



**Monitoring report form for CDM project activity
(Version 07.0)**

MONITORING REPORT		
Title of the project activity	Grid-connected Solar PV project in Merina Dakhar	
UNFCCC reference number of the project activity	10368	
Version number of the PDD applicable to this monitoring report	1.2	
Version number of this monitoring report	1	
Completion date of this monitoring report	18/11/2020	
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	Ten Merina Ndakhar SA Atmosfair gGmbH	
Host Party	Senegal	
Applied methodologies and standardized baselines	Methodology: ACM0002 – Grid connected electricity generation from renewable sources – version 17.0	
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
	0	33,610
Amount of GHG emission reductions or net anthropogenic GHG removals estimated ex ante for this monitoring period in the PDD	34,495	

SECTION A. Description of project activity

A.1. General description of project activity

The “Grid-connected Solar PV project in Mérina Dakhar” involves the construction and operation of a solar photovoltaic (PV) plant of 29.49 MW in Mérina Dakhar, department of Tivouane, region of Thiès, Senegal. The site of the solar power plant covers an area of 82.9 hectares and is equipped with 92,160 modules of 320 W each, connected to the national grid.

Meridiam (75%), Eiffage (15%) and FONSIS (10%) created the dedicated project company, Ten Mérina Ndakhar SA. SolaireDirect, a top tier French PV developer and contractor, is in charge of operation and maintenance (O&M) through turnkey contracts.

A.2. Location of project activity

The project is located next to rural community of Mérina Dakhar, Merina Dakhar Arrondissement, Tivaouane Department, Thiès Region, Senegal. The project site's final geo-coordinates are:

A' 15° 9'32.83"N 16°35'18.03"W

B' 15° 9'3.20"N 16°35'17.80"W

C' 15° 9'2.98"N 16°35'48.32"W

D' 15° 9'32.62"N 16°35'48.54"W

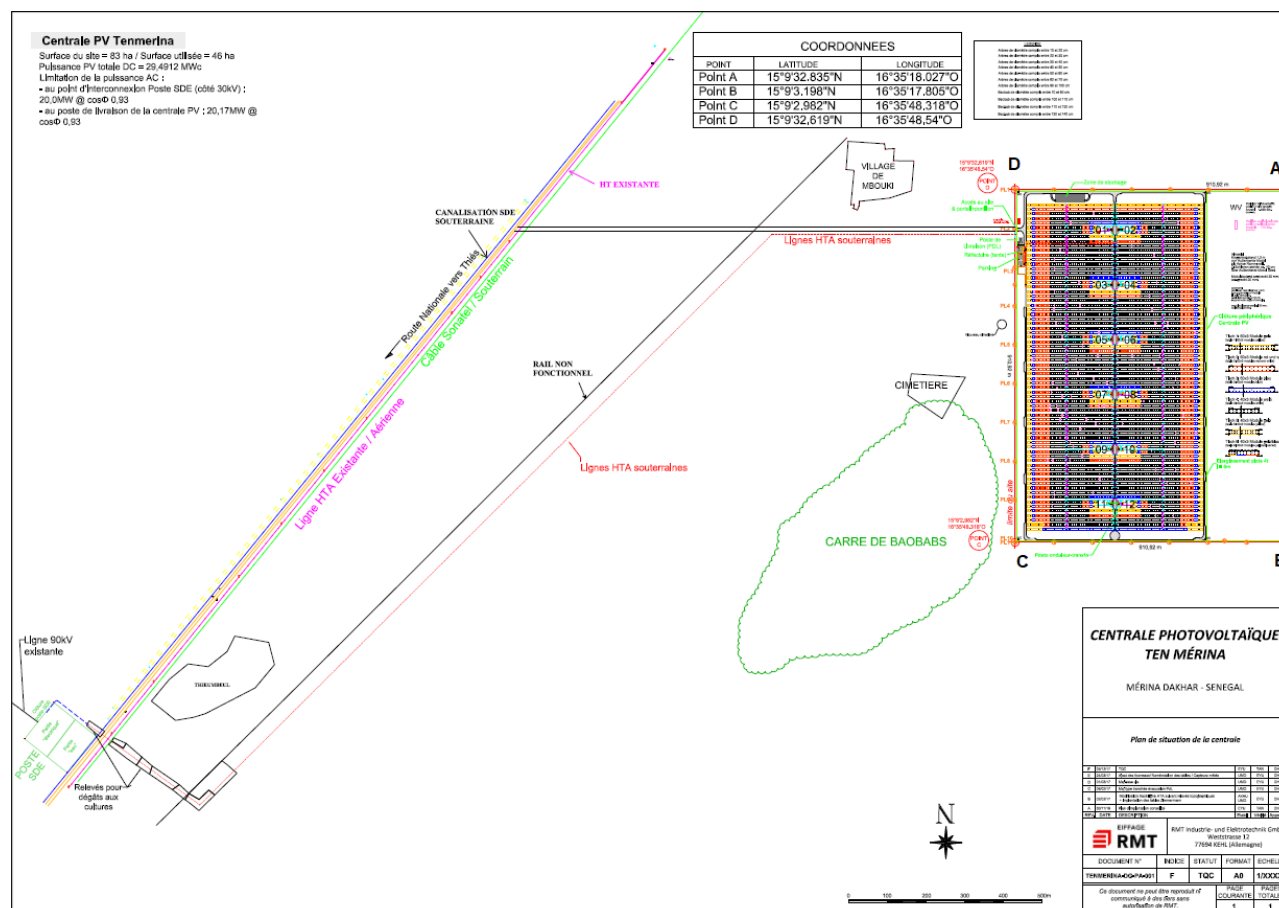


Figure 1: Layout of the project

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	Ten Mérina Ndakhar SA	No
Germany	Atmosfair gGmbH	No

A.4. References 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 17.0.

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

A.5. Crediting period type and duration

The project activity applies a renewable crediting period. This monitoring period belongs to the first 7 years crediting period of the project (20/11/2017-19/11/2024).

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. The PV modules are provided by JinkoSolar manufacturer: modules JKM320PP-72 of poly silver frame solar panel.

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 (%)	16.49
Length (mm)	1,956
Width (mm)	992
Thickness(mm)	40

Table 1: Electrical and mechanical characteristics of the modules

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

Table 2: Technical data of the 12 inverters

Parameter	Unit	Description
Rated capacity	kVA	1620-1890-2040
Rated voltage H/L	kV	20-22-33
Rated frequency	Hz	50 or 60 Hz
Manufacturer	-	Schneider Electric

Table 3: Technical data of transformers

The facility is interfaced to the grid at the metering point situated at the onsite delivery substation, where the electricity produced in the PV power plant is delivered to SENELEC, the grid operator.

Relevant implementation dates and events during operation are described in the table below.

Date	Event
02/05/2017	Start of construction of power plant
15/09/2017	Extension of bus bar RMT at substation (grid)
20/09 to 24/10/2017	No load test

24/10/2017	Electrical connection to Senelec grid
25/10 to 29/11/2017	General test of loads and equipment
20 to 21/11/2017	Performance tests under the power purchase agreement
20 to 29/11/2017	Performance tests under the EPC contract
20/11/2017	Sealing of meters no. 1 & no. 2 by Senelec at onsite delivery point.
20/11/2017	Effective start date of electricity export (commissioning)

Table 4: Relevant implementation dates

B.2. Post-registration changes

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

N/A

B.2.2. Corrections

N/A

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 October 2017 (as registered) to 20 November 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 and affects the start of this monitoring period (category B).

B.2.4. Inclusion of monitoring plan

N/A

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

The following permanent changes to the registered monitoring plan have been approved by the Executive Board on 2 July 2019 (PRC-10368-002):

Update of situation and number of MV electricity meters. The move of two electricity meters from SENELEC’s Mékhé substation to the onsite metering point and resulting change of total number of meters is due to a request of SENELEC, the grid operator, to be in conformity with the power purchase agreement (Annex H, p.6/12).

The frequency of verification & calibration of the electronic electricity meters indicated in the PDD is brought in line with the ACM0002, V.17, 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, which is the equivalent to “verification” in the national regulations, with “calibration”) at stage of project validation.

The power purchase agreement further determines that the metering point situated at the onsite delivery substation represents the interface between the grid operator SENELEC and the PV power plant as per methodological tool “Baseline, project and/or leakage emissions from electricity consumption and monitoring of electricity generation” Version 3.0 and para. 78 of Project Standard V.2. The PDD is updated accordingly.

All changes are in line with para. 238-239 of the Project Standard V.2.
The version number of the revised PDD is 1.2, completed on 28/03/2019.

B.2.6. Changes to project design

N/A

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

N/A

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 17.0), 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. 17. 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 is reliably monitored through two calibrated electricity meters installed at each of the two feeder lines (30 kV) to the onsite delivery substation and cross-checked with sales records.

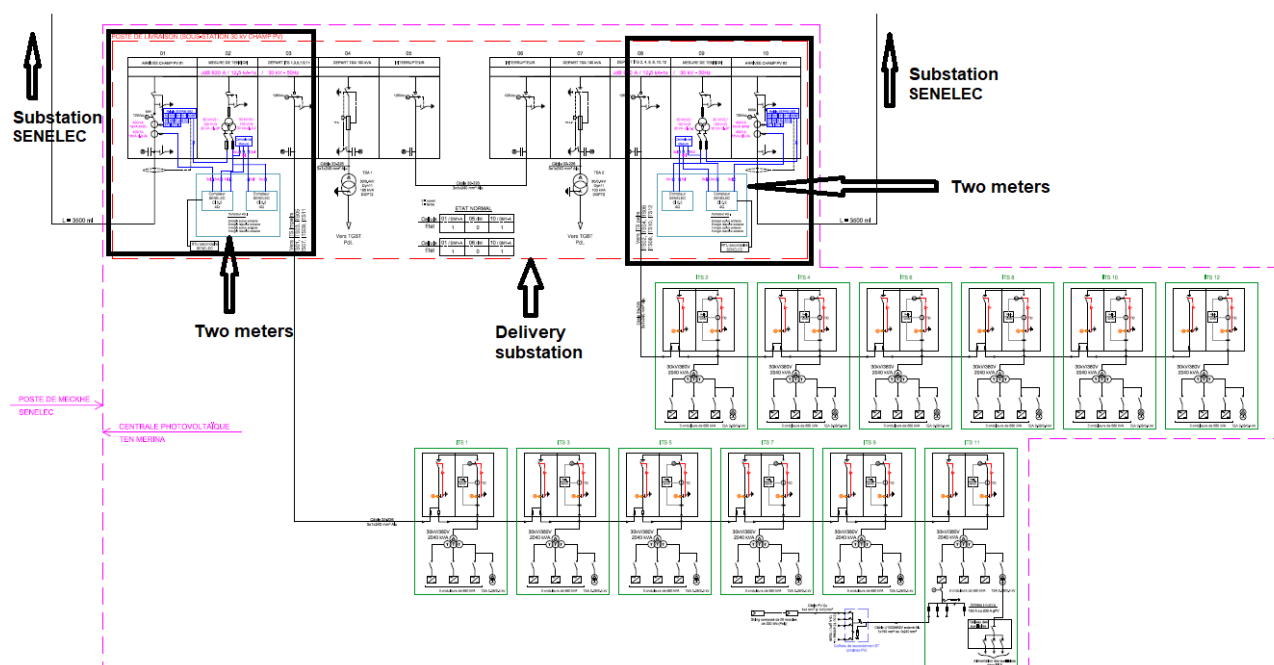
The SCADA1 system allows the whole PV facilities to be manually or automatically controlled and monitored:

- Locally, from the equipment and/or HMI2 installed at the onsite delivery substation
- Remotely, from a dedicated operator console station.

At project start, meter 1 and meter 2 were installed at the onsite delivery substation and meter 3 and meter 4 at the SENELEC's 90kV/30kV distribution substation located in Mékhé (Mékhé substation). The latter two were moved to the onsite delivery substation on 13/12/2017.

Meter	Serial number	Inverter Transformer Substations
Meter 3 (Ten Mérina Ndakhar SA)	03619295	ITS1-3-5-7-9-11
Meter 4 (Ten Mérina Ndakhar SA)	03619293	ITS2-4-6-8-10-12
Meter 2 (SENELEC 2)	03619294	ITS2-4-6-8-10-12
Meter 1 (SENELEC 1)	03619296	ITS1-3-5-7-9-11

All meters are ITRON SL7000 type with accuracy class 0.2S (active), 2 (reactive) and compliant with IEC standard 62053-23. They have been successfully calibrated and verified at Itron factory on March 28th, 2017.



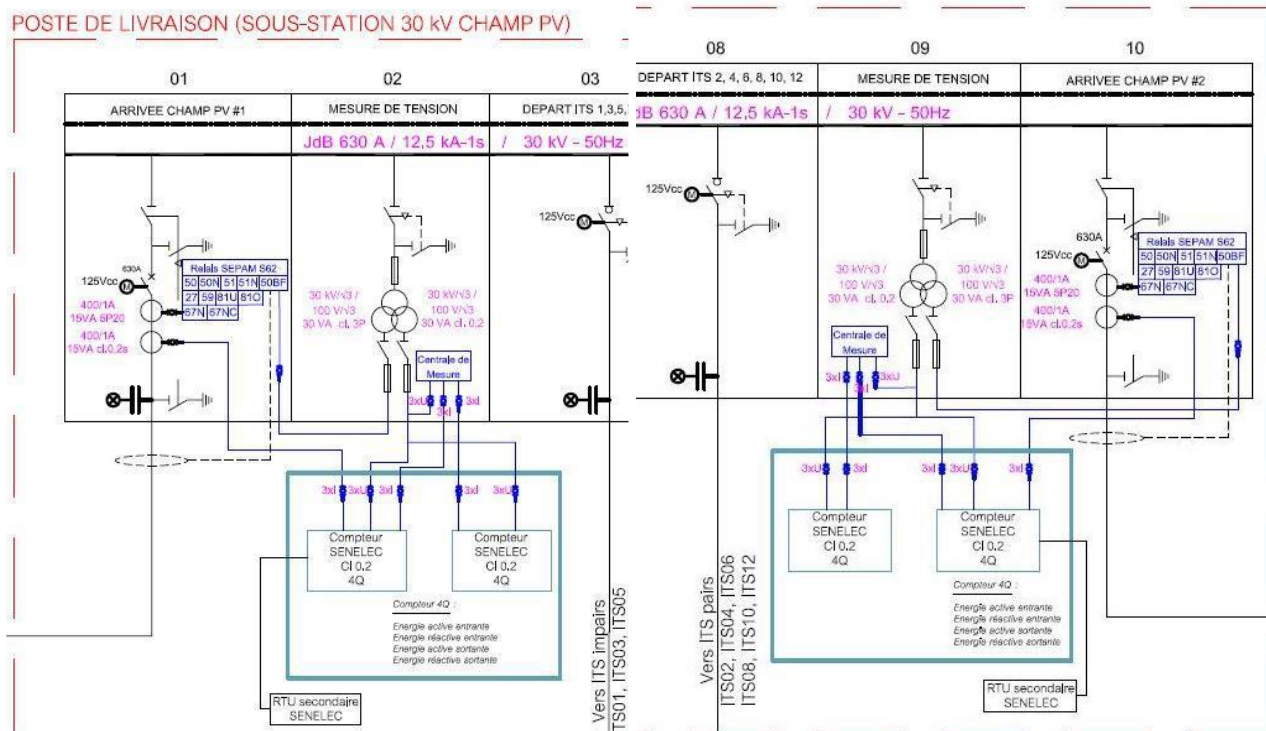


Figure 2: Location of meters in PV power plant with magnified extracts¹

The organizational structure, roles and responsibilities of personnel for the operation and maintenance of the power plant is shown in the graph below. Technical/maintenance department is responsible for monitoring.

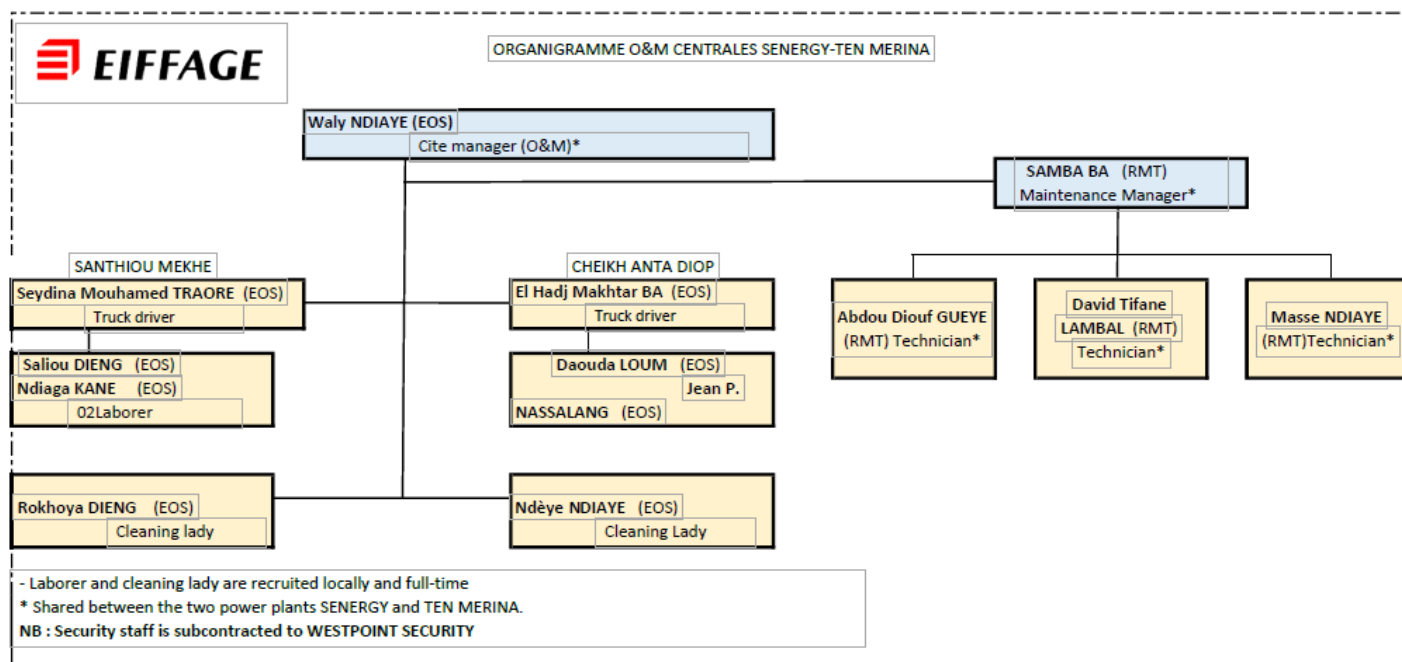


Figure 3: Organizational structure, roles and responsibilities of personnel

¹ All meters are sealed by Senelec.

SECTION D. Data and parameters

D.1. Data and parameters fixed ex ante

Data/Parameter	EF _{CO₂,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>0.07550</td></tr> </table>	Natural gas	0.05430	Diesel	0.07260	Residual fuel	0.07550
Natural gas	0.05430						
Diesel	0.07260						
Residual fuel	0.07550						
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>41.3266</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	41.3266
(in GJ/t)											
Natural gas	34.4860										
Diesel	42.5331										
Residual fuel of all power units except Kounoune	38.9252										
Residual fuel of Kounoune	41.3266										
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" (Version 5.0, EB87, Annex 9)
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” (Version 5.0, EB87, Annex 9)
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” (Version 5.0, EB87, Annex 9)
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
Value(s) applied	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	GT1	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) ² 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	%

² Tool to calculate the emission factor for an electricity system" (Version 5.0, EB87, Annex 9)

Description	The percentage share of total installed capacity of grid-connected solar PV in the total installed grid connected power generation capacity in the host country
Source of data	Senelec data and governmental communications
Value(s) applied	0.05% ³
Choice of data or measurement methods and procedures	-
Purpose of data/parameter	Additionality demonstration
Additional comments	-

Data/Parameter	The total installed capacity of solar PV
Unit	MW
Description	The total installed capacity of the grid-connected solar PV in the host country.
Source of data	Senelec data and governmental communications
Value(s) applied	44.03 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. Please refer to B.5

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	Net electricity production fed into grid (MWh)
	01/10/2019 – 31/12/2019	12,573
	01/01/2020 – 30/09/2020	36,878
	TOTAL:	49,451

³ The total capacity of the Senelec grid in 2015 is equal to 897.97 MW - Source: http://www.crse.sn/sites/default/files/2017-04/RevisionTarifaire-2016_0.pdf (p.8)

Monitoring equipment	<p>Two meters (1 Ten Mérina Ndakhar SA and 1 Senelec meter) have been installed at each of the two feeder lines (30 kV) (cells ITS1-3-5-7-9-11 & cells ITS2-4-6-8-10-12) to the onsite delivery substation. The metering point (grid interface) is situated at the onsite delivery substation.</p> <p>Type: ITRON SL7000</p> <p>Accuracy class: CI 0.2S (active); CI 2 (reactive) (as per PPA metering provisions).</p> <table border="1" data-bbox="525 416 1441 645"> <thead> <tr> <th>Meter</th><th>Serial number</th><th>Inverter Transformer Substations</th></tr> </thead> <tbody> <tr> <td>Meter 3 (Ten Mérina Ndakhar SA)</td><td>03619295</td><td>ITS1-3-5-7-9-11</td></tr> <tr> <td>Meter 4 (Ten Mérina Ndakhar SA)</td><td>03619293</td><td>ITS2-4-6-8-10-12</td></tr> <tr> <td>Meter 2 (SENELEC 2)</td><td>03619294</td><td>ITS2-4-6-8-10-12</td></tr> <tr> <td>Meter 1 (SENELEC 1)</td><td>03619296</td><td>ITS1-3-5-7-9-11</td></tr> </tbody> </table> <p>A SCADA system allows the whole PV facilities to be manually or automatically controlled and monitored locally or remotely.</p> <p>Technical/Engineering/Maintenance Department is responsible for measurements.</p>	Meter	Serial number	Inverter Transformer Substations	Meter 3 (Ten Mérina Ndakhar SA)	03619295	ITS1-3-5-7-9-11	Meter 4 (Ten Mérina Ndakhar SA)	03619293	ITS2-4-6-8-10-12	Meter 2 (SENELEC 2)	03619294	ITS2-4-6-8-10-12	Meter 1 (SENELEC 1)	03619296	ITS1-3-5-7-9-11
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Meter 3 (Ten Mérina Ndakhar SA)	03619295	ITS1-3-5-7-9-11														
Meter 4 (Ten Mérina Ndakhar SA)	03619293	ITS2-4-6-8-10-12														
Meter 2 (SENELEC 2)	03619294	ITS2-4-6-8-10-12														
Meter 1 (SENELEC 1)	03619296	ITS1-3-5-7-9-11														
Measuring/reading/recording frequency	Continuous measurement and at least monthly recording.															
Calculation method (if applicable)	n/a															
QA/QC procedures	<p>Electricity outputs have been 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.</p> <p>In general, the Project Participant and SENELEC ensure jointly the QA/QC of the meter measurements. Within the project participant's monitoring organization, 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, is done in accordance with national standards or requirements set by the meter supplier or requirements set by the grid operators:</p> <p>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:</p> <p>In absence of a grid code and stipulations of the meter supplier, national requirements apply. <u>As per Senegalese decree 60-415</u>, in normal circumstances, <u>a periodic verification of the meters is performed on an annual basis</u>.</p> <p>Date of last calibration (test report of conformity): 27/03/2017, Start of operation: 20/11/2017.</p> <p>Validity: not applicable (no calibration required).</p> <p>Date of annual verification: A verification has been carried out on 24/06/2020. All meters were found in conformity. The previous verification had been carried on 07/02/2019.</p>															
Purpose of data/parameter	Calculation of baseline emissions															
Additional comments	-															

D.3. Implementation of sampling plan

N/A

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	33,610	-	-	-	33,610	33,610

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)
33,610	34,495

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

The monitoring period goes from October 1st 2019 till September 30th 2020. Thus the calculation for this monitoring period has been done as following: 3/12*amount in PDD for 2019 + 9/12*amount in PDD for 2020 = 3/12*34,549+9/12*34,477

E.6. Remarks on increase in achieved emission reductions

N/A

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

N/A

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).

<i>Version</i>	<i>Date</i>	<i>Description</i>
01.0	28 May 2010	EB 54, Annex 34. Initial adoption.
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