



Monitoring report form for CDM project activity
(Version 07.0)

MONITORING REPORT

| | | |
|---|--|-------------------------------------|
| Title of the project activity | Grid-connected Solar PV project in Méouane | |
| UNFCCC reference number of the project activity | 10327 | |
| Version number of the PDD applicable to this monitoring report | 1.6 | |
| Version number of this monitoring report | 1 | |
| Completion date of this monitoring report | 11/12/2020 | |
| Monitoring period number | 3 | |
| Duration of this monitoring period | 01/10/2019 – 30/09/2020 | |
| Monitoring report number for this monitoring period | 1 | |
| Project participants | Senergy PV SA atmosfair gGmbH | |
| Host Party | Senegal | |
| Applied methodologies and standardized baselines | Methodology: ACM0002 - Grid-connected electricity generation from renewable sources - Version 16.0 | |
| Sectoral scopes | Sectoral Scope : 1 - Energy industries (renewable - / non-renewable sources) | |
| Amount of GHG emission reductions or net anthropogenic GHG removals achieved by the project activity in this monitoring period | Amount achieved before 1 January 2013 | Amount achieved from 1 January 2013 |
| | - | 33,879 tCO ₂ e |
| Amount of GHG emission reductions or net anthropogenic GHG removals estimated ex ante for this monitoring period in the PDD | 34,090 tCO ₂ e | |

SECTION A. Description of project activity

A.1. General description of project activity

The “Grid-connected Solar PV project in Méouane” involves a solar photovoltaic (PV) plant of 29.49 MW in Méouane, department of Tivaouane, region of Thiès, Senegal. The solar power plant covers an area of 64 hectares and is equipped with 92,160 modules of 320 W each, connected to the national grid.

Meridiam, FONSIS and Senergy SUARL set up the dedicated project company, Senergy PV SA. SolaireDirect, a top tier French PV developer and contractor has been in charge of the engineering, procurement, and construction (EPC) and operation and maintenance (O&M) through turnkey contracts.

GHG emission reductions thus arise from the generation of clean solar electricity which displaces power from the Senegalese grid, historically powered by a thermal-intensive generation mix.

A.2. Location of project activity

The project is located in the village of Santhiou Mékhé, Commune of Méouane, Department of Tivaouane, region of Thiès in Senegal (130km from Dakar).

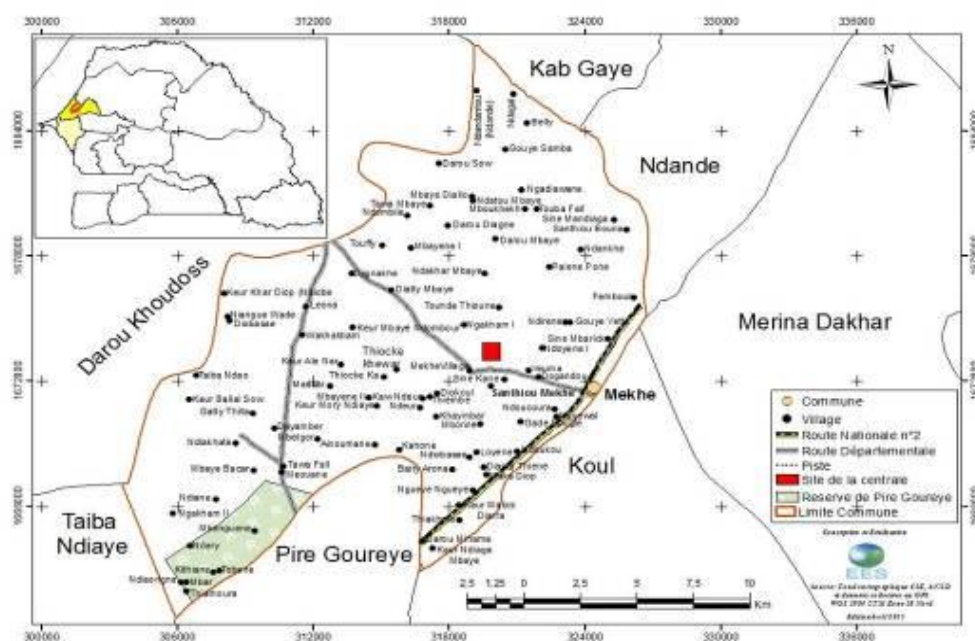


Figure 1: Location of the project¹

The project site's geographical coordinates are:

- B.1: 15°8'1.32" N 16°40'21.83" W
- B.2: 15°7'35.29" N, 16°40'21.63" W
- B.3: 15°7'35.09" N 16°40'48.42" W
- B.4: 15°8'1.12" N 16°40'48.62" W

¹The red square represents the site location.

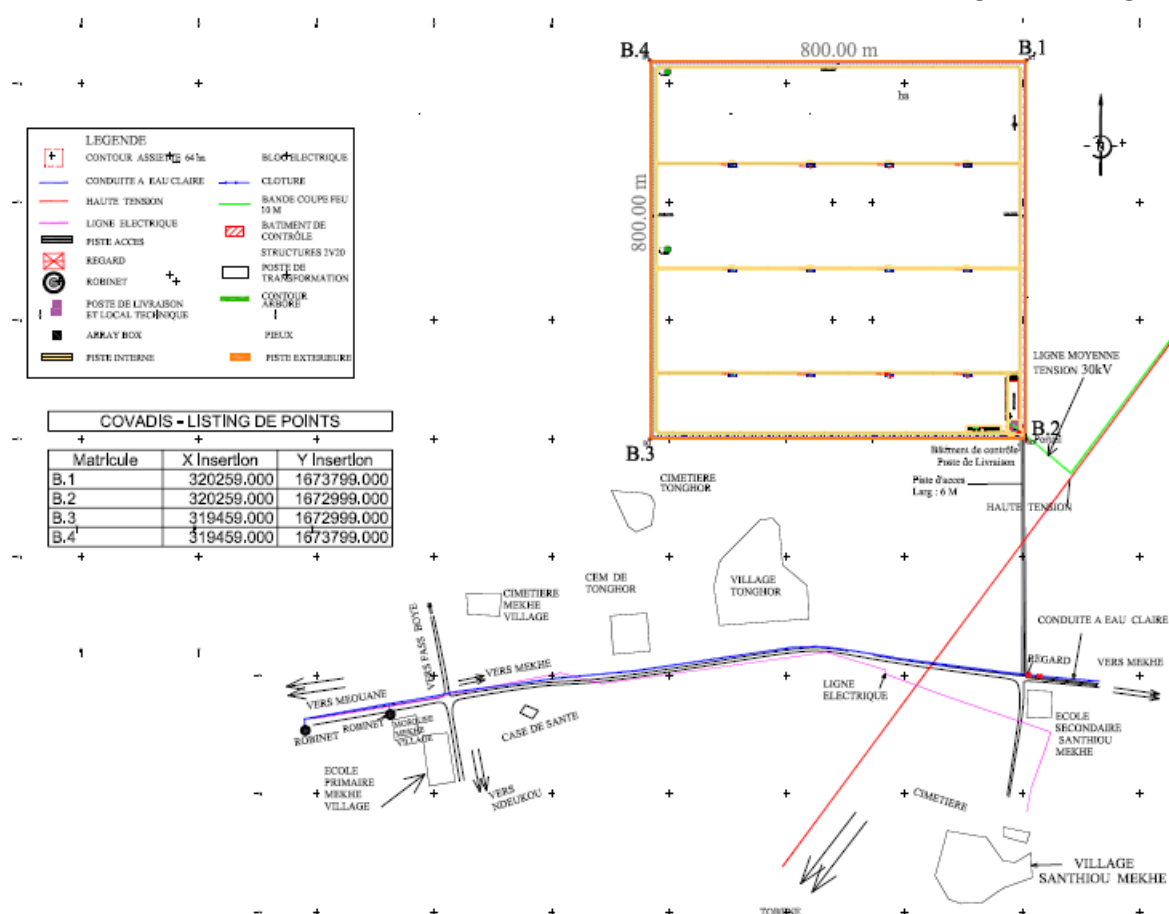


Figure 2: Layout of the project

A.3. Parties and project participants

| Parties involved | Project participants | Indicate if the Party involved wishes to be considered as project participant (Yes/No) |
|---------------------|----------------------|--|
| Republic of Senegal | Senergy PV SA | No |
| Germany | atmosfair gGmbH | No |

A.4. Reference to applied methodologies and standardized baselines

The approved baseline and monitoring methodology selected for to the proposed project activity is:

ACM0002: Large-scale Consolidated Methodology: Grid-connected electricity generation from renewable sources, Version 16.0².

The methodology also refers to the latest approved version of the "Tool to calculate the emission factor for an electricity system" (Version 5.0, EB87, Annex 9) which is applied by the project.

A.5. Crediting period type and duration

The project activity applies a renewable crediting period of 7 years (i.e. 84 months). This monitoring period belongs to the first 7 years crediting period of the project (28/07/2017 – 27/07/2024).

² <https://cdm.unfccc.int/methodologies/DB/XP2LKUSA61DKUQC0PIWPGWDN8ED5PG>

SECTION B. Implementation of project activity

B.1. Description of implemented project activity

The project relies on solar power sources through photovoltaic conversion technology to produce electricity, which is fed into the Senegalese grid. Prior to the implementation of the project, the site was not used, neither for agricultural nor industrial purposes.

The PV array consists of 92,160 fields polycrystalline photovoltaic modules of 320 W for a total installed capacity of 29,491.2 kW (equivalent to 20,400 kilowatts to the inverter output). The modules installed are the JC320M/24-Abs of poly silver frame solar panel manufactured by Renesola.

Table 1: Electrical and mechanical characteristics of the modules

| | |
|------------------------------|-------------------|
| Peak Power (W) | 320 |
| Type of cells | Poly Silver Frame |
| Rated voltage (Vmpp) STC (V) | 37.4 |
| Rated current (Impp) STC (A) | 8.56 |
| Yield (%) | 16.5 |
| Length (mm) | 1,956 |
| Width (mm) | 994 |
| Thickness(mm) | 40 |

The characteristics of the inverters and transformers installed are as follows:

Table 2: Electrical and mechanical characteristics of the inverters

| Parameter | Unit | Description |
|---------------------------|------|------------------------------|
| Model | | Conext Core XC Series XC 680 |
| Maximum Input Current | A | 1 280 |
| Rated AC power | Wp | 680 kW |
| Operating frequency range | Hz | 50/60 Hz |
| Maximum efficiency | % | 99.1% |
| Manufacturer | | Schneider Electric |

Table 3: Technical data of transformers

| Parameter | Unit | Description |
|-------------------|------|--------------------|
| Rated capacity | kVA | 2040 |
| Rated voltage H/L | kV | 20-22-30-33 |
| Rated frequency | Hz | 50 or 60 Hz |
| Manufacturer | - | Schneider Electric |

The facility exports its electricity to the grid via the substation Mékhé (located about 9.5 km away). The project imports grid electricity through the same MV line (30KV) for auxiliary consumption.

B.2. Post-registration changes

B.2.1. Temporary deviations from the registered monitoring plan, applied methodologies or standardized baselines or other methodological regulatory documents

n/a

B.2.2. Corrections

The following corrections of the Project Design Document have been approved by the Board on 23/06/2019 (PRC-10327-001) as applicable from previous monitoring period already:

Correction of sections A.3 and B.7.1 with regard to situation of meters to be coherent with figures 6 and 7 of the same section and correction of section B.7.1 with regard to number of meters to be coherent section A.3.

Correction of section B.7.3 with regard to situation of meters to be coherent with figures 6 and 7 and with regard to number of meters to be coherent with section A.3.

Reasons: The incoherence with regard to location of meters in the registered PDD is due to the ambiguous use of “sub-station” in internal communication both for the Senelec grid substation and the main distribution substation located at the project site at stage of project registration. At the same time, figures 6 and 7 of the revised PDD clearly indicate the metering points.

The incoherence with regard to number of meters in the registered PDD is due to the installation of two Senelec - owned meters and two Senergy PV SA - owned meters. Section B.7.1 and section B.7.3 mentioned only two meters, as there was uncertainty about the necessity and possibility of monitoring of the Senelec meters at stage of project validation/registration.

All corrections are in line with ACM0002, V. 16 (Data / Parameter table 14), which does not state any requirements with respect to location and number of meters, the actual situation (including the PPA) as well as para. 232 of the Project Standard V.2. All parameter values of the registered monitoring plan remain unchanged.

B.2.3. Changes to the start date of the crediting period

Following project implementation delays, the start date of the crediting period has been postponed from previously expected 01/05/2017 (as registered) to 28/07/2017, in compliance with §278 “Changes to the start date of the crediting period” of the CDM Project Standard. The change has been notified to the secretariat on 22/09/2018.

B.2.4. Inclusion of monitoring plan

Not applicable.

B.2.5. Permanent changes to the registered monitoring plan, or permanent deviation of monitoring from the applied methodologies, standardized baselines, or other applied methodological regulatory documents

The following permanent changes to the registered monitoring plan of the Project Design Document have been approved by the Board on 23/06/2019 (PRC-10327-001) as applicable from this monitoring period already:

Update of frequency of calibration, maintenance & testing requirements of the electricity meters according to methodological tool “Baseline, project and/or leakage emissions from electricity consumption and monitoring of electricity generation” Version 3.0, and para. 81 (c) of Project Standard V.2) and the actual situation. These specifications have not been clear yet or erroneously interpreted (confusion of “testing and inspection” in the power purchase agreement with “calibration”) at stage of project validation. Furthermore, there are no clear “industry standards”, as per ACM0002, Version 16, para. 71 so that the tool is applied to define calibration, maintenance & testing requirements of the meters.

B.2.6. Changes to project design

Not applicable.

B.2.7. Changes to specific afforestation or reforestation project activity

Not applicable.

SECTION C. Description of monitoring system

The proposed project activity’s monitoring plan complies with the methodology ACM0002 - Consolidated baseline methodology for grid-connected electricity generation from renewable sources (Version 16.0), whereby it is stated that:

“All data collected as part of monitoring should be archived electronically and be kept at least for 2 years after the end of the last crediting period. 100% of the data should be monitored if not indicated otherwise in the tables of Section 6.1 of ACM0002 Ver. 16. All measurements should be conducted with calibrated measurement equipment according to relevant industry standards”.

Therefore, the quantity of net electricity generation supplied by the project plant to the grid are reliably monitored through two times two calibrated electricity meters installed at the main distribution sub-station located at the project site and cross-checked with sales records.

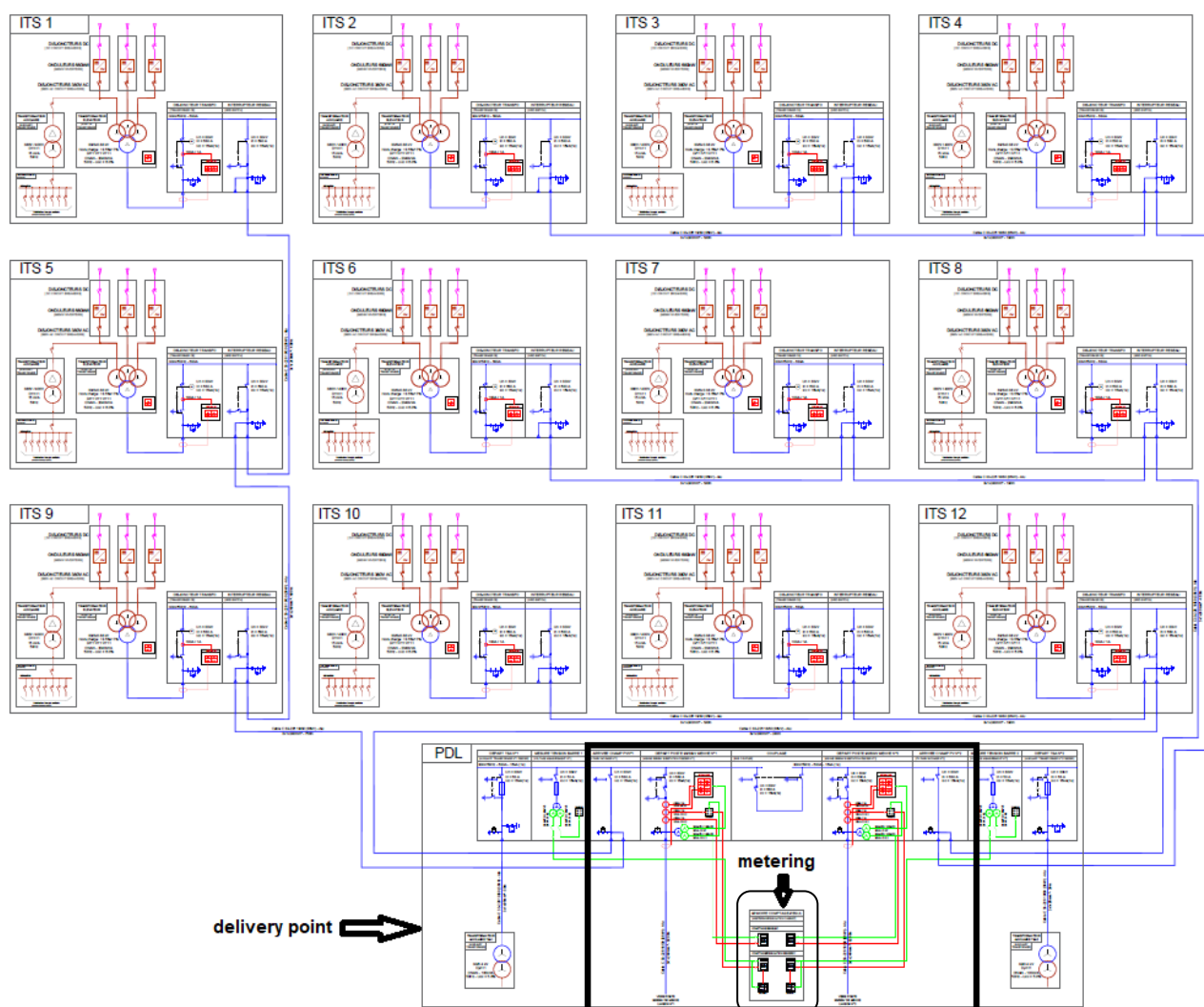
The SCADA³ system allows the whole PV facilities to be manually or automatically controlled and monitored:

- Locally, from the equipment and/or HMI⁴ installed in Main Distribution Substation
- Remotely, from a dedicated operator console station.

Two times two bidirectional electricity meters are installed at the main distribution substation located at the project site before export to Senelec's substation:

| Meter | Serial number |
|----------|---------------|
| SENELEC1 | 73068569 |
| SENERGY1 | 73068570 |
| SENELEC2 | 73068568 |
| SENERGY2 | 73068571 |

All meters are ITRON SL7000 type with accuracy class 0.2S (active), 2 (reactive) and compliant with IEC standards 62053-22 & 62053-23. They have been successfully calibrated and verified at Itron factory on 14/09/2016 (date of test report).



³ SCADA means Supervisory Control and Data Acquisition.

⁴ HMI means Human Machine Interface.

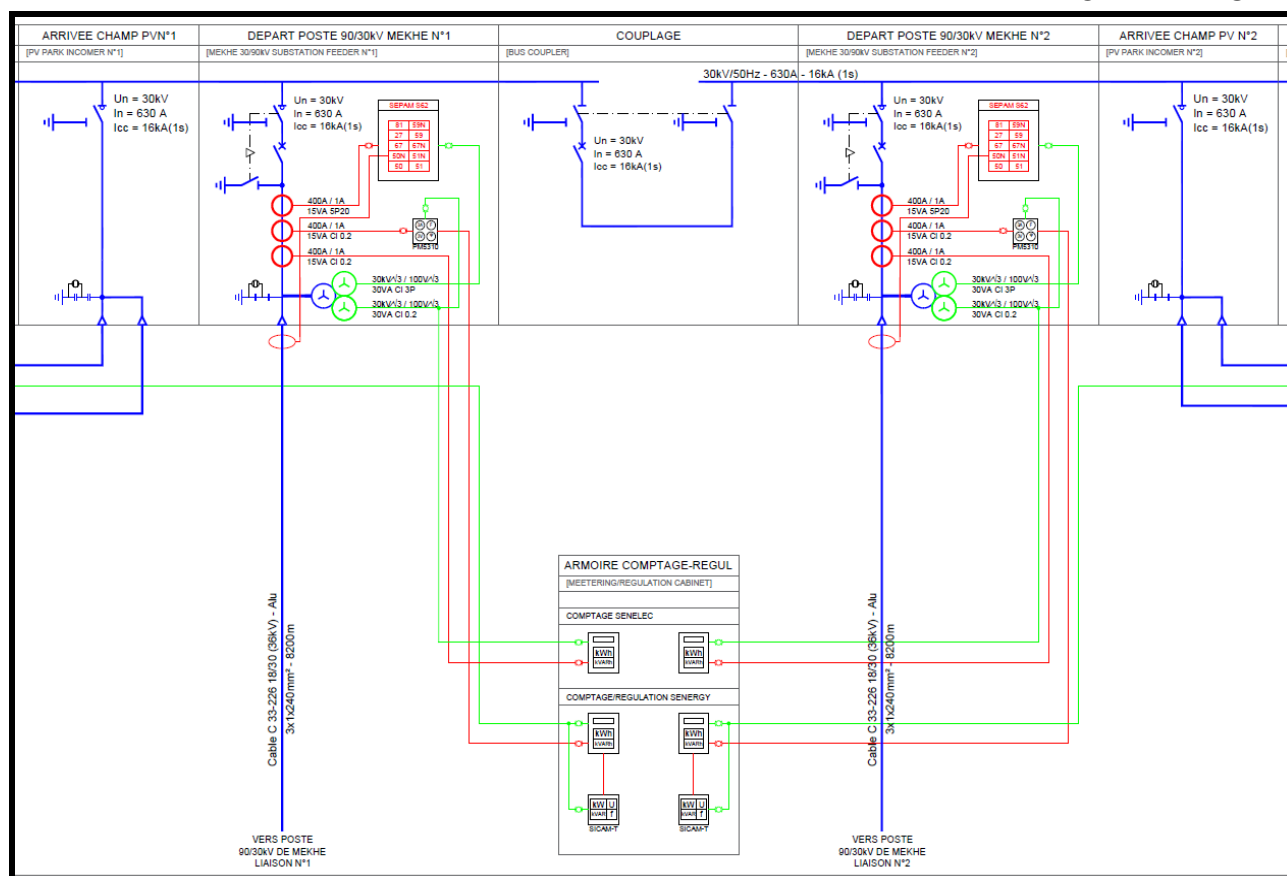


Figure 3: Location of meters in PV power plant with magnified extract

The organizational structure of the power plant is shown in the graph below. Technical/maintenance department is responsible for monitoring.

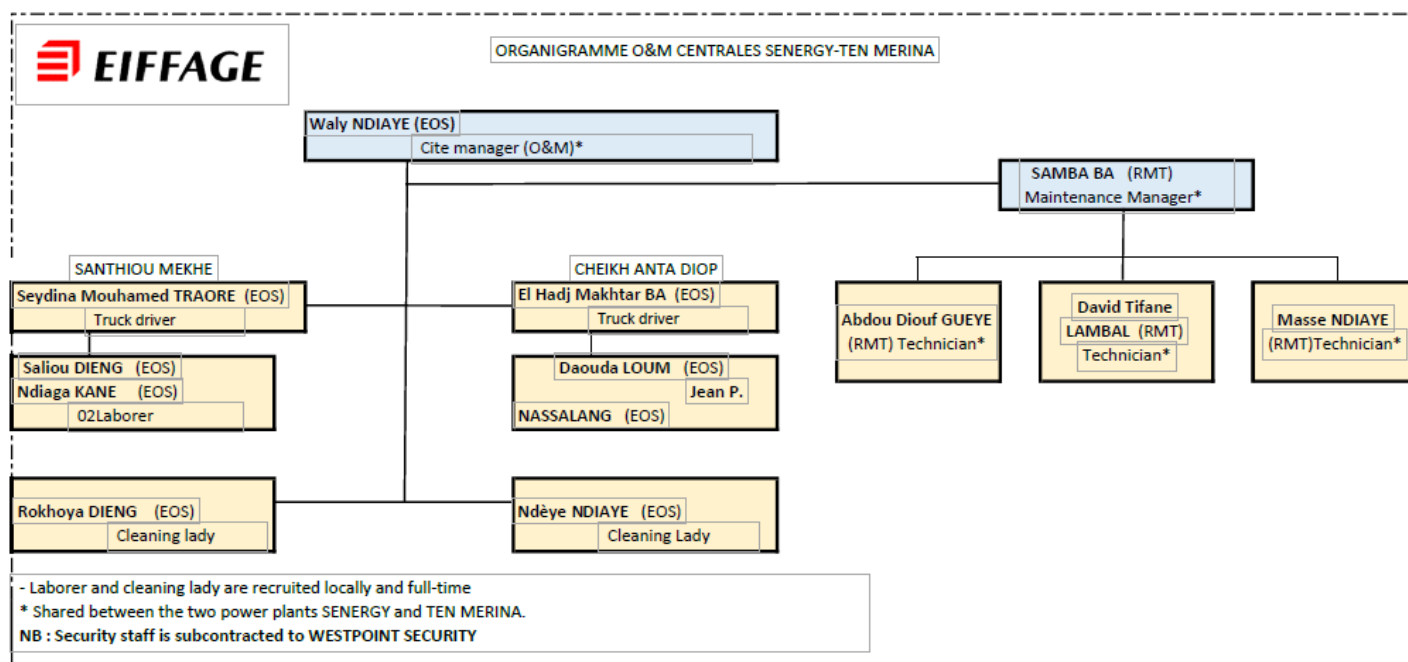


Figure 4: Organizational structure, roles and responsibilities of personnel

SECTION D. Data and parameters

D.1. Data and parameters fixed ex ante

| | | | | | | | |
|---|---|-------------|---------|--------|---------|---------------|----------------|
| Data/Parameter | $EF_{CO_2,i,y}$ | | | | | | |
| Unit | t CO ₂ /GJ | | | | | | |
| Description | CO ₂ emission factor of fuel type <i>i</i> used in power unit <i>m</i> in year <i>y</i> | | | | | | |
| Source of data | IPCC default values at the lower limit of the uncertainty at a 95 per cent confidence interval as provided in Table 1.4 of Chapter 1 of Vol. 2 (Energy) of the 2006 IPCC Guidelines on National GHG Inventories have been applied as no other values can be provided by SENELEC or by the Ministry of Energy. | | | | | | |
| Value(s) applied | <table> <tr> <td>Natural gas</td><td>0.05430</td></tr> <tr> <td>Diesel</td><td>0.07260</td></tr> <tr> <td>Residual fuel</td><td><u>0.07550</u></td></tr> </table> | Natural gas | 0.05430 | Diesel | 0.07260 | Residual fuel | <u>0.07550</u> |
| Natural gas | 0.05430 | | | | | | |
| Diesel | 0.07260 | | | | | | |
| Residual fuel | <u>0.07550</u> | | | | | | |
| Choice of data or measurement methods and procedures | - | | | | | | |
| Purpose of data/parameter | Calculation of baseline emissions | | | | | | |
| Additional comments | - | | | | | | |

| | | | | | | | | | | | |
|---|---|-----------|--|-------------|---------|--------|---------|--|---------|---------------------------|----------------|
| Data/Parameter | $NCV_{i,y}$ | | | | | | | | | | |
| Unit | GJ/mass or volume unit | | | | | | | | | | |
| Description | Net calorific value (energy content) of fuel type <i>i</i> in year <i>y</i> | | | | | | | | | | |
| Source of data | All NCV values have been provided by the national power utility (SENELEC). | | | | | | | | | | |
| Value(s) applied | <table> <tr> <td>(in GJ/t)</td><td></td></tr> <tr> <td>Natural gas</td><td>34.4860</td></tr> <tr> <td>Diesel</td><td>42.5331</td></tr> <tr> <td>Residual fuel of all power units except Kounoune</td><td>38.9252</td></tr> <tr> <td>Residual fuel of Kounoune</td><td><u>41.3266</u></td></tr> </table> | (in GJ/t) | | Natural gas | 34.4860 | Diesel | 42.5331 | Residual fuel of all power units except Kounoune | 38.9252 | Residual fuel of Kounoune | <u>41.3266</u> |
| (in GJ/t) | | | | | | | | | | | |
| Natural gas | 34.4860 | | | | | | | | | | |
| Diesel | 42.5331 | | | | | | | | | | |
| Residual fuel of all power units except Kounoune | 38.9252 | | | | | | | | | | |
| Residual fuel of Kounoune | <u>41.3266</u> | | | | | | | | | | |
| Choice of data or measurement methods and procedures | - | | | | | | | | | | |
| Purpose of data/parameter | Calculation of baseline emissions | | | | | | | | | | |
| Additional comments | - | | | | | | | | | | |

| | |
|---|---|
| Data/Parameter | $EF_{grid,CM,y}$ |
| Unit | tCO ₂ /MWh |
| Description | Combined margin CO ₂ emission factor for grid connected power generation in year <i>y</i> calculated using the latest version of the “Tool to calculate the emission factor for an electricity system” |
| Source of data | As per data provided by Senelec |
| Value(s) applied | 0.6798 |
| Choice of data or measurement methods and procedures | As per the “Tool to calculate the emission factor for an electricity system” |

| | |
|---------------------------|---|
| Purpose of data/parameter | Calculation of baseline emissions |
| Additional comments | According to the methodology, this parameter will be revised at the renewal of each crediting period. |

| | |
|--|--|
| Data/Parameter | $EF_{grid,OM,y}$ |
| Unit | tCO ₂ /MWh |
| Description | Operating Margin CO ₂ emission factor for grid connected power generation in year <i>y</i> calculated using the latest version of the "Tool to calculate the emission factor for an electricity system" |
| Source of data | As per data provided by Senelec |
| Value(s) applied | 0.6795 |
| Choice of data or measurement methods and procedures | As per the "Tool to calculate the emission factor for an electricity system" |
| Purpose of data/parameter | Calculation of baseline emissions |
| Additional comments | According to the methodology, this parameter will be revised at the renewal of each crediting period. |

| | |
|--|--|
| Data/Parameter | $EF_{grid,BM,y}$ |
| Unit | tCO ₂ /MWh |
| Description | Build Margin CO ₂ emission factor for grid connected power generation in year <i>y</i> calculated using the latest version of the "Tool to calculate the emission factor for an electricity system" |
| Source of data | As per data provided by Senelec |
| Value(s) applied | 0.6808 |
| Choice of data or measurement methods and procedures | As per the "Tool to calculate the emission factor for an electricity system" |
| Purpose of data/parameter | Calculation of baseline emissions |
| Additional comments | According to the methodology, this parameter will be revised at the renewal of each crediting period. |

| | |
|-----------------------|---|
| Data/Parameter | $FC_{i,m,y}$ |
| Unit | Mass or volume unit |
| Description | Amount of fuel type <i>i</i> consumed by power unit <i>m</i> in year <i>y</i> |
| Source of data | As per data provided by Senelec |

| Value(s) applied | Name of power units connected to the national grid | | FC FO,m,y [tonnes] | | | FC diesel,m,y [tonnes] | | | FC gasoil,m,y [tonnes] | | |
|--|--|---------------------|--------------------|--------|--------|------------------------|------|------|------------------------|-------|-------|
| | | | 2013 | 2014 | 2015 | 2013 | 2014 | 2015 | 2013 | 2014 | 2015 |
| | | | | | | | | | | | |
| | SENELEC | C1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | SENELEC | C3 | 8432 | 47884 | 80971 | 0 | 0 | 0 | 0 | 0 | 0 |
| | SENELEC | C4 | 112122 | 112054 | 109467 | 60 | 0 | 0 | 536 | 964 | 795 |
| | SENELEC | TAG2 | 0 | 0 | 0 | 1682 | 0 | 0 | 3939 | 9893 | 5333 |
| | SENELEC | TAG4 | 0 | 0 | 0 | 9639 | 0 | 0 | 14067 | 21835 | 14117 |
| | Wartsila | C6 | 112063 | 123540 | 131207 | 0 | 0 | 0 | 117 | 93 | 30 |
| | Wartsila | C7 | 129422 | 127846 | 123202 | 0 | 0 | 0 | 238 | 10 | 114 |
| | | KAHONE | - | - | 4534 | - | - | 0 | | - | 732 |
| | Mitsubishi | Kounoune Power | 82994 | 73757 | 86905 | 0 | 0 | 0 | 1121 | 6847 | 455 |
| | MEGS | GTI | 0 | 0 | 0 | 0 | 0 | 0 | 3391 | 0 | 0 |
| | APR Energy | Location APR | 0 | 0 | 0 | 0 | 0 | 0 | 64940 | 51452 | 30146 |
| | | APR EDM | 0 | 0 | 0 | 0 | 0 | 0 | 18603 | 27822 | 31825 |
| | Aggreko | Sococim | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | AGG. CDB | - | 7314 | 17853 | - | 0 | 0 | - | 18198 | 28230 |
| | | Aggreko Diass 22 MW | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5141 |
| | | Solaire CICAD | - | - | - | - | - | - | - | - | - |
| Choice of data or measurement methods and procedures | - | | | | | | | | | | |
| Purpose of data/parameter | Calculation of baseline emissions. | | | | | | | | | | |
| Additional comments | - | | | | | | | | | | |

| | |
|----------------|--|
| Data/Parameter | EG _{m,y} |
| Unit | MWh |
| Description | Net electricity generated by power plant/unit <i>m</i> , <i>k</i> or <i>n</i> (or in the project electricity system in case of <i>EGy</i>) in year <i>y</i> or hour <i>h</i> |
| Source of data | For grid-connected plants, data are provided by the SENELEC. For off-grid power plants, "the value of 10 per cent of the total electricity generation by grid power plants in the electricity system" is used for the purpose of the operating margin determination; "The value of 10 per cent of the electricity generation by grid power plants included in the sample group as per Step 5" is used for the purpose of the build margin determination. |

| Value(s) applied | Name of power units connected to the national grid | | EGm,y [MWh] | | | | |
|--|--|----------------|-------------|---------|---------|---------|---------|
| | | | 2011 | 2012 | 2013 | 2014 | 2015 |
| | SENELEC | C3 | 61 328 | 68 529 | 16 580 | 128 258 | 226 816 |
| | SENELEC | C4 | 267 680 | 434 944 | 520 833 | 512 148 | 502 266 |
| | SENELEC | TAG2 | 62 244 | 10 172 | 13 330 | 23 830 | 12 500 |
| | SENELEC | TAG4 | 3 317 | 14 241 | 71 527 | 62 765 | 39 429 |
| | Wartsila | C6 | 420 395 | 414 765 | 537 480 | 597 837 | 628 840 |
| | Wartsila | C7 | 452 612 | 379 404 | 630 108 | 619 141 | 597 448 |
| | KAHONE | | | | | | 21 393 |
| | Mitsubishi | Kounoune Power | 390 341 | 382 926 | 395 301 | 377 973 | 412 871 |
| | MEGS | GTI | 0 | 16 610 | 9 985 | 0 | 0 |
| | APR Energy | Location APR | 0 | 0 | 281 346 | 222 251 | 128 442 |
| | | APR EDM | | | 82 971 | 123 940 | 141 986 |
| | Aggreko | Sococim | 0 | 0 | 77 986 | 53 613 | 0 |
| | AGG. CDB | | | | | 113 994 | 198 646 |
| | Aggreko Diass 22 MW | | | | | | 22 464 |
| | Industries Chimiques du Sénégal | | | | | | 9 200 |
| Choice of data or measurement methods and procedures | - | | | | | | |
| Purpose of data/parameter | Calculation of baseline emissions | | | | | | |
| Additional comments | - | | | | | | |

| | |
|--|--|
| Data/Parameter | $\eta_{m,y}$ |
| Unit | - |
| Description | Average net energy conversion efficiency of power unit <i>m</i> or <i>k</i> in year <i>y</i> |
| Source of data | Among the 3 options below: a) Documented manufacturer's specifications (if the efficiency of the plant is not significantly increased through retrofits or rehabilitations); or b) For grid power plants: data from the utility, the dispatch center or official records if it can be deemed reliable; or c) The default values provided in the table below in appendix 1 (if available for the type of power plant) Option c) is chosen because data for option a) and b) are not available. |
| Value(s) applied | 37.50% for natural gas steam turbine for new units (after 2000). |
| Choice of data or measurement methods and procedures | - |
| Purpose of data/parameter | Calculation of baseline emissions |
| Additional comments | Option A2 is used for the calculation of the power unit called Aggreko Sococim, year 2011, 2012, 2013, as data on fuels consumption were not available |

| | |
|-----------------------|---|
| Data/Parameter | The percentage share of total installed capacity of the specific technology |
| Unit | % |

| | |
|--|---|
| Description | The percentage share of total installed capacity of the specific technology in the total installed grid connected power generation capacity in the host country |
| Source of data | Senelec official data |
| Value(s) applied | 0.02% ⁵ |
| Choice of data or measurement methods and procedures | - |
| Purpose of data/parameter | Additionality demonstration |
| Additional comments | The total installed capacity of solar PV is used to prove automatic additionality of the project. |

| | |
|--|--|
| Data/Parameter | The total installed capacity of solar PV |
| Unit | MW |
| Description | The total installed capacity of the solar PV in the host country. |
| Source of data | Senelec official data |
| Value(s) applied | 2 MW (at the time of PDD submission for registration) |
| Choice of data or measurement methods and procedures | - |
| Purpose of data/parameter | Additionality demonstration |
| Additional comments | This parameter is used to confirm the automatic additionality of the project activity. |

D.2. Data and parameters monitored

| | | | |
|---------------------------------|---|-------------------------|--|
| Data/Parameter | EG _{facility,y} | | |
| Unit | MWh/yr | | |
| Description | Quantity of net electricity generation supplied by the project plant/unit to the grid in year y | | |
| Measured/calculated/default | Measured | | |
| Source of data | Electricity meter(s) at project site. | | |
| Value(s) of monitored parameter | | | |
| | YEAR | Duration | Net electricity production fed into grid (MWh) |
| | 2019 | 01/10/2019 - 31/12/2019 | 12,604 |
| | 2020 | 01/01/2020 - 30/09/2020 | 37,241 |
| | | TOTAL: | 49,845 |

⁵ The total capacity of the Senelec grid in 2015 is equal to 897.97 MW.
<http://www.crse.sn/upl/RevisionTarifaire-2016b.pdf>

| Monitoring equipment | <p>The meters measuring the amount of electricity exported and imported through the 30 kV line have the following characteristics: Type: ITRON SL7000 Accuracy class: CI 0.2S (active) ; CI 2 (reactive) Two times two electricity meters are installed at the main distribution substation located at the project site:</p> <table border="1" data-bbox="549 353 1310 533"> <thead> <tr> <th>Meter</th><th>Serial number</th></tr> </thead> <tbody> <tr> <td>SENELEC1</td><td>73068569</td></tr> <tr> <td>SENERGY1</td><td>73068570</td></tr> <tr> <td>SENELEC2</td><td>73068568</td></tr> <tr> <td>SENERGY2</td><td>73068571</td></tr> </tbody> </table> <p>A SCADA system allows the whole PV facilities to be manually or automatically controlled and monitored locally or remotely. Technical/Engineering/Maintenance Department is responsible for measurements.</p> | Meter | Serial number | SENELEC1 | 73068569 | SENERGY1 | 73068570 | SENELEC2 | 73068568 | SENERGY2 | 73068571 |
|---------------------------------------|--|-------|---------------|----------|----------|----------|----------|----------|----------|----------|----------|
| Meter | Serial number | | | | | | | | | | |
| SENELEC1 | 73068569 | | | | | | | | | | |
| SENERGY1 | 73068570 | | | | | | | | | | |
| SENELEC2 | 73068568 | | | | | | | | | | |
| SENERGY2 | 73068571 | | | | | | | | | | |
| Measuring/reading/recording frequency | Continuous measurement and at least monthly recording. | | | | | | | | | | |
| Calculation method (if applicable) | - | | | | | | | | | | |
| QA/QC procedures | <p>Electricity outputs are electronically stored and reading recorded on a record sheet by the Technical/Engineering/ Maintenance Department under the Plant Manager's authority.</p> <p>Cross check of measurement results with records for sold electricity. The company Solairedirect is responsible for the selection, installation, calibration, servicing, testing and repairing of all energy meters.</p> <p>The calibration of meters, including the frequency of calibration, should be done in accordance with national standards or requirements set by the meter supplier or requirements set by the grid operators: Requirements set by the meter supplier apply. With respect to frequency of calibration, <u>no periodic calibration is required</u> after initial calibration ex works, neither by national standards, nor by the meter supplier, nor by the grid operator.</p> <p>Regular maintenance and testing in accordance with the stipulation of the meter supplier and/or as per the requirements set by the grid operators or national requirements: In absence of a grid code and stipulations of the meter supplier, national requirements apply. <u>As per Senegalese decree 60-415, in normal circumstances, a periodic verification of the meters is performed on an annual basis.</u></p> <p>Date of last calibration: 14/09/2016, Start of operation: 28/07/2017. Validity: not applicable (no calibration required). Date of annual verification⁶: A verification took place on 24/06/2020. All meters were found in conformity. The previous one was undertaken on 07/02/2019.</p> | | | | | | | | | | |
| Purpose of data/parameter | Calculation of baseline emissions | | | | | | | | | | |

⁶ The periodic verification (instead of calibration) aims at verifying if the meters are still in conformity with decree 60-415. As per Art. 1 and 2 of the decree, it shall be verified if the meter underwent initial primitive verification and if it meets certain characteristics, particularly in terms precision. The verification determines if the meter is in conformity with the decree or needs to be refurbished or removed from service.

| | |
|---------------------|---|
| Additional comments | - |
|---------------------|---|

D.3. Implementation of sampling plan

Not applicable

SECTION E. Calculation of emission reductions or net anthropogenic removals

E.1. Calculation of baseline emissions or baseline net removals

Baseline emissions include only CO₂ emissions from electricity generation in fossil fuel fired power plants that are displaced due to the project activity. The methodology assumes that all project electricity generation above baseline levels would have been generated by existing grid-connected power plants and the addition of new grid-connected power plants. The baseline emissions are calculated as follows:

$$BE_y = EG_{PJ,y} \times EF_{grid,CM,y} \quad \text{Equation (7)}$$

Where:

BE_y = Baseline emissions in year y (t CO₂/yr)

$EG_{PJ,y}$ = Quantity of net electricity generation that is produced and fed into the grid as a result of the implementation of the CDM project activity in year y (MWh/yr)

$EF_{grid,CM,y}$ = Combined margin CO₂ emission factor for grid connected power generation in year y calculated using the latest version of the "Tool to calculate the emission factor for an electricity system" (tCO₂/MWh)

Calculation of $EG_{PJ,y}$

Since the project activity consists in the installation of new grid-connected renewable power plant at site where no renewable power plant was operated prior to the implementation of the project activity, it verifies the case of Greenfield renewable energy power plant, option (a) whereby:

$$EG_{PJ,y} = EG_{facility,y} \quad \text{Equation (8)}$$

Where:

$EG_{PJ,y}$ = Quantity of net electricity generation that is produced and fed into the grid as a result of the implementation of the CDM project activity in year y (MWh/yr)

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

Net electricity generation is calculated by deducting auto-consumption of the power plant from gross annual electricity production.

Calculation of $EF_{grid,CM,y}$

The grid emission factor ($EF_{grid,CM,y}$) was calculated ex-ante as per the "Tool to calculate the emission factor for an electricity-system" (Version 05.0.0). The emission factor is not monitored during the first crediting period of the project activity but shall be updated at the renewal of the crediting period of the project activity.

E.2. Calculation of project emissions or actual net removals

According to the approved methodology ACM0002, project emissions are calculated as follows:

$$PE_y = PE_{FF,y} + PE_{GP,y} + PE_{HP,y} \quad \text{Equation (1)}$$

Where:

PE_y = Project emissions in year y (t CO₂e/yr)

$PE_{FF,y}$ = Project emissions from fossil fuel consumption in year y (t CO₂/yr)

$PE_{GP,y}$ = Project emissions from the operation of geothermal power plants due to the release of non-condensable gases in year y (t CO₂e/yr)

$PE_{HP,y}$ = Project emissions from water reservoirs of hydro power plants in year y (t CO₂e/yr)

$PE_{FF,y}$, $PE_{GP,y}$ and $PE_{HP,y}$ are equal to 0 as the project is an installation of a PV solar plant with no auxiliary fossil fuel consumption.

E.3. Calculation of leakage emissions

No leakage emissions are considered. The emissions potentially arising due to activities such as power plant construction and upstream emissions from fossil fuel use (e.g. extraction, processing, transport etc.) are neglected.

E.4. Calculation of emission reductions or net anthropogenic removals

| | Baseline GHG emissions or baseline net GHG removals (t CO ₂ e) | Project GHG emissions or actual net GHG removals (t CO ₂ e) | Leakage GHG emissions (t CO ₂ e) | GHG emission reductions or net anthropogenic GHG removals (t CO ₂ e) | | |
|--------------|---|--|---|---|-----------------|--------------|
| | | | | Before 01/01/2013 | From 01/01/2013 | Total amount |
| Total | 33,879 | - | - | - | 33,879 | 33,879 |

E.5. Comparison of emission reductions or net anthropogenic removals achieved with estimates in the registered PDD

| Amount achieved during this monitoring period (t CO ₂ e) | Amount estimated ex ante for this monitoring period in the PDD (t CO ₂ e) |
|---|--|
| 33,879 | 34,090 |

E.5.1. Explanation of calculation of “amount estimated ex ante for this monitoring period in the PDD”

The amount has been calculated as follows:

3 months in 2019 * total amount 2019 + 9 months in 2020 * total amount in 2020 = $3/12 \times 34,219 + 9/12 \times 34,048 = 34,090$ tCO₂

E.6. Remarks on increase in achieved emission reductions

Not applicable.

E.7. Remarks on scale of small-scale project activity

Not applicable.

Document information

| <i>Version</i> | <i>Date</i> | <i>Description</i> |
|----------------|-----------------|---|
| 07.0 | 31 May 2019 | Revision to: <ul style="list-style-type: none"> • Ensure consistency with version 02.0 of the “CDM project standard for project activities” (CDM-EB93-A04-STAN); • Add a section on remarks on the observance of the scale limit of small-scale project activity during the crediting period; • Add "changes specific to afforestation or reforestation project activity" as a possible post-registration changes; • Clarify the reporting of net anthropogenic GHG removals for A/R project activities between two commitment periods; • Make editorial improvements. |
| 06.0 | 7 June 2017 | Revision to: <ul style="list-style-type: none"> • Ensure consistency with version 01.0 of the “CDM project standard for project activities” (CDM-EB93-A04-STAN); • Make editorial improvements. |
| 05.1 | 4 May 2015 | Editorial revision to correct version numbering. |
| 05.0 | 1 April 2015 | Revisions to: <ul style="list-style-type: none"> • Include provisions related to delayed submission of a monitoring plan; • Provisions related to the Host Party; • Remove reference to programme of activities; • Overall editorial improvement. |
| 04.0 | 25 June 2014 | Revisions to: <ul style="list-style-type: none"> • Include the Attachment: Instructions for filling out the monitoring report form (these instructions supersede the "Guideline: Completing the monitoring report form" (Version 04.0)); • Include provisions related to standardized baselines; • Add contact information on a responsible person(s)/ entity(ies) for completing the CDM-MR-FORM in A.6 and Appendix 1; • Change the reference number from <i>F-CDM-MR</i> to <i>CDM-MR-FORM</i>; • Editorial improvement. |
| 03.2 | 5 November 2013 | Editorial revision to correct table in page 1. |
| 03.1 | 2 January 2013 | Editorial revision to correct table in section E.5. |
| 03.0 | 3 December 2012 | Revision required to introduce a provision on reporting actual emission reductions or net GHG removals by sinks for the period up to 31 December 2012 and the period from 1 January 2013 onwards (EB 70, Annex 11). |
| 02.0 | 13 March 2012 | Revision required to ensure consistency with the "Guidelines for completing the monitoring report form" (EB 66, Annex 20). |
| 01.0 | 28 May 2010 | EB 54, Annex 34. Initial adoption. |

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