



**Monitoring report form
(Version 04.0)**

Complete this form in accordance with the Attachment "Instructions for filling out the monitoring report form" at the end of this form.

MONITORING REPORT

Title of the project activity	10MW Photovoltaic Plant in Dubai, UAE
Reference number of the project activity	6964
Version number of the monitoring report	01
Completion date of the monitoring report	05/08/2014
Registration date of the project activity	10/08/2012
Monitoring period number and duration of this monitoring period	1 01/07/2013 to 31/07/2014
Project participant(s)	Dubai Electricity and Water Authority (DEWA), Dubai Carbon Centre of Excellence (DCCE)
Host Party(ies)	United Arab Emirates (host)
Sectoral scope and selected methodology(ies), and where applicable, applied standardized baseline(s)	Sectoral Scope: 1: Energy Industries (renewable-/non-renewable sources) Methodology: AMS-I.D.
Estimated amount of GHG emission reductions or net anthropogenic GHG removals by sinks for this monitoring period in the registered PDD	13,850 tCO ₂ emission reductions estimated during the monitoring period based on the estimation in PDD, which stands at "12,765 tCO ₂ " per year.
Actual GHG emission reductions or net anthropogenic GHG removals by sinks achieved in this monitoring period	10,360 tCO ₂
Actual GHG emission reductions or net anthropogenic GHG removals by sinks achieved during the period up to 31 December 2012(if applicable)	Not applicable
Actual GHG emission reductions or net anthropogenic GHG removals by sinks achieved during the period from 1 January 2013 onwards (if applicable).	10,360 tCO ₂

SECTION A. Description of project activity

A.1. Purpose and general description of project activity

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- a) Purpose of the project activity and the measures taken for GHG emission reductions or net anthropogenic GHG removals by sinks;

The purpose of the project activity was to develop a 10 MW output capacity photovoltaic power plant (PV) in Dubai, United Arab Emirates (hereinafter referred to as the "project"). The project proponent is the Dubai Electricity and Water Authority (DEWA), a Dubai Government-run company. DEWA is responsible for power generation, water production, transmission and distribution of power and water in the Emirate of Dubai. The project reduces greenhouse gas emissions by displacing fossil fuel based electricity from the grid through electricity generation from solar radiation.

- b) Brief description of the installed technology and equipment;
The photovoltaic power plant is composed of 13 thin film - PV modules (connected together serial) with a total output capacity of 10 MW, an installed capacity of 13 MW peaks to generate 24,778 MWh annually (estimated).

The project lifetime is estimated at 25 years. The project activity will contribute to sustainable development by:

- Generation of sustainable electric power,
- Reduction of fossil fuel consumption
- Reduction of greenhouse gas emissions from the combustion of fossil fuels.

- c) Relevant dates for the project activity (e.g. construction, commissioning, continued operation periods, etc.);

The important dates of the project are as below:

Description	Date
Project Registration	10/08/2012
Contract awarded	08/10/2012
Start of the Crediting Period	01/07/2013
First power delivery	29/09/2013
Full power delivery	02/10/2013
Plant takeover	07/10/2013

- d) Total GHG emission reductions or net anthropogenic GHG removals by sinks achieved in this monitoring period:

The project activity reduced 10,360 tCO₂ in this monitoring period.

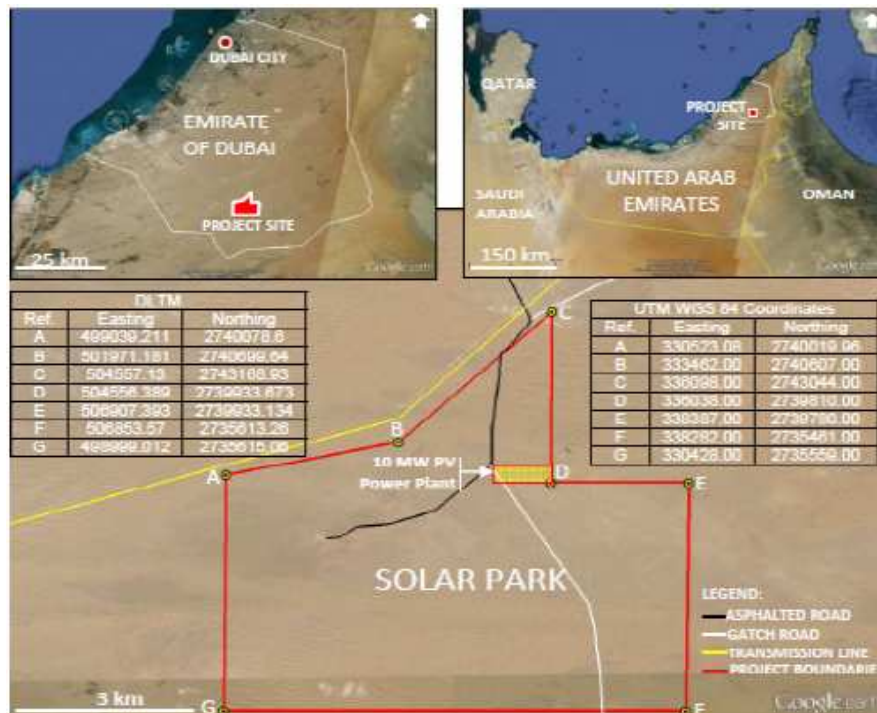
A.2. Location of project activity

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- (a) Host Party(ies);
United Arab Emirates
- (b) Region/ State/ Province, etc.;
Dubai Emirate
- (c) City/ Town/ Community, etc.;
Seih Al Dahl

(d) Physical/ Geographical location

The power station utilizing PV technology is in the southeast of the city of Dubai located in the host country United Arab Emirates. The 10 MW output PV power plant is located within the designated area of the Solar Park located in Seih Al Dahl area of the Emirate of Dubai, at about 55 kilometres south of Dubai City proper. The project covers an area of about 0.3km² of the 48 km² designated area for the Solar Park. GPS coordinates of the 10 MW site: 27.4008°N / 50.4054°E (center of the 10 MW plant).



A.3. Parties and project participant(s)

Party involved ((host) indicates a host Party)	Private and/or public entity(ies) project participants (as applicable)	Indicate if the Party involved wishes to be considered as project participant (Yes/No)
United Arab Emirates (host)	<ul style="list-style-type: none"> Dubai Electricity and Water Authority (DEWA); Dubai Carbon Centre of Excellence 	No

A.4. Reference of applied methodology and standardized baseline

>> The approved methodology employed for the proposed project is AMS I.D “Grid connected renewable electricity generation”, version 17. The methodology can be found at:

<http://cdm.unfccc.int/methodologies/DB/RSCTZ8SKT4F7N1CFDXCSA7BDQ7FU1X>

Other than the methodology, the below tool is used for the project activity:

Tool to calculate the emission factor for an electricity system, Version 02.2.1 (EB 63). The tool can be found at: <http://cdm.unfccc.int/methodologies/PAMethodologies/tools/am-tool-07-v2.2.1.pdf>

A.5. Crediting period of project activity

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Type: Renewable crediting period

Start date: 01/07/2013

Length of the crediting period: 7 years

A.6. Contact information of responsible persons/ entities

>> Dubai Carbon Centre of Excellence has prepared this document.

Mr. Clemens Plochl clemensp@dcce.aeMr. Fazil Abdul Rahiman fazilr@dcce.ae

Dubai Carbon Centre of Excellence is a project participant in this project activity.

SECTION B. Implementation of project activity**B.1. Description of implemented registered project activity**

>> The project activity is a PV plant with total 10 MW output capacity. The standard test conditions of modules are used to describe the photovoltaic power plant capacity. Thereby, the losses until the feed in (metering system) are not considered. For the DEWA project it has been defined that the photovoltaic plant is designed to ensure a specified Alternating Current (AC) output (after converter) instead of the typically used for the Standard Test Conditions (STC) definition.

Hence, DEWA project require a higher Direct Current (DC) capacity until inverter requirement. The 10 MW PV power plant requires a DC capacity of 13 MW to reach the defined 10 MW AC output.

13 PV power blocks are installed at the entire PV power plant.

Each 1 MW PV power block consists of:

1 x 1,000 kVA transformer 33 kV

2 x 500 kVA inverter

11,760 x 85W CdTe modules => the resulting module area per 1 MW power block is around 8,467 m².

The connection of DC devices is as following:

14 modules (1.19 kW) are connected together serial (called string) and 2 strings are connected together in parallel with cable clamps and one cable is ongoing to a junction box incomer.

Maximum 24 cables (48 strings) are connected in parallel at one junction box, eight times 24 cables and one time 18 cables are connected to a junction per 500 kVA inverter, hence 9 junction boxes are connected to each inverter and 18 junction boxes are installed per 1 MW PV power block.

Cadmium telluride¹ (CdTe) PV modules are used. CdTe is a semiconductor that absorbs and converts sunlight into electricity. CdTe layers are deposited onto a glass "superstrate" that allows sunlight to enter. The sunlight passes through the glass and produces electrical current and voltage in the lower layers. The 10 MW PV power plant include a total of 152,880 CdTe PV modules.

B.2. Post registration changes**B.2.1. Temporary deviations from registered monitoring plan, applied methodology or applied standardized baseline**

>> (This section is left blank intentionally)

B.2.2. Corrections

>> (This section is left blank intentionally)

B.2.3. Permanent changes from registered monitoring plan, applied methodology or applied standardized baseline

>>. (This section is left blank intentionally)

B.2.4. Changes to project design of registered project activity

>> (This section is left blank intentionally)

B.2.5. Changes to start date of crediting period

>> (This section is left blank intentionally)

B.2.6. Types of changes specific to afforestation or reforestation project activity

>> (This section is left blank intentionally)

SECTION C. Description of monitoring system

>> The monitoring plan has been developed based on the approved methodology **AMS-I.D, Version 17**. Monitoring has taken place from the start of the first crediting period and will continue up to the end of the last crediting period.

Management structure and responsibility

As the project proponent, DEWA undertakes the overall responsibility for daily operating and reporting.

Staff to carry out the monitoring work (data recording and archiving, quality assurance and quality control of the data, equipment's calibration, scheduled and unscheduled maintenance and adoption of corrective actions, if needed) has been identified within the company.

Management structure: The manager of the project activity holds the overall responsibility for the monitoring process, including the follow up of daily operations, revision of the monitored results/data, and quality assurance of measurements and the process of training new staff.

Responsibility of the personnel directly involved: ☐ The personnel involved with monitoring is responsible for carrying out the following tasks:

- Supervise and verify metering and recording
- Collection of additional relevant data

- Ensure regular calibration and maintenance
- Data archives: retain all monitoring data and make it available to the DOE for the verification of emission reductions

Monitoring equipment and installation: A main meter and check meter in the incomers of 33 kV main switchgear at PV side monitor the quantity of annual electricity delivered to the grid by the project activity. All equipment is in state of the art technology and in full compliance with approved standard.

Data monitoring and management: All monitoring data and records are archived in electronic form and summary as paper prints. Electronic documents are electronic backed up. Main meter and check meter have back-up summation when main meters fail due to any reason.

Quality control Calibration check is performed initially before the energization with DEWA tariff metering department and properly calibrated in accordance with the instructions (schedules, procedures) for quality assurance from the technology provider and according to DEWA requirements.

SECTION D. Data and parameters

D.1. Data and parameters fixed ex ante or at renewal of crediting period

(Copy this table for each piece of data and parameter.)

Data / Parameter:	$EF_{grid,CM,y}$
Unit:	tCO ₂ /MWh
Description:	Combined Margin CO ₂ Emission Factor
Source of data:	DEWA Grid Emission Factor Calculation according to the Tool to calculate the emission factor for an electricity system, Version 02.2.1 (EB 63) http://cdm.unfccc.int/Projects/DB/AENOR1344580628.37/view
Value(s) applied:	0.5152
Purpose of data:	Calculation of emission reductions
Additional comment:	The parameter multiplied with monitored data gives the emission reductions

D.2. Data and parameters monitored

(Copy this table for each piece of data and parameter.)

Data / Parameter:	$EG_{facility,y}$
Unit:	MWh
Description:	Quantity of the net electricity supplied by the project activity to the grid by the PV plant over the time period y
Measured/ Calculated / Default:	Measured
Source of data:	Bi-directional meter and check meter in the incomers of 33kV main switchgear at PV side in the electrical control building.
Value(s) of monitored parameter:	20,108.03

Monitoring equipment:	Make: SEL-735 Power Quality and Revenue Meter Accuracy: 0.2 S Calibration date: 06/05/2013 and 08/05/2013 Validity: 5 years
Measuring/ Reading/ Recording frequency:	Continuous measurements and at least monthly recording. The data is archived electronically and as paper prints for 2 years following the end of the last crediting period. The data (meter-reading) is recorded at least monthly by duty operator on a data sheet and is submitted to the chief engineer. This data is compiled each month and kept as a record/study in soft (electronic) and hard (paper) copies. Hard copies are kept in the electrical record room for monthly record and are archived for 2 years following the end of the crediting period.
Calculation method (if applicable):	Not applicable
QA/QC procedures:	<u>Generally</u> The meter reading instruments are calibrated in line with approved standard or according to the manufacture specifications. The accuracy of the meter(s) is 0.2. The meter reading instruments are calibrated periodically either in accordance with the specifications of the local/national standards or as per the manufacturer specification, but are calibrated properly every 2 years. For QA/QC, an external CDM consultant cross checks the records for plausibility. All parameter data collected is archived electronically and kept for at least 2 years after the end of the crediting period.
Purpose of data:	To calculate the emission reductions.
Additional comment:	The parameter multiplied with the parameter "Combined Margin CO ₂ Emission Factor" gives the emission reductions.

D.3. Implementation of sampling plan

>>. (This section is left blank intentionally)

SECTION E. Calculation of emission reductions or GHG removals by sinks

E.1. Calculation of baseline emissions or baseline net GHG removals by sinks

>> $EG_{facility,y} = 20108.03 \text{ MWh}$

$EF_{grid,CM,y} = 0.5152 \text{ tCO}_2/\text{MWh}$

Baseline emissions, $BE_y = EG_{facility,y} * EF_{grid,CM,y}$
 $= 20108.03 \text{ MWh} * 0.5152 \text{ tCO}_2/\text{MWh} = 10359.66 \text{ tCO}_2$

E.2. Calculation of project emissions or actual net GHG removals by sinks

>> Project emissions, $PE_y = 0$

E.3. Calculation of leakage

>> Leakage emissions, $LE_y = 0$

E.4. Summary of calculation of emission reductions or net anthropogenic GHG removals by sinks

Item	Baseline emissions or baseline net GHG removals by sinks (t CO ₂ e)	Project emissions or actual net GHG removals by sinks (t CO ₂ e)	Leakage (t CO ₂ e)	Emission reductions or net anthropogenic GHG removals by sinks (t CO ₂ e)
Total	10,360	0	0	10,360

E.5. Comparison of actual emission reductions or net anthropogenic GHG removals by sinks with estimates in registered PDD

Item	Values estimated in ex-ante calculation of registered PDD	Actual values achieved during this monitoring period
Emission reductions or GHG removals by sinks (t CO ₂ e)	10,667	10,360

E.6. Remarks on difference from estimated value in registered PDD

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Project activity according to the PDD:

Based on PDD ex-ante forecast:

Values according to the PDD: 24778 MWh for 365 days (page 25 of the registered PDD)

Monitoring period: 01/07/2013 to 31/07/2014 → 396 days

=> (24778 MWh / 365 days) * 396 days = 26,882.43 MWh

Emission reductions ex-ante: 26,882 MWh * 0.5152 tCO₂/MWh = 13,849.61 tCO₂**Implemented project activity:**

Measured value: 20108.03 MWh for 396 days

Emission reductions: 20108.03 MWh * 0.5152 tCO₂/MWh = 10359.66 tCO₂**Difference between PDD estimated and measured emission reductions:**13,849.61 tCO₂ - 10359.66 tCO₂ = 3,489.95 tCO₂

The difference between the actual and the estimated values is attributed to the fact that the electricity generation started only by 29th September 2014, which is almost 90 days after the start of the crediting period.

E.7. Actual emission reductions or net anthropogenic GHG removals by sinks during the first commitment period and the period from 1 January 2013 onwards

Item	Actual values achieved up to 31 December 2012	Actual values achieved from 1 January 2013 onwards
Emission reductions or GHG removals by sinks (t CO ₂ e)	Not applicable	10,360

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

Project participant and/or responsible person/ entity	<input checked="" type="checkbox"/> Project participant <input type="checkbox"/> Responsible person/ entity for completing the CDM-MR-FORM
Organization name	Dubai Electricity and Water Authority (DEWA)
Street/P.O. Box	564
Building	DEWA Headquarters, Oud Metha
City	Dubai
State/Region	Dubai
Postcode	564
Country	United Arab Emirates
Telephone	+971 4 515 0572
Fax	
E-mail	Mohd.Abdulkareem@dewa.gov.ae
Website	http://www.dewa.gov.ae/default.aspx
Contact person	Mohammed Abdulkareem AlShamsi
Title	Senior Manager, Climate change & Sustainability
Salutation	Mr.
Last name	AlShamsi
Middle name	Abdulkareem
First name	Mohammed
Department	General Management - New Business Development
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Direct fax	
Direct tel.	+971 4 515 0572
Personal e-mail	

Project participant and/or responsible person/ entity	<input checked="" type="checkbox"/> Project participant <input checked="" type="checkbox"/> Responsible person/ entity for completing the CDM-MR-FORM
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