{HP,y}$$

4. Leakage

No leakage emissions are considered.

- PP will purchase new energy generating equipment for this PoA, so not transferred from another activity.
- The main emissions potentially giving rise to leakage in the context of electric sector projects are emissions arising due to activities such as power plant construction and upstream emissions from fossil fuel use (e.g. extraction, processing, and transport).

$$LE_y = 0$$

5. Emission Reductions

$$ER_y = (BE_y - PE_y) - LE_y$$

Where:

- ER_y = Emission reductions in year y (tCO₂e)
 BE_y = Total Baseline emissions in year y (tCO₂e)
 PE_y = Total Project emissions in year y (tCO₂e)
 LE_y = Leakage emissions in year y (tCO₂e)

E.6.3. Data and parameters that are to be reported in CDM-SSC-CPA-DD form:

For ex ante calculations:



Data / Parameter:	(i) $C_{facility_captive}$ (ii) $C_{facility_grid}$ (iii) $C_{facility_ADD}$ (iv) $C_{facility_replacement}$
Data unit:	MW
Description:	(i) Capacity of renewable energy equipment introduced by project activity (Greenfield project that applies methodology AMS-I.F.) (ii) Capacity of renewable energy equipment introduced by project activity (Greenfield project that applies methodology AMS-I.D.) (iii) Capacity of renewable energy equipment that Added under the project (iv) Capacity of renewable energy equipment introduced by project for the purpose of Replacement of existing facilities
Source of data used:	CPA database
Value applied:	To be filled by CPA
Justification of the choice of data or description of measurement methods and procedures actually applied :	(i) and (ii) <i>Greenfield project</i> ; Capacity of renewable energy equipment introduced by project activity (iii) <i>Capacity addition</i> ; Capacity of renewable energy equipment that Added under the project (iv) <i>Replacement</i> ; Capacity of renewable energy equipment introduced by project for the purpose of Replacement of existing facilities
Any comment:	This parameter and value will be applied to ex ante calculation of baseline emissions.

Data / Parameter:	<i>H</i>
Data unit:	hr/yr
Description:	Yearly operating hours
Source of data used:	Fixed data
Value applied:	8760
Justification of the choice of data or description of measurement methods and procedures actually applied :	It assumes that Renewable energy equipment installed for CPA will be continually operated. (365d/yr and 24hr/d)
Any comment:	-

Data / Parameter:	$UC_{renewable\ energy}$
Data unit:	%
Description:	Utilization coefficient of renewable energy equipment
Source of data used:	Korea Power Exchange
Value applied:	Photovoltaic system : 0.153 Wind power plant : 0.251 Small-hydro power plant : 0.442
Justification of the choice of data or description of measurement methods and procedures actually	Korea Power Exchange (KPX) surveyed for Utilization coefficient of renewable energy equipment in Korea.



applied :	
Any comment:	-

For Replacement type project (especially wind power project):

Data / Parameter:	<i>EG_{historical}</i>
Data unit:	MWh
Description:	Annual average historical net electricity generation delivered to the grid by the existing renewable energy plant that was operated at the project site prior to the implementation of the project activity
Source of data used:	CPA database
Value applied:	To be filled by CPA
Justification of the choice of data or description of measurement methods and procedures actually applied :	It can be check from KPX invoice (or evidence document assessed by authorized person in KPX) and historical monitoring data by electricity meters.
Any comment:	-

Data / Parameter:	<i>O_{historical}</i>
Data unit:	MWh
Description:	Standard deviation of the annual average historical net electricity generation delivered to the grid by the existing renewable energy plant that was operated at the project site prior to the implementation of the project activity
Source of data:	Calculated from data used to establish <i>EG_{historical}</i>
Value applied:	To be filled by CPA
Justification of the choice of data or description of measurement methods and procedures actually applied :	Parameter to be calculated as the standard deviation of the annual generation data used to calculate <i>EG_{historical}</i> for retrofit or replacement project activities
Any comment:	-

Data / Parameter:	<i>DATE_{BaselineRetrofit}</i>
Data unit:	date
Description:	Point in time when the existing equipment would need to be replaced in the absence of the project activity
Source of data used:	CPA database
Value applied:	To be filled by CPA
Justification of the choice of data or description of measurement methods and procedures actually applied :	In order to estimate <i>DATE_{BaselineRetrofit}</i> , project participants may consider the specification of the existing equipment that may be determined and documented.
Any comment:	

Data / Parameter:	<i>DATE_{hist}</i>
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Data unit:	date
Description:	Point in time from which the time span of historical data for replacement project activities may start
Source of data used:	CPA database
Value applied:	To be filled by CPA
Justification of the choice of data or description of measurement methods and procedures actually applied :	$DATE_{hist}$ is latest point in time between: (i) The commercial commissioning of the plant/unit; (ii) If applicable: the last capacity addition to the plant/unit; or (iii) If applicable: the last retrofit of the plant/unit
Any comment:	In this PoA, CPA implementers will consider the commercial commissioning of the plant/unit as $DATE_{hist}$.

For small-hydro power project:

Data / Parameter:	EF_{Res}
Data unit:	kgCO ₂ e/MWh
Description:	Default emission factor for emissions from reservoirs
Source of data used:	Decision by EB23
Value applied:	90
Justification of the choice of data or description of measurement methods and procedures actually applied :	
Any comment:	-

Data / Parameter:	Cap_{BL}
Data unit:	W
Description:	Installed capacity of the hydro power plant before the implementation of the project activity
Source of data used:	The data provided by project participant
Value applied:	To be filled by CPA (applied value is depend on each CPA)
Justification of the choice of data or description of measurement methods and procedures actually applied :	Determine the installed capacity based on recognized standards If CPA is a greenfield project, this value does not exist prior to the implementation of the project activity. (For new hydro power plants, this value is zero)
Any comment:	-

Data / Parameter:	A_{BL}
Data unit:	m ²
Description:	Area of the single or multiple reservoirs measured in the surface of the water, before the implementation of the project activity, when the reservoir is full
Source of data used:	The data provided by project participant
Value applied:	To be filled by CPA (applied value is depend on each CPA)
Justification of the choice	Measured from topographical surveys, maps, satellite pictures, etc.



of data or description of measurement methods and procedures actually applied :	If CPA is a green-field project, this value does not exist prior to the implementation of the project activity. (For new reservoirs, this value is zero)
Any comment:	-

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

E.7.1. Data and parameters to be monitored by each SSC-CPA:

For common parameter

Data / Parameter:	$EF_{CO_2, grid, y}$
Data unit:	tCO ₂ / MWh
Description:	CO ₂ emission factor of the grid electricity in year y
Source of data to be used:	CPA database
Value of data applied for the purpose of calculating expected emission reductions in section B.5	To be filled by CPA
Description of measurement methods and procedures to be applied:	As per the latest version of “Tool to calculate the emission factor for an electricity system”
QA/QC procedures to be applied:	As per the latest version of “Tool to calculate the emission factor for an electricity system”
Any comment:	- Value will be applied under the year corresponding to the CPA is added. - In case of the project that apply the methodology AMS-I.F., $EF_{CO_2, y}$ is same with $EF_{CO_2, grid, y}$.

For captive use type

Data / Parameter:	$EG_{BL, captive, y}$
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 to be used:	CPA database
Value of data applied for the purpose of calculating expected emission reductions in section B.5	To be filled by CPA
Description of measurement methods and procedures to be applied:	Measurements are undertaken using electricity meter. The net electricity displaced is the gross energy generation by the project activity power plant minus the auxiliary/station electricity consumption <u>As for the total quantity of electricity generated by this project,</u> Measuring equipment : Electricity meter (the measuring device in inverter) Calibration frequency : 3 year Accuracy of measurement method: Allowable error range $\leq 3.0\%$ Measurement interval : Automatically measured <u>As for the auxiliary electricity consumption (of monitoring equipment),</u> The auxiliary electricity consumption will be calculated according to the below equation. (Equation: The auxiliary electricity consumption $= Standby\ power * Numbers * Hours$).



QA/QC procedures to be applied:	The measuring device should be recalibrated at least once in three years in accordance with the instructions (schedules, procedures) for QA of the technology provider and/or grid operator. There will be strict compliance to maintenance schedule recommended by the technology provider and/or the grid operator.
Any comment:	Monitoring frequency : Continuous monitoring, hourly measurement and at least monthly recording

Data / Parameter:	<i>EG_{BL Add,y}</i>
Data unit:	MWh
Description:	Quantity of net electricity generation supplied <u>to the end users</u> in year y by the project plant/unit that has been added under the project activity
Source of data to be used:	CPA database
Value of data applied for the purpose of calculating expected emission reductions in section B.5	To be filled by CPA
Description of measurement methods and procedures to be applied:	Measurements are undertaken using electricity meter. The net electricity displaced is the gross energy generation by the project activity power plant minus the auxiliary/station electricity consumption <u>As for the total quantity of electricity generated by this project,</u> Measuring equipment : Electricity meter (the measuring device in inverter) Calibration frequency : 3 year Accuracy of measurement method: Allowable error range $\leq 3.0\%$ Measurement interval : Automatically measured <u>As for the auxiliary electricity consumption (of monitoring equipment),</u> The auxiliary electricity consumption will be calculated according to the below equation. (<i>Equation: The auxiliary electricity consumption</i> $= \text{Standby power} * \text{Numbers} * \text{Hours}$).
QA/QC procedures to be applied:	The measuring device should be recalibrated at least once in three years in accordance with the instructions (schedules, procedures) for QA of the technology provider and/or grid operator. There will be strict compliance to maintenance schedule recommended by the technology provider and/or the grid operator.
Any comment:	Monitoring frequency : Continuous monitoring, hourly measurement and at least monthly recording

For grid-connected type

Data / Parameter:	<i>EG_{BL grid,y}</i>
Data unit:	MWh
Description:	Quantity of net electricity supplied <u>to the grid</u> as a result of the implementation of the CDM project activity in year y
Source of data to be used:	CPA database
Value of data applied for the purpose of calculating expected emission reductions in section B.5	To be filled by CPA
Description of	Measurements are undertaken using electricity meters.



measurement methods and procedures to be applied:	<p>Measurement results shall be cross checked with records for sold/purchased electricity (e.g. invoices/receipts).</p> <p>The net electricity generation supplied to the grid is the difference between the total quantity of electricity generated by this project and the auxiliary electricity consumption. But at the meter for the electricity generation, the consumption electricity is already subtracted and then the net electricity is supplied to the KPX.</p> <p>When the plant doesn't operate and stop generating electricity, the consumption electricity is calculated using electric charge invoice based on the meter for electricity from grid.</p>
QA/QC procedures to be applied:	<p>The measuring device should be recalibrated at least once in three years in accordance with the instructions (schedules, procedures) for QA of the technology provider and/or grid operator.</p> <p>There will be strict compliance to maintenance schedule recommended by the technology provider and/or the grid operator.</p>
Any comment:	Monitoring frequency : Continuous monitoring, hourly measurement and at least monthly recording

Data / Parameter:	<i>EG_{BL, Add, y}</i>
Data unit:	MWh
Description:	Quantity of net electricity generation supplied <u>to the grid</u> in year y by the project plant/unit that has been added under the project activity
Source of data to be used:	CPA database
Value of data applied for the purpose of calculating expected emission reductions in section B.5	To be filled by CPA
Description of measurement methods and procedures to be applied:	<p>Measurements are undertaken using electricity meters.</p> <p>Measurement results shall be cross checked with records for sold/purchased electricity (e.g. invoices/receipts).</p> <p>The net electricity generation supplied to the grid is the difference between the total quantity of electricity generated by this project and the auxiliary electricity consumption. But at the meter for the electricity generation, the consumption electricity is already subtracted and then the net electricity is supplied to the KPX.</p> <p>When the plant doesn't operate and stop generating electricity, the consumption electricity is calculated using electric charge invoice based on the meter for electricity from grid.</p>
QA/QC procedures to be applied:	<p>The measuring device should be recalibrated at least once in three years in accordance with the instructions (schedules, procedures) for QA of the technology provider and/or grid operator.</p> <p>There will be strict compliance to maintenance schedule recommended by the technology provider and/or the grid operator.</p>
Any comment:	Monitoring frequency : Continuous monitoring, hourly measurement and at least monthly recording

Data / Parameter:	<i>EG_{PJ, facility, y}</i>
Data unit:	MWh



Description:	Quantity of net electricity supplied to the grid by the project plant/unit in year y
Source of data to be used:	CPA database
Value of data applied for the purpose of calculating expected emission reductions in section B.5	To be filled by CPA
Description of measurement methods and procedures to be applied:	<p>Measurements are undertaken using electricity meters.</p> <p>Measurement results shall be cross checked with records for sold/purchased electricity (e.g. invoices/receipts).</p> <p>The net electricity generation supplied to the grid is the difference between the total quantity of electricity generated by this project and the auxiliary electricity consumption. But at the meter for the electricity generation, the consumption electricity is already subtracted and then the net electricity is supplied to the KPX.</p> <p>When the plant doesn't operate and stop generating electricity, the consumption electricity is calculated using electric charge invoice based on the meter for electricity from grid.</p>
QA/QC procedures to be applied:	<p>The measuring device should be recalibrated at least once in three years in accordance with the instructions (schedules, procedures) for QA of the technology provider and/or grid operator.</p> <p>There will be strict compliance to maintenance schedule recommended by the technology provider and/or the grid operator.</p>
Any comment:	Monitoring frequency : Continuous monitoring, hourly measurement and at least monthly recording

For small-hydro power project (additionally monitored):

Data / Parameter:	Cap_{PJ}
Data unit:	W
Description:	Installed capacity of the hydro power plant after the implementation of the project activity
Source of data to be used:	CPA database (Project site)
Value of data applied for the purpose of calculating expected emission reductions in section B.5	To be filled by CPA
Description of measurement methods and procedures to be applied:	Determine the installed capacity based on recognized standards
QA/QC procedures to be applied:	-
Any comment:	Monitoring frequency : Yearly

Data / Parameter:	A_{PJ}
Data unit:	m ²
Description:	Area of the single or multiple reservoirs measured in the surface of the water, after the implementation of the project activity, when the reservoir is full.



Source of data to be used:	CPA database (Project site)
Value of data applied for the purpose of calculating expected emission reductions in section B.5	To be filled by CPA
Description of measurement methods and procedures to be applied:	Measured from topographical surveys, maps, satellite pictures, etc
QA/QC procedures to be applied:	-
Any comment:	Monitoring frequency : Yearly

Data / Parameter:	TEG_y
Data unit:	MWh
Description:	Total electricity produced by the project activity, including the electricity supplied to the grid and the electricity supplied to internal loads, in year y
Source of data to be used:	Project activity site
Value of data applied for the purpose of calculating expected emission reductions in section B.5	To be filled by CPA
Measurement procedures (if any):	Electricity meters
Description of measurement methods and procedures to be applied:	Continuous measurement and at least monthly recording
QA/QC procedures to be applied:	-
Any comment:	Applicable to hydro power project activities with a power density of the project activity (PD) greater than 4 W/m ² and less than or equal to 10 W/m ²

E.7.2. Description of the monitoring plan for a SSC-CPA:

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All introduced system has a monitoring meter for checking the output data, this monitoring data will be sent to JGP and JGP manages the data. The CPA database includes the following data-set that can unambiguously determine the emission reductions attributable to each CPA

[Table 17] List of data

Data type	List of data
System information	<ul style="list-style-type: none"> ✓ A serial number ✓ system type ✓ location ✓ introduced date
Energy production	<ul style="list-style-type: none"> ✓ Generated electricity quantity

Management of the monitoring information



A serial number*, system type, location and introduced date of each introduced monitoring system will be collected and recorded. This information will be used for identification of each introduced monitoring system. All information about introduced monitoring systems will be collected when these are installed.

* *Serial number is created as 'JGP – Type of renewable energy (i.e., PV, WD, HP) – Added order'.*

Installation of monitoring equipment

- All introduced project systems have to be installed monitoring equipment.
 - (i) In case of the generated electricity supplied to the end users for captive use, monitoring equipment is inverter (inverters have the measuring device in them) and (ii) In case of the generated electricity supplied to the national grid, monitoring equipment is electricity meter to monitor the quantity of electric transmission.
- In accordance with Article 7 of Electric Utility Act, Any person who intends to operate an electric utility business shall obtain a license by the type of the electric utility from the Minister of Knowledge Economy.
- In accordance with Article 63 of Electric Utility Act, When any person has completed the works for setting up or altering electric installations, electric facility operator shall use these installations only after they have passed an Inspection conducted by the Minister of Knowledge Economy or the Mayor or/Do governor.
- Installed monitoring equipment should comply with the standards at 'Guideline for the support on the new and renewable energy equipments' as below.

[Reference] Requirements of monitoring equipment¹⁸

In the case of this projects that install the mandatory monitoring equipment, the project participant has to follow regulations as below.

1) Requirements of equipment

[Table 18] requirements per equipment type

<i>Equipment</i>	<i>Requirements</i>	<i>Evidence</i>
Inverter	Accuracy \leq 3%	- specification of the equipment
Electricity meter	Accuracy \leq 1%	- specification of the equipment

2) Measurement positions and monitoring item

[Table 19] measurement position and monitoring item

<i>category</i>	<i>Monitoring item</i>	<i>Data (aggregate)</i>	<i>Measurement</i>
Photovoltaic	Daily electricity output (kW)	24 unit (hourly)	- output data of inverter (or related monitoring equipment)
Wind power			
Hydropower	Operation time (min)	1 unit (daily)	

Measurement of the energy generation

- The amount of electricity transmitted to the grid or supplied to the end user for captive use shall be measured automatically by established meters. The monitoring equipment measures the quantity of energy generation automatically and continually.
- In case of Grid connected type
- The net electricity export/supplied to a grid ($EG_{BL,y}$) is the difference between the measured quantities of the grid electricity export and the import. To monitor the amount of electricity export, (1) quantity of electricity export measured by the electric meter is used as a main source of the data

¹⁸ Standards for New & renewable energy facilities, Renewable energy centre of Korea, Jan 2010



and (2) invoice/receipts for the sold electricity is used as a measure for cross check. As for the amount of electricity import from the grid to the project power plant, the amount measured at the grid interface/connection used for billing purposes (e.g. Monthly invoice/receipts for the purchased electricity published by Korea Power eXchange) will be the main source of data¹⁹.

- In case of Captive use type
- The net electricity generation is the difference between the total quantity of electricity generated by this project and the auxiliary electricity consumption.

(1) the quantity of generated electricity by the electric meter (or inverter) is used as main source of the data and (2) the auxiliary electricity consumption (of connector bands and inverters) will be very small; however, the auxiliary electricity consumption will be conservatively calculated using recording annually the number of systems operating and estimating the annual hours of systems operating (*Equation: The auxiliary electricity consumption = Standby power²⁰ (of monitoring equipments) * Numbers * Hours*).

The net electricity generation is the quantity of generated electricity from the renewable electric generation facility excluding the quantity of auxiliary electricity consumption. (*The net electricity generation = the quantity of generated electricity – the quantity of auxiliary electricity consumption*)

Archive of the monitoring data

- This data will be collected and recorded as below:

[Table 20] data to be collected and recorded

Type	Generated energy	Consumed energy
Photovoltaic	Electricity	None
Wind power	Electricity	None
Small hydro	Electricity	None

- All introduced project systems have to be installed monitoring equipment and it measures the data of energy production/consumption. This measured data will be collected and recorded for each monitoring period, and used to calculate emission reductions for that portion of the crediting period.
- At the end of each month, the measured data are transferred to CME (Jeju special self-governing province) and the person in charge of data management in JGP should be archived the data as electronically. The CPA implementer will also keep the copy of generating electronic energy.
- In order to verify the emission reductions of the project, the index of the project materials and monitoring results will be collected. All paper-based information and data shall be stored by CPA implementer and all the materials shall have copies for backup. And all data will be kept until 2 years after the end of the total credit period of the proposed project.
- CME will prepare the monitoring procedures and calibration and measurement manual that will be implemented during the operation of the CPA.
- After the proposed PoA is registered and added CPA begins its operation, the monitoring report will be submitted for the verification. The report will cover the monitoring of generating electronic

¹⁹ Electricity import amount is measured by the electric meter that is, in most cases, legally installed, operated and owned by Power Company. Therefore, the monthly invoice issued by power company is the only reliable source that is directly monitored by measuring equipment while more specific data (hour or daily base data) is often not available for the CPA implementer (because providing such information is not the responsibility of the power company). This is why CPA implementer will use the invoice/receipts for monitoring electricity import amount as a main data source.

²⁰ 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.



energy, check report, report on calculation of the emission reductions and records of monitoring instrument repair and calibration, etc.

Quality Assurance & Quality Control

- Each CPA implementer should apply QA&QC procedures for monitoring.
- All introduced monitoring equipment should be certified to national standards.
- Basically, monitoring should be performed by complying with ‘monitoring procedure’ in the Operating Manual Document and the person in charge of monitoring should be educated about it. Before the formal operation of the proposed project, the person in charge of project will organize the relevant people to participate the training. The period of the training will last 1 working day at least.
- CPA implementer should guarantee the accuracy and safety of monitoring equipment. According to *General guidelines to SSC CDM methodologies*, the monitoring equipment will be calibrated and inspected to ensure their accuracy at least once in 3(three) years.
- If an unusual data without any special change or effect is detected, metering device should be inspected and plural staffs would record data again with cross-check.

Identify organizational structure, responsibilities.

[Table 21] Monitoring structure and responsibility

Monitoring Structure	Responsibility
Director of Jeju special self-governing province(CME)	- Duty of whole management - Check and approval of monitoring report
↑	
Monitoring manager of Jeju special self-governing province(CME)	- General management of monitoring activity - Archive and manage the monitoring data - Write out the monitoring report
↑	
Monitoring manager of each CPA project site	- General management of the monitoring activity at CPA project site - Archive the monitoring data and transmit to CME
↑	
The person in charge of Monitoring at each CPA project site	- Operate and manage the renewable energy equipment - Operate and manage the monitoring equipment - Document and inform the finding issue from monitoring activity

Monitoring period

Measured data will be collected for each monitoring period and used to calculate emission reductions for that portion of the crediting period. Generally, monitoring period can be decided by project participant.

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

>>

The baseline study and monitoring methodology has been determined on 13/04/2011.

Person/entity determining the baseline: Mr. Sangsun Ha, Ms. Hyemi Park / Ecoeye Co., Ltd.

E-mail : hyem@ecoeye.com

Tel : +82) 31-710-7369



Annex 1

**CONTACT INFORMATION ON COORDINATING/MANAGING ENTITY and
PARTICIPANTS IN THE PROGRAMME of ACTIVITIES**

Organization:	Jeju Special Self-Governing Province
Street/P.O.Box:	6 Munnyeon-ro
Building:	
City:	Jeju-si
State/Region:	Jeju Special Self-Governing Province
Postfix/ZIP:	690-700
Country:	Republic of Korea
Telephone:	+82-64-710-2537
FAX:	+82-64-710-6908
E-Mail:	hunbi97@korea.kr
URL:	http://www.jeju.go.kr
Represented by:	
Title:	Division Officer
Salutation:	Ms
Last Name:	Jeong
Middle Name:	
First Name:	Soon
Department:	Smart Grid Division
Mobile:	
Direct FAX:	As above
Direct tel:	As above
Personal E-Mail:	As above



**SMALL-SCALE CDM PROGRAMME OF ACTIVITIES DESIGN DOCUMENT FORM
(CDM SSC-PoA-DD) - Version 01**



CDM – Executive Board

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Organization:	Ecoeye Co.,Ltd
Street/P.O.Box:	404-1, Baekhyeon-dong
Building:	
City:	Bundang-gu, Seongnam-si
State/Region:	Gyeonggi-do
Postfix/ZIP:	463-420
Country:	Republic of Korea
Telephone:	+82-31-710-7346
FAX:	+82-31-716-1848
E-Mail:	sangsun_ha@ecoeye.com
URL:	http://www.ecoeye.com
Represented by:	
Title:	Division director
Salutation:	Mr
Last Name:	Ha
Middle Name:	
First Name:	sangsun
Department:	Emission Trading Division
Mobile:	
Direct FAX:	As above
Direct tel:	As above
Personal E-Mail:	As above



Annex 2

INFORMATION REGARDING PUBLIC FUNDING

There is no public funding in this project.



Annex 3

BASELINE INFORMATION

Each CPA will calculate the emission factor in accordance with the latest version of ‘Tool to calculate the Emission Factor for an electricity system’ and report the specific information about the calculation in its CPA-DD.



Annex 4

MONITORING INFORMATION

(1) Standard monitoring form

Period: 20YY/MM

System information					Energy production (kWh)	Energy Consumption (kWh)	N o t e
Serial number	technology	Capacity (kWh)	Location	Introduced date			
Total							
