Verification and certification report form for CDM project activities

(Version 01.0)

Complete this form in accordance with the "Attachment: Instructions for filling out the verification and certification report form for CDM project activities" at the end of this form.

VERICATION AND CERTIFICATION REPORT	
Title of the project activity	Rwanda Electrogaz Compact Fluorescent Lamp (CFL) distribution project
Reference number of the project activity	3404
Version number of the verification and certification report	2
Completion date of the verification and certification report	30/03/2017
Monitoring period number and duration of this monitoring period	Second Monitoring Period: 01/08/2012 – 31/03/2014
Version number of monitoring report to which this report applies	04
Crediting period of the project activity corresponding to this monitoring period	30/05/2010 – 29/05/2020. 10 years. Fixed.
Project participant(s)	Rwanda: Rwanda Energy Group Ltd (REG Ltd); Netherlands: Netherlands' Ministry of Infrastructure and the Environment (IenM); Germany: BASF SE; KfW; Austria: Kommunalkredit Public Consulting GmbH; Denmark: Maersk Olie og Gas A/S; Dong Energy Salg & Service A/S; Nordjysk Elhandel A/S; Danish Ministry of Climate, Energy and Building/Danish Energy Agency; Aalborg Portland A/S; Sweden: Goteborg Energi AB; Italy: Government of Italy - Ministry for the Environment, Land and Sea; Belgium: Bruxelles Environnement – IBGE; Walloon Region: Walloon Air and Climate Agency; Spain: Kingdom of Spain - Ministry of Agriculture, Food and Environment and Ministry of Economy and Competitiveness; EDP - Energias de Portugal, S.A.; Endesa Generación, S.A.; Gas Natural SDG, S.A.; Hidroeléctrica del Cantábrico, S.A.; Finland: Ruukki Metals Oy; Norway: Statoil ASA; Statkraft Carbon Invest AS; Switzerland: Schweizerische Rückversicherungsgesellschafts AG (Swiss RE); Japan: Daiwa Securities Co., Ltd.; Fujifilm Corporation;

	Idemitsu Kosan Co., Ltd.; JX Nippon Oil & Energy Corporation; The Okinawa Electric Power Corporation, Inc.; Luxembourg: Ministry of Sustainable Development and Infrastructure Bilateral and Multilateral Funds: International Bank for Reconstruction and Development (IBRD) as Trustee of the Community Development Carbon Fund (CDCF)
Host Party	Rwanda
Sectoral scope(s), selected methodology(ies), and where applicable, selected standardized baseline(s)	Sectoral Scope 3: Energy demand. AMS-II.J. ver. 7 - Demand-side activities for efficient lighting technologies
Estimated GHG emission reductions or net anthropogenic GHG removals for this monitoring period in the registered PDD	45,714 tCO_2.
Certified GHG emission reductions or net anthropogenic GHG removals for this monitoring period	14,592 tCO_2.
Name of DOE	AENOR INTERNACIONAL S.A.U
Name, position and signature of the approver of the verification and certification report	 José Magro González Climate Change Manager

SECTION A. Executive summary

Brief Summary

AENOR Internacional S.A.U (AENOR) has performed the second verification of the emission reduction of the project "Rwanda Electrogaz Compact Fluorescent Lamp (CFL) distribution project" (Registration Ref. Nº 3404) from 01/08/2012 – 31/03/2014.

The purpose of the Rwanda Electrogaz CFL Distribution Project is to expand the use of high-efficiency lighting technology in Rwanda's residential sector through the distribution of high-quality Compact Fluorescent Lamps.

The project activity, implemented by the national public electricity utility Rwanda Energy Group, Ltd (REG Ltd), is designed with two components:

- Component 1: Existing grid-connected customers have the opportunity to exchange incandescent lamps of a range of 25 to 100 watts for high-quality self-ballasted compact fluorescent lamps (CFLs) of up to 20 Watts.
- Component 2: As part of the national electrification program, which aims to increase the grid-connected rate up to 36% by 2020, newly connected REG customers receive a capped number of CFLs with their new electricity meter at the time of the connection. CFLs of 15 and 20 Watts were distributed.

The CFL distribution project is implemented through 4 phases starting mid-2007. Distribution of 4 phases was completed as of May 2014, with distribution of nearly 700,000 lamps.

Scope of the Verification

The verification, as an independent and objective review, shall assess and verify that the implementation of the project activity and the steps taken to report emission reductions comply with the CDM criteria and relevant guidance provided by the CMP and the CDM Executive Board.

The verification shall:

1. Ensure that the project activity has been implemented and operated as per the revised PDD /1/ and that all physical features (technology, project equipment, and monitoring and metering equipment) of the project are in place. It is, therefore, necessary to:
    - Interview relevant personnel to confirm that the operational and data collection procedures are implemented in accordance with the monitoring plan.
    - Check the monitoring equipment, including calibration performance and observations of monitoring practices, against the requirements of the revised PDD and the selected methodology.
    - Check that the manual operating provisions are duly followed (processes, routines, instructions, forms and the like).
2. Ensure that the monitoring report /4/ and other supporting documents provided are complete and verifiable and in accordance with applicable CDM requirements. It is, therefore, necessary to:
    - Review relevant documentation and conduct an on-site visit.
    - Review data and information presented to verify their completeness.
    - Review indicators that must be addressed in the monitoring plan.

- Review the monitoring plan and monitoring methodology, paying particular attention to the frequency of measurements, the quality of metering equipment including calibration requirements, and the quality assurance and quality control procedures.

3. Ensure that actual monitoring systems and procedures comply with the monitoring systems and procedures described in the monitoring plan and the approved methodology, carrying out:

    - A review of information flows for generating, aggregating and reporting the monitoring parameters.

    - A cross-check between information provided in the monitoring report and data from other sources such as plant logbooks, inventories, purchase records or similar data sources.

    - A review of calculations and assumptions made in determining GHG data and emission reductions.

    - A review of the project documentation provided by the project participant to check that it is based upon both quantitative and qualitative information on emission reductions. Quantitative information comprises the reported numbers in the monitoring report submitted to the DOE. Qualitative information comprises information on internal management controls, calculation procedures, and procedures for transfer of data, frequency of emissions reports, and review and internal audit of calculations.

4. Evaluate the data recorded and stored as per the monitoring methodology, carrying out:

    - An evaluation of data management and the quality assurance and quality control system in the context of their influence on the generation and reporting of emission reductions.

    - An identification of quality control and quality assurance procedures in place to prevent or identify and correct any errors or omissions in the reported monitoring parameters.

5. Identify and inform the project participant of any concerns related to the project's activity and operation conformance with the revised project design document. The project participant shall address the concerns and supply additional relevant information.

6. Provide a verification report to the project participant, the Parties involved and the CDM Executive Board. The report shall be made publicly available.

The verification is not meant to provide any consultancy services to the client. However, stated requests for clarifications and/or corrective actions may provide input for improvement of the monitoring report.

AENOR, based on the Specific Instruction for the Validation, verification and certification of clean development mechanism (CDM) project activities (IE/DTC/039), /5/ which is in turn based on the CDM Validation and Verification Standard version 09.0 (VVS) /6/, has used a risk-based approach in the verification, focusing on the identification of significant risks for the generation of CERs and verifying the mitigation measures for these issues.

Verification Process and Conclusion

The verification was performed through means of the following the requirements of validation and verification standard, Version 09.0, the applied methodology /2/, and relevant CDM rules. The process of the verification includes:

I. A desk review of the monitoring report and all support documents.

II. Follow-up interviews and site inspection.

III. The resolution of outstanding issues and the issuance of the verification report and statement.

The verification of the emission reductions has assessed all factors and issues that constitute the basis for emission reductions from the project. These include:

- The emission reduction calculations and the relevant data records.
- The calibration and maintenance records for the monitoring
- The management systems to support the project operation and monitoring.

The project is implemented in accordance with the revised Project Design Document and the approved Monitoring Plan. The monitoring system is in place and the emission reductions are calculated without material misstatements, based on the approved methodology AMS-II.J. version 07. Therefore, in AENOR's opinion, the GHG emissions reductions reported for the project in the latest version of the monitoring report are correct.

All Corrective Action Requests (CAR) and Clarification Actions (CL) have been checked by the verification team and have been adequately resolved.

AENOR is able to certify that the emissions reductions from the "Rwanda Electrogaz Compact Fluorescent Lamp (CFL) distribution project" from 01/08/2012 – 31/03/2014 amount to 14,592 tonnes of CO_2 equivalent.

SECTION B. Verification team, technical reviewer and approver

B.1. Verification team member

No.	Role	Type of resource	Last name	First name	Affiliation (e.g. name of central or other office of DOE or outsourced entity)	Involvement in			
						Desk review	On-site inspection	Interview(s)	Verification findings
1.	Team Leader	IR	Medrano Gutierrez	Alfonso	AENOR	X	X	X	X
2.	Verifier	IR	García Madero	Mª Mercedes	AENOR	X	X	X	X

B.2. Technical reviewer and approver of the verification and certification report

No.	Role	Type of resource	Last name	First name	Affiliation (e.g. name of central or other office of DOE or outsourced entity)
1.	Technical reviewer	IR	Pellitero Martínez	Marcelino	AENOR

3.	Approver	IR	Magro González	José	AENOR

SECTION C. Application of materiality

AENOR verification team has considered the CDM requirements on materiality concept according to:

- Decision 9/CMP.7 Materiality standard under the clean development mechanism.
- CDM Validation and Verification Standard (VVS) version 09.0 /6/.
- Guideline: Application of materiality in verifications version 02.0 /28/.

"Rwanda Electrogaz Compact Fluorescent Lamp (CFL) distribution project" is a small scale CDM project activity achieving total emission reductions < 30,000 tons of CO_2e per year; as such, a 5 per cent materiality threshold is applied for this verification as per VVS.

C.1. Consideration of materiality in planning the verification

No.	Risk that could lead to material errors, omissions or misstatements	Assessment of the risk		Response to the risk in the verification plan and/or sampling plan
		Risk level	Justification	
1.	Human error in the quantification of emissions	Low	Data used for the emissions reduction calculation are collected through automated systems so the risk for human error is reduced. Calculation spreadsheets are used to determine the emissions reductions.	Verification has been focused on the assessment of: • Quality of raw data and procedures for its collection. • Calculation spreadsheets. • Controls established to • Detect and correct any error or omission in monitoring parameters. • Monitoring procedures. • Reliability of internal and external data. • Internal data quality control for monitored parameters and metering systems. The verification plan included a desk review, on-site inspection and interviews with relevant personnel.

2	Undue reliance on a poorly designed information system, which may have few effective quality controls	Low	According to MR there are QC/QA procedures applied for monitoring parameters and data management.	Verification has been focused on the assessment of: • Quality of raw data and procedures for its collection. • Calculation spreadsheets. • Controls established to detect and correct any error or omission in monitoring parameters. • Monitoring procedures. • Reliability of internal and external data. • Internal data quality control and implementation of internal procedures for quality management. • Sampling plan described in section E.6.3 The verification plan included a desk review, on-site inspection and interviews with relevant personnel. Please see section D.4 for the sampling approach applied.

C.2. Consideration of materiality in conducting the verification

The verification has been performed through a desk review and on-site inspection including interviews with relevant personnel.

The verification activities in which risks were assessed are the evaluations of:

- Monitoring system including calibration of scales
- Calculation spreadsheets
- Quality of raw data and procedures for its collection.
- Data flow
- Data control procedures
- Sampling plan

Some mistakes were identified and subsequently corrected. These findings are detailed in Appendix 4 and they were successfully closed. Therefore related identified mistakes as listed in findings in Appendix 4 to this report have been determined to be immaterial. All identified inconsistencies and clarification requests have been successfully closed.

Based on the assessment carried out, AENOR confirms with a reasonable level of assurance that the claimed emission reductions are free from material errors, omissions or misstatements.

SECTION D. Means of verification

D.1. Desk review

The desk review involved a review of:

- Project documentation: PDD revised /1/, initial version monitoring report /3/ and final Version of monitoring report /4/.
- CDM project standard version 09.0 /7/ and CDM project cycle procedure version 09.0 /8/.
- CDM Monitoring report form and the instruction for filling out the MR.
- Relevant decisions, clarifications and guidance from the CMP and the CDM Executive Board.
- The monitoring plan and the applied monitoring methodology, paying close attention to the frequency of measurements, the quality of metering equipment and the quality assurance and quality control procedures.
- The data and information presented to verify their completeness, including the monitoring report and the measuring records of the different monitored parameters.
- The influence of data management and the quality assurance and quality control system on the generation and reporting of emission reductions.
- A comparison of the actual CERs claimed in the monitoring period with the estimate in the PDD, and explanation of any significant increase.

A complete list of all documents reviewed is attached in Appendix 3 of this report.

D.2. On-site inspection

Duration of on-site inspection: 30/03/2016 to 31/03/2016				
No.	**Activity performed on-site**	**Site location**	**Date**	**Team member**
1.	• Monitoring report and emission reduction calculations. • Flows for generating, aggregating and reporting the monitoring parameters. • Crosscheck between information provided in the monitoring report and data from the monitoring system, log books, purchase records, handwritten records. • Testing of monitoring equipment and observation of monitoring practices. • Running of specific checks and trials on data sources and data management practices where non conformities are detected. • Clarifications related to monitoring procedures. • Sufficiency of monitoring plan. • Reliability of internal and external data. • Internal data quality control. • Implementation of ex-post installation surveys	REG Ltd Headquarters at Kigali	27/04/2015 30/04/2015	Alfonso Medrano Gutiérrez Mª Mercedes García Madero
2.	• Householder interviews • Checking Lamp identification • Checking Lamp wattage • Number of lamps distributed • Distribution dates • Cross –check database information • Checking survey implementation	Householders site visits: Gikondo, Nyarugenge, Kanombe, Ngoma	28/04/2015 29/04/2015	Alfonso Medrano Gutiérrez Mª Mercedes García Madero

D.3. Interviews

No.	Interviewee			Date	Subject	Team member
	Last name	First name	Affiliation			
1.	Marcos	Patricia	Climate and Carbon Finance Unit at The World Bank	27-30/04/2015	Monitoring report and emission reduction calculations. Reliability of internal and external data. Internal data quality control. Implementation of ex-post installation surveys.	Alfonso Medrano Gutiérrez Mª Mercedes García Madero
2.	Boukerche	Sandrine	Carbon Fund Manager at The World Bank	27-30/04/2015	Monitoring report and emission reduction calculations. Reliability of internal and external data. Internal data quality control. Implementation of ex-post installation surveys.	Alfonso Medrano Gutiérrez Mª Mercedes García Madero
3	Mugeraneza	Viator	REG Ltd Project coordinator	27-30/04/2015	Flows for generating, aggregating and reporting the monitoring parameters. Crosscheck between information provided in the monitoring report and data from the monitoring system, log books, purchase records, Handwritten records. Testing of monitoring equipment and observation of monitoring practices. Running of specific checks and trials on data sources and data management practices where non conformities are detected. Clarifications related to monitoring procedures. Sufficiency of monitoring plan. Reliability of internal and external data. Internal data quality control. Implementation of ex-post installation surveys	Alfonso Medrano Gutiérrez Mª Mercedes García Madero

No.	Interviewee			Date	Subject	Team member
	Last name	First name	Affiliation			
4	40 householders in the regions: Gikondo, Nyarugenge, Kanombe, Ngoma were interviewed by AENOR team			28/04/2015 29/04/2015	• Checking Lamp identification • Checking Lamp wattage • Number of lamps distributed • Distribution dates • Cross –check database information • Checking survey implementation	Alfonso Medrano Gutiérrez Mª Mercedes García Madero

D.4. Sampling approach

AENOR followed paragraph 21 to 27 of the Standard for sampling and surveys for CDM project activities and programme of activities (ver. 04.1) (the version in force at the time of the site visit) /29/ in order to verify whether the sample size and sampling method proposed by the PP was adequate to achieve the minimum confidence/precision requirements.

AENOR confirms that the selected samples by the project proponent for their monitoring surveys are representative of the population and that the required confidence and precision have been met. This is in line with the requirement of paragraph 21-22 of the Standard for sampling and surveys for CDM project activities and programme of activities (ver. 04.1)

In line with the requirements of paragraph 24 of the above mentioned Standard for sampling, AENOR has designed an acceptance sampling, and verified a total of 40 samples during the on-site visit to customer households and found PPs survey records to be acceptable within the limits required as per paragraph 24 to 26 of the sampling standard as described below.

AENOR´s sample size of 40 samples for onsite visit was deemed to be adequate due to the following reasons:

- AENOR selected an acceptable quality level at 1% (following the guidance of the Standard for sampling and surveys for CDM project activities and programme of activities (ver. 04.1). In line with paragraph 25 of the sampling standard, the maximum discrepancy (unacceptable quality level) was fixed at 20% of the determined sample size.

- The maximum error associated with the determination indicated in paragraph above shall remain at levels indicated below:

    - A 10% chance that the DOE will wrongly reject the PPs records (producer's risk).

    - A 10% chance that the DOE will wrongly accept the PPs records (consumer's risk).

Using the previous provisions, AENOR determined the size of the sample for the verification of the survey as 40 and an acceptance number (maximum discrepancies admitted) of 1 for the survey.

This total sample size of 40 is obtained by means of manual calculation and following the Guideline: Sampling and surveys for CDM project activities and programmes of activities. Ver. 03.0 (version in force at the time of the site visit) (EB 75, Annex 8) in its Appendix 5: Best-practice examples – acceptance sampling.

AENORs onsite visits of the sampled households and the interviews with the householders further revealed no discrepancies with the PP records included in the monitoring survey, which was well within the preset limit of error.

Hence, AENOR confirms that the sampling size and the method used for onsite verification were in line with the requirements of the Standard for sampling and surveys for CDM project activities and programme of activities (ver. 04.1) (the version in force at the time of the site visit) which are also in line with the current version of that standard (version 05.0).

D.5. Clarification requests, corrective action requests and forward action requests raised

Areas of verification findings	No. of CL	No. of CAR	No. of FAR
Compliance of the monitoring report with the monitoring report form		**CAR2**	
Compliance of the project implementation with the PDD		**CAR1**	
Post-registration changes			
Compliance of the monitoring plan with the monitoring methodology including applicable tool and standardized baseline			
Compliance of monitoring activities with the monitoring plan	**CL1**	**CAR3, CAR4, CAR5, CAR6**	
Compliance with the calibration frequency requirements for measuring instruments			
Assessment of data and calculation of emission reductions or net removals			
Others (please specify) Quality Management; defined organizational structure, responsibilities and competencies Internal QA/QC and document control	**CL2, CL3**		
Total	**3**	**6**	0

SECTION E. Verification findings

E.1. Compliance of the monitoring report with the monitoring report form

Means of verification	The compliance of the monitoring report with the monitoring report form was verified through the desk-review of last version of monitoring report and the latest version of applicable monitoring report form, CDM rules and references and supported documents provided by the project participants. In AENOR´s opinion the monitoring report was completed using the last version of the applicable monitoring report form and has followed the instructions for filling attached at the end of the form.
Findings	CAR2 (please see Appendix 4)
Conclusion	It is AENOR opinion that the monitoring report was completed using the latest version of the applicable monitoring report form and the instructions for filling it were properly followed by the PP.

E.2. Remaining forward action requests from validation and/or previous verification

>>A FAR was raised in the previous verification process. The FAR said literally: *"It shall be assessed whether the amount of installed CFL that are still functional is monitored by means of a different survey for each component of the project, or with a unique survey for both components. It shall be assessed, in case only one survey is developed, if this situation could affect the emission reduction calculation".*

AENOR has verified that PRC were approved by the EB as of December 2, 2016 (please see section E.4 below). According to the revised PDD, both components: component 1 and component 2 shall be monitored according to the requirements of AMS-II.J version 7 and, therefore, the annual survey of the CFLs that were operating in 2012, 2013 and 2014 under component 2 is no longer required.

According to the revised PDD, all the parameters monitored for component 2 described in the initial PDD that had to be monitored through annual checks according to methodology AMS II-C version 11; are now monitored according to methodology AMS-II.J version 7, applying default values, as it has been approved in the revised PDD.

AENOR confirms that according to the revised PDD and the applied methodology, no different surveys are needed to monitor the amount of installed CFL that are still functional in each component. Therefore, FAR01 opened in the previous verification process is considered resolved.

E.3. Compliance of the project implementation with the registered project design document

Means of verification	The compliance of the project implementation with the revised project design document was verified through the on-site visit and desk-review of documents provided by the project participants (All registered documents are listed in Appendix 3). The audit team reviewed the main technical features of the project activity. After crosschecking the available information, the audit team found that the project was implemented according to the requirements established in the revised PDD.
Findings	-
Conclusion	According to paragraph 385 of VVS version 09.0, AENOR verification team confirms that: • The implementation status of the Project is consistent with the revised PDD. • The actual operation of the Project is as per the revised PDD. • Information (data and variables) provided in the monitoring report is in accordance with that stated in the revised PDD.

E.4. Post-registration changes

E.4.1. Temporary deviations from the registered monitoring plan, monitoring methodology or standardized baseline

N/A

E.4.2. Corrections

Post registration changes including corrections were approved by the EB on 02/12/2016. Reference: PRC-3404-002:

https://cdm.unfccc.int/PRCContainer/DB/prcp447598078/view

E.4.3. Changes to the start date of the crediting period

N/A

E.4.4. Inclusion of a monitoring plan to a registered project activity

N/A

E.4.5. Permanent changes from registered monitoring plan, monitoring methodology or standardized baseline

Post registration changes including changes from registered monitoring plan were approved by the EB on 02/12/2016. Reference: PRC-3404-002:

https://cdm.unfccc.int/PRCContainer/DB/prcp447598078/view

E.4.6. Changes to the project design of a registered project activity

N/A

E.4.7. Types of changes specific to afforestation and reforestation project activities

>>
N/A

E.5. Compliance of monitoring plan with the monitoring methodology including applicable tool and standardized baseline

Means of verification	As it has been explained above, Post Registration Changes were requested by the PP in order to be able to monitor some parameters according to the applied monitoring methodology. Those changes were approved by the EB on 02/12/2016 (PRC-3404-002). The verification team reviewed whether the monitoring plan of the revised PDD was in accordance with the applied methodology and any other monitoring aspect of the project activity that is not specified in the methodology. Once the PRC is approved, AENOR verified that the monitoring plan is in line with the new version of the methodology to be applied, and can confirm that the new approved monitoring plan is in line with the applicable methodology AMS II.J version 07
Findings	CAR1
Conclusion	AENOR confirms that the monitoring plan of the revised PDD is in accordance with the applied methodology AMS-II.J. *version 07* based on the following reasons: • During the desk review monitoring parameters included in the applied methodology were compared with the ones included in the Monitoring plan of the revised PDD, and they were found consistent. • The monitoring plan perfectly fulfils the criteria stated in the monitoring methodology. • No other relevant aspects for monitoring not included in the methodology were identified.

E.6. Compliance of monitoring activities with the registered monitoring plan

E.6.1. Data and parameters fixed ex ante or at renewal of crediting period

Means of verification	Data and parameters fixed ex ante were verified through desk-review of monitoring report /4/, revised PDD /1/ and applied methodology /2/. The list of the parameters fixed ex ante verified is: - $EF_{CO2,ELEC,i}$: Emission factor for the national electricity grid. Value applied: 0.6540 kg CO_{2e}/kWh - TD_y: Average annual technical grid losses in year y Value applied: 10% - NTG: Net-to-gross adjustment factor. Value applied: 0.95 - Oi: Average daily operating hours of the lighting devices replaced by the

	group of "i" lighting devices. Value applied: 3.5 hours - Li: Equipment lifetime. Value applied: 6,000 hours - Xi: Number of operating hours per year for equipment type i Value applied: 1,277.5 hours - $Ri_{:}$ Percentage of lamps of type i operating at the rated lifetime. Value applied: 50% - $P_{i,BL}$: Power of the incandescent lamps in the baseline scenario. Value applied: 83.3 Watt
Findings	No finding was raised regarding this issue
Conclusion	Data parameters fixed at validation, used for calculating the emission reduction, are in accordance with revised PDD and the applied methodology. All data sources and assumptions are appropriate and calculations are correct as applicable to the proposed CDM project activity.

E.6.2. Data and parameters monitored

Means of verification	The audit team carried out a review of information flows for generating, aggregating and reporting the monitoring parameters to assess a completeness of monitoring in line with the monitoring plan and the applied methodology, including: – The measurement/determination method used. – Significant inaccuracies occurred in case of measured or estimated values of some parameters. – Measuring, reading and/or recording frequency. – QA/QC procedures applied to prevent or identify and correct any errors or omissions in the reported monitoring parameters. The monitoring system and all applied procedures are in compliance with the monitoring plan and the applied methodology AMS-II.J. ver 07 based on the information included in the final monitoring report and the ERs spreadsheet /10/ The list of all parameters monitored and the means of verification used are detailed as follows: – **Customer information** – Monitoring: Once at bulb distribution. – Means of verification: AENOR verified the actual figures available at the moment of the site visit against the database register. Handwritten registers were also checked and personal information from customers interviewed during on-site visit. AENOR confirms that this parameter has been monitored according to the monitoring plan stated in the revised PDD and no inconsistencies have been found between the information verified in situ and the distribution database /17-22/ – **Distribution date:** – Monitoring: Once at bulb distribution – Means of verification: AENOR verified the actual figures available at the moment of the site visit against the database register. Handwritten registers were also checked and personal information from customers interviewed during on-site visit. AENOR confirms that this parameter has been monitored according to the monitoring plan stated in the revised PDD and no inconsistencies have been found between the information verified in situ and the distribution database /17-22/.

- **$Q_{PJ,i}$: Number (quantity) of pieces of CFLs of type *i* distributed under the project.**
- Monitoring: Once at bulb distribution. The number of pieces distributed is:

  Component 1
  - For distributed CFL, i = 15 W
    Phase 3: 56,726
  - For distributed CFL, i = 20 W
    Phase 1: 40,328
    Phase 2: 132,042
    Phase 3: 22,573

  Component 2
  - For distributed CFL, i = 15 W
    25,524
  - For distributed CFL, i = 20 W
    70,990
- Means of verification: AENOR verified the actual figures available at the moment of the site visit against the database register. Handwritten registers were also checked and personal information from customers interviewed during on-site visit. AENOR confirms that this parameter has been monitored according to the monitoring plan stated in the revised PDD and no inconsistencies have been found between the information verified in situ and the distribution database /17-22/. Furthermore, the number of CFL distributed was compared to the number of ICL collected and received at the central storage in Kigali. AENOR confirms that the lowest number is used as monitored values for ERs calculation.

  AENOR confirms that ERs generated by the CFLs distributed under Phase 1 are not claimed for this second monitoring period, because some of them are not traceable with the data base because the identification number on the lamp is no longer visible due to time passing. (see CAR3)

  AENOR confirms that this approach is conservative, because in this way the CFLs distributed under phase 1 that were not traceable with the database are not included in the monitoring and therefore not included in the ERs calculation.
- **$P_{i,PJ}$ Rated power of the project CFLs of the group of "*i*" lighting devices, *i***
- Monitoring: At bulb distribution and Ex post monitoring surveys. The power of the project CFLs is:
  - Phase 1 and Phase 2

    20 W
  - Phase 3

    15 W and 20 W
- Means of verification: AENOR verified the actual figures available at the moment of the site visit against the database register. Handwritten registers were also checked and personal information from customers interviewed during on-site visit. AENOR confirms that this parameter has been monitored according to the monitoring plan stated in the revised PDD and no inconsistencies have been found between the information verified in situ and the distribution database /17-22/
- **$Q_{BL,I}$: Number (quantity) of pieces of incandescent lamps (ICLs) of type i exchanged under the project**
- Monitoring: Once at bulb distribution. The number of pieces exchanged is:

ICL types		Values per Phase and CFL type			
Parameter	**(W)**	**Phase 1**	**Phase 2**	**Phase 3**	
		20 W	**20 W**	**15 W**	**20 W**
P_{ABL}	25	953	0	0	0
P_{BBL}	40	12,330	1,068	22,059	0
P_{CBL}	60	11,961	51,266	34,667	0
P_{DBL}	75	15,084	79,708	0	22,573
Total	**-**	**40,328**	**132,042**	**56,726**	**22,573**

- Means of verification: AENOR verified the actual figures available at the moment of the site visit against the database register. Handwritten registers were also checked and personal information from customers interviewed during on-site visit. AENOR confirms that this parameter has been monitored according to the monitoring plan stated in the revised PDD and no inconsistencies have been found between the information verified in situ and the distribution database /17-22/

  A third party was engaged to certify the number of ICLs collected. AENOR verified the reports available for Phase 1 /17/ and Phase 2 and Phase 3 /18/. The sampling methodology used in these reports is based on the Guidelines for sampling and surveys for CDM project activities and programme of activities, version 03.0. /33/. The methodology is also in line with Guidelines for sampling and surveys for CDM project activities and programme of activities, version 04.0 /30/.

- **$P_{i,BL}$: Power of the incandescent lamps exchanged *y***

- Monitoring: Once at bulb distribution. The following table summarized the number of ICLs for each baseline wattage category.

	25W	**40 W**	**60 W**	**75 W**
Phase 1	953	12,330	11,961	15,084
Phase 2	0	1,068	51,266	79,708
Phase 3	0	22,059	34,667	22,573
Total	**953**	**35,457**	**97,894**	**117,365**

- Means of verification: AENOR verified the actual figures available at the moment of the site visit against the database register. Handwritten registers were also checked and personal information from customers interviewed during on-site visit. AENOR confirms that this parameter has been monitored according to the monitoring plan stated in the revised PDD and no inconsistencies have been found between the information verified in situ and the distribution database /17-24/

  A third party was engaged to certify the number and wattage of ICLs collected. AENOR verified the reports available for Phase 1 /17/ and Phase 2 and Phase 3 /18/. The sampling methodology used in these reports is based on the Guidelines for sampling and surveys for CDM project activities and programme of activities, version 03.0. /33/.

  For Phase 1, ICLs with unreadable wattage were assigned a wattage proportional to the distribution of wattages in the bulbs with a wattage measurement. AENOR verified these figures and consider that they are correct and the emission reduction calculation is conservative. Please refer to “Component 1 Monitored PBL” in ERs calculation spreadsheet.

- **$N_{sample,s}$: Number of sampled CFLs during the post installation survey *s***

- Monitoring: Ex-post surveys are conducted: once in the first year of installation, and once every 3 years, or once for every 30% of elapsed rated lifetime (whichever is shorter)

  - 1st monitoring survey: April, 2008. Phase 1: 100

	○ 2nd monitoring survey: October, 2009 Phase 1: 100, Phase 2: 200. ○ 3rd monitoring survey: June, 2011. Phase 1: 110, Phase 2: 125, Phase 3: 120 ○ 4th monitoring survey: September, 2013. Phase 2: 125; Phase 3: 120 The data of each checked CFL is recorded on the survey questionnaire while the ex-post installation survey is conducted. One questionnaire is filled in per each sampled customer. The information from the questionnaire is afterwards entered into a survey database; this database is related to one monitoring interval. – Means of verification: Please see section E.6.3 and section D.4 of this verification report. – **$N_{OK,s}$: Number of sampled CFLs which are functional during the post installation surveys** – Monitoring: Ex-post surveys are conducted: once in the first year of installation, and once every 3 years, or once for every 30% of elapsed rated lifetime (whichever is shorter) ○ 1st monitoring survey: April, 2008. Phase 1: 84 ○ 2nd monitoring survey: October, 2009. Phase 1: 88; Phase 2: 160 ○ 3rd monitoring survey: June, 2011. Phase 1: 58; Phase 2: 74; Phase 3: 77 ○ 4th monitoring survey: September, 2013. Phase 2: 75; Phase 3: 75 The data of each checked CFL is recorded on the survey questionnaire while the ex-post installation survey is conducted. One questionnaire is filled in per each sampled customer. The information from the questionnaire is afterwards entered into a survey database; this database is related to one monitoring interval. – Means of verification: Please see section E.6.3 and section D.4 of this verification report. – **$LFR_{i,y}$: Lamp Failure Rate for equipment type *i* in year *y* (fraction)** – Monitoring: Ex-post surveys are conducted: once in the first year of installation, and once every 3 years, or once for every 30% of elapsed rated lifetime (whichever is shorter) ○ 1st monitoring survey: April, 2008. ○ 2nd monitoring survey: October, 2009. ○ 3rd monitoring survey: June, 2011. ○ 4th monitoring survey: September, 2013. AENOR verified that the Lamp failure rate is calculated according to the procedures stated in the revised PDD and the applied methodology. – Means of verification: Please see section E.6.3 and section D.4 All the parameters for achieving emission reduction calculation by the prescribed equations for baseline emissions, project emissions, leakage and emissions reduction have been listed in section D. of the MR in a complete manner. AENOR team verified the information flow (from data generation, aggregation, to recording, calculation and reporting) for these parameters including the values in the monitoring reports.
Findings	CL1, CAR3, CAR4, CAR5, CAR6
Conclusion	According to paragraphs 392 and 393 of VVS version 09.0, AENOR verification team confirms that:

	• The monitoring has been carried out in accordance with the monitoring plan in the revised PDD. • All parameters required by the monitoring plan have been measured / determined without material misstatements and in line with all applicable standards and relevant requirements.

E.6.3. Implementation of sampling plan

Means of verification

According to the applied methodology and the registered PDD, the following parameters were determined using sampling and survey approach:

- **$N_{sample,s:}$** Number of sampled CFLs during the post installation survey.
- **$N_{OK,s}$:** Number of sampled CFLs which are functional during the post installation surveys
- **$LFR_{i,y}$:** Lamp Failure Rate for equipment type i in year y (fraction)

The sampling objective was to determine the ex-post Lamp Failure Rate (LFR) for adjustment of the net electricity savings and emission reduction calculations. As per AMS-II.J version 3 (version that was applicable when the sampling design was carried out), the sampling size had to be determined by minimum 90% confidence interval and 10% maximum error margin; and the size of the sample had to be no less than 100.

Using the calculation method for a normal distribution, the sample size would have been 68, which is lower than the minimum size allowed by the applied methodology. Hence, the minimum size of the sample would be 100 for each population (phase in this case).

The calculation of the sample size was done assuming an “absolute” 10% maximum error margin. This interpretation of the statistical calculation is allowed by paragraph 11 of the Standard for sampling and surveys for CDM project activities version 4.1 that was in force at the time of the sampling design.

The statistical calculation was done following procedures outlined in technical literature due to the fact that there were no guidelines from UNFCCC at the moment of the PDD registration and the project implementation. AENOR considers the technical references used were adequate taking into account they are the same used to develop the future CDM Guideline: Sampling and surveys (eg. Cochran, W.E., 1977. Sampling Techniques).

AENOR was able to reproduce the calculation obtaining the same results.

Furthermore, AENOR verified that the target population is the distributed CFLs under Phase 1 through Phase 3. The sampling method was applied to each Phase separately. The number of households is determined by dividing the sample size by the number of CFLs distributed per household in each phase.

AENOR verified that multi-stage sampling was applied where clusters (first stage) corresponded to EWSA branches, which are located in various administrative entities called sectors and districts, and clusters were randomly selected. In the second stage, households were selected randomly, in each selected cluster (REG branch).

The collected data are described in the corresponding survey reports provided to the verification team /16//17//18/, and are summarized in the table below. The verification team checked the figures during the on-site visit by means of the review of the central database, household visits, and the handwritten records.

Survey	Sampling Frame	$N_{OK,s}$	$N_{sample,s}$	$LFR_{i,y}$

1st Survey April 2008	Phase 1 CFLs	84	100	0.160
2nd Survey October 2009	Phase 1 CFLs	88	100	0.120
	Phase 2 CFLs	160	200	0.200
3rd Survey June 2011	Phase 1 CFLs	58	110	0.473
	Phase 2 CFLs	74	125	0.408
	Phase 3 CFLs	77	120	0.358
4th Survey September 2013	Phase 2 CFLs	75	125	0.400
	Phase 3 CFLs	75	120	0.375

AENOR considers the procedure for sampling to be accurate, conservative and following the approved methodology AMS-II.J ver. 03 and the EB guidance for sampling that were in force at the time when the surveys were designed and carried out. AENOR was able to reproduce the calculations of the sample size, obtaining the same results.

The methodology requires confidence / precision of 90/10 for this parameter. The project proponent calculated the reliability of the different surveys to check whether the requirements are met. The results are as follows:

	1st Survey April 2008	**2nd Survey October 2009**	**3rd Survey June 2011**	**4th Survey September 2013**
Phase 1	6.02%	5.34%	7.82%	-
Phase 2	-	4.65%	7.23%	7.20%
Phase 3	-	-	7.20%	7.28%

The actual achieved confidence / precision obtained by AENOR (when reproducing the calculations) was the same than the indicated by the project proponent for each survey in the evidence /12/. Therefore, AENOR confirms that this requirement has been met for each of them.

AENOR verified the result of the calculation of confidence/precision following the Guideline: Sampling and surveys for CDM project activities and programmes of activities. Ver. 03.0 (EB 75, Annex 8) /33/. As in the case of the calculation of the sample number, the reliability has been calculated taking into account the "absolute" 10% maximum error margin. This interpretation of the statistical

	calculation is allowed by paragraph 11 of the Standard for sampling and surveys for CDM project activities version 4.1.
Findings	CL1, CL3, CAR1, CAR3, CAR4, CAR5
Conclusion	AENOR confirms that the sampling & survey method used to monitor component 1 complies with the procedures stated in the applied methodology at the time of sampling & survey design (AMS-II.J version 3), and it is also in line with the Standard for Sampling and surveys for CDM project activities and programme of activities version 04.1 that was in force at the time sampling & survey design. AENOR confirms that the sample sizes have been properly calculated, the samples were randomly selected to be representative of the population, and the required confidence/precision was properly met.

E.7. Compliance with the calibration frequency requirements for measuring instruments

Means of verification	Not applicable since monitoring was carried out by sampling approach, and there is no equipment to be calibrated in the project activity according to the revised PDD.
Findings	N/A
Conclusion	N/A

E.8. Assessment of data and calculation of emission reductions or net removals

E.8.1. Calculation of baseline GHG emissions or baseline net GHG removals by sinks

Means of verification	According to the revised PDD and as per AMS-II.J (version 7), the emissions reduction generated by both components of the project activity in year y is calculated directly as follows: $ERy = NESy * EF_{CO2,ELEC,y}$ Where: - $EF_{CO2,ELEC,y}$ = Emission factor in year y calculated in accordance with the provisions in AMS I.D (tCO2/MWh) - ERy = Emission reductions in year y (tCO2e) $NESy = \sum Q_{PJ,i} * (1 – LFR_{i,y}) * ES_i * NTG/ (1 - TD_y)$ $ESi = (P_{i,BL} – P_{i,PJ}) * O_i * 365/1000$ Where: - NES_y = Net electricity saved in year y (kWh) - $QP_{J,i}$ = Number (quantity) of pieces of equipment of type i distributed under the project activity (units) - i = Counter for equipment type - ES_i = Estimated annual electricity savings for equipment of type i, for the relevant technology (kWh) - $LFR_{i,y}$ = Lamp Failure Rate for equipment type i in year y (fraction) - TDy = Average annual technical losses (transmission and distribution) in year y - NTG = Net-to-gross adjustment factor, a default value of 0.95 to be used unless a more appropriate value based on a lighting use survey from the

same region and not older than 2 years is available

- $P_{i, BL}$ = Rated power of the baseline lighting devices of the group of "i" lighting devices (Watts) or 75W if the baseline lighting device is a 100W ICL and the project lighting device a 20W CFL
- $P_{i, PJ}$ = Rated power of the project lighting devices of the group of "i" lighting devices (Watts)
- Oi = Average daily operating hours of the lighting devices replaced by the group of "i" lighting devices

The Lamp Failure Rate (LFRy), the % of lamps that have failed, is calculated based on the results of the ex-post surveys as follows: $LFRy = 1 – (N_{OK,x} / N_{Sample,s})$

The ERs achieved by the project during the current monitoring period is summarized in the table below:

		Aug-Dec 2012	2013	Jan-Mar 2014	**Total**
Component 1	*Energy savings (MWh)*	*3,376*	*8,053*	*1,985*	*13,414*
	ERs	**2,205**	**5,261**	**1,297**	**8,763**
Component 2	*Energy savings (MWh)*	*2,262*	*5,360*	*1,306*	*8,929*
	ERs	**1,477**	**3,499**	**853**	**5,829**
Total project	*Energy savings (MWh)*	*5,639*	*13,413*	*3,291*	*22,343*
	ERs	**3,682**	**8,760**	**2,150**	**14,592**

AENOR has reproduced the calculation of emission reductions made by the PP for both components in the ERs spreadsheets and the same results have been obtained. Therefore the calculation is deemed to be appropriate and consistent with the evidence provided and cross-checked.

Findings

CAR6

Conclusion

According to paragraph 402 of VVS version 09.0, AENOR verification team confirms that:

- A complete set of data for the monitoring period is available.
- Information on the baseline GHG emission calculation provided in the monitoring report has been cross-checked with other sources.
- Calculations of baseline emissions have been carried out in accordance with the formulae and methods described in the monitoring plan and the applied methodology.
- There are no assumptions in emission calculations.
- Appropriate emission factor, default values and other reference values have been correctly applied.
- No errors, miscalculations, omissions, misstatements or incomplete

	information has been identified.

E.8.2. Calculation of project GHG emissions or actual net GHG removals by sinks

Means of verification	N/A
Findings	N/A
Conclusion	N/A

E.8.3. Calculation of leakage GHG emissions

Means of verification	N/A
Findings	N/A
Conclusion	N/A

E.8.4. Summary of calculation of GHG emission reductions or net anthropogenic GHG removals by sinks

Means of verification	The verification team has checked if the MR includes a summary table of the emission reductions calculation specifying separately: - Total baseline emissions - Total project emissions - Total leakage - Total emission reductions. The auditing team has reproduced the ERs calculation made by the PP in the spreadsheets and the same results have been obtained. Therefore the calculation is deemed to be appropriate and consistent with the evidence provided and cross-checked by AENOR.
Findings	No findings were raised regarding this issue.
Conclusion	According to paragraph 402 of VVS version 09.0, AENOR verification team confirms that: - A complete set of data for the monitoring period is available. - Information provided in the monitoring report has been cross-checked with other sources. - Calculations of baseline emissions, and project activity emissions and leakage, as appropriate, have been carried out in accordance with the formulae and methods described in the monitoring plan and the applied methodology.

E.8.5. Comparison of actual GHG emission reductions or net anthropogenic GHG removals by sinks with estimates in registered PDD

Means of verification	The comparison of actual GHG emission reductions with estimates in revised PDD has been checked and re-calculated by the verification team. Based on the above assessment, the emission reduction during the monitoring period 01/08/2012 – 31/03/2014 is verified to be 14,592 tCO_{2e}. The value of estimated emission reductions during the same period, in the revised PDD is 45,714 tCO2e.
Findings	No CARs/CLs/FARs raised in this section.

Conclusion	According to paragraph 256 of CDM Project Standard version 09.0, AENOR verification team confirms that: A comparison of actual GHG emission reductions or net anthropogenic GHG removal of the project activity achieved during this monitoring period with the estimates in the revised PDD has been provided. The verification team considers that the calculation of the comparison is correct.

E.8.6. Remarks on difference from estimated value in registered PDD

Means of verification	On the basis of the above comparison of actual values of the monitoring period with the estimations in the revised PDD the verification team has checked whether an appropriate explanation is included in the MR.
Findings	The verified emission reductions are lower than the estimated value for this period in the revised PDD. No CARs/CLs/FARs raised in this section.
Conclusion	Not applicable since the actual GHG emission reductions are lower than the estimate in the revised PDD.

E.8.7. Actual GHG emission reductions or net anthropogenic GHG removals by sinks during the first commitment period and the period from 1 January 2013 onwards

Means of verification	The verification team has checked section E.4 of the MR and the ER calculation Spreadsheet.
Findings	No CARs/CLs/FARs raised in this section.
Conclusion	AENOR confirms the emission reductions achieved during this monitoring period were generated: - GHG emission reductions or net GHG removals by sinks reported up to 31 December 2012: 3,682 tCO_{2e} - GHG emission reductions or net GHG removals by sinks reported from 1 January 2013 onwards: 10,910 tCO2e

SECTION F. Internal quality control

>>

Following the completion of the assessment process by the verification team, all documentation undergoes an internal quality control through a technical review before the request for Issuance of CERs is submitted. The Technical reviewer is a qualified member of AENOR, independent from the team that carried out the verification of the project activity. The technical reviewer or the team appointed for the technical review is qualified in the technical area(s) and sectoral scope(s) of the project activity.

SECTION G. Verification opinion

>>

AENOR has performed the verification of the emission reductions of the “Rwanda Electrogaz Compact Fluorescent Lamp (CFL) distribution project” for the period from 01/08/2012 – 31/03/2014.

The verification approach was based on the requirements as defined under the Kyoto Protocol, Marrakech accord, Montreal COP/MOP 1, Nairobi COP/MOP 2 as well as those defined by the CDM Executive Board.

AENOR planned and performed the verification to obtain the information, explanations and evidence that we considered necessary to provide sufficient evidence for us to give reasonable assurance that the amount of GHG emission reductions for the reporting period, prepared on the basis of both the revised monitoring plan and the final monitoring report, are fairly stated.

AENOR conducted our verification with regard to the monitoring plan included in the revised Project Design Document, and the applied methodology as registered for the project. This assessment included:

- Collection of evidence supporting the reported data
- Checking whether the provisions of the monitoring plan, were consistently and appropriately applied.

AENOR has verified whether the information included in the final monitoring report is correct and that the emissions reductions achieved have been determined correctly.

In AENOR's opinion, GHG emissions reported for the project in the final monitoring report are fairly stated.

The GHG emission reductions were calculated without material errors, omissions or misstatements in a conservative and appropriate manner according to the approved methodology AMS-II.J. Version 7 and the monitoring plan and formulae provided in the revised PDD.

SECTION H. Certification statement

>>

AENOR is able to certify that the emission reductions achieved by the "Rwanda Electrogaz Compact Fluorescent Lamp (CFL) distribution project" for the period from 01/08/2012 – 31/03/2014 amount to 14,592 $tCO_{2.}$

Madrid, March 30th, 2017.

Alfonso Medrano Gutiérrez
Team Leader

José Magro González
Authorized person

Appendix 1. Abbreviations

Abbreviations	Full texts
AENOR	AENOR Internacional S.A.U.
AMS-II.J	“Demand side activities for efficient lighting technologies” (version 07)
CAR	Corrective action request
CDM	Clean development mechanism
CDM-EB	CDM Executive Board
CER	Certified emission reduction
CL	Clarification request
CMP	Conference of the Parties serving as the Meeting of the Parties to the Kyoto Protocol
CO_2	Carbon dioxide
CO_2e	Carbon dioxide equivalent
DNA	Designated national authority
DOE	Designated operational entity
ER	Emission reduction
FAR	Forward action request
GHG	Greenhouse gas(es)
IBRD	International Bank for Reconstruction and Development as Trustee of the Prototype Carbon Fund
IPCC	Intergovernmental Panel on Climate Change
MoV	Means of verification
MP	Monitoring Plan
MR	Monitoring report
PCP	Clean Development Mechanism Project Cycle Procedure (Version 09.0)
PDD	Project Design Document
PP	Project participants
PS	Clean Development Mechanism Project Standard (Version 09.0)
tC	Carbon tonnes
tCO_2eq	Carbon dioxide equivalent tonnes
UNFCCC	United Nations Framework Convention on Climate Change
VVS	CDM Validation and Verification Standard version 09.0

Appendix 2. Competence of team members and technical reviewers

Necessary skills and competences to undertake the verification are confirmed by the qualification certificate of all team involved in the process.

CERTIFICATE OF QUALIFICATION

Subject: Verification and Technical Review Team for "Rwanda Electrogaz Compact Fluorescent Lamp (CFL) distribution project"

Madrid, 24/03/2017

Hereby I confirm the following records of qualification, according with AENOR internal instruction "Validation, Verification and Certification of Clean Development Mechanism (CDM) project activities" IE-DTC-039, and in relation with the verification process of the above mentioned project activity:

Name: Alfonso MEDRANO GUTIERREZ

CDM Team Leader: Yes

CDM Verifier: Yes

CDM Technical Reviewer: N/A

External Technical Expert: N/A

Technical areas related with the project activity:

T.A 3.1 Energy demand

Mª Carmen Gonzalez
Authorised person

CERTIFICATE OF QUALIFICATION

Subject: Verification and Technical Review Team for “Rwanda Electrogaz Compact Fluorescent Lamp (CFL) distribution project”

Madrid, 24/03/2017

Hereby I confirm the following records of qualification, according with AENOR internal instruction “Validation, Verification and Certification of Clean Development Mechanism (CDM) project activities” IE-DTC-039, and in relation with the verification process of the above mentioned project activity:

Name: Maria Mercedes GARCÍA MADERO

CDM Team Leader: N/A

CDM Verifier: Yes

CDM Technical Reviewer: N/A

External Technical Expert: N/A

Technical areas related with the project activity:
T.A 3.1 Energy demand

Mª Carmen Gonzalez
Authorised person

CERTIFICATE OF QUALIFICATION

Subject: Verification and Technical Review Team for “Rwanda Electrogaz Compact Fluorescent Lamp (CFL) distribution project”

Madrid, 24/03/2017

Hereby I confirm the following records of qualification, according with AENOR internal instruction “Validation, Verification and Certification of Clean Development Mechanism (CDM) project activities” IE-DTC-039, and in relation with the verification process of the above mentioned project activity:

Name: Marcelino PELLITERO MARTÍNEZ

CDM Team Leader: N/A

CDM Verifier: N/A

CDM Technical Reviewer: Yes

External Technical Expert: N/A

Technical areas related with the project activity:

T.A 3.1 Energy demand

Mª Carmen Gonzalez
Authorised person

Appendix 3. Documents reviewed or referenced

No.	Author	Title	References to the document	Provider
1	PP	PDD revised. Version 14 (27/10/2016)		UNFCCC Website
2	PP	AMS-II.J: “Demand-side activities for efficient lighting technologies”, version 07		UNFCCC Website
3	PP	Monitoring report, version 1 dated on 03/04/2015.		PP
4	PP	Monitoring report, version 4 dated on 23/03/2017.		PP
5	AENOR	Validation, Verification and Certification of CDM Project Activities (IE-DTC-039)		AENOR
6	UNFCCC	Clean Development Mechanism Validation and Verification Standard. Version 09.0.		UNFCCC Website
7	CDM-EB	Clean Development Mechanism Project Standard. Version 09.0		UNFCCC Website
8	CDM-EB	Clean Development Mechanism Project Cycle Procedure. Version 09.0		UNFCCC Website
9	AENOR	Validation Opinion on PRC dated on 28/10/2016		UNFCCC Website
10	PP	ERs_Calculation_Mar 2017		PP
11	CDM-EB	Standard for Sampling and surveys for CDM project activities and programme of activities version 05.0		UNFCCC Website
12	PP	Absolute Precision Calculation		PP
13	PP	4th ex-post Survey Database_Sep 2013		PP
14	PP	Final Report post installation survey		PP
15	PP	Memo 02.10.2013_EXPOST-SURVEY_Methodology_Finalised		PP
16	PP	3rd_Post_Installation_EWSA_CFLs_SurveyReport_Sept2011		PP
17	PP	ICL_Estimation_of_Number_ThirdPartyReport_Phase1		PP
18	PP	ICL-Estimation 3rd Party Report Phases2&3_04.09.2013		PP
19	PP	CFL_DistributionDatabase_Component1_Phase1_rev		PP
20	PP	CFL_DistributionDatabase_Component1_Phase2		PP

No.	Author	Title	References to the document	Provider
21	PP	CFL_DistributionDatabase_Component1_Phase3		PP
22	PP	CFL_DistributionDatabase_Component2_Phase3		PP
23	PP	CFL_TestReport&Specifications_Phase2_with EWSA		PP
24	PP	CFL_TestReport&Specifications_Phase3		PP
25	PP	Questionnaire ex-post surveys		PP
26	PP	CFL_TestReport&Specifications_Phase1		PP
27	PP	Confirmation Letter_CFLs Distribution 3Phases		PP
28	CDM-EB	Guideline: Application of materiality in verifications version 02.0		UNFCCC Website
29	CDM-EB	Standard for sampling and surveys for CDM project activities and programme of activities (ver. 04.1).		UNFCCC Website
30	CDM-EB	Guidelines for sampling and surveys for CDM project activities and programme of activities, version 04.0		UNFCCC Website
31	PP	ATTANDANCE LIST OF ENUMERATORS 2011		PP
32	PP	ATTANDANCE LIST OF ENUMERATORS 2013		PP
33	CDM-EB	Guidelines for sampling and surveys for CDM project activities and programme of activities, version 03.0		PP

Appendix 4. Clarification requests, corrective action requests and forward action requests

Table 1. Remaining FAR from validation and/or previous verification

FAR ID	01	**Section no.**	n/a	**Date:** 14/05/2015
Description of FAR				
A FAR was raised in the previous verification process. The FAR raised said literally: "It shall be assessed whether the amount of installed CFL that are still functional is monitored by means of a different survey for each component of the project, or with a unique survey for both components. It shall be assessed, in case only one survey is developed, if this situation could affect the emission reduction calculation.				
Project participant response				**Date:** 23/03/2017

A PRC to the PDD was requested and approved by the EB as of December 2, 2016. In the approved revised PDD, both component 1 and component 2 are monitored according to the requirements of AMS-II. J version 7 (instead of AMS-II. C version 11 for component 2). This is in line with the recommendation by SSCWG in its 50th meeting. Thus, no annual checks of the CFLs that were operating in 2012, 2013 and 2014 are required.
Documentation provided by project participant

DOE assessment	**Date:** 24/03/2017
AENOR confirms that PRC were approved by the EB as of December 2, 2016. According to the revised PDD, both component 1 and component 2 are now monitored according to the requirements of AMS-II. J version 7 and no annual checks of the CFLs that were operating in 2012, 2013 and 2014 under component 2 are required. Parameters monitored using the annual checks for component 2 are now applying default values provided by methodology AMS-II. J version 7. **FAR01 is closed.**	

Table 2. CL from this verification

CL ID	01	**Section no.**	E.6.2	**Date:** 14/05/2015
Description of CL				
The results obtained in the 3rd ex-post monitoring survey: June, 2011, shall be provided to the DOE Team.				
Project participant response				**Date:** 23/03/2017
3rd ex-post monitoring survey June 2011 report is provided to the DOE.				
Documentation provided by project participant				
3rd_Post_Installation_EWSA_CFLs_SurveyReport_Sept2011				
DOE assessment				**Date:** 24/03/2017
Evidence provided is deemed to be appropriate. **CL1 is solved**				

CL ID	02	**Section no.**	E.6	**Date:** 14/05/2015
Description of CL				
Roles and positions of each person in the GHG management process are not clearly defined in the monitoring report, from raw data generation to submission of the final data.				
Project participant response				**Date:** 23/03/2017
The roles and responsibilities of each person in the GHG management process have been incorporated. For further information please see Section C of the latest version of the MR.				
Documentation provided by project participant				
Monitoring Report version 4				

DOE assessment	Date: 24/03/2017
Roles and responsibilities have been properly described in the MR. **CL2 is solved.**	

CL ID	03	Section no.	E.6	Date: 14/05/2015
Description of CL				
Evidence to demonstrate that the personnel who carried out the monitoring surveys were properly trained shall be provided to the DOE team.				
Project participant response				**Date:** 23/03/2017
Evidence of training is provided to the DOE.				
Documentation provided by project participant				
09.10.2013_Questionnaire EWSA version kinyarwanda_Final 2013 *EWSA TRAINING MANUAL* *Questionnaire corrigé FRANCAIS 2013* *QUESTIONNAIRE D'ENQUETE SUR LES LAMPES ECONOMIQUES VERSION.[1] A Manelle 2011* ATTANDANCE LIST OF ENUMERATORS 2011 ATTANDANCE LIST OF ENUMERATORS 2013				
DOE assessment				**Date:** 24/03/2017
Evidence provided is deemed to be appropriate. **CL3 is solved.**				

Table 3. CAR from this verification

CAR ID	01	Section no.	E.3	Date: 14/05/2015
Description of CAR				
Monitoring of component 2 has not been carried out according to the applied methodology (AMS-II.C, version 11, paragraph 14) because no annual checks have been carried out to monitor the CFLs that were still operating in 2012, 2013 and 2014. A temporary deviation from the registered monitoring plan/applied methodology has been included in the MR version 1, but no justification or proposal of the value to be applied in the ERs calculation for non-metered lamps has been described in the monitoring report. Furthermore, according to the Appendix 1 of the CDM project standard version 09.0, since the deviation is related to the baseline emissions, Prior Approval of the EB shall be requested by the PP unless the parameters not properly monitored are considered as zero.				
Project participant response				**Date:** 23/03/2017

A PRC to the PDD was requested and approved by the EB as of December 2, 2016. In the approved revised PDD, both component 1 and component 2 are monitored according to the requirements of AMS-II. J version 7 (instead of AMS-II. C version 11 for component 2). This is in line with the recommendation by SSCWG in its 50th meeting. Thus, no annual checks of the CFLs that were operating in 2012, 2013 and 2014 are required.
Documentation provided by project participant

DOE assessment	**Date:** 24/03/2017
AENOR confirms that PRC were approved by the EB as of December 2, 2016. According to the revised PDD, both component 1 and component 2 are now monitored according to the requirements of AMS-II. J version 7 and no annual checks of the CFLs that were operating in 2012, 2013 and 2014 are required. **CAR1 is solved**	

CAR ID	02	**Section no.**	E.1	**Date:** 14/05/2015

Description of CAR

The monitoring report has not been completed according to the "Instructions for filling out the monitoring report form version 05.1":

- Section A.4: The MR does not refer to the UNFCCC CDM website for the exact reference of the applied methodologies, tools and standardized baselines.
- Section A.6: It shall be indicated in the MR whether the person(s)/entity(ies) who has completed the MR form is(are) also a project participant(s).
- Section B.2.1: The MR shall Include the reasons for the deviation(s), how it deviates from the monitoring plan, applied methodology(ies) and/or applied standardized baseline, the duration for which the deviation(s) is(are) applicable and justification on the conservativeness of the approach. (Please see CAR1).
- Section D.1: Parameter ly "Average annual technical grid losses" (component 2) has not been included as a parameter fixed ex ante as it is required by the applied methodology AMS II.C version 11.
- Section D.2: Parameter $O_{k,d,m}$ "Operating hours of the distributed CFL k on day d as given by valid meter m" (component 2) has not been included as a parameter to be monitored as it is required by the applied methodology AMS II.C version 11 and the registered PDD.

Project participant response	**Date:** 23/03/2017

The monitoring report form version 05.1 is now used:

- Section A.4 has been updated accordingly.
- Section A.6 already specifies that the International Bank for Reconstruction and Development as Trustee of the Community Development Carbon Fund, is a project participant.
- Section B2.1: The reason for the deviation are now provided in the MR. See also explanation for CAR#1 above.
- Section D.1: A permanent change from the registered monitoring plan has been requested and approved by the CDM EB on 02/12/2016. The MR has been updated in line with the approved revised monitoring plan in which the Average annual technical grid losses in year y (TDy) was adopted.
- Section D.2: A permanent change from the registered monitoring plan has been requested and approved by the CDM EB on 02/12/2016, to allow for the use the default value of 3.5 hours per day for the parameter "Oi – Operating hours of the distributed CFLs" instead of a monitoring value, in accordance with methodology AMS II.J version 07. As a result, parameter $O_{k,d,m}$ has deleted in the updated MR in line with the approved revised PDD.

Documentation provided by project participant

Monitoring Report version 4

DOE assessment	**Date:** 24/03/2017

The latest version of the MR has been properly completed according to the "Instructions for filling out the monitoring report form version 05.1".

CAR2 is solved.

CAR ID	03	Section no.	E.6.2	Date: 14/05/2015
Description of CAR				
Some CFLs distributed under phase 1 in 2007 are not traceable with the data base because the identification number on the lamp is no longer visible due to time passing and therefore it cannot be ensured that lamps distributed in phase 1 are part of the project activity.				
Project participant response				**Date:** 23/03/2017
Emissions reductions corresponding to the CFLs distributed under Phase 1 will not be claimed for this second monitoring period. The ER calculation spreadsheet has been updated by removing the ERs corresponding to CFL distributed under Phase 1. Please refer to excel file named *"ERs Calculation_170323.xlsx"*				
Documentation provided by project participant				
"ERs Calculation_170323.xlsx"				
DOE assessment				**Date:** 24/03/2017
AENOR confirms that CFLs distributed under Phase 1 are not claimed for this second monitoring period. AENOR confirms that this approach is conservative, because in this way the CFLs distributed under phase 1 that were not traceable with the database are not included in the monitoring and therefore not included in the ERs calculation. **CAR3 is solved.**				

CAR ID	04	Section no.	E.6.3	Date: 14/05/2015
Description of CAR				
Monitoring results of the 4th ex post monitoring survey carried out in September 2013 are not detailed in the corresponding section of the Monitoring Report.				
Project participant response				**Date:** 23/03/2017
Results from the 4th ex-post survey conducted in September 2013 have been incorporated in the table for parameter $N_{OK,S}$. Please refer to section D.3 of the updated MR.				
Documentation provided by project participant				
Monitoring Report version 4				
DOE assessment				**Date:** 24/03/2017
The results from the 4th ex-post survey conducted in September 2013 have been properly included in the MR. **CAR4 is solved.**				

CAR ID	05	Section no.	E.6.2	Date: 14/05/2015
Description of CAR				
Parameter $\mathbf{O_{k,d,m}}$ *"Operating hours of the distributed CFL k on day d as given by valid meter m"* has not been monitored during the current monitoring period. In order to solve this issue, a proposal of Permanent Changes for the Monitoring Plan has been included in section B.2.5 of the monitoring report, but no revised PDD has been provided to the DOE team.				
Project participant response				**Date:** 23/03/2017
A permanent change from the registered monitoring plan was requested and approved by the CDM EB on 02/12/2016, to allow for the use the default value of 3.5 hours per day for the parameter "Oi – Operating hours of the distributed CFLs" instead of a monitoring value, in accordance with methodology AMS II.J version 07.				
Documentation provided by project participant				
DOE assessment				**Date:** 24/03/2017
AENOR confirms that PRC were approved by the CDM EB on 02/12/2016 and a default value of 3.5 hours per day for the parameter "Oi – Operating hours of the distributed CFLs" is applied in accordance with methodology AMS II.J version 07. **CAR5 is solved.**				

CAR ID	06	Section no.	E.8.1	Date: 14/05/2015
Description of CAR				
Calculation of Lamp Failure Rate is not traceable in the ERs spreadsheet.				
Project participant response				**Date:** 23/03/2017
The formula to calculate the Lamp Failure Rate (LFR) is added. Please refer to excel spreadsheet named "ERs Calculation_170323.xlsx"				
Documentation provided by project participant				
"ERs Calculation_170323.xlsx"				
DOE assessment				**Date:** 24/03/2017
Calculation Lamp Failure Rate is traceable in the latest version of the MR and annexed spreadsheet. **CAR06 is closed.**				

Document information

Version	*Date*	*Description*
01.0	23 March 2015	Initial publication.

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Business Function: Issuance
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