



**CLEAN DEVELOPMENT MECHANISM
FORM FOR SUBMISSION OF BUNDLED SMALL SCALE PROJECT ACTIVITIES
(SSC-CDM-BUNDLE)**

SECTION A. General description of the Bundle

A.1. Title of the Bundle:

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Bundled Hadong-Busan photovoltaic Power Project of The Korea Southern Power Corporation

A.2. Version and Date :

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Version : 07

Date : 15th April 2010

A.3. Description of the Bundle and the subbundles :

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Project activity	Type	Category	Technology/Measure
Small-scale Photovoltaic power	AMS I	D	Renewable energy technologies that supply electricity to a grid

-The purpose of the project activity

Bundled Hadong-Busan PV (photovoltaic) Power Project activity is the construction and operation of The Korea Southern Power Co.(hereinafter referred to as KOSPO). This bundled project is a photovoltaic plant inside of Hadong Thermal Power Plant site and Busan Combined Cycle Power Plant site in the Republic of Korea. The aim of this project activity is to generate and supply electricity using solar energy, which contributes to mitigation of climate change. The Hadong-Busan photovoltaic power plant will supply to the grid 1,680MWh of electricity per year and 16,800 MW in total during the crediting period.

- How to reduce greenhouse gas emissions by the proposed project activity :

Since photovoltaic technology can generate electricity without emitting any greenhouse gas (hereinafter GHG), this project activity contributes to reduction of GHG by alternating at least one of the fossil fuel fired power plants which would have generated electricity with emitting GHG. The expected GHG emission reduction is 1,078 tCO₂/yr and 10,780 tCO₂ in total during the crediting period.

-The the project participants' view to the contribution of the project activity to sustainable development

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

- Social/Technological aspects



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- The proposed project can diversify sources of electric generation and be a model case as a PV power plant that utilizes solar energy.
 - The proposed project will contribute to revitalization of local energy industry under the corporation of a local government.
- Economical aspects
 - The proposed project will supply the local area with the available electric power and contribute to national energy supply.
 - The proposed project will create job opportunities directly and indirectly through construction and operation of the plant.
 - Environmental and National aspects
 - The proposed project will reduce GHG emission and other air pollutants occurring from fossil fuel extraction, processing, transportation, and burning.
 - The proposed project will contribute to the policy of Korea government which promotes the development of new & renewable energy technology.

A.4. Project participants:

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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 (host)	- Public entity : Korea Southern Power Co., Ltd.(KOSPO)	No

SECTION B.A.4. Technical description of the Bundle:

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B.1. Location of the Bundle:

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B.1.1. Host Party(ies):

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Republic of Korea

B.1.2. Region/State/Province etc.:

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Project activity	Province
Hadong Photovoltaic Power	Gyeongsangnam-do
Busan Photovoltaic Power	Busan Metropolitan City

B.1.3. City/Town/Community etc:

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Project activity	City
Hadong Photovoltaic Power	Hadong-gun



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Busan Photovoltaic Power	Saha-gu
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B.1.4. Details of physical location, including information allowing the unique identification of this Bundle:

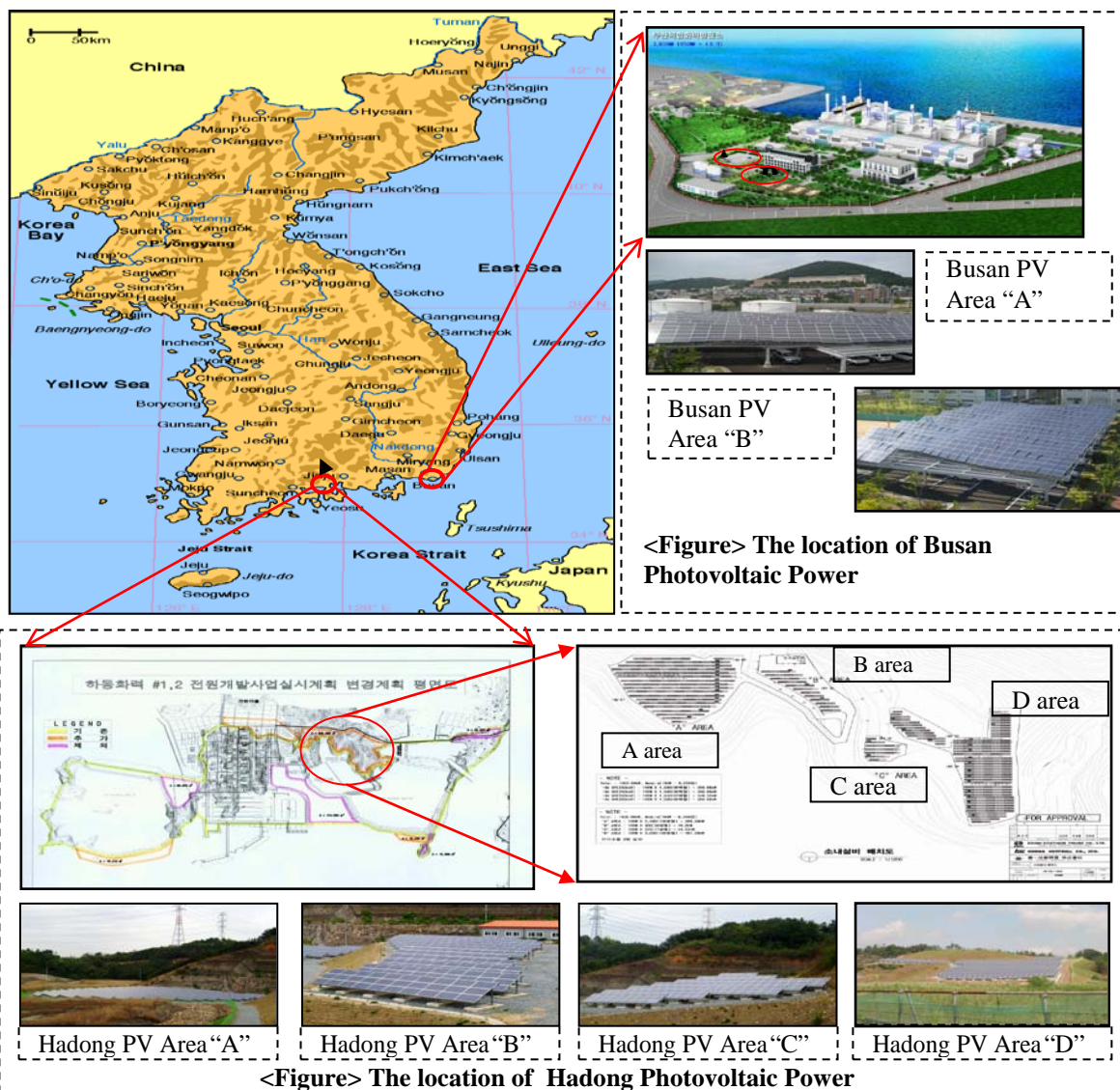
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Hadong Photovoltaic Power :

Hadong Photovoltaic Power is located at the Hadong Thermal Power Plant, Gadeok-ri, Geumseong-myeon, Hadong-gun, Gyeongsangnam-do (latitude of 34°57' N and longitude of 127°49' E).

Busan Photovoltaic Power:

Busan Photovoltaic Power is located at the Busan Combined Cycle Power Plant, Gamcheon-1-dong, Saha-gu, Busan Metropolitan City (latitude of 35°05' N and longitude of 128°59' E).



**B.2. Type(s), and category(ies) and technology/(ies)/Measure/(s) of the bundle:**

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The project type and category(ies) of the small-scale project activity

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

Project Type : I - Renewable energy project

Project category : I.D - Electricity generation for a system for a grid (Version 15)

Sectoral Scope: 1 - Energy industries (renewable - / non-renewable sources).

Technology/measure of the small-scale project activity

Bundled Hadong-Busan PV Power Project make use of renewable energy resources to generate electricity and the total installed capacity is 1.39MW (Hadong PV Power 1.0MW, Busan PV Power 0.39MW). Though the actual capacity of Hadong PV power plant is 0.9984 MW, it is written as 1.0 MW for brevity. This PV Power generates electricity by the photovoltaic technology that converts light directly into electricity. This facility is composed of photovoltaic modules, inverters, and transformer.

The principle of generating electricity is simple. Photovoltaic modules collect light and convert it into electricity, and then inverters convert the direct current (DC) to the alternating current (AC), and finally transformer changes a voltage suitable for transmitting it to grid.

Hadong-Busan PV Power is unmanned power plant. The remote operating and monitoring system of the PV Power Plant makes it possible to audit and measure the data by sending electric characteristics such as power generation, voltage, electric current and frequency electricity produced by photovoltaic technology to the main computer. If it happens to be a problem in communication facilities which transfers data to KPX, the person in charge is manually sending the data stored in meter recorder to KPX. It is also possible to audit and measure the data at a distant place by a LAN or a modem and so a part which breaks down will be captured and managed quickly at a distant place, in case that there is something wrong with the equipment.

The operating team was trained for operating, monitoring, and managing PV generation system by Manufacturing Company, (Hadong ; KC-cottrell, Busan ; Hex Power Energy). They furnished training materials to operation workers of central control room which makes them able to learn in order.

KOSPO forms the “Manual of procedures for photovoltaic operation and maintenance” which documents the detailed process and check points for power plant operation and manages Hadong PV power and Busan PV Power plant based on the manual for secure and systematic power plant operation.

The technical information of each project activity is as follows:

<Table> Technical Data of Hadong-Busan PV(photovoltaic) Power Project

Item	Type	Specifications		
		Hadong Photovoltaic Power	Busan Photovoltaic Power	
			Area A	Area B
Photovoltaic module	Type	single-crystalline silicon	single-crystalline silicon	single-crystalline silicon



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	Capacity	1.0MW	0.24MW	0.15MW
	Module maximum output power	160W	170W	200W
	Number of modules	6,240	1,428	736
Inverter	Type	GT250K	C3100S/C350S	C3100S/C350S
	Capacity	250kW×5 (1 for Stand-by)	100kW/50kW	100kW/50kW
	Output voltage	315V	380/220V	380/220V
	Control method	PWM Invert(IGBT)	PWM Invert(IGBT)	PWM Invert(IGBT)
	Node form	3-Phase 3-Wire	3-Phase 3-Wire	3-Phase 3-Wire
	Unit	4+1(1 for Stand-by)	2/1	1/1
Transformer	Capacity	1,250kVA	1,250kVA	
	Voltage	380V/22.9kV, 3phase, 60Hz	380V/22.9kV, 3phase, 60Hz	
	Cooling type	Forced wind cooling	Forced wind cooling	

B.3 Estimated amount of emission reductions over the chosen crediting period:

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Estimated amount of emission reductions over the 10 year-crediting period is 10,780 tons

Years	Annual estimation of emission reductions in tones of CO ₂ e
Year 1 (2009. 11. 1 ~ 2010. 10. 31)	1,078 ton CO ₂
Year 2 (2010. 11. 1 ~ 2011. 10. 31)	1,078 ton CO ₂
Year 3 (2011. 11. 1 ~ 2012. 10. 31)	1,078 ton CO ₂
Year 4 (2012. 11. 1 ~ 2013. 10. 31)	1,078 ton CO ₂
Year 5 (2013. 11. 1 ~ 2014. 10. 31)	1,078 ton CO ₂
Year 6 (2014. 11. 1 ~ 2015. 10. 31)	1,078 ton CO ₂
Year 7 (2015. 11. 1 ~ 2016. 10. 31)	1,078 ton CO ₂
Year 8 (2016. 11. 1 ~ 2017. 10. 31)	1,078 ton CO ₂
Year 9 (2017. 11. 1 ~ 2018. 10. 31)	1,078 ton CO ₂
Year 10 (2018. 11. 1 ~ 2019. 10. 31)	1,078 ton CO ₂
Total estimated reductions (Tones of CO ₂ e)	10,780 ton CO ₂
Total number of crediting years	10
Annual average over the crediting period of estimated reductions (tones of CO₂ e)	1,078 ton CO ₂

SECTION C. Duration of the project activity / Crediting period:**C.1. Duration of the Bundle**

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C.1.1. Starting date of the Bundle:

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The starting date of the project activity is as below:



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Hadong Photovoltaic Power : 17 March 2008

Busan Photovoltaic Power : 26 March 2008

Each starting date chosen is the date when the contract for construction of the plant was signed, and is therefore the date when the implementation of the project activity begins.

C.2. Choice of crediting period and related information:

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C.2.1. Renewable crediting period:

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N/A

C.2.1.1. Starting date of the first crediting period:

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N/A

C.2.1.2. Length of the first crediting period:

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N/A

C.2.2. Fixed crediting period:

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C.2.2.1. Starting date:

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01 November 2009 or the date of registration of the project, whichever comes later

C.2.2.2. Length:

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10 years

SECTION D. Application of a monitoring methodology:

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Data / Parameter:	Electricity Quantity, EG _y
Data unit:	MWh
Description:	Net Electricity supplied to the grid by renewable technology in the year y
Source of data to be used:	KOSPO
Value of data	Measured value
Description of measurement methods and procedures to be applied:	Electricity exported to grid by Hadong PV & Busan PV Power Plant is measured electronically by established meter hourly and sent to KPX.
QA/QC procedures to be applied:	The meter was set up transparently in accordance with 'Law regarding measurement' and 'Act on operation of electricity



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	<p>market' and sealed after affirmation of KPX.</p> <p>Additionally, The meter will be calibrated one time per 3 years according to “Indicative simplified baseline and monitoring methodologies for selected small-scale CDM project activity categories”(EB41th Annex 20). The allowed error of data must be within $\pm 0.5\%$</p>
Any comment:	<ul style="list-style-type: none">- Data will be measured hourly and recorded monthly.- Data will be kept for more than two years after the last issuance of CERs for this project activity in paper form and electric form.- Data will be aggregated monthly and yearly.- This data is only the amount of electricity generation except the electricity consumed in the plant and electricity imported for the project activity.



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Annex 1**CONTACT INFORMATION ON PARTICIPANTS IN THE PROJECT ACTIVITY**

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