

CDM VERIFICATION REPORT

- 1st Periodic Verification-

WORLD BANK - IBRD

PROJECT: "Rwanda Electrogaz Compact Fluorescent Lamp (CFL)
distribution project"

UNFCCC REFERENCE NUMBER: 3404

MONITORING PERIOD:

FROM 30/05/2010 TO 31/07/2012

AENOR Reference nº: 2012/0018/CDM/15

"1st" PERIODIC VERIFICATION

"Rwanda Electrogaz Compact Fluorescent Lamp (CFL) distribution project"

Verification Report:	AENOR Reference n°:		Version of this document:		Date of this rev.:	
	2012/0018/CDM/15		03		18/06/2014	
Project:	Title:		Registration date:		UNFCCC Reference	
	Rwanda Electrogaz Compact Fluorescent Lamp (CFL) distribution project		30/05/2010		3404	
Project Participant(s):	Host Party:		Other involved Parties:			
	Rwanda		Netherlands Germany Austria Denmark Sweden Italy Belgium Spain Finland Norway Switzerland Japan Luxembourg International Bank for Reconstruction and Development (IBRD) as Trustee of the Community Development Carbon Fund (CDCF)			
Applied methodology/ies:	Title:		Code:	N° revision	Scope:	
	Demand-side activities for efficient lighting technologies		AMS-II.].	ver. 3	3	
	Demand-side energy efficiency activities for specific technologies		AMS-II.C.	ver. 11	3	
Monitoring report:	Title:		Draft version:		Final version:	
	Rwanda Electrogaz Compact Fluorescent Lamp (CFL) distribution project		1		5	
Emission reductions:	Monitoring period:	Verified amount		As per draft MR (ver. 1)		As per PDD:
	30/05/2010 – 31/07/2012	23,491		22,057		62,934
Previous versions of this document:			Version:		Date:	
			1		16/10/2013	
			2		19/12/2013	
			3			

<p>Summary of verification:</p>	<p>The Spanish Association for Standardization and Certification (AENOR) has performed the verification of the emission reduction of the project "Rwanda Electrogaz Compact Fluorescent Lamp (CFL) distribution project" (Registration Ref. N° 3404) from 30 May 2010 until 31 July 2012</p> <p>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.</p> <p>The project activity, implemented by the national public electricity utility, EWSA, is designed with two components:</p> <p><u>Component 1:</u> 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.</p> <p><u>Component 2:</u> As part of the national electrification program, newly connected EWSA 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</p> <p>The CFL distribution project is implemented through 4 phases starting mid-2007. Thus far 3 phases of distribution have been completed with distribution of 360,923 bulbs. As per the PDD, the total number of CFLs to be distributed in the 4 phases is 800,000.</p> <p>A risk based verification approach was employed to identify key risks to emission reduction estimations.</p> <p>The quality assurance of the data used in the calculation of the emission reduction was verified during the on-site visit. The implementation of the project was also verified and the proper use of the meters and procedure controls were tested.</p> <p>Calibration evidence allowed the verification team to verify that meters worked correctly during the monitoring period.</p> <p>The project is implemented in accordance with the registered 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 methodologies AMS-II.J. ver.3, and AMS-II.C. ver.11. Therefore, in AENOR's opinion, the GHG emission reductions reported in the latest version of the Monitoring Report are correct.</p> <p>All corrective action requests (CAR) and clarification actions (CL) have been checked by the verification team and have been adequately resolved.</p> <p>Based on the information checked and evaluated, AENOR is able to certify that the emissions reductions from the "Rwanda Electrogaz Compact Fluorescent Lamp (CFL) distribution project" during the period from 30 May 2010 until 31 July 2012 amount to 23,491 tonnes of CO₂ equivalent.</p>
<p>Report prepared by:</p>	<p>Climate Change Unit. AENOR</p>

Abbreviations

AMS.II.C	Demand-side energy-efficiency activities for specific technologies
AMS.II.J	Demand-side activities for efficient lighting technologies
BM	Build Margin
CAR	Corrective Action Requested
CL	Clarification
CDM	Clean Development Mechanism
CER	Certified Emission Reductions
CFL	Compact Fluorescent Lamp
DECISION 3/CMP.1	Modalities and Procedures for a Clean Development Mechanism as Defined in Article 12 of the Kyoto Protocol
DNA	Designated National Authority
EB	Executive Board of the CDM of the Kyoto Protocol
EIA	Environmental Impact Assessment
EWSA	Energy, Water and Sanitation Authority (Formerly RECO RWASCO)
GHG	Greenhouse Gasses
GWh	Giga Watt hour
IPCC	Intergovernmental Panel on Climate Change
IBRD	International Bank for Reconstruction and Development
MP	Monitoring Plan
MWh	Mega Watt hour
OM	Operating Margin
PDD	Project Design Document
RECO-RWASCO	Rwandan Electricity Corporation - Rwanda Water and Sewerage Corporation (Formerly Electrogaz)
tC	Carbon tones
TJ	Tera Joules
Tool	Tool for the calculation of the emission factor of the electricity system
Additionality tool	Tool for the demonstration and assessment of the additionality
UNFCCC	United Nations Framework Convention on Climate Change
VVS	Validation and Verification Standard

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1 INTRODUCTION

The International Bank for Reconstruction and Development (IBRD) acting as Trustee of the Community Development Carbon Fund (CDCF), has commissioned AENOR to carry out the verification and certification of emission reductions reported for the “Rwanda Electrogaz Compact Fluorescent Lamp (CFL) distribution project” (CDM registration number 3404) for the period from 30 May 2010 until 31 July 2012. This report contains the findings from the verification and a certification statement for the certified emission reductions.

A first monitoring report (ver. 1) was made publicly available at the UNFCCC website on 11 December 2012. This monitoring report was published taking into account a monitoring period from 30/05/2010 to 31/05/2012. As consequence of a CAR raised in relation to the implementation of the monitoring plan (please refer to CAR 3), a new monitoring report was prepared with a new monitoring period. The new monitoring period was communicated to the EB and it is from 30/05/2010 to 31/07/2012.

1.1 Objective

According to the Modalities and Procedures for a CDM (Decision 3/CMP1, paragraph 61) the purpose of the verification is the periodic independent review and ex-post determination by the DOE of the monitored reductions in anthropogenic emissions by sources of GHG that have occurred as a result of a registered CDM project activity during the verification period.

Certification is the written assurance by the DOE that, during a specified time period, a project activity achieved the reductions in anthropogenic emissions by sources of greenhouse gases as verified.

1.2 Scope

The verification, such 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 registered PDD and that all physical features (technology, project equipment, and monitoring and metering equipment) of the project are in place. Therefore, it is necessary to:
 - Interview relevant personnel to confirm that the operational and data collection procedures are implemented in accordance with the approved monitoring plan.
 - Check the monitoring equipment including calibration performance and observations of monitoring practices against the requirements of the registered 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 and other supporting documents provided are complete, 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 revised monitoring plan.
 - Review the revised 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 log books, inventories, purchase records or similar data sources.
 - A review of calculations and assumptions made in determining the GHG data and emission reductions
 - A review of the project documentation provided by the project participant to check that 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.
 - 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 participants of any concerns related to the project's activity and operation conformance with the registered project design document. Project participants shall address the concerns and supply additional relevant information.
6. Provide a verification report to the project participants, 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), which is in turn based on the CDM Validation and Verification Standard, 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.

1.3 Description of the Project Activity

Host Country:	Rwanda
Title of project activity:	Rwanda Electrogaz Compact Fluorescent Lamp (CFL) distribution project
UNFCCC registration No:	3404

Project Participants:

- Rwanda (Host): Energy, Water and Sanitation Authority (EWSA)

- 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 Naturgas 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.;
- Luxemburg: Ministry of Sustainable Development and Infrastructure.
- International Bank for Reconstruction and Development (IBRD) as Trustee of the Community Development Carbon Fund (CDCF)

Project participant which hires AENORs verification services: International Bank for Reconstruction and Development ("IBRD"). The World Bank Group.

1818H St – Washington, DC – USA

IBRD-carbonfinance@worldbank.org

Location of the project activity: Country wide
 Project's crediting period: 30 May 2010 to 29 May 2020 (fixed)
 Verification period: 30 May 2010 to 31 July 2012.
 Project starting date: 10 January 2007

The validation and previous verifications are summarized below:

Process	DOE	Crediting period	Date	Amount of CERs
Registration	AENOR	30 May 2010 to 29 May 2020	30 May 2010	23,858 /year

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 EWSA, the name of this entity is EWSA (Energy, Water and Sanitation Authority), according to Law of Rwanda no 43/2000 of 07/12/2010. Prior to this date the name was RECO RWASCO. Prior to 08/2009, RECO - RWASCO was officially named Electrogaz. The change does not impact project legal terms and implementation. For coherence in this document, only EWSA is used in the MR to refer to the project entity, unless

there is a historical or legal reason to use an earlier name. The MOC for the change of name has been submitted on September 27, 2012.

The project 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.

This component follows the AMS-II.] ver.03 methodology.

Component 2: As part of the national electrification program, newly connected EWSA 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.

This component follows the AMS-II.C ver.11 methodology.

The CFL distribution project is implemented through 4 phases starting mid-2007. Thus far 3 phases of distribution have been completed with distribution of 360,923 bulbs. As per the PDD, the total number of CFLs to be distributed in the 4 phases is 800,000.

2 METHODOLOGY

The verification has assessed the quality of the information, including:

- A desk review of the relevant information of all issues that constitute the basis for emission reductions from the project.
- On-site inspections; a review of performance records, interviews with project participants, collection of measurements, observation of established practices and testing of the accuracy of monitoring equipment.
- A review of additional data from other sources relevant to the project activity's resulting emission reductions.

Special focus is given on:

- The proper implementation of the project as described in the registered PDD.
- The data collection system, verifying that it meets the requirements of the revised monitoring plan as per the applied methodologies. Whether sufficient evidence is available, both in terms of frequency (time period between evidence) and in covering the full monitoring period. The source and nature of the evidence (external or internal, oral or documented).
- The available information from sources other than that used in the final version of the monitoring report were cross-checked against the data in the monitoring report to confirm that the stated figures included in it are correct.

The verification of the emission reductions has assessed all factors and issues that constitute the basis for emission reductions from the project, as detailed in the Verification Protocol, included in this report as Annex 1.

2.1 Verification Steps

Preparations: From 10 December 2012 to 13 January 2013

On-site verification: From 14 to 18 January 2013

Reporting: From 7 October 2013 to 18 June 2014

2.1.1 Appointment of team members and technical reviewers

The list of involved personnel and the qualification status are summarized in the table below:

Name	Qualification	
	Position in the team	Technical areas
Pablo TABOADA UTRERA	CHIEF VERIFIER	
José Luis FUENTES PÉREZ	VERIFIER	
Mercedes GARCÍA MADERO	VERIFIER	TA 3.1 Energy demand
Raquel DEL CASTILLO	VERIFIER TRAINEE	
José Antonio GESTO	TECHNICAL REVIEWER	TA 3.1 Energy demand

Marcelino PELLITERO	TECHNICAL REVIEWER	TA 3.1 Energy demand
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Technical areas (TA) mentioned above correspond to the following:

TA code	Technical area
TA 1.1	Thermal energy generation from fossil fuels and biomass including thermal electricity from solar (COMPLEX);
TA 1.2	Energy generation from renewable energy sources.
TA 2.1	Electricity distribution;
TA 2.2	Heat distribution
TA 3.1	Energy demand
TA 4.1	Cement sector (COMPLEX);
TA 4.2	Aluminum (COMPLEX);
TA 4.3	Iron and steel (COMPLEX);
TA 4.4	Refinery (COMPLEX)
TA 5.1	Chemical process industries (COMPLEX).
TA 6.1	Construction.
TA 7.1	Transport.
TA 8.1	Mining and mineral processes, excluding those included in TA 8.2 below;
TA 8.2	Oil and gas industry, coal mine methane recovery and use (COMPLEX).
TA 9.1	Metal production.
TA 10.1	Mining and mineral processes, excluding those included in TA 10.2 below;
TA 10.2	Oil and gas industry, coal mine methane recovery and use (COMPLEX).
TA 11.1	Chemical process industries (COMPLEX);
TA 11.2	GHG capture and destruction.
TA 12.1	Chemical process industries (COMPLEX).
TA 13.1	Waste handling and disposal;
TA 13.2	Animal waste management.
TA 14.1	Forestry
TA 15.1	Agriculture
TA 15.2	Animal waste management.

2.1.2 Publication of the Monitoring Report

A first monitoring report (ver. 1) was made publicly available at the UNFCCC website on 11 December 2012. As consequence of a CAR raised in relation to the implementation of the monitoring plan (please refer to CAR 3), a new monitoring report was prepared with a new monitoring period. The new monitoring period was communicated to the EB and it is from 30/05/2010 to 31/07/2012.

2.1.3 Review of Documentation

Version 01.0 of the monitoring report was made publicly available to GSC on 11 December 2012. After the on-site visit, and due to the on-site visit conclusions, the monitoring report was updated to address the CARs and/or CLs, and a final version of the monitoring report dated 19 May 2014 was issued.

The desk review involved a review of:

- Project documentation: PDD registered /1/, validation report /2/ and approved monitoring plan.
- Relevant decisions, clarifications and guidance from the CMP and the CDM Executive Board.
- The monitoring plan and the applied monitoring methodologies /3//4/, 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 /5/ 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 final monitoring report /6/ with the estimate in the PDD, and explanation of any significant increase.

A complete list of all documents reviewed is attached in section 6 of this report.

2.1.4 Site Visits

From 14 to 18 January 2013, an AENOR's verification team carried out an on-site visit to the Rwanda Electrogaz Compact Fluorescent Lamp (CFL) distribution project.

During the visit the verification team was able to see the project facilities and sites and carried out:

- An assessment of the implementation and operation of the project activity as per the registered PDD.
- 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 log books, inventories, purchase records or similar data sources.
- A check of the monitoring equipment including calibration performance and observations of monitoring practices against the requirements of the PDD and the selected methodology.
- A review of calculations and assumptions made in determining the GHG data and 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.
- Interviews with relevant personnel to confirm that the operational and data collection procedures are implemented in accordance with the approved revision of the monitoring plan.

- On site visits to customer households sampled by the PP for the implementation of ex-post installation surveys.

Interviewed organization Person/Position	Interview topics
<p>EWSA</p> <ul style="list-style-type: none"> • Viator Mugeraneza. Project coordinator. <p>The World Bank</p> <ul style="list-style-type: none"> • Leon Biaoou. Carbon Finance Specialist. Carbon Finance Unit. <p>Antennas/ customer households</p> <ul style="list-style-type: none"> • Gikondo • Nyarugenge • Remera <p>Stations/ customer households</p> <ul style="list-style-type: none"> • Muhanga • Ngoma • Nyanza • Ruhango • Rwamagana 	<ul style="list-style-type: none"> • 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.. • Monitoring report and emission reduction calculations. • Testing of monitoring equipment and observation of monitoring practices. • Calibration of meters. • 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

2.1.5 Findings

As an outcome of the verification process, the team can raise different types of findings according to the CDM Validation and Verification Manual.

Corrective Action Requests (CARs) are issued, where:

- (a) Non-conformities with the monitoring plan or methodology are found in monitoring and reporting, or if the evidence provided to prove conformity is insufficient;
- (b) Mistakes have been made in applying assumptions, data or calculations of emission reductions which will impair the estimate of emission reductions;

(c) Issues identified in a FAR during verification to be verified during verification have not been resolved by the project participants.

Clarification Requests (CLs) are issued if information is insufficient or not clear enough to determine whether the applicable CDM requirements have been met.

Forward Action Requests (FARs) are issued for actions if the monitoring and reporting require attention and/or adjustment for the next verification period.

The project participants were requested to address all verification findings and finally provided the verification team with sufficient evidence to determine that the applicable CDM requirements have been met. The project participant modified the initial monitoring report to resolve the verification team concerns and resubmitted a final version. AENOR has prepared this report based on the final monitoring report.

All the verification findings are summarized in section 3 below and documented in more detail in section 5 and in the verification protocol included in Annex 1.

2.1.6 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.

3 VERIFICATION FINDINGS

The summary of CAR, FAR and CL issued are shown in Table below:

	Verification topic	No. of CAR	No. of CL	No. of FAR
1	Project history and implementation	1,2	1,2	1
2	Compliance with monitoring plan	3		1
3	Compliance with monitoring methodology			
4	Monitoring Parameters	4	3, 4, 5, 6	
5	Emission Reduction Calculations			
6	Quality of Evidence to determine ER			
7	Management System and Quality Assurance			
	SUM	4	6	2

All raised CARs, CLs and FARs are shortly explained briefly in the following sections. For an in depth evaluation of all verification items it should be referred to the verification protocol (see Annex 1).

3.1 Remaining issues, CARs, FARs from Previous Validation or Verification.

During the previous validation process, the DOE might have raised issues that could not be closed or resolved during the last monitoring period. For this purpose FARs might have been raised.

In the validation process for the Rwanda Electrogaz Compact Fluorescent Lamp (CFL) distribution project AENOR has raised a Forward Action Request to check the implementation of the environmental mitigations measures at the verification stage of the project.

The final environmental impact assessment (EIA) report regarding the management of waste including incandescent light bulbs collected and faulty CFLs has been prepared by the National University of Rwanda. The report has been sent to the Rwanda Development Board (RDB) which is entitled to approve EIAs in Rwanda. The recommendation of the report on ICL disposal could not be implemented in the considered monitoring period. However, necessary actions are being taken to resolve this FAR by implementing the waste management system.

AENOR has received the clearance letter from The Rwanda Environment Management Authority (Rema) of the project on destruction of 300,000 ICLs. The letter is dated on 10 June 2013.

Thus, AENOR considers this FAR is closed, and this issue will be verified as part of the next verification process.

3.2 Post Registration Changes

3.2.1 Temporary deviations from the registered monitoring plan or applied methodology

No temporary deviation is requested.

3.2.2 Permanent changes

3.2.2.1 Corrections

No corrections to the project information or parameters fixed at validation as it is described in the registered PDD have been requested.

3.2.2.2 Permanent Changes from the registered monitoring plan or applied methodology

No changes from the revised monitoring plan or applied methodology have been approved for this monitoring period or submitted with this verification report.

3.2.2.3 Changes to project design of registered project activity

No changes to the project design of the project activity have been approved for this monitoring period or submitted with this verification report.

3.2.2.4 Changes to start date of crediting period

No changes to the start date of the crediting period stated in the registered PDD have been requested.

3.3 Project Implementation

The project was implemented as described in the registered PDD.

The project start date is 10 January, 2007, which is the date of signature of the purchase contract of the first batch (50,000 CFLs)

The project is implemented in 4 phases. The first three phases of distribution are completed. The procurement for the purchase of 400,000 CFLs for phase 4 is finalized. The CFLs are in EWSA's warehouse since December 2011. Their distribution started in July 2012.

The table below provides the number of CFLs distributed under each phase, as accounted for and double-checked as per the PDD requirements.

CFL distribution project status

Phase	Procured/Estimated Number of CFLs	Actual Distributed CFL	Distribution Timeline in the registered PDD	Actual End date of distribution
Phase1	50,000	43,119	August - September 2007	December 2007
Phase2	150,000	132,351	September 2008 - March 2009	June 2009
Phase3	200,000	185,453	Mid 2009	December 2010
Phase4	400,000	N/A	Mid 2010 to early 2011 (monthly recorded)	(Started in July 2012)

In exchange for each CFL distributed in Component 1, the customers provide an incandescent lamp (ICL). All the incandescent lamps were shipped to the central warehouse in Kigali for storage before destruction. Prior to the destruction of the incandescent lamps, an Environmental study has been conducted to provide guidance on the proper way to dispose of the lamps (as required by REMA). The Rwanda National University has prepared the study [7]. The report has been sent to the Rwanda Development Board (RDB) which is entitled to approve EIAs in Rwanda.

AENOR has received the clearance letter of the project, from The Rwanda Environment Management Authority (Rema), on destruction of 300,000 ICLs. The letter is dated on 10 June 2013. /8/.

This issue was the origin of a FAR during the validation process (refer to section 3.1 for more details).

Quantity and Rated power of the collected ICLs, ex-post monitored

ICL Power rate Group (W)	Number of ICL in Component 1		
	Phase 1	Phase 2	Phase 3
25	953	0	0
40	12,330	1,068	22,059
60	11,961	51,266	34,667
75	15,084	79,708	33,970
Total	40,328	132,042	90,696

For Component 1, the number of distributed CFLs and received ICL should be equal; however, losses of ICLs resulted during the shifting of lamps from the branches to the central storage location in Kigali. The lamp numbers presented in the table above represent those that have been verified physically in the central storage location. Also, broken ICLs were not accounted for.

At the end of each phase, an independent party certifies the collection of incandescent lamps through a random sampling of the lamps in storage – the number, rating and operational condition of the ICLs, as per EWSA records. The independent certifier prepares a report /9/, including witnessing the destruction/crushing of the ICLs in the safe disposal area.

AENOR was able to check these reports and evaluate the procedure to perform them and the correctness of the results. It is AENOR opinion the reports are correct.

The number of lamps distributed per household was restricted in each Phase of the distribution. Phase 1 distribution was limited to 2 per household. Phase 2 was limited to 5 per household. Phase 3 was limited to 4 per household. The number of lamps distributed per household was always fewer than six.

The number of lamps used for ER calculation is taken conservatively by comparing the number of CFLs distributed with the number of ICLs collected.

3.4 Update on changes and incidents

During the on-site visit and the desk review process, the audit team reviewed different information from the operational system of the project, logbooks, metering system, communications and other internal reports and records in order to identify changes or incidents during the operation of the project. The findings are as follows:

During the implementation of the project there were several incidents with the distribution of CFLs. The deviation between the number of CFLs procured and the number of CFLs distributed was due to the following:

- Some lamps were found faulty during the distribution,
- Others were broken, and
- Some losses were noted during the lamps distribution.

The overall timeline of the project was lengthened compared to the projection in the PDD due to two major factors, as follows:

- The distribution pace for existing customers (Component 1: Phase 1, Phase 2 and partly Phase 3) slowed down at the second half of Phase 2 and during Phase 3 as the coverage of existing customers increased, reducing the target population.
- Each phase is associated with a specific lamp purchase contract. The procurement process and the contract implementation (up to the lamp delivery) for the 3rd phase took more time than expected, mainly due to procurement delays, leading to a delay of about 6 months. The planned supply of phase 4 of 400,000 CFLs in mid-2010 was delivered in December 2011 and their distribution started in July 2012.

All those aspects were confirmed by the verification team during the on-site visit by means of the review of purchase documents /10/ and the distribution database. /11/

No other significant incidents or changes on the normal operation of the project, except the changes explained above that took place during the monitoring period

3.5 Compliance of the monitoring plan with the monitoring methodology

The verification team reviewed whether the registered monitoring plan was in accordance with the applied methodology and if any other monitoring aspect of the project activity that is not specified in the methodology was identified.

The verification team confirmed that the monitoring plan of the validated CDM project activity is in accordance with the applied approved methodologies AMS-II.J. ver.3, and AMS-II.C. ver.11. based on the following reasons:

- During the desk review monitoring parameters included in the applied methodologies were compared with the ones included in the monitoring plan of the registered PDD, and they were found consistent.
- During the verification process no need was identified for revision of the monitoring plan.
- No other relevant aspects for monitoring not included in the methodology were identified
- No deviations from the monitoring methodologies were identified during the verification process.

3.6 Compliance of monitoring with the monitoring plan

Regarding the compliance with the monitoring plan, the verification team reviewed if:

- The monitoring of reductions in GHG emissions resulting from the proposed CDM project activity were implemented in accordance with the monitoring plan contained in the registered PDD.
- The monitoring plan and the applied methodologies had been properly implemented and followed by the project participants.
- All parameters stated in the monitoring plan, the applied methodologies and relevant CDM EB decisions had been sufficiently monitored and updated.
- The responsibilities and authorities for monitoring and reporting were in accordance with the responsibilities and authorities stated in the monitoring plan.

The monitoring system and all applied procedures are in compliance with the monitoring plan contained in the registered PDD and the applied methodologies AMS-II.J. ver.3, and AMS-II.C. ver.11. based on the information included in the final monitoring report.

There is only an aspect to be noted, it is as follows:

It is a requirement of the AMS-II.J methodology, applicable only for component 1 of this project; to perform an ex post monitoring surveys to confirm installation and operation of the CFLs. In such a survey it has to be registered whether CFLs distributed under the project activity are operational.

On the other hand, it is a requirement of the AMS-II.C methodology, applicable for component 2 only, to perform an annual check of a sample of non-metered systems to ensure that they are still operating.

In the monitoring period assessed in the present verification report, the information for this annual check for component 2 has been obtained in the ex-post surveys that monitor installation and operation of the CFLs for the purpose of component 1. It has to be noticed that the situation applied to Phase 3 where CFLs distributed are split over the 2 components. Samples are performed simultaneously with the ex-post surveys for component 1. This means a separate sampling was not conducted for the annual check, but the results of Phase 3 (with an annual check of lamps that are still operation (AMS-II.C) which is similar to proportion of lamps that are still working under the lamp failure rate determination (AMS-II.J)) were used. It was possible to combine the surveys for component 1 and component 2 because both components are implemented in the same areas and supplied by the same electricity network (furthermore, bulbs are the same make & models and sourced from the same procurement process). The sample is drawn from the overall population, i.e. Phase 3 including CFLs installed in Component 1 and Component 2. So, both components are covered in the sample.

Once analyzed this issue, AENOR concludes that the use of the same survey for both components is adequate to the objective of the monitoring plan. For both components, areas where the project was performed are the same (mainly in Kigali but also in other localities), the distribution of bulb population is homogeneous and the use of electricity is the same. The parameter monitored is in fact the same, since it means the amount of CFL lamps still functioning. This parameter only depends on the time elapsed since the installation of the lamp and does not depend on whether the electrification of the household is a recent one (Component 1 is applicable to existing customers and Component 2 to new customers –households no yet electrified). Thus, this implementation of the registered monitoring plan does not induce any error in the emission reduction calculation and it is statistically accurate, calculations and assumptions are considered conservative and GHG emissions will not be over-estimated.

That said, AENOR considers, due to the weight that surveys have in the monitoring plan, and in order to avoid any misunderstanding in future verifications, to raise a **FAR** aiming to give special importance to the review of the above mentioned situation in the following verification process. During the following verification process 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.

Data Collection Procedures

There are several procedures for data collecting depending on the methodology applicable for each component of the project.

Data collection procedures applicable for both Component 1 (AMS-II.J, Version 03) and Component 2 (AMS-II.C, Version 11)

Recording of lamp distribution data:

Data	<ul style="list-style-type: none">• Date of CFL distribution• Customer identification• Number of CFLs provided and wattage.
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	<ul style="list-style-type: none"> Number of ICLs exchanged for each type (for Component 1 only).
Data generation	<p>Customer provides unique identification to EWSA employee (e.g. EWSA bill, prepaid purchase or voucher).</p> <p>Component 1 only: Customer provides ICL(s) to EWSA employee. EWSA provides CFL(s) to customer.</p>
Data recording	<p>Phase 1: Data entered in a handwritten register and then entered into an Excel database.</p> <p>Phase 2 & 3: Data entered in an Excel database and in an in-house software. The Excel database serves as the reference for data recording.</p>
Data aggregation	<p>Phase 1: Data from handwritten registers aggregated in the Excel database</p> <p>Phase 2 & 3: Data aggregated Excel database and in the in-house software. The Excel database serves as the reference for data recording.</p>

Data collection procedures applicable for Component 1 (AMS-II.), Version 03) only

An Ex post monitoring survey [12] is carried out within the first year after installation and once for every 30% of the elapsed rated lifetime (or every 3 years) to confirm installation and operation of the CFLs

The CFLs distributed in Phases 1 to 3 have a rated lifetime of 6,000 hours or 4.7 years, considering a daily use of 3.5 hours. Based upon this, and the requirement that the first survey be carried out within the first year after installation, the following schedule of the ex-post monitoring surveys was implemented.

Phase	Time Elapsed from Equipment Installation				Dates of ex-post surveys		
	30% of rated life	60% of Rated Life	90% of Rated Life	100% of rated life	First	Second	Third
Phase 1	28/05/2009	24/10/2010	21/03/2012	09/09/2012	Apr-08	Oct-09	Jun-11
Phase 2	26/11/2010	23/04/2012	19/09/2013	10/03/2014	Oct-09	Jun-11	NA
Phase 3	28/05/2012	24/10/2013	22/03/2015	10/09/2015	Jun-11	NA	NA

Data	<ul style="list-style-type: none"> Check whether each CFL distributed under the project activity is installed (based on records on the type/number of efficient lamps distributed to each individual household) Record whether CFLs distributed under the project activity are operational Determine whether defective CFLs were replaced by the end-user and, if so, with what type/wattage of lamp.
Data generation	Door-to-door surveys of a sample of CFLs, with a sample size no less than 100 or 0.1% of the population
Data recording	Data are recorded in a central database, or in a spreadsheet and then in the database
Data aggregation	The data analysis results are provided in the survey report

Data collection procedures applicable for Component 2 (AMS-II.C, Version 11) only

Annual checks of a sample of non-metered systems to ensure that they are still operating:

The percentage of CFLs that are still operating is captured through annual surveys on a sample of non-metered lamps. The percentage of functioning non-metered CFLs will be used to discount the energy savings and thus emission reductions.

AMS-II.C is applicable only for Phases 3 (part of CFLs distributed) and 4 (Component 2). The current monitoring period does not comprise Phase 4, since CFL distribution under Phase 4 started in July 2012 and this monitoring period ended in July 2012. Therefore, annual checks are only required for Phase 3 as per AMS-II.C, version 11. Since the end date of CFL distribution for Phase 3 was December 2010, the first annual check should be conducted between January and December 2011. This annual check was actually conducted in June 2011.

The information requested for the annual check was already captured in the ex-post surveys that monitor installation and operation of the CFLs for the purpose of component 1. Samples were performed simultaneously with the ex-post surveys for Component 1.

This means that a separate sampling was not conducted for the annual check, but the results of Phase 3 were used. As explained before, it was possible to combine the surveys for Component 1 and Component 2 because both components are implemented in the same areas and supplied by the same electricity network.

Thus, the relevant survey for this monitoring period was undertaken in June 2011.

The third ex-post survey, which was finalized in June 2011, is used to determine the percentage of CFLs that are still operating for phase 3.

Once analyzed this issue, AENOR concludes that the use of the same survey for both components is adequate for monitoring purposes and is a correct implementation of the monitoring plan. A more detailed analysis of this situation is included in section 3.6 of the current report.

It should be noted that only CFLs from existing customers have been considered in the ER calculations for Component 1 (i.e. 79,299 CFLs), and only CFLs from new customers have been used for the ERs calculation under Component 2 (i.e. 96,514). AENOR was able to review the calculations spreadsheet, and concludes they are correct and accurate.

Data	Record whether CFLs distributed under the project activity are operational
Data generation	Door-to-door surveys of a sample of CFLs, with a sample size no less than 100 or 0.1% of the population
Data recording	Data are recorded in a central database, or in a spreadsheet and then in the database
Data aggregation	The data analysis results are provided in the survey report

Recording the “power” of the device installed using nameplate data or bench tests of a sample of the units installed

The power rate of the distributed lamps are recording during the distribution phase using nameplate data

Data	Power (rated Wattage) of CFLs distributed under the project activity that are installed
Data generation	Data are captured in the distribution software or in a registry by each EWSA distribution branches and consolidated in a central database. The power rate is also evidenced through the CFL specifications and test reports
Data recording	Data are recorded in a central database, or in a spreadsheet and then in the database
Data aggregation	The data analysis results are provided in the survey report

Metering a sample of the units installed for their operating hours using run time meters

Data	Average daily operating hours of project lamps
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Data generation	Run-time meters with index set at zero installed on a sample of the total number of project CFLs; date of installation recorded On index recording date, index of the run time meter is noted The index is divided by the number of days of the monitored period to determine the operating hours per day of the monitored CFL The mean is calculated based on the observed values for the monitored CFLs
Data recording	Data recorded on paper or electronically
Data aggregation	Data are aggregated in an excel spread sheet

The implementation of all those procedures was confirmed by the verification team during the on-site visit by means of the assessment and review of:

- Central customer database
- Databases and spread sheets located in antennas and stations visited by AENOR
- Handwritten registers and records /13/
- Ex post monitoring surveys reports
- Analysis of the in-house software developed ad-hoc
- On site visit to a sample of customer households

The project activity has been implemented country-wide, mainly in urban areas, at all EWSA customers. EWSA geographic cover is divided in 21 branches total in Phases 1 and 2; 23 total in Phase 3 (called antennas in Kigali and stations in the rest of the country). AENOR selected 3 antennas and 5 stations as a part of carrying out the site visit to confirm the implementation of the project activity. AENOR visited the antennas at Gikondo, Nyarugenge and Remera, and the stations at Muhanga, Ngoma, Nyanza, Ruhango and Rwamagana to confirm the correctness of data gathered at the time of surveys by the monitoring surveys conducted by the PP.

During the visit AENOR was able to verify that the project has been implemented as planned and as mentioned in the registered PDD by visiting a sample of 40 metered and non-metered CFLs selected at random from the records available at the offices of EWSA in respective zones and city offices and the survey samples.

The verification team confirms that the monitoring for the verified period has been carried out in accordance with the monitoring plan included in the registered PDD. The list of all parameters monitored and the means of verification used are detailed in the following section.

3.7 Monitoring Parameters

The verification team carried out a review of information flow for generating, aggregating and reporting the monitoring parameters to assess a completeness of monitoring, according to the registered monitoring plan and the applied methodologies, including:

- The measurement/determination method used.
- Relevant monitoring equipment, their features and the control and calibration procedures.
- Significant inaccuracies occurring in the case of measured or estimated values of some parameter.
- 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 parameters to be monitored and monitoring equipment are different depending on the applicable methodology and component. They are as follows:

Data and parameters applicable for Component 1 (AMS-II.J, Version 03) and 2 (AMS-II.C, Version 11)

Data / Parameter:	Customer information (for components 1 and 2)
Measuring frequency:	-
Recording frequency:	Once at bulb distribution
Is measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology? (Yes / No)	Yes.
Type of monitoring equipment:	Not applicable
Is accuracy of the monitoring equipment as stated in the PDD?	Not applicable
Calibration frequency / interval:	Not applicable
Is the calibration interval in line with the monitoring plan of the PDD?	Not applicable
Company performing the calibration:	Not applicable
Did calibration confirm proper functioning of monitoring equipment? (Yes / No):	Not applicable
Is/are) calibration(s) valid for the whole reporting period?	Not applicable
If applicable, has the reported data been crosschecked with other available data?	Yes, with handwritten registers and personal information from customers interviewed during on-site visit
How were the values in the monitoring report verified	Cross check of actual figures available at the moment of the site visit were checked with instant records of EWSA and the months from 30/05/2010 to 31/07/2012 were checked with records on PDF and Excel files and the database register.
Does the data management (from monitoring equipment to emission reduction calculation) ensure correct transfer of data and reporting of emission reductions and are necessary QA/QC processes in place?	Yes. The EWSA system assures the traceability of all records and the spreadsheets could assure correct emission reduction calculations in a transparent way

Data / Parameter:	Distribution date (Components 1 and 2)
Measuring frequency:	-
Recording frequency:	Once at bulb distribution
Is measuring and reporting frequency in accordance with the monitoring plan and monitoring	Yes.

methodology? (Yes / No)	
Type of monitoring equipment:	Not applicable
Is accuracy of the monitoring equipment as stated in the PDD?	Not applicable
Calibration frequency /interval:	Not applicable
Is the calibration interval in line with the monitoring plan of the PDD?	Not applicable
Company performing the calibration:	Not applicable
Did calibration confirm proper functioning of monitoring equipment? (Yes / No):	Not applicable
Is/are) calibration(s) valid for the whole reporting period?	Not applicable
If applicable, has the reported data been crosschecked with other available data?	Yes, with handwritten registers and personal information from customers interviewed during on-site visit
How were the values in the monitoring report verified	Cross check of actual figures available at the moment of the site visit were checked with instant records of EWSA and the months from 30/05/2010 to 31/07/2012 were checked with records on PDF and Excel files and the database register.
Does the data management (from monitoring equipment to emission reduction calculation) ensure correct transfer of data and reporting of emission reductions and are necessary QA/QC processes in place?	Yes. The EWSA system assures the traceability of all records and the spreadsheets could assure correct emission reduction calculations in a transparent way

Data and parameters applicable for Component 1 (AMS-II.), Version 03]

Data / Parameter:	Number (quantity) of pieces of CFLs of type / distributed under the project (2_{P1,i})
Measuring frequency:	-
Recording frequency:	Once at bulb distribution
Is measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology? (Yes / No)	Yes.
Type of monitoring equipment:	Not applicable
Is accuracy of the monitoring equipment as stated in the PDD?	Not applicable
Calibration frequency /interval:	Not applicable
Is the calibration interval in line with the monitoring plan of the PDD?	Not applicable
Company performing the calibration:	Not applicable
Did calibration confirm proper functioning of monitoring equipment? (Yes / No):	Not applicable

Is/are) calibration(s) valid for the whole reporting period?	Not applicable
If applicable, has the reported data been crosschecked with other available data?	Yes, with handwritten registers and personal information from customers interviewed during on-site visit
How were the values in the monitoring report verified	Cross check of actual figures available at the moment of the site visit were checked with instant records of EWSA and the months from 30/05/2010 to 31/07/2012 were checked with records on PDF and Excel files and the database register.
Does the data management (from monitoring equipment to emission reduction calculation) ensure correct transfer of data and reporting of emission reductions and are necessary QA/QC processes in place?	Yes. The EWSA system assures the traceability of all records and the spreadsheets could assure correct emission reduction calculations in a transparent way. Component 1. The number of CFL distributed is compared to the number of ICL collected and received at the central storage in Kigali. The lowest number is used as monitored values for ERs calculation.

Data / Parameter:	Rated power of the project CFLs of the group of "I" lighting devices, / (P_i, P_{II})
Measuring frequency:	-
Recording frequency:	Once at bulb distribution
Is measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology? (Yes / No)	Yes.
Type of monitoring equipment:	Not applicable
Is accuracy of the monitoring equipment as stated in the PDD?	Not applicable
Calibration frequency /interval:	Not applicable
Is the calibration interval in line with the monitoring plan of the PDD?	Not applicable
Company performing the calibration:	Not applicable
Did calibration confirm proper functioning of monitoring equipment? (Yes / No):	Not applicable
Is/are) calibration(s) valid for the whole reporting period?	Not applicable
If applicable, has the reported data been crosschecked with other available data?	Yes, with handwritten registers and the technical specifications set in the tender
How were the values in the monitoring report verified	Cross check of actual figures available at the moment of the site visit were checked with instant records of EWSA and the months from 30/05/2010 to 31/07/2012 were checked with records on PDF and Excel files and the database register. As part of the CFLs procurement process, bidders provided CFL test certificates in all phases /14/. For phase 2, EWSA conducted a mission in China to

	participate in the testing of a sample of CFLs in a laboratory. This mission was part of EWSA quality control approach set up in the bidding process of Phase 2, where the selected supplier was requested to finance a trip in a laboratory where a sample of CFLs supplied will be tested in the presence of EWSA staff. AENOR has been provided with the tests certificates and reports.
Does the data management (from monitoring equipment to emission reduction calculation) ensure correct transfer of data and reporting of emission reductions and are necessary QA/QC processes in place?	Yes. The EWSA system assures the traceability of all records and the spreadsheets could assure correct emission reduction calculations in a transparent way

Data / Parameter:	Number (quantity) of pieces of incandescent lamps (ICLs) of type / exchanged under the project (Q_{BL,i})
Measuring frequency:	-
Recording frequency:	Once at bulb distribution
Is measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology? (Yes / No)	Yes.
Type of monitoring equipment:	Not applicable
Is accuracy of the monitoring equipment as stated in the PDD?	Not applicable
Calibration frequency /interval:	Not applicable
Is the calibration interval in line with the monitoring plan of the PDD?	Not applicable
Company performing the calibration:	Not applicable
Did calibration confirm proper functioning of monitoring equipment? (Yes / No):	Not applicable
Is(are) calibration(s) valid for the whole reporting period?	Not applicable
If applicable, has the reported data been crosschecked with other available data?	Yes, with handwritten registers and personal information from customers interviewed during on-site visit
How were the values in the monitoring report verified	Cross check of actual figures available at the moment of the site visit were checked with instant records of EWSA and the months from 30/05/2010 to 31/07/2012 were checked with records on PDF and Excel files and the database register. A third party was engaged to certify the number of ICLs collected. The report is available for Phase 1 /15/. The sampling methodology is based on the International Standard ISO 2859-1: 1999). For Phase 2 and Phase 3, such a report /16/ was

	prepared by an independent consultant using a sampling approach based on the Guidelines for sampling and surveys for CDM project activities and programme of activities, version 02.0. /18/ This report was provided to the verification team.
Does the data management (from monitoring equipment to emission reduction calculation) ensure correct transfer of data and reporting of emission reductions and are necessary QA/QC processes in place?	<p>Yes. The EWSA system assures the traceability of all records and the spreadsheets could assure correct emission reduction calculations in a transparent way.</p> <p>Overall, the numbers of ICLs derived from the reports are compared to the number of ICLs in the database and the lowest values are always used for ERs calculations. /17/</p> <p>For Phase 1, the report found a total of 41,169 ICLs, of which the lower value of 40,328 ICLs is used in the ER calculation. For Phase 2 and Phase 3, the report found 136,325 ICLs and 87,626 ICLs compared to 132,042 ICLs and 79,299 ICLs respectively.</p> <p>AENOR was able to check these figures and we consider they are correct and the emission reduction calculation is conservative.</p>

Data / Parameter:	Rated power of the baseline incandescent lamps (ICLs) of the group of "I" lighting devices, / ($P_{i,BL}$)
Measuring frequency:	Measured as taken from ICL nameplate
Recording frequency:	Once at bulb distribution
Is measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology? (Yes / No)	Yes.
Type of monitoring equipment:	Not applicable
Is accuracy of the monitoring equipment as stated in the PDD?	Not applicable
Calibration frequency /interval:	Not applicable
Is the calibration interval in line with the monitoring plan of the PDD?	Not applicable
Company performing the calibration:	Not applicable
Did calibration confirm proper functioning of monitoring equipment? (Yes / No):	Not applicable
Is/are) calibration(s) valid for the whole reporting period?	Not applicable
If applicable, has the reported data been crosschecked with other available data?	Yes, with handwritten registers and the technical specifications set in the tender
How were the values in the monitoring report verified	<p>Cross check of actual figures available at the moment of the site visit were checked with instant records of EWSA and the months from 30/05/2010 to 31/07/2012 were checked with records on PDF and Excel files and the database register.</p> <p>A third party was engaged to certify the number</p>

	of ICLs collected. The report is available for Phase 1. The sampling methodology is based on the International Standard ISO 2859-1: 1999). For Phase 2 and Phase 3, such a report was prepared by an independent consultant using a sampling approach based on the Guidelines for sampling and surveys for CDM project activities and programme of activities, version 02.0. This report was provided to the verification team.
Does the data management (from monitoring equipment to emission reduction calculation) ensure correct transfer of data and reporting of emission reductions and are necessary QA/QC processes in place?	<p>Yes. The EWSA system assures the traceability of all records and the spreadsheets could assure correct emission reduction calculations in a transparent way.</p> <p>Overall, the numbers of ICLs derived from the reports are compared to the number of ICLs in the database and the lowest values are always used for ERs calculations.</p> <p>The numbers of ICL per wattage of baseline devices are consolidated. Only final numbers used in ER calculation are used. Note that for Phase 1, ICLs with unreadable wattage were assigned wattage proportional to the distribution of wattages in the bulbs with a wattage measurement.</p> <p>AENOR was able to check these figures and we consider they are correct and the emission reduction calculation is conservative.</p>

Data / Parameter:	Number of sampled CFLs during the post installation survey s (N_{sample,s})
Measuring frequency:	-
Recording frequency:	<p>As per AMS-II.] (Version 03), ex-post surveys are conducted:</p> <ul style="list-style-type: none"> - Once in the first year of installation, and - Once every 3 years, or once for every 30% of elapsed rated lifetime (whichever is shorter) <p>1st ex-post monitoring survey: April, 2008 2nd ex-post monitoring survey: October, 2009 3rd ex-post monitoring survey: June, 2011</p>
Is measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology? (Yes / No)	Yes.
Type of monitoring equipment:	Survey reports
Is accuracy of the monitoring equipment as stated in the PDD?	Not applicable
Calibration frequency /interval:	Not applicable
Is the calibration interval in line with the monitoring plan of the PDD?	Not applicable
Company performing the calibration:	Not applicable
Did calibration confirm proper functioning of monitoring equipment? (Yes / No):	Not applicable

Is/are) calibration(s) valid for the whole reporting period?	Not applicable
If applicable, has the reported data been crosschecked with other available data?	Yes, with handwritten registers
How were the values in the monitoring report verified	Cross check of actual figures available at the moment of the site visit were checked with instant records of EWSA and the months from 30/05/2010 to 31/07/2012 were checked with records on PDF and Excel files and the database register.
Does the data management (from monitoring equipment to emission reduction calculation) ensure correct transfer of data and reporting of emission reductions and are necessary QA/QC processes in place?	<p>Yes. The EWSA system assures the traceability of all records and the spreadsheets could assure correct emission reduction calculations in a transparent way.</p> <p>As per AMS-II.] (Version 03), ex-post surveys are conducted:</p> <ul style="list-style-type: none"> – Once in the first year of installation, and – Once every 3 years, or once for every 30% of elapsed rated lifetime (whichever is shorter) <p>1st ex-post monitoring survey: April, 2008 2nd ex-post monitoring survey: October, 2009 3rd ex-post monitoring survey: June, 2011</p> <p>AENOR was able to check these surveys and we consider they are correct and the emission reduction calculation is conservative.</p>

Data / Parameter:	Number of sampled CFLs which are functional during the post installation survey s (N_{OK,s})
Measuring frequency:	-
Recording frequency:	<p>As per AMS-II.] (Version 03), ex-post surveys are conducted:</p> <ul style="list-style-type: none"> – Once in the first year of installation, and – Once every 3 years, or once for every 30% of elapsed rated lifetime (whichever is shorter) <p>1st ex-post monitoring survey: April, 2008 2nd ex-post monitoring survey: October, 2009 3rd ex-post monitoring survey: June, 2011</p>
Is measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology? (Yes / No)	Yes.
Type of monitoring equipment:	Survey reports
Is accuracy of the monitoring equipment as stated in the PDD?	Not applicable
Calibration frequency /interval:	Not applicable
Is the calibration interval in line with the monitoring plan of the PDD?	Not applicable
Company performing the calibration:	Not applicable
Did calibration confirm proper functioning of monitoring	Not applicable

equipment? (Yes / No):	
Is(are) calibration(s) valid for the whole reporting period?	Not applicable
If applicable, has the reported data been crosschecked with other available data?	Yes, with handwritten registers
How were the values in the monitoring report verified	Cross check of actual figures available at the moment of the site visit were checked with instant records of EWSA and the months from 30/05/2010 to 31/07/2012 were checked with records on PDF and Excel files and the database register.
Does the data management (from monitoring equipment to emission reduction calculation) ensure correct transfer of data and reporting of emission reductions and are necessary QA/QC processes in place?	<p>Yes. The EWSA system assures the traceability of all records and the spreadsheets could assure correct emission reduction calculations in a transparent way.</p> <p>As per AMS-II.] (Version 03), ex-post surveys are conducted:</p> <ul style="list-style-type: none"> – Once in the first year of installation, and – Once every 3 years, or once for every 30% of elapsed rated lifetime (whichever is shorter) <p>1st ex-post monitoring survey: April, 2008 2nd ex-post monitoring survey: October, 2009 3rd ex-post monitoring survey: June, 2011</p> <p>AENOR was able to check these surveys and we consider they are correct and the emission reduction calculation is conservative.</p>

Data and parameters applicable for Component 2 (AMS-II.C, Version 11)

Data / Parameter:	Number (quantity) of pieces of CFLs of type / distributed under the project (N_i)
Measuring frequency:	-
Recording frequency:	Once at bulb distribution
Is measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology? (Yes / No)	Yes.
Type of monitoring equipment:	Not applicable
Is accuracy of the monitoring equipment as stated in the PDD?	Not applicable
Calibration frequency /interval:	Not applicable
Is the calibration interval in line with the monitoring plan of the PDD?	Not applicable
Company performing the calibration:	Not applicable
Did calibration confirm proper functioning of monitoring equipment? (Yes / No):	Not applicable
Is(are) calibration(s) valid for the whole reporting period?	Not applicable
If applicable, has the reported data	Yes, with handwritten registers and personal

been crosschecked with other available data?	information from customers interviewed during on-site visit
How were the values in the monitoring report verified	Cross check of actual figures available at the moment of the site visit were checked with instant records of EWSA and the months from 30/05/2010 to 31/07/2012 were checked with records on PDF and Excel files and the database register.
Does the data management (from monitoring equipment to emission reduction calculation) ensure correct transfer of data and reporting of emission reductions and are necessary QA/QC processes in place?	Yes. The EWSA system assures the traceability of all records and the spreadsheets could assure correct emission reduction calculations in a transparent way. Equipment storage control system for inputs and outputs is applied at both EWSA central store at Kigali and in all antennas and stations.

Data / Parameter:	Rated power of the project CFLs of the group of "P" lighting devices (P_i,P_{ij})
Measuring frequency:	Measured as taken from technical specifications
Recording frequency:	Once at bulb distribution
Is measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology? (Yes / No)	Yes.
Type of monitoring equipment:	Not applicable
Is accuracy of the monitoring equipment as stated in the PDD?	Not applicable
Calibration frequency /interval:	Not applicable
Is the calibration interval in line with the monitoring plan of the PDD?	Not applicable
Company performing the calibration:	Not applicable
Did calibration confirm proper functioning of monitoring equipment? (Yes / No):	Not applicable
Is(are) calibration(s) valid for the whole reporting period?	Not applicable
If applicable, has the reported data been crosschecked with other available data?	Yes, with the technical specifications set in the tender
How were the values in the monitoring report verified	Cross check of actual figures available at the moment of the site visit were checked with instant records of EWSA and the months from 30/05/2010 to 31/07/2012 were checked with records on PDF and Excel files and the database register. As part of the CFLs procurement process, bidders provided CFL test certificates in all phases. For phase 2, EWSA conducted a mission in China to participate in the testing of a sample of CFLs in a laboratory. This mission was part of EWSA quality control approach set up in the bidding process of Phase 2, where the selected supplier was requested to finance a trip in a laboratory where

	a sample of CFLs supplied will be tested in the presence of EWSA staff. AENOR has been provided with the tests certificates and reports.
Does the data management (from monitoring equipment to emission reduction calculation) ensure correct transfer of data and reporting of emission reductions and are necessary QA/QC processes in place?	Yes. The EWSA system assures the traceability of all records and the spreadsheets could assure correct emission reduction calculations in a transparent way

Data / Parameter:	Operating hours of the distributed CFL k on day d as given by valid meter m ($O_{k,d,m}$)
Measuring frequency:	Run-time meters works continuously when lamps are switched on
Recording frequency:	Once annually or at the end of each monitoring period
Is measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology? (Yes / No)	Yes.
Type of monitoring equipment:	Run-time meters installed at sample of CFLs
Is accuracy of the monitoring equipment as stated in the PDD?	Yes
Calibration frequency /interval:	The run-time meter manufacturer did not provide any calibration procedures. EWSA uses the equipment from the Electricity Technical Control Bureau operating with the time measuring device to test the accuracy of metering. Validity and reliability of meters are evaluated at the time of the purchase.
Is the calibration interval in line with the monitoring plan of the PDD?	Not applicable
Company performing the calibration:	EWSA uses the equipment from the Electricity Technical Control Bureau operating with the time measuring device to test the accuracy of metering. AENOR was able to check the tests reports.
Did calibration confirm proper functioning of monitoring equipment? (Yes / No):	Yes
Is(are) calibration(s) valid for the whole reporting period?	Yes
If applicable, has the reported data been crosschecked with other available data?	Yes, with handwritten registers and personal information from customers interviewed during on-site visit
How were the values in the monitoring report verified	Cross check of actual figures available at the moment of the site visit were checked with instant records of EWSA and the months from 30/05/2010 to 31/07/2012 were checked with records on PDF and Excel files and the database register.
Does the data management (from monitoring equipment to emission	Yes. The EWSA system assures the traceability of all records and the spreadsheets could assure

reduction calculation) ensure correct transfer of data and reporting of emission reductions and are necessary QA/QC processes in place?	correct emission reduction calculations in a transparent way
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Data and parameters determined by a sampling approach: Component 1:

Nsamples Number of sampled CFLs during the post installation survey & NOKs Number of sampled CFLs which are functional during the post installation surveys

Implemented sampling design

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, the sampling size was determined by minimum 90% confidence interval and 10% maximum error margin; and the size of the sample was to be no less than 100. Using the calculation method for a normal distribution, the sample size would be 68, which is lower than the minimum size allowed by the methodology. Hence, the minimum size of the sample is 100 for each population (or phase). This calculation was done assuming an "absolute" 10% maximum error margin. This interpretation of the statistical calculation is allowed by paragraph 11 of the current Standard for sampling and surveys for CDM project activities version 4.1. 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.

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. 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 (EWSA branch).

The following method was used to select the cluster and the households to be surveyed based on the number of CFLs to be covered by the survey:

1. Make a list of antennas (21 total in Phases 1 and 2; 23 total in Phase 3)
2. Establish a sample selection interval
3. Pin point the distributed lamps named population
4. Calculate cumulative population
5. Choose randomly a number which is a starting point
6. Add the sampling interval for moving to the next step and select the cluster within which the number falls. Proceed until enough branches are selected to fulfill the sample size requirement (see table below)
7. Within the cluster, 5 (five) households to be surveyed are randomly selected (except for the first survey of Phase 1, where households were randomly selected proportionally to the quantity of bulbs distributed).

The number of samples for the survey relevant for this monitoring report is presented in the below table. The survey date is June 2011, which corresponds to the third survey for Phase 1, second

survey for Phase 2 and first survey for Phase 3. The following table also includes the results for the 1st and 2nd surveys.

Survey	Sampling Frame	Final Sample Size (number of CFLs)	Number of CFLs per household	Number of households surveyed	Number of clusters (branches surveyed)
1) April 2008	Phase 1 CFLs	100	2	50	7
2) October 2009	Phase 1 CFLs	100	2	50	10
	Phase 2 CFLs	200	5	40	8
	Total	300	-	90	-
3) June 2011	Phase 1 CFLs	110	2	55	11
	Phase 2 CFLs	125	5	25	5
	Phase 3 CFLs	120	4	30	6
	Total	355	-	110	-

Collected Data

AENOR was able to reproduce the calculations of the sample size, obtaining the same results.

The collected data are summarized in a survey report provided to the verification team. 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.

AENOR considers the procedure for sampling to be accurate, conservative and following the approved methodology AMS-II.] ver. 03 and the EB guidance for sampling.

Analysis of the collected data

Survey #	Sampling Frame	N _{OK,s}	N _{sample,s}	LFR _{i,y}
1) April 2008	Phase 1 CFLs	84	100	0.160
2) October 2009	Phase 1 CFLs	88	100	0.120
	Phase 2 CFLs	160	200	0.200
3) June 2011	Phase 1 CFLs	58	110	0.473
	Phase 2 CFLs	74	125	0.408
	Phase 3 CFLs	77	120	0.358

Demonstration on whether the required confidence/precision has been met

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:

	Survey 1 – April 2008	Survey 2 – October 2009	Survey 3 – June 2011
Phase 1	6.02%	5.34%	7.82%
Phase 2	-	4.65%	7.23%
Phase 3	-	-	7.20%

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. Therefore, the requirement has been met for each of them.

To verify the result of the calculation of confidence/precision, AENOR has followed the Guideline: Sampling and surveys for CDM project activities and programmes of activities. Ver. 03.0 (EB 75, Annex 8) [19]. 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 current Standard for sampling and surveys for CDM project activities version 4.1.

Data and parameters determined by a sampling approach: Component 2:

Ok,d,m Operating hours of the distributed CFL k on day d as given by valid meter m

Implemented sampling design

Run-time meters were installed on a sample of the total number of CFLs installed under Phase 3, Component 2 of the project activity. According to the PDD, a run time meter had to be installed on 0.1% of bulbs (96,514 bulbs * 0.1% = 97 bulbs, minimum). An oversample of 44% was applied and 140 run-time meters were installed. To assure a random selection and to base the measurement on different lighting locations per household, meters were installed using systematic sampling (on each of the CFLs distributed to every 1000th new customer who benefits from the project, in each of the antennas / stations (i.e. 1, 1001, 2001, etc.)). Thirty-five (35) households were included in the sample. The first run-time meters were installed with Phase 3 CFLs from November 2009 to December 2010. The hour meters were reinstalled, or read if they had been installed correctly initially, in July – August 2011. The second reading took place in April – July 2012.

Collected Data

Collected data was provided to AENOR. The verification team checked the figures during the on-site visit by means of the review of the central database and the handwritten records, and double-checked them with on-site visits to the customer households.

Analysis of the collected data

Upon follow-up by the project entity, 51 of the installed hour meters were observed to be obviously defective, lost or inaccessible. Therefore the number of hour meters that potentially could provide valid information was 89; these provided an average of 5.9 hours/day. Upon checking the reliability of these results, it was found that the precision did not achieve the 95/15 level (as specified in the PDD); the precision was 18%.

As per the “General Guidelines for sampling and surveys for small-scale CDM project activities”, a quality control and assurance methodology was applied to the project, and all values above 12 hours were considered outliers. This was based on the conservative approach that there is an average of 12 night time hours per day. This resulted in 77 valid readings. This range represents the clear majority of the results, excludes results that seem unrealistic based on common usage times and results in an Oi of 4.4 hours.

During the on-site visit to the sample of households, and by means of the several interviews held with the customers, AENOR could confirm that the above mentioned assumptions adopted for the exclusion of the outlier usage time ratios were rationally representatives of the mean social behavior in Rwanda.

To ensure that the mean operating hours value obtained is representative of the population, the error margin is calculated from the readings. Descriptive statistics of the collected data are described here.

Parameter	Value	Description
Population	96,514	CFL bulbs
Sample meters	77	Meter readings
Mean operating hours	4.4	Hours
Standard Deviation	2.82	
Confidence Interval Radius	0.6269	
Margin of error	14.23%	

AENOR considers to be accurate the procedure for sampling, conservative and following the approved methodology, and the EB guidance for sampling.

AENOR was able to reproduce the calculations of the sample size, obtaining the same results.

The recording frequency was in accordance with the PPD. In spite of some few cases where the measures were recorded some days before the end of the monitoring period, AENOR considers that the records are valid due to the fact that the parameter is a measurement of the mean operating hours during a long period of time. AENOR has proceeded to estimate the error in those situation, by means of a statistical calculation, and has found is under the margin of error admitted.

Demonstration on whether the required confidence/precision has been met

The PDD monitoring plan requires confidence / precision of 95/15 for this parameter. The actual achieved confidence / precision was 95/14.23. Therefore, the requirement has been met.

AENOR has been provided with the original raw data (measurements recorded in the 140 hour meters), has checked the records excluded at a first stage and has reproduced the statistical analysis after discarding the outliers. Therefore, it is AENOR's opinion that the 77 readings are selected by the project proponent adequately. It is deemed to be reasonable the exclusion of records with more than 12 hours, considering the average of daylight time in Rwanda.

AENOR was able to reproduce the calculations of confidence/precision, obtaining the same results. To verify the calculations of confidence/precision, AENOR has followed the Guideline: Sampling and surveys for CDM project activities and programmes of activities ver. 03.0 (EB 75, Annex 8) in its Appendix 4, and using manual calculations with Microsoft Excel software.

Checks of a sample of non-metered systems to ensure that they are still operating

Implemented sampling design

The sampling objective was to determine the percentage of systems that are still operating, to apply to Component 1. The sample was the same as that for Component 1, Phase 3 to determine the ex-post Lamp Failure Rate for that component. For the two components, the bulbs and time of distribution are identical, the rated lifetime of the CFLs is the same independently of the power and the distribution inside the households are also independent of the power of the CFLs installed; hence, the sample is appropriate. The target population is the distributed CFLs under Phase 3. 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 from all the branches.

Moreover, 5 households (second stage) are visited in each selected cluster (EWSA branch). The following method was used to select the cluster and the households to be surveyed based on the number of CFLs to be covered by the survey:

- Make a list of antennas
- Establish a sample selection interval
- Pin point the distributed lamps named population
- Calculate cumulative population
- Choose randomly a number which is a starting point
- Add the sampling interval for moving to the next step and select the cluster within which the number falls.
- Within the cluster the households to be surveyed are randomly selected.

The number of samples for the survey relevant for this monitoring report was as follows. Survey date: June 2011.

Sampling Frame	Final Sample Size (number of CFLs)	Number of CFLs per household	Number of households surveyed	Number of clusters (branches surveyed)
Phase 3 CFL	120	4	30	6

AENOR considers the procedure for sampling to be accurate, conservative and following the approved methodology, and the EB guidance for sampling

AENOR was able to reproduce the calculations of the sample size, obtaining the same results.

The verification team checked the figures during the on-site visit by means of the review of the central database and the handwritten records, and double-checked them with on-site visits to the customer households.

DOE verification on-site sampling:

AENOR has followed paragraph 21 to 27 of the Standard for sampling and surveys for CDM project activities and programme of activities (ver. 04.1). /20/

AENOR confirms that the selected samples (as elaborated in the MR) 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 sampling Standard and has been explained before.

Paragraph 23 of the sampling Standard, is not applicable, as the sample selection and survey have been conducted by a sampling approach.

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

AENORs 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 errors 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 each kind of monitoring survey as 20. (20 metered CFLs and 20 non-metered), and an acceptance number (maximum discrepancies admitted) of 1 for each survey.

This total sample size of 40 samples (20 + 20) 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 (EB 75, Annex 8) in its Appendix 5: Best-practice examples – acceptance sampling.

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

Hence, AENOR confirms that the sampling size and the method of onsite verification were in line with the requirements of the sampling standard.

3.8 Assessment of data and calculation of greenhouse gas emissions reductions

A complete set of data is available for the whole monitoring period and all the parameters have been monitored in accordance with the registered monitoring plan. The project participant has provided the verification team with all data (spreadsheets and ex-post installations surveys) corresponding to the monitoring period verified. Conservative assumptions have been taken by the project participant when incidents happened as explained above in chapter 3.4.

The reported data have been cross-checked against other sources available as explained above in chapter 3.6.

The verification team confirms that the methods and formulae used to obtain the baseline and project emissions and the emissions reductions are appropriate. The same has been done in accordance with the methods and formulae described in the registered monitoring plan and applicable methodology.

The verifier confirms that the monitoring report includes all parameters and monitored data at the intervals required by the methodology and PDD.

The verification team confirms that the emission factor and default values (fixed values from the registered PDD) have been correctly applied and justified in the monitoring report.

Emission reductions are calculated using different equations depending on the component and the methodology.

For component 1

As per AMS-II.), the emissions reduction by the project activity in year y is calculated directly as follows.

$$ER_y = NES_y * EF_{CO_2,ELEC,y}$$

Where:

$EF_{CO_2,ELEC,y}$ = Emission factor in year y calculated in accordance with the provisions in AMS I.D
(tCO₂/MWh)

ER_y = Emission reductions in year y (tCO₂e)

$$NES_y = \sum Q_{P,l} * (1 - LFR_{i,y}) * ES_i * NTG / (1 - TD_y)$$

$$ES_i = (P_{i,BL} - P_{i,P}) * O_i * 365/1000$$

Where:

NES_y = Net electricity saved in year y (kWh)

$Q_{P,l}$ = Number (quantity) of pieces of equipment of type l distributed under the project activity
(units)

l = Counter for equipment type

ES_i = Estimated annual electricity savings for equipment of type l , for the relevant technology
(kWh)

$LFR_{i,y}$ = Lamp Failure Rate for equipment type l in year y (fraction)

TD_y = 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 " l " lighting devices (Watts) or

75W if the baseline lighting device is a 100W ICL and the project lighting device a 20W CFL¹

P_i, P_j = Rated power of the project lighting devices of the group of "i" lighting devices (Watts)

O_i = Average daily operating hours of the lighting devices replaced by the group of "i" lighting devices

The monitored Lamp Failure Rate (LFR_y), the % of lamps that have failed, is calculated based on the results of the ex-post surveys as follows:

$$LFR_y = 1 - (N_{OK,s} / N_{sample,s})$$

Survey #	Sampling Frame	N _{OK,s}	N _{sample,s}	LFR _{i,y}
1) April 2008	Phase 1 CFLs	84	100	0.160
2) October 2009	Phase 1 CFLs	88	100	0.120
	Phase 2 CFLs	160	200	0.200
3) June 2011	Phase 1 CFLs	58	110	0.473
	Phase 2 CFLs	74	125	0.408
	Phase 3 CFLs	77	120	0.358

Based on the information available at validation (initial surveys) the PP has calculated the ex-ante LFR. Documentation with the calculations has been provided to AENOR .

Year	Sep 07 - Aug 08	Sep 08 - Aug 09	Sep 09 - Aug 10	Sep 10 - Aug 11	Sep 11 - Aug 12		
	1	2	3	4	5		
LFR _{i,y} - Phase 1	0.106	0.213	0.319	0.426	1.000		
Year	Sep 08 - Aug 09	Sep 09 - Aug 10	Sep 10 - Aug 11	Sep 11 - Aug 12	Sep 12 - Aug 13		
	1	2	3	4	5		
LFR _{i,y} - Phase 2	0.106	0.213	0.319	0.426	1.000		
Year	Jun 09 - May 10	Jun 09 - May 11	Jun 09 - May 12	Jun 09 - May 13	Jun 09 - May 14		
	1	2	3	4	5		
LFR _{i,y} - Phase 3	0.106	0.213	0.319	0.426	1.000		

¹ For conservativeness, and as agreed by the EB following with a request for deviation of AMS-II.] /21/, when a 100W ICL is replaced by a 20W CFL, it is considered in the electricity savings calculations "that 20 W CFL is replacing a 75 W incandescent bulb (which is the next available standard wattage of incandescent bulb for which the light output of 20 W CFL will be equivalent or higher)".

LFR ex-ante calculations VS ex-post measured values			
Phase #	Ex-post Survey #	Ex-ante calculation	Monitored value
1	1 (Apr 2008)	0.106	0.160
	2 (Oct 2009)	0.319	0.120
	3 (Jun 2011)	0.426	0.473
2	1 (Oct 2009)	0.213	0.200
	2 (June 2011)	0.319	0.408
3	1 (June 2011)	0.213	0.358

A result of these calculations in most cases the ex-ante LFR is lower than the actual LFR. Following the UNFCCC clarification SSC_354, and in the absence of a mortality curve developed in accordance with a national or international standard, the ex-post LFR is used in those cases in which it is higher than the ex-ante LFR. In order to be conservative, the ex-ante LFR is used when it is higher than the monitored value. This is considered a conservative approach. Also, LFR values have been calculated from the date of completion of the installation of all equipment, and thus it is in accordance with UNFCCC clarification SSC_670.

With respect to $Q_{p,l}$, since the quantity of collected ICLs and distributed CFLs do not match (fewer ICLs than CFLs), the ER calculation considers only as many CFLs as correspond to a collected ICL, to ensure conservativeness.

The detailed CERs calculation has been assessed by the verification team. The calculation has been reproduced obtaining the same result. AENOR considers the calculation to be correct and the assumptions conservatives.

For Component 2

As per AMS-II.C, the emissions reduction by the project activity in year y is calculated directly as follows.

$$ER_y = (E_{BL} - E_{PJ}) * EF_{grid} * (\% \text{ in operation})$$

Where:

ER_y = Annual reduction of GHG emissions

BE_y = Annual GHG emissions in baseline scenario

PE_y = Annual GHG emissions in project scenario

E_{BL} = Annual electricity consumption by the ICLs in the baseline scenario

E_{PJ} = Annual electricity consumption by the CFLs in the project scenario

EF_{grid} = Emission Factor of the connected grid

% in operation = percent of sampled CFLs which are functional (based on ex-post survey)

$$E_{BL \text{ or } PJ} = \sum (N_i * P_{i,BL \text{ or } PJ} * O_i) / (1 - l_y)$$

Where:

$E_{BL \text{ or } PJ}$ = annual energy baseline (BL) or project (PL) in kWh per year

N_i = the number of devices installed of the group i devices

$P_{i,BL \text{ or } PL}$ = the power of the device installed of the group i devices (either recorded for CFLs or assumed for ICLs)

O_i = the average annual operating hours of the devices

l_y = Average annual technical grid losses (transmission and distribution) during year y for the grid serving the locations where the devices are installed, expressed as a fraction.

The percentage of functioning non metered CFLs (64%) is used to discount the energy savings and thus emission reductions.

The detailed CERs calculation has been assessed by the verification team. The calculation has been reproduced obtaining the same result. AENOR considers the calculation to be correct and the assumptions conservatives.

Based on the above description, total emission reductions have been conservatively calculated to be **23,491** tCO₂e.

The emission reductions for the monitoring period 30 May 2010 – 31 July 2012 have been compared against the estimated CERs in the registered PDD and the actual verified emission reductions. The actual emission reductions achieved during the current monitoring period are lower than the emission reductions stated in the registered CDM-PDD. A comparison is given in the table below.

Item	Values applied in ex-ante calculation of the registered CDM-PDD	Actual values reached during the monitoring period
Emission reductions (tCO ₂ e)	62,934	23,491

3.9 Quality of Evidence to Determine Emission Reductions

AENOR was able to confirm that the calculations are based on authentic data from the EWSA historical records and on the systematic monitoring of the energy savings of the project. The spreadsheets used to calculate these figures and the spreadsheets used to calculate the monthly certified emission reductions (CER) calculations and all figures were tracked, checked and found to be consistent. The monitoring information is stored on the EWSA site server computer with regular and systematic back-ups.

During the verification of the project activity, AENOR assessed the necessary data to verify the emissions reductions claimed by the project participant for the monitoring period. The verification team checked the following evidence and information:

- Manufacturer's specification and performance tests. [22]/[23]
- The features of the measurement equipment installed.
- Ex-post monitoring survey reports.
- Third party certification reports.
- Handwritten records.
- Customer interviews.

The verification team can confirm that sufficient evidence is available for the whole monitoring period and the same is verifiable and that the data collection system meets the requirements of the monitoring plan and the applied methodology according to the assessment carried out on site and in the document review.

3.10 Management System and Quality Assurance

During the on-site visit, the verification team carried out an identification of quality control and quality assurance procedures to prevent or identify and correct any errors or omissions in the reported monitoring parameters, and verified the level of implementation of the management system and Quality Assurance required by the monitoring plan.

During the on-site visit, the audit team could verify that monitoring systems and all applied procedures are in compliance with the monitoring plan and the approved methodology. The

different QA/QC procedures established in the monitoring plan are applied. The internal procedures assessed during the onsite visit are the following:

- Instructions for the CFL Lamps Distribution Project /24/
- Instructions for the CFL Lamps Distribution Project monitoring surveys /25/
- Database for CFLs distribution

3.11 Hints for next periodic Verification

A FAR has been raised. During the following verification process, 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.

4 VERIFICATION AND CERTIFICATION STATEMENT

Reporting period: From 30/05/2010 to 31/07/2012

Verified emission reductions in the above reporting period:

Emission reductions: 23,491 tCO₂equivalent

AENOR has performed the verification of the emission reductions of the Rwanda Electrogaz Compact Fluorescent Lamp (CFL) distribution project for the period 30/05/2010 to 31/07/2012.

Our 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.

We planned and performed our work to obtain the information and explanations 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 monitoring plan included in the registered PDD and the monitoring report version 5, are fairly stated.

We conducted our verification having regard to the monitoring plan included in the Project Design Document, and the applied baseline 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.

We have verified whether the information included in the monitoring report version 5 is correct and that the emissions reductions achieved have been determined correctly.

In our opinion, GHG emissions reported for the project in monitoring report version 5 are fairly stated

The GHG emission reductions were calculated correctly on the basis of the approved baseline and monitoring methodologies AMS-II.J. version 3, AMS-II.C. version 11 and the monitoring plan and formulae provided in the registered PDD.

AENOR is able to certify that the emission reductions from the Rwanda Electrogaz Compact Fluorescent Lamp (CFL) distribution project for the period 30/05/2010 to 31/07/2012 amount to **23,491 tCO₂** equivalent.

Madrid, 18 June 2014.



Pablo Taboada

Chief Verifier



Luis Robles

Authorized person

5 CLARIFICATION, CORRECTIVE ACTION REQUESTS AND FORWARD ACTION REQUEST

PROJECT ACTIVITY	Rwanda Electrogaz Compact Fluorescent Lamp (CFL) distribution project		
FINDING	N° 1		
Classification	CAR <input type="checkbox"/>	CL <input type="checkbox"/>	FAR <input checked="" type="checkbox"/>
Description of finding <i>Describe the finding in unambiguous style; address the context (e.g. section)</i>	<p>During validation AENOR has raised a Forward Action Request to check the implementation of the environmental mitigations measures at the verification stage of the project (FAR 1).</p> <p>An environmental analysis has been made but it is awaiting the local authorities' approval. Exchanged ICLs and failed CFLs have not been destroyed and they are still stored in a warehouse.</p> <p>This FAR is still open, and its resolution will be linked with the final decision of local environmental authorities.</p>		
PP RESPONSE #1	<i>This section shall be filled by the PP.</i>		
<i>It shall address the corrective action taken in details</i>	<p>The final environmental impact assessment (EIA) report regarding the management of waste including incandescent light bulbs collected and faulty CFLs has been prepared by the National University of Rwanda. The report has been sent to the Rwanda Development Board (RDB) which is entitled to approve EIAs in Rwanda. The recommendation of the report on ICL disposal could not be implemented in the considered monitoring period. However, necessary actions are being taken to resolve this FAR by implementing the waste management system.</p>		
<i>It shall provide and indentified the evidences proposed (if applicable)</i>			
DOE Assessment #1 <i>The assessment shall encompass all open issues. In case of non-closure additional corrective action and DOE assessments (#2, #3, etc.) shall be added</i>	<p>The following issues should be clarified:</p> <p>Is already approved the EIA?</p> <p>Is already implemented the waste management system?</p> <p>Which actions have been taken related with the waste management system?</p>		
PP RESPONSE #2			
<i>Corrective action</i>	<p>The EIA has not been approved yet because the Environmental agency requested certain clarifications on the technology to be used to destroy the ICLs. Please find attached the approval by the environmental agency on the selection of technology.</p> <p>As soon as EWSA receives the approval from REMA it will start the implementation of the destruction of the ICLs.</p>		
<i>Evidences proposed</i>	REMA certificate		
DOE Assessment #2	<p>AENOR has received the clearance letter from The Rwanda Environment Management Authority (Rema) of the project on destruction of 300,000 ICLs. The letter is dated on 10 June 2013.</p> <p>This FAR is CLOSED</p>		
Conclusion <i>Tick the appropriate checkbox</i>	CAR/CL CLOSED <input checked="" type="checkbox"/>	To be checked during the periodic verification <input type="checkbox"/>	

PROJECT ACTIVITY	Rwanda Electrogaz Compact Fluorescent Lamp (CFL) distribution project		
FINDING	N° 2		
Classification	CAR <input type="checkbox"/>	CL <input type="checkbox"/>	FAR <input checked="" type="checkbox"/>
Description of finding <i>Describe the finding in unambiguous style; address the context (e.g. section)</i>	During the following verification process, 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.		
PP RESPONSE #1	<i>This section shall be filled by the PP.</i>		
<i>It shall address the corrective action taken in details</i>			
<i>It shall provide and indentified the evidences proposed (if applicable)</i>			
DOE Assessment #1 <i>The assessment shall encompass all open issues. In case of non-closure additional corrective action and DOE assessments (#2, #3, etc.) shall be added</i>			
PP RESPONSE #2			
<i>Corrective action</i>			
<i>Evidences proposed</i>			
DOE Assessment #2			
Conclusion <i>Tick the appropriate checkbox</i>	CAR/CL CLOSED <input type="checkbox"/>	To be checked during the periodic verification <input checked="" type="checkbox"/>	

PROJECT ACTIVITY	Rwanda Electrogaz Compact Fluorescent Lamp (CFL) distribution project		
FINDING	N° 1		
Classification	CAR <input checked="" type="checkbox"/>	CL <input type="checkbox"/>	FAR <input type="checkbox"/>
Description of finding <i>Describe the finding in unambiguous style; address the context (e.g. section)</i>	There is no reference in the Monitoring Report (MR) to the deviation of the methodology approved during validation. Deviation shall be referred in the MR.		
PP RESPONSE #1	<i>This section shall be filled by the PP.</i>		
<i>It shall address the corrective action taken in details</i>	On 17 November 2009 (before registration), the EB approved, following a request for deviation, to allow under AMS-II.] the replacement of a 100W ICL by a 20W CFL in this specific project. This deviation which does not apply exclusively to this monitoring period is clarified in the monitoring report.		
<i>It shall provide and indentified the evidences proposed (if applicable)</i>			
DOE Assessment #1 <i>The assessment shall encompass all open issues. In case of non-closure additional corrective action and DOE assessments (#2, #3, etc.) shall be added</i>	A reference to the deviation has been included in the MR. THIS CAR IS CLOSED		
PP RESPONSE #2	<i>This section shall be filled by the PP.</i>		
<i>Corrective action</i>			
<i>Evidences proposed</i>			
DOE Assessment #2			
Conclusion <i>Tick the appropriate checkbox</i>	CAR/CL CLOSED <input checked="" type="checkbox"/>	To be checked during the periodic verification <input type="checkbox"/>	

PROJECT ACTIVITY	Rwanda Electrogaz Compact Fluorescent Lamp (CFL) distribution project		
FINDING	N° 2		
Classification	CAR <input checked="" type="checkbox"/>	CL <input type="checkbox"/>	FAR <input type="checkbox"/>
Description of finding <i>Describe the finding in unambiguous style; address the context (e.g. section)</i>	The last monitoring report form version shall be used.		
PP RESPONSE #1	<i>This section shall be filled by the PP.</i>		
<i>It shall address the corrective action taken in details</i>	The monitoring report form has been converted to Version 03.2 under VVS track.		
<i>It shall provide and indentified the evidences proposed (if applicable)</i>			
DOE Assessment #1 <i>The assessment shall encompass all open issues. In case of non-closure additional corrective action and DOE assessments (#2, #3, etc.) shall be added</i>	This CAR is CLOSED		
PP RESPONSE #2	<i>This section shall be filled by the PP.</i>		
<i>Corrective action</i>			
<i>Evidences proposed</i>			
DOE Assessment #2			
Conclusion <i>Tick the appropriate checkbox</i>	CAR/CL CLOSED <input checked="" type="checkbox"/>	To be checked during the periodic verification <input type="checkbox"/>	

PROJECT ACTIVITY	Rwanda Electrogaz Compact Fluorescent Lamp (CFL) distribution project		
FINDING	N° 3		
Classification	CAR <input checked="" type="checkbox"/>	CL <input type="checkbox"/>	FAR <input type="checkbox"/>
Description of finding <i>Describe the finding in unambiguous style; address the context (e.g. section)</i>	<p>Further explanations and information (records, evidence) shall be provided to show the monitoring of parameters such as :</p> <ul style="list-style-type: none"> - Files with data from the Phase 1: information from each branch and a compilation of all. - Database from Phases 2&3. - The summary of all the information of the project adapted to the monitoring period. - Sheet "Component 2" shows 136 installed meters, however, sheet "hours meters verification report" shows in column "meters" an accumulative of 112 meters. All the information on the hour meters installed from Component 1 shall be provided. The total amount of "hour meters" installed should be clarified. It should be provided further information (evidence) to trace the number of installed meters with number of customers. - Evidence on the tests made with the hourly meters and documentation/communications provided by the manufacturer around the procedures for calibration - Reports of post-installation surveys (both Components), with the form used as questionnaire. 		
PP RESPONSE #1	<i>This section shall be filled by the PP.</i>		
<i>It shall address the corrective action taken in details</i>	<ul style="list-style-type: none"> - The project database is provided for Phase 1, Phase 2 and Phase 3 showing the details of the CFLs distribution data and ICL collection for each branch and in aggregated way. - The final number of lamps considered for the emission reductions calculation are computed from information submitted by each branch - The summary of all information are adapted for the monitoring period - The number of hour meters has been corrected in sheet "Component 2" to match the total number of meters actually installed. The information of all meters involved in Component 2 is provided along with the evidence of the account number from the customer service database. There are no hour meters installed for component 1 as per the requirement of AMS II.). - As per the meter manufacturer specification, there is no calibration needed for the supplied hour meters since these meters are counters based on an electrical reset. This is confirmed through an e-mail communication between the PE and the supplier. In addition, the PE conducted internal tests that confirmed the well-functioning of the hour meters. - The post-installation surveys are carried out using a sampling method applied to each phase separately. The survey reports and the questionnaire are provided to the DOE. The filled questionnaires were presented to the DOE during the site visit. 		
<i>It shall provide and indentified the evidences proposed (if applicable)</i>			
DOE Assessment #1 <i>The assessment shall encompass all open issues. In case of non-closure additional corrective action and DOE assessments (#2, #3, etc.) shall be added</i>	<p>All the information requested has been provided and it is deemed to be correct with the following exceptions: It should be included in the MR an explanation of the calculation of the number of "hour meters" to be installed in Component 2, and a clarification of the suitability of the schedule of the "hour meter" readings to the current monitoring period. THIS CAR IS STILL OPEN</p>		

<p>PP RESPONSE #2</p>	<p>According to the approved monitoring plan, meters are installed on each of the CFLs distributed to every 1000th new customer (i.e. 0.1% of CFLs distributed) who benefits from the project. The number of hour meters to be installed in Component 2 was equal to the total number of CFLs distributed, which were 96,513 for Component 2, divided by 1000, giving a sample size of 96.5 (97) for the hour meters. 140 hour meters were installed, an oversample of 44%.</p> <p>Upon follow-up by the project entity, 51 of the installed hour meters were observed to be defective, lost or inaccessible. Therefore the number of hour meters that potentially could provide valid information was 89; these provided an average of 5.9 hours/day. Upon checking the reliability of these results, it was found that the precision did not achieve the 95/15 level (as specified in the PDD for this parameter); the precision was 18%.</p> <p>As per the "General Guidelines for sampling and surveys for small-scale CDM project activities" version 1, page 7, a quality control and assurance methodology was applied to the project, and all values above 12 hours were considered outliers. This was based on the conservative approach that there is an average of 12 nighttime hours per day (actually this the shortest day in the year, i.e. June 2). This resulted in 77 valid readings, with a much lower mean of 4.4 hours and a precision of 14.23%, satisfying the 95/15 level specified in the PDD. Actually, the minimum sample size required to achieve 95/15 level using the mean value and standard deviation from the 77 acceptable reading is found to be only 36 meters.</p> <p>Furthermore, the Guidelines for Sampling and Surveys for CDM Project Activities and Programme of Activities, Version 4.0, has been applied to double check the validity of sampling approach and it has been concluded that only 36 meters are actually needed to meet the 95/15 confidence and precision using the mean operating hour and the standard deviation</p> $\sqrt{(1-f) \frac{s^2}{n}}$ <p>refer "Component 2 Monitored Oi" in ERs calculation spreadsheet.</p> <p>The monitoring period has been extended up to 31 July 2012 in order to include all the "hour meter" readings.</p>		
<p>DOE Assessment #2</p>	<p>An explanation has been included in the MR. AENOR considers it is correct and clear. Based on the above checking, it has been deemed that the number of 77 meters used to derive the average operating hours used for ER calculation is correct and conservative. Due the extension of the monitoring period, the schedule of "hour meter" readings is deemed to be correct. This CAR is CLOSED</p>		
<p>Conclusion <i>Tick the appropriate checkbox</i></p>	<p>CAR/CL CLOSED <input checked="" type="checkbox"/></p>	<p>To be checked during the periodic verification</p>	<input type="checkbox"/>

PROJECT ACTIVITY	Rwanda Electrogaz Compact Fluorescent Lamp (CFL) distribution project		
FINDING	N° 4		
Classification	CAR <input checked="" type="checkbox"/>	CL <input type="checkbox"/>	FAR <input type="checkbox"/>
Description of finding <i>Describe the finding in unambiguous style; address the context (e.g. section)</i>	Control tests of CFLs and the independent certifier report on the collection of ICLs for all phases implemented shall be provided.		
PP RESPONSE #1	<i>This section shall be filled by the PP.</i>		
<i>It shall address the corrective action taken in details</i>	<p>On the control tests of CFLs:</p> <p>Such control tests are not required by the CDM or the PDD.</p> <p>For all phases, as part of the CFLs procurement process, bidders provided CFL test certificates in all phase. The test certificates for Phase 1, 2 & 3 are provided to the DOE.</p> <p>For phase 2 only, the PE conducted a mission in China to participate in the testing of a sample of CFLs in a laboratory. This mission was part of EWSA quality control approach set up in the bidding process of Phase 2, where the selected supplier was requested to finance a trip in a laboratory where a sample of CFLs supplied will be tested in the presence of EWSA staff to witness that the CFLs technical requirements are fulfilled.</p> <p>The Monitoring report was modified accordingly.</p> <p>On the independent certifier report on the collection of ICLs:</p> <p>A third party was engaged to certify the number of ICLs collected. The report is currently available for Phase 1. For Phase 2 and Phase 3, such report was not prepared as the record of collected ICLs has been improved and the number of collected and distributed lamps can be generated from the distribution data from each branch.</p>		
<i>It shall provide and indentified the evidences proposed (if applicable)</i>			
DOE Assessment #1 <i>The assessment shall encompass all open issues. In case of non-closure additional corrective action and DOE assessments (#2, #3, etc.) shall be added</i>	<p>Control tests have been provided to the verification team and they are deemed to be correct.</p> <p>On the independent certifier report on the collection of ICLs:</p> <p>As per the monitoring plan included in the registered PDD: "Control of the stock is done by an external party at the end of each phase to ensure consistency between the stock registered and the database". Thus, how is ensured the consistency between the stock registered and the database in phases 2 and 3? THIS CAR IS STILL OPEN.</p>		
PP RESPONSE #2	<i>This section shall be filled by the PP.</i>		
<i>Corrective action</i>	A third party conducted a study to count the number of ICLs collected and stored in EWSA warehouse in Kigali for Phase 2 and Phase 3.		
<i>Evidences proposed</i>	Consultant report		
DOE Assessment #2	AENOR has assessed the third party report and considers the information has been included appropriately in the MR and calculations. THIS CAR IS CLOSED		
Conclusion <i>Tick the appropriate checkbox</i>	CAR/CL CLOSED <input checked="" type="checkbox"/>	To be checked during the periodic verification <input type="checkbox"/>	

PROJECT ACTIVITY		Rwanda Electrogaz Compact Fluorescent Lamp (CFL) distribution project	
FINDING		N° 1	
Classification	CAR <input type="checkbox"/>	CL <input checked="" type="checkbox"/>	FAR <input type="checkbox"/>
Description of finding <i>Describe the finding in unambiguous style; address the context (e.g. section)</i>	<p>Issues to be clarified</p> <ul style="list-style-type: none"> The PP has changed his name from "RECO – RWASCO" to "EWSA". This change has to be noticed to the CDM Team. Evidence of this notification shall be provided. It shall be clarified, in the description of the implementation of the project, the total amount of ICLs recovered by power in each phase and the total amount of CFLs delivered by power in each phase and in each component. A comparison between different lamps during phases and components shall be clearly described. Section A. 1 of the monitoring report refers to 50% for component 2, however PDD refers to 36% 		
PP RESPONSE #1 <i>It shall address the corrective action taken in details</i>	<p><i>This section shall be filled by the PP.</i></p> <ul style="list-style-type: none"> The name of the PP has changed and the MOC has been requested to EB The number of CFLs distributed and ICLs collected with the corresponding wattage has been clarified in the monitoring report. It should be noted that the numbers reported are those cross-checked with information compiled from branches, resulting in lower number compared to actually distributed and collected lamps. This is a mistake. The number is 36% as per the registered PDD. 		
<i>It shall provide and indentified the evidences proposed (if applicable)</i>			
DOE Assessment #1 <i>The assessment shall encompass all open issues. In case of non-closure additional corrective action and DOE assessments (#2, #3, etc.) shall be added</i>	<p>The new MOC has been provided to the DOE. The MR has been updated adequately. Information about number of CFLs distributed and ICLs collected has been corrected. THIS CL IS CLOSED</p>		
PP RESPONSE #2 <i>Corrective action</i>	<p><i>This section shall be filled by the PP.</i></p>		
<i>Evidences proposed</i>			
DOE Assessment #2			
Conclusion <i>Tick the appropriate checkbox</i>	CAR/CL CLOSED <input checked="" type="checkbox"/>	To be checked during the periodic verification <input type="checkbox"/>	

PROJECT ACTIVITY	Rwanda Electrogaz Compact Fluorescent Lamp (CFL) distribution project		
FINDING	N° 2		
Classification	CAR <input type="checkbox"/>	CL <input checked="" type="checkbox"/>	FAR <input type="checkbox"/>
Description of finding <i>Describe the finding in unambiguous style; address the context (e.g. section)</i>	Further explanations shall be provided regarding the delay in the project implementation.		
PP RESPONSE #1	<i>This section shall be filled by the PP.</i>		
<i>It shall address the corrective action taken in details</i>	Mainly due to procurement delays		
<i>It shall provide and identified the evidences proposed (if applicable)</i>			
DOE Assessment #1 <i>The assessment shall encompass all open issues. In case of non-closure additional corrective action and DOE assessments (#2, #3, etc.) shall be added</i>	Documentation related to the procurement process has been reviewed. Information has been included in the MR. THIS CL IS CLOSED		
PP RESPONSE #2	<i>This section shall be filled by the PP.</i>		
<i>Corrective action</i>			
<i>Evidences proposed</i>			
DOE Assessment #2			
Conclusion <i>Tick the appropriate checkbox</i>	CAR/CL CLOSED <input checked="" type="checkbox"/>	To be checked during the periodic verification <input type="checkbox"/>	

PROJECT ACTIVITY	Rwanda Electrogaz Compact Fluorescent Lamp (CFL) distribution project		
FINDING	N° 3		
Classification	CAR <input type="checkbox"/>	CL <input checked="" type="checkbox"/>	FAR <input type="checkbox"/>
Description of finding <i>Describe the finding in unambiguous style; address the context (e.g. section)</i>	Section D2 of Monitoring Report identifies Rated power of the baseline ICLs as default value. It shall be clarified if it is measured or default		
PP RESPONSE #1	<i>This section shall be filled by the PP.</i>		
<i>It shall address the corrective action taken in details</i>	The value is measured as taken from ICLs nameplates when they are exchanged against CFLs. This is corrected in the monitoring report.		
<i>It shall provide and indentified the evidences proposed (if applicable)</i>			
DOE Assessment #1 <i>The assessment shall encompass all open issues. In case of non-closure additional corrective action and DOE assessments (#2, #3, etc.) shall be added</i>	Correct information has been included in the MR. THIS CL IS CLOSED		
PP RESPONSE #2	<i>This section shall be filled by the PP.</i>		
<i>Corrective action</i>			
<i>Evidences proposed</i>			
DOE Assessment #2			
Conclusion <i>Tick the appropriate checkbox</i>	CAR/CL CLOSED <input checked="" type="checkbox"/>	To be checked during the periodic verification	<input type="checkbox"/>

PROJECT ACTIVITY	Rwanda Electrogaz Compact Fluorescent Lamp (CFL) distribution project		
FINDING	N° 4		
Classification	CAR <input type="checkbox"/>	CL <input checked="" type="checkbox"/>	FAR <input type="checkbox"/>
Description of finding <i>Describe the finding in unambiguous style; address the context (e.g. section)</i>	<p>It shall be clarified data used in section D.3 of the monitoring report to select the clusters in phase 1. Specifically, if 48023 really correspond to the cumulative population of phase 1 since 48827 units were distributed according to data in section D.2. Likewise, evidence of value "11" used to determine the branches.</p> <p>In this regard, it should be assessed the fulfillment of sampling design with Annex 4, EB 69 and Annex 5 EB 69.</p>		
PP RESPONSE #1	<i>This section shall be filled by the PP.</i>		
<i>It shall address the corrective action taken in details</i>	<p>The type of sampling implemented was multi-stage sampling, where in the first stage, clusters were chosen randomly, and in the second stage, 5 households were sampled within each cluster. The participating EWSA branches, through which distribution is organized, were the clusters on which the first stage of random sampling was implemented. Clusters were chosen randomly until enough had been selected to fulfill the minimum sample size requirement. For example, for Phase 1, the CFL sample size was 110, and there were 2 CFLs per household. The survey company pre-defined that they would sample 5 households per cluster. Thus, 110 CFLs divided by (2 bulbs * 5 households) = 11 clusters (branches).</p> <p>In the current version of the MR, 43,119 bulbs are considered in Phase 1 for emission reduction calculations, because there is traceable evidence of them in the branch distribution reports (even though as many as 49,314 were distributed under the project); this is conservative as the sample size is calculated on a larger population (so high sample size expected) than the population used to calculate ERs. The sampling interval applied to select clusters and households for sampling covers the entire population of bulbs included in the emission reduction calculations; hence, there is no impact on the results due to the sampling approach, despite absolute differences in the number of bulbs considered for ER calculations (43,119) and the total population reported in the survey report (48,023).</p>		
<i>It shall provide and indentified the evidences proposed (if applicable)</i>			
DOE Assessment #1 <i>The assessment shall encompass all open issues. In case of non-closure additional corrective action and DOE assessments (#2, #3, etc.) shall be added</i>	<p>It is not clear the origin of the data used to calculate de sample size for the survey of phase 1(48,023) taking into account the amount of bulbs designed to be distributed (49,314). THIS CL IS STILL OPEN</p>		
PP RESPONSE #2	<i>This section shall be filled by the PP.</i>		
<i>Corrective action</i>	<p>There were a number of earlier draft versions of the lamps records reports; one of these was consulted by the third party consultant to determine the number bulbs to sample. The final number of CFL allocated to branches is 49,314 while the number distributed CFLs is lower (43,119). Finally, the number used for ERs calculation is taken conservatively as the number of ICLs collected and checked (i.e. 40,328).</p> <p>It is worth to explain that as such these numbers do not affect the correct implementation of the sampling approach and the appropriateness of ER calculation. For instance, for Phase 1, the sampling interval is 4,366 (48023/11). Applying a total number of 43,119 (distributed CFL) or 40,328 (CFL used in ER calculation), a household will be picked up every 3,919 or 3,666 interval for survey until the number of households and CFL required in the sampling plan is reached. Basically, the overall number of CFL surveyed will</p>		

	remain the same, it is only which household will be selected that could change preserving the randomness of the selection. To avoid any further confusion, the illustration has been removed from the monitoring report.	
<i>Evidences proposed</i>		
DOE Assessment #2	OK. The explanations have been deemed to be correct. THIS CL IS CLOSED	
Conclusion <i>Tick the appropriate checkbox</i>	CAR/CL CLOSED <input checked="checked" type="checkbox"/>	To be checked during the periodic verification <input type="checkbox"/>

PROJECT ACTIVITY	Rwanda Electrogaz Compact Fluorescent Lamp (CFL) distribution project		
FINDING	N° 5		
Classification	CAR <input type="checkbox"/>	CL <input checked="" type="checkbox"/>	FAR <input type="checkbox"/>
Description of finding <i>Describe the finding in unambiguous style; address the context (e.g. section)</i>	It shall be clarified according to calculations for component 2, the start date of CFLs in phase 3 and the end date. Based on calculations, in January 2011 all package is distributed, however in other sections is identified Dec2010. However, monitoring report in section D.3 for Ok,d,m states that first run meters were installed from November 2009 to December 2010.		
PP RESPONSE #1	<i>This section shall be filled by the PP.</i>		
<i>It shall address the corrective action taken in details</i>	In the emission reduction calculations, it is conservatively assumed that CFLs in component 2 start are all operational the month after their distribution. Hence although the distribution ended in December 2010, we assume 100% of bulbs are contributing to emission reductions only from January 2011.		
<i>It shall provide and indentified the evidences proposed (if applicable)</i>			
DOE Assessment #1 <i>The assessment shall encompass all open issues. In case of non-closure additional corrective action and DOE assessments (#2, #3, etc.) shall be added</i>	In the spreadsheet for the calculation for Ok,d,m parameter for component 2, it is used 13 months to describe de distribution of lamps from November 2009 to December 2010 instead of 14 months. THIS CL IS STILL OPEN.		
PP RESPONSE #2	For consistency, 14 months are now utilized for the calculation.		
<i>Corrective action</i>			
<i>Evidences proposed</i>			
DOE Assessment #2	OK. Calculations are clear now. THIS CL IS CLOSED.		
Conclusion <i>Tick the appropriate checkbox</i>	CAR/CL CLOSED <input checked="" type="checkbox"/>	To be checked during the periodic verification	<input type="checkbox"/>

PROJECT ACTIVITY	Rwanda Electrogaz Compact Fluorescent Lamp (CFL) distribution project		
FINDING	N° 6		
Classification	CAR <input type="checkbox"/>	CL <input checked="" type="checkbox"/>	FAR <input type="checkbox"/>
Description of finding <i>Describe the finding in unambiguous style; address the context (e.g. section)</i>	It shall be clarified if section D.2 of the monitoring report for this parameter (Rated power of the project CFLs) should also consider the phase 4.		
PP RESPONSE #1	<i>This section shall be filled by the PP.</i>		
<i>It shall address the corrective action taken in details</i>	This monitoring period does not cover Phase 4 even if the same rated power of CFLs will be involved (already determined in the registered PDD). The evidence for rated power of CFLs included in Phase 4 will be provided when emission reductions are claimed for this phase.		
<i>It shall provide and indentified the evidences proposed (if applicable)</i>			
DOE Assessment #1 <i>The assessment shall encompass all open issues. In case of non-closure additional corrective action and DOE assessments (#2, #3, etc.) shall be added</i>	OK. The explanation is deemed to be correct. THIS CL IS CLOSED.		
PP RESPONSE #2	<i>This section shall be filled by the PP.</i>		
<i>Corrective action</i>			
<i>Evidences proposed</i>			
DOE Assessment #2			
Conclusion <i>Tick the appropriate checkbox</i>	CAR/CL CLOSED <input checked="" type="checkbox"/>	To be checked during the periodic verification <input type="checkbox"/>	

6 REFERENCES

/1/	PDD Rwanda Electrogaz Compact Fluorescent Lamp (CFL) Distribution project (Version 12)
/2/	CDM Validation report. Dated on 10 February 2010
/3/	Approved methodology ASM-II.C (version 11)
/4/	Approved methodology ASM-II.J (version 03)
/5/	Monitoring report. Ver 1
/6/	Monitoring report. Ver 5
/7/	Environmental Impact Assessment for the destruction and disposal of incandescent bulbs and compact fluorescent lamps. National University of Rwanda. November 2012
/8/	Clearance of the project on destruction of 300,000 bulbs. REMA. 10 June 2013
/9/	ICLs Independent Counting Phases1&2&3. Final Reports.
/10/	Contract for supply of Compact Fluorescent Lamps. EWSA
/11/	EWSA CFL Distribution Database
/12/	Post Installation Survey Reports. EWSA (April 2008, October 2009, June 2011)
/13/	Handwritten registers and records. EWSA (several years)
/14/	CFL Test reports & specifications (Phases 1, 2 & 3)
/15/	ICL Estimation of Number. Third Party Report Phase 1.
/16/	ICLs Independent Counting Phase 2&3 Final Report.
/17/	ERs Calculation Rwanda CFL spreadsheet. Excel file.
/18/	Guidelines for Sampling and Surveys for CDM Project Activities and Programme of Activities, Version 2.0
/19/	Guideline: Sampling and surveys for CDM project activities and programmes of activities. Ver. 03.0
/20/	Standard for sampling and surveys for CDM project activities and programme of activities (ver. 04.1)
/21/	Request for deviation from AMS-II. J DEV0264
/22/	Hourmeters Technical Specification. Curtis instruments, INC
/23/	Hourmeter Manual Test report. EWSA Metering Department.
/24/	Instructions for the CFL Lamps Distribution Project. EWSA
/25/	Instructions for the CFL Lamps Distribution Project monitoring surveys: Procedure for light bulbs sampling Rwanda CFL v.1. EWSA

"1st" PERIODIC VERIFICATION

"Rwanda Electrogaz Compact Fluorescent Lamp (CFL) distribution project"

ANNEX 1. CDM VERIFICATION PROTOCOL

PROJECT: Rwanda Electrogaz Compact Fluorescent Lamp (CFL) distribution project

REFERENCE NUMBER: 2012/0018/CDM/15

MONITORING AND REPORTING PERIOD:

FROM 30/05/2010 TO 31/07/2012

1st Periodic Verification

Verification Team: Mercedes García Madero Raquel Del Castillo Jose Luis Fuentes Pablo Taboada	
Version of this Verification Protocol: 5	Date: 16/06/2014

"1st" PERIODIC VERIFICATION

"Rwanda Electrogaz Compact Fluorescent Lamp (CFL) distribution project"

Checklist Question	Ref	Comments	Draft conclusion	Final conclusion
1. Project history				
Open issues from validation <i>Check (in case of 1st periodic verification) whether there are any open issues indicated in the validation report (e.g. FAR) Have they been addressed appropriately?</i>	1.1.	During validation AENOR has raised a Forward Action Request to check the implementation of the environmental mitigations measures at the verification stage of the project (FAR 1). An environmental analysis has been made but it is awaiting the local authorities' approval. Exchanged ICLs and failed CFLs have not been destroyed and they are still stored in a warehouse. AENOR has received the clearance letter from The Rwanda Environment Management Authority (Rema) of the project on destruction of 300,000 ICLs. The letter is dated on 10 June 2013. This FAR is CLOSED.	FAR 1	OK
Open issues from previous verification <i>Check (in case of further periodic verifications) whether there are any open issues indicated in previous verification (FAR) Have they been addressed appropriately?</i>	1.2.	N/A. This is the first verification	N/A	N/A
Requests for Deviations/Revisions of Monitoring Plan <i>Check if there have been any requests for deviations from the monitoring methodology or requests for revisions of the monitoring plan. If any, make sure that they are considered during verification</i>	1.3.	The EB agreed, following a request for deviation, to allow under AMS-II.) the replacement of a 100W ICL by a 20W CFL in this specific project. CAR 1. There is no reference in the Monitoring Report (MR) to the deviation of the methodology approved during validation. Deviation shall be referred in the MR. A reference to the deviation has been included in the MR. This CAR is closed.	CAR 1	OK
2. Project implementation in accordance with the registered project design document				
<i>Has the CDM project activity been implemented as per the registered PDD?</i>	2.1.	CL1: Issues to be clarified <ul style="list-style-type: none"> The PP has changed his name from "RECO - RWASCO" to "EWSA". This change has to be noticed to the CDM Team. Evidence of this notification shall be provided. It shall be clarified, in the description of the implementation of the project, the total amount of ICLs recovered by power in each phase and the total amount of CFLs delivered by power in each phase and in each component. A comparison between different lamps during phases and components shall be clearly described. Section A. 1 of the monitoring report refers to 50% for component 2, however PDD refers to 36% The new MOC has been provided to the DOE. The MR has been updated adequately. Information about number of CFLs distributed and ICLs collected has been corrected. THIS CL IS CLOSED The CDM project activity has been implemented as per the registered PDD.	Cl1	OK

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Checklist Question	Ref	Comments	Draft conclusion	Final conclusion
Are all physical features of the CDM project activity proposed in the registered PDD, in place? All figures and features included in the registered PDD shall be checked during the on-site visit. Any discrepancy found shall be reported and the post registration changes procedure shall be applied.	2.2.	Yes, all physical features of the CDM project activity proposed in the registered PDD are in place. All figures and features included in the registered PDD have been checked during the on-site visit.	FAR 1, CL 1	OK
Have the project participants operated the CDM project activity as per the registered PDD?	2.3.	Yes, the project participants have operated the CDM project activity as per the registered PDD.	FAR 1, CL 1	OK
Actual status of installation works Project installation should be finished at time of initial verification in so far as the project should be ready to generate emission reductions afterwards. It shall be clearly described the starting date of operation and the progress of the project activity? Is the implementation delayed? What were the reasons for the delay?	2.4.	CL2 Further explanations shall be provided regarding the delay in the project implementation. This CL is Closed Actual status and project development are clearly described in the MR.	CL2	OK
Contractors for equipment and installation works Who has installed the equipment? Who was contracted for planning etc.?	2.5.	EWSA (Rwanda Energy, Water and Sanitation Authority).	OK	OK
Project boundaries Check whether the project boundaries are still in compliance with the ones indicated by the PDD.	2.6.	The project boundaries are still in compliance with the ones indicated by the PDD.	OK	OK
On-site visit Was an on-site visit conducted? If not, justify the rationale of the decision.	2.7.	On-site visit was carried out 14-18/01/2013.	OK	OK
3. Update on Changes and Incidents (during the Monitoring Period)				
Incidents Identify if there have been any significant	3.1.	Incidents during the development of the project are detailed in the monitoring report	FAR 1, CL 1	OK

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Checklist Question	Ref	Comments	Draft conclusion	Final conclusion
<i>incidents, deviant operation modes and/or downtimes of the equipment? Consider e.g. interviews with operational personnel, operational log sheets and analysis of performance data.</i>				
<i>Is the information (data and variables) provided in the monitoring report different from that stated in the registered PDD? Has it caused an increase in estimates of the emission reductions in the current monitoring period or is highly likely to increase the estimates of emission reductions in the future monitoring periods?</i>	3.2.	Data and variables provided in the monitoring report have not caused an increase in estimates of the emission reductions.	OK	OK
Personnel <i>Find out, if relevant monitoring personnel have been exchanged? In case of changes, assure that the implemented monitoring procedures have not been affected.</i>	3.3.	No monitoring personnel have been exchanged.	OK	OK
Legislation <i>Find out whether relevant legislation with effect on the project activity in the host country has been changed.</i>	3.4.	No legislation with effect on the project has been changed	OK	OK
4. Monitoring Report – General				
<i>Is the monitoring report (and other supporting documents) provided complete in accordance with latest applicable version of the Issuance information and reporting checklist?</i>	4.1.	Yes, information is complete	OK	OK
<i>Is the Monitoring Report Form (CDM-MR) used by the Project participants in the monitoring report?</i>	4.2.	CAR 2. The last monitoring report form version shall be used. The monitoring report form has been converted to Version 03.2 under VVS track. This CAR is closed.	CAR 2	OK
<i>Is the monitoring report and other</i>	4.3.	Yes, the documents are provided complete.	CAR 2	OK

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<i>supporting documents provided complete in accordance with latest applicable version of the Guidelines for completing the monitoring report form (CDM-MR)?</i>				
Monitoring period <i>Check if the monitoring period is in line with a) the crediting period and/or b) previous monitoring periods?</i>	4.4.	The monitoring period is in line with the crediting period in the PDD.	OK	OK
Publication of Monitoring Report <i>Check if the monitoring report has been made publicly available on the UNFCCC website before the verification commenced.</i>	4.5.	Monitoring report was made publicly available on 11 December 2012	OK	OK
Transparency <i>Assess if the monitoring report is transparent, i.e. clear and unequivocal</i>	4.6.	Yes, the monitoring report is transparent, clear and unequivocal	CAR 2	OK
Misstatements on general issues <i>Assess whether the monitoring report is free of material misstatements regarding issues other than the monitoring parameters. Discuss the monitoring parameters in detail in chapter "Monitoring Parameters".</i>	4.7.	The monitoring report is free of material misstatements regarding issues other than the monitoring parameters.	CAR 2	OK
5. Compliance of the monitoring plan with the monitoring methodology.				
<i>Is the validated monitoring plan of the proposed CDM project activity in accordance with the applied methodology?</i>	5.1.	The monitoring plan is in accordance with the applied methodology.	OK	OK
<i>Are there any monitoring aspects of the project activity that are not specified in the methodology, particularly in the case of small-scale methodologies (e.g. additional monitoring parameters, monitoring frequency and calibration frequency)?</i>	5.2.	No, there aren't	OK	OK
6. Compliance of monitoring with the monitoring plan				

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Checklist Question	Ref	Comments	Draft conclusion	Final conclusion
<i>Is the monitoring of reductions in GHG emissions to result from the proposed CDM project activity implemented in accordance with the monitoring plan contained in the registered PDD or the accepted revised monitoring plan?</i>	6.1.	Yes, the monitoring has been implemented in accordance with the monitoring plan contained in the registered PDD.	OK	OK
<i>Have the monitoring plan and the applied methodology been properly implemented and followed by the project participants?</i>	6.2.	Monitoring plan and applied methodology have been applied properly.	OK	OK
<i>Have all parameters stated in the monitoring plan, the applied methodology and relevant CDM Executive Board decisions been sufficiently monitored and updated as applicable (Project emission, baseline emission, leakage, management and operational system and environmental and social parameters)</i>	6.3.	<p>CAR 3</p> <p>Further explanations and information (records, evidence) shall be provided to show the monitoring of parameters such as :</p> <ul style="list-style-type: none"> - Files with data from the Phase 1: information from each branch and a compilation of all. - Database from Phases 2&3. - The summary of all the information of the project adapted to the monitoring period. - Sheet "Component 2" shows 136 installed meters, however, sheet "hours meters verification report" shows in column "meters" an accumulative of 112 meters. All the information on the hour meters installed from Component 1 shall be provided. The total amount of "hour meters" installed should be clarified. It should be provided further information (evidence) to trace the number of installed meters with number of customers. - Evidence on the tests made with the hourly meters and documentation/communications provided by the manufacturer around the procedures for calibration - Reports of post-installation surveys (both Components), with the form used as questionnaire. <p>All parameters have been sufficiently monitored. An explanation has been included in the MR. AENOR considers it is correct and clear. Based on the checking performed, it has been deemed that the number of 77 meters used to derive the average operating hours used for ER calculation is correct and conservative</p> <p>THIS CAR IS CLOSED</p> <p>FAR 2</p> <p>During the following verification process, 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.</p>	CAR 3	OK FAR 2
<i>Are the responsibilities and authorities for monitoring and reporting in accordance with the responsibilities and authorities stated in the monitoring plan?</i>	6.4.	EWSA replaced to Electrogaz as project implementer, then, this issue shall be updated in the monitoring plan of the PDD. See CL 1.	CL1	OK

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Checklist Question	Ref	Comments	Draft conclusion	Final conclusion
		Once CL1 is closed the MR includes all the responsibilities and authorities for monitoring and reporting in accordance with what is stated in the monitoring plan.		
7. Monitoring Parameters (List all parameters of the PDD chapter B.7.1; pl. copy the lines below for each parameter)				
7.1. "Symbol of parameter: Customer information"	7.1.	"Description: Customer information"		
Measurement Determination method <i>Describe how the monitoring parameter was measured determined.</i> <i>Check if relevant equipment has been exchanged and if in cases of failures downtimes of standard equipment other measurement determination methods have been used.</i> <i>Assess whether the measurement or determination method (data generation, frequency, aggregation, equipment, recording, reporting, standards) is in line with the registered monitoring plan of the PDD and the applied methodology.</i>	7.1.1.	Measured by EWSA	OK	OK
Monitoring Equipment <i>Is the equipment of used for monitoring (quality, type, accuracy, calibration requirements) in accordance with the relevant guidance provided by the CDM Executive Board and is equipment controlled and calibrated in accordance with the monitoring plan?</i>	7.1.2.	N/A	N/A	N/A
Accuracy <i>In case of measured (or estimated) values, check whether significant inaccuracies occur; in this case, make sure that appropriate discounts have been considered for ER calculation.</i>	7.1.3.	N/A	N/A	N/A

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Monitoring results <i>Are monitoring results consistently recorded as per approved frequency?</i>	7.1.4.	Yes. Information is recorded in a central database.	CAR 3	OK
Quality assurance and quality control procedures <i>Have quality assurance and quality control procedures been applied in accordance with the monitoring plan to prevent or identify and correct any errors or omissions in the reported monitoring parameters?</i>	7.1.5.	Yes.	OK	OK
Verification <i>Describe how the value and the information flow (from data generation, aggregation, to recording, calculation and reporting) were verified. Consider the measurement determination procedure, accuracies, QA/QC procedure, source and nature of the evidences. Consider as well plausibility checks as far as possible. Check if the applied value could be backed up by corresponding evidences covering the full monitoring period.</i>	7.1.6.	Database has been provided to the verification team and was reviewed during on-site visit.	OK	OK
7.2. "Symbol of parameter: Distribution Date"	7.2	"Description: Distribution Date"		
Measurement Determination method <i>Describe how the monitoring parameter was measured determined. Check if relevant equipment has been exchanged and if in cases of failures </i>	7.2.1.	Measured by EWSA	OK	OK

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<i>downtimes of standard equipment other measurement determination methods have been used. Assess whether the measurement or determination method (data generation, frequency, aggregation, equipment, recording, reporting, standards) is in line with the registered monitoring plan of the PDD and the applied methodology.</i>				
Monitoring Equipment <i>Is the equipment of used for monitoring (quality, type, accuracy, calibration requirements) in accordance with the relevant guidance provided by the CDM Executive Board and is equipment controlled and calibrated in accordance with the monitoring plan?</i>	7.2.2.	N/A	N/A	N/A
Accuracy <i>In case of measured (or estimated) values, check whether significant inaccuracies occur; in this case, make sure that appropriate discounts have been considered for ER calculation.</i>	7.2.3.	N/A	N/A	N/A
Monitoring results <i>Are monitoring results consistently recorded as per approved frequency?</i>	7.2.4.	Yes. Information is recorded in a central database.	CAR 3	OK
Quality assurance and quality control procedures <i>Have quality assurance and quality control procedures been applied in accordance with the monitoring plan to prevent or identify and correct any errors</i>	7.2.5.	Yes.	OK	OK

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<i>or omissions in the reported monitoring parameters?</i>				
Verification <i>Describe how the value and the information flow (from data generation, aggregation, to recording, calculation and reporting) were verified. Consider the measurement determination procedure, accuracies, QA/QC procedure, source and nature of the evidences. Consider as well plausibility checks as far as possible. Check if the applied value could be backed up by corresponding evidences covering the full monitoring period.</i>	7.2.6	Database has been provided to the verification team and was reviewed during on-site visit.	OK	OK
7.3. "Symbol of parameter: Qp,j,i or Ni	7.3	"Description: Number of pieces of CFLs of type I distributed under the project		
Measurement Determination method <i>Describe how the monitoring parameter was measured determined. Check if relevant equipment has been exchanged and if in cases of failures downtimes of standard equipment other measurement determination methods have been used. Assess whether the measurement or determination method (data generation, frequency, aggregation, equipment, recording, reporting, standards) is in line with the registered monitoring plan of the PDD and the applied methodology.</i>	7.3.1.	Measured by EWSA	OK	OK
Monitoring Equipment <i>Is the equipment of used for monitoring</i>	7.3.2.	N/A	N/A	N/A

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<i>(quality, type, accuracy, calibration requirements) in accordance with the relevant guidance provided by the CDM Executive Board and is equipment controlled and calibrated in accordance with the monitoring plan?</i>				
Accuracy <i>In case of measured (or estimated) values, check whether significant inaccuracies occur; in this case, make sure that appropriate discounts have been considered for ER calculation.</i>	7.3.3.	N/A	N/A	N/A
Monitoring results <i>Are monitoring results consistently recorded as per approved frequency?</i>	7.3.4.	Yes. Information is recorded in a central database.	CAR 3	OK
Quality assurance and quality control procedures <i>Have quality assurance and quality control procedures been applied in accordance with the monitoring plan to prevent or identify and correct any errors or omissions in the reported monitoring parameters?</i>	7.3.5.	Yes.	OK	OK
Verification <i>Describe how the value and the information flow (from data generation, aggregation, to recording, calculation and reporting) were verified. Consider the measurement determination procedure, accuracies, QA/QC procedure, source and nature of the evidences. Consider as well</i>	7.3.6	Database has been provided to the verification team and was reviewed during on-site visit.	OK	OK

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<i>plausibility checks as far as possible. Check if the applied value could be backed up by corresponding evidences covering the full monitoring period.</i>				
7.4. "Symbol of parameter: Pi,pj	7.4	"Description: Rated power of the project CFLs of the group of "i" lighting devices.		
Measurement / Determination method <i>Describe how the monitoring parameter was measured determined. Check if relevant equipment has been exchanged and if in cases of failures downtimes of standard equipment other measurement determination methods have been used. Assess whether the measurement or determination method (data generation, frequency, aggregation, equipment, recording, reporting, standards) is in line with the registered monitoring plan of the PDD and the applied methodology.</i>	7.4.1.	Default value	OK	OK
Monitoring Equipment <i>Is the equipment of used for monitoring (quality, type, accuracy, calibration requirements) in accordance with the relevant guidance provided by the CDM Executive Board and is equipment controlled and calibrated in accordance with the monitoring plan?</i>	7.4.2.	N/A	N/A	N/A
Accuracy <i>In case of measured (or estimated) values, check whether significant inaccuracies occur; in this case, make sure that appropriate discounts have been considered for ER calculation.</i>	7.4.3.	N/A	N/A	N/A

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Monitoring results <i>Are monitoring results consistently recorded as per approved frequency?</i>	7.4.4.	CAR 4 Control tests of CFLs and the independent certifier report on the collection of ICLs for all phases implemented shall be provided. Yes, monitoring results are consistently recorded. This CAR is Closed	CAR 4	OK
Quality assurance and quality control procedures <i>Have quality assurance and quality control procedures been applied in accordance with the monitoring plan to prevent or identify and correct any errors or omissions in the reported monitoring parameters?</i>	7.4.5.	Yes, quality assurance and quality control procedures have been applied in accordance with the monitoring plan	CAR 4	OK
Verification <i>Describe how the value and the information flow (from data generation, aggregation, to recording, calculation and reporting) were verified. Consider the measurement determination procedure, accuracies, QA/QC procedure, source and nature of the evidences. Consider as well plausibility checks as far as possible. Check if the applied value could be backed up by corresponding evidences covering the full monitoring period.</i>	7.4.6	Database has been provided to the verification team and was reviewed during on-site visit.	CAR 4	OK
7.5. "Symbol of parameter: Qbl,i	7.5	"Description: number of pieces of ICLs exchanged under the project.		
Measurement Determination method <i>Describe how the monitoring parameter was measured determined. Check if relevant equipment has been exchanged and if in cases of failures </i>	7.5.1.	Measured by EWSA	OK	OK

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<i>downtimes of standard equipment other measurement determination methods have been used. Assess whether the measurement or determination method (data generation, frequency, aggregation, equipment, recording, reporting, standards) is in line with the registered monitoring plan of the PDD and the applied methodology.</i>				
Monitoring Equipment <i>Is the equipment of used for monitoring (quality, type, accuracy, calibration requirements) in accordance with the relevant guidance provided by the CDM Executive Board and is equipment controlled and calibrated in accordance with the monitoring plan?</i>	7.5.2.	N/A	N/A	N/A
Accuracy <i>In case of measured (or estimated) values, check whether significant inaccuracies occur; in this case, make sure that appropriate discounts have been considered for ER calculation.</i>	7.5.3.	N/A	N/A	N/A
Monitoring results <i>Are monitoring results consistently recorded as per approved frequency?</i>	7.5.4.	Yes, monitoring results are consistently recorded.	CAR 4	OK
Quality assurance and quality control procedures <i>Have quality assurance and quality control procedures been applied in accordance with the monitoring plan to prevent or identify and correct any errors</i>	7.4.5.	Yes, quality assurance and quality control procedures have been applied in accordance with the monitoring plan	CAR 4	OK

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<i>or omissions in the reported monitoring parameters?</i>				
Verification <i>Describe how the value and the information flow (from data generation, aggregation, to recording, calculation and reporting) were verified. Consider the measurement determination procedure, accuracies, QA/QC procedure, source and nature of the evidences. Consider as well plausibility checks as far as possible. Check if the applied value could be backed up by corresponding evidences covering the full monitoring period.</i>	7.4.6	Database has been provided to the verification team and was reviewed during on-site visit.	CAR 4	OK
7.6. "Symbol of parameter: Pi,bl	7.6	"Description: Rated power of the baseline ICLs.		
Measurement Determination method <i>Describe how the monitoring parameter was measured determined. Check if relevant equipment has been exchanged and if in cases of failures downtimes of standard equipment other measurement determination methods have been used. Assess whether the measurement or determination method (data generation, frequency, aggregation, equipment, recording, reporting, standards) is in line with the registered monitoring plan of the PDD and the applied methodology.</i>	7.6.1.	CL 3 Section D2 of Monitoring Report identifies Rated power of the baseline ICLs as default value. It shall be clarified if it is measured or default. The value is measured as taken from ICLs nameplates when they are exchanged against CFLs. This is corrected in the monitoring report. This CL is closed.	CL 3	OK
Monitoring Equipment <i>Is the equipment of used for monitoring (quality, type, accuracy, calibration</i>	7.6.2.	N/A	N/A	N/A

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<i>requirements) in accordance with the relevant guidance provided by the CDM Executive Board and is equipment controlled and calibrated in accordance with the monitoring plan?</i>				
Accuracy <i>In case of measured (or estimated) values, check whether significant inaccuracies occur; in this case, make sure that appropriate discounts have been considered for ER calculation.</i>	7.6.3.	N/A	N/A	N/A
Monitoring results <i>Are monitoring results consistently recorded as per approved frequency?</i>	7.6.4.	Yes, monitoring results are consistently recorded.	CAR 4	OK
Quality assurance and quality control procedures <i>Have quality assurance and quality control procedures been applied in accordance with the monitoring plan to prevent or identify and correct any errors or omissions in the reported monitoring parameters?</i>	7.6.5.	Yes, quality assurance and quality control procedures have been applied in accordance with the monitoring plan	CAR 4	OK
Verification <i>Describe how the value and the information flow (from data generation, aggregation, to recording, calculation and reporting) were verified. Consider the measurement determination procedure, accuracies, QA/QC procedure, source and nature of the evidences. Consider as well plausibility checks as far as possible.</i>	7.6.6	Database has been provided to the verification team and was reviewed during on-site visit.	CAR 4	OK

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Checklist Question	Ref	Comments	Draft conclusion	Final conclusion
<i>Check if the applied value could be backed up by corresponding evidences covering the full monitoring period.</i>				
7.7. "Symbol of parameter: N samples"	7.7	"Description: Number of samples CFLs during the post installation survey"		
Measurement Determination method <i>Describe how the monitoring parameter was measured determined.</i> <i>Check if relevant equipment has been exchanged and if in cases of failures downtimes of standard equipment other measurement determination methods have been used.</i> <i>Assess whether the measurement or determination method (data generation, frequency, aggregation, equipment, recording, reporting, standards) is in line with the registered monitoring plan of the PDD and the applied methodology.</i>	7.7.1.	Measured by EWSA	OK	OK
Monitoring Equipment <i>Is the equipment of used for monitoring (quality, type, accuracy, calibration requirements) in accordance with the relevant guidance provided by the CDM Executive Board and is equipment controlled and calibrated in accordance with the monitoring plan?</i>	7.7.2.	N/A	N/A	N/A
Accuracy <i>In case of measured (or estimated) values, check whether significant inaccuracies occur; in this case, make sure that appropriate discounts have been considered for ER calculation.</i>	7.7.3.	N/A	N/A	N/A

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Monitoring results <i>Are monitoring results consistently recorded as per approved frequency?</i>	7.7.4.	CL 4. It shall be clarified data used in section D.3 of the monitoring report to select the clusters in phase 1. Specifically, if 48023 really correspond to the cumulative population of phase 1 since 48827 units were distributed according to data in section D.2. Likewise, evidence of value "11" used to determine the branches. In this regard, it should be assessed the fulfillment of sampling design with Annex 4, EB 69 and Annex 5 EB 69. Once clarified these issues, this CL is closed. Yes, monitoring results are consistently recorded	CL 4, CAR 3	OK
Quality assurance and quality control procedures <i>Have quality assurance and quality control procedures been applied in accordance with the monitoring plan to prevent or identify and correct any errors or omissions in the reported monitoring parameters?</i>	7.7.5.	Yes, quality assurance and quality control procedures have been applied in accordance with the monitoring plan	CL 4	OK
Verification <i>Describe how the value and the information flow (from data generation, aggregation, to recording, calculation and reporting) were verified. Consider the measurement determination procedure, accuracies, QA/QC procedure, source and nature of the evidences. Consider as well plausibility checks as far as possible. Check if the applied value could be backed up by corresponding evidences covering the full monitoring period.</i>	7.7.6	Database has been provided to the verification team and was reviewed during on-site visit.	CL 4	OK
7.8. "Symbol of parameter: Nok	7.8	"Description: Number of sampled CFLs functional during the post installation surveys.		
Measurement / Determination	7.8.1.	Measured by EWSA	OK	OK

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method <i>Describe how the monitoring parameter was measured determined.</i> <i>Check if relevant equipment has been exchanged and if in cases of failures downtimes of standard equipment other measurement determination methods have been used.</i> <i>Assess whether the measurement or determination method (data generation, frequency, aggregation, equipment, recording, reporting, standards) is in line with the registered monitoring plan of the PDD and the applied methodology.</i>				
Monitoring Equipment <i>Is the equipment of used for monitoring (quality, type, accuracy, calibration requirements) in accordance with the relevant guidance provided by the CDM Executive Board and is equipment controlled and calibrated in accordance with the monitoring plan?</i>	7.8.2.	N/A	N/A	N/A
Accuracy <i>In case of measured (or estimated) values, check whether significant inaccuracies occur; in this case, make sure that appropriate discounts have been considered for ER calculation.</i>	7.8.3.	N/A	N/A	N/A
Monitoring results <i>Are monitoring results consistently recorded as per approved frequency?</i>	7.8.4.	CL 4. It shall be clarified data used in section D.3 of the monitoring report to select the clusters in phase 1. Specifically, if 48023 really correspond to the cumulative population of phase 1 since 48827 units were distributed according to data in section D.2. Likewise, evidence of value "11" used to determine the branches. In this regard, it should be assessed the fulfillment of sampling design with Annex 4, EB 69 and Annex 5	CL 4, CAR 3	OK

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		EB 69. Once clarified these issues, this CL is closed. Yes, monitoring results are consistently recorded		
Quality assurance and quality control procedures <i>Have quality assurance and quality control procedures been applied in accordance with the monitoring plan to prevent or identify and correct any errors or omissions in the reported monitoring parameters?</i>	7.8.5.	Yes, quality assurance and quality control procedures have been applied in accordance with the monitoring plan	CL 4	OK
Verification <i>Describe how the value and the information flow (from data generation, aggregation, to recording, calculation and reporting) were verified. Consider the measurement determination procedure, accuracies, QA/QC procedure, source and nature of the evidences. Consider as well plausibility checks as far as possible. Check if the applied value could be backed up by corresponding evidences covering the full monitoring period.</i>	7.8.6	Database has been provided to the verification team and was reviewed during on-site visit.	CL 4	OK
7.9. "Symbol of parameter: Ni	7.9	"Description: Number of pieces of CFLs distributed during the project"		
Measurement Determination method <i>Describe how the monitoring parameter was measured determined. Check if relevant equipment has been exchanged and if in cases of failures downtimes of standard equipment other measurement determination methods</i>	7.9.1.	Measured by EWSA	OK	OK

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<i>have been used. Assess whether the measurement or determination method (data generation, frequency, aggregation, equipment, recording, reporting, standards) is in line with the registered monitoring plan of the PDD and the applied methodology.</i>				
Monitoring Equipment <i>Is the equipment of used for monitoring (quality, type, accuracy, calibration requirements) in accordance with the relevant guidance provided by the CDM Executive Board and is equipment controlled and calibrated in accordance with the monitoring plan?</i>	7.9.2.	N/A	N/A	N/A
Accuracy <i>In case of measured (or estimated) values, check whether significant inaccuracies occur; in this case, make sure that appropriate discounts have been considered for ER calculation.</i>	7.9.3.	N/A	N/A	N/A
Monitoring results <i>Are monitoring results consistently recorded as per approved frequency?</i>	7.8.4.	<p>CL 5. It shall be clarified according to calculations for component 2, the start date of CFLs in phase 3 and the end date. Based on calculations, in January 2011 all package is distributed, however in other sections is identified Dec 2010. However, monitoring report in section D.3 for Ok,d,m states that first run meters were installed from November 2009 to December 2010.</p> <p>Although the distribution ended in December 2010, it is assumed 100% of bulbs are contributing to emission reductions only from January 2011.</p> <p>Information is recorded in a central database.</p> <p>Once clarified these issues, this CL is closed.</p> <p>Yes, monitoring results are consistently recorded</p>	CAR 3 CL 5	OK
Quality assurance and quality control procedures	7.9.5.	Yes	OK	OK

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Checklist Question	Ref	Comments	Draft conclusion	Final conclusion
<i>Have quality assurance and quality control procedures been applied in accordance with the monitoring plan to prevent or identify and correct any errors or omissions in the reported monitoring parameters?</i>				
Verification <i>Describe how the value and the information flow (from data generation, aggregation, to recording, calculation and reporting) were verified. Consider the measurement determination procedure, accuracies, QA/QC procedure, source and nature of the evidences. Consider as well plausibility checks as far as possible. Check if the applied value could be backed up by corresponding evidences covering the full monitoring period.</i>	7.9.6	Database has been provided to the verification team and was reviewed during on-site visit.	OK	OK
7.10. "Symbol of parameter: Pi,pj"	7.10	"Description: Rated power of the project CFLs"		
Measurement Determination method <i>Describe how the monitoring parameter was measured determined. Check if relevant equipment has been exchanged and if in cases of failures downtimes of standard equipment other measurement determination methods have been used. Assess whether the measurement or determination method (data generation, frequency, aggregation, equipment, recording, reporting, standards) is in line with the registered monitoring plan of the</i>	7.10.1.	Default value	OK	OK

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Checklist Question	Ref	Comments	Draft conclusion	Final conclusion
<i>PDD and the applied methodology.</i>				
Monitoring Equipment <i>Is the equipment of used for monitoring (quality, type, accuracy, calibration requirements) in accordance with the relevant guidance provided by the CDM Executive Board and is equipment controlled and calibrated in accordance with the monitoring plan?</i>	7.10.2.	N/A	N/A	N/A
Accuracy <i>In case of measured (or estimated) values, check whether significant inaccuracies occur; in this case, make sure that appropriate discounts have been considered for ER calculation.</i>	7.10.3.	N/A	N/A	N/A
Monitoring results <i>Are monitoring results consistently recorded as per approved frequency?</i>	7.10.4.	CL 6 It shall be clarified if section D.2 of the monitoring report for this parameter (Rated power of the project CFLs) should also consider the phase 4. This monitoring period does not cover Phase 4. . THIS CL IS CLOSED. Information is recorded in a central database	CL 6	OK
Quality assurance and quality control procedures <i>Have quality assurance and quality control procedures been applied in accordance with the monitoring plan to prevent or identify and correct any errors or omissions in the reported monitoring parameters?</i>	7.10.5.	OK	OK	OK
Verification <i>Describe how the value and the information flow (from data generation,</i>	7.10.6	Database has been provided to the verification team and was reviewed during on-site visit.	OK	OK

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<i>aggregation, to recording, calculation and reporting) were verified. Consider the measurement determination procedure, accuracies, QA/QC procedure, source and nature of the evidences. Consider as well plausibility checks as far as possible. Check if the applied value could be backed up by corresponding evidences covering the full monitoring period.</i>				
7.11. "Symbol of parameter: Ok,d,m	7.11	"Description: Operating hours of the distributed CFL		
Measurement Determination method <i>Describe how the monitoring parameter was measured determined. Check if relevant equipment has been exchanged and if in cases of failures downtimes of standard equipment other measurement determination methods have been used. Assess whether the measurement or determination method (data generation, frequency, aggregation, equipment, recording, reporting, standards) is in line with the registered monitoring plan of the PDD and the applied methodology.</i>	7.11.1.	Measured by EWSA from a sample	OK	OK
Monitoring Equipment <i>Is the equipment of used for monitoring (quality, type, accuracy, calibration requirements) in accordance with the relevant guidance provided by the CDM Executive Board and is equipment controlled and calibrated in accordance</i>	7.11.2.	Run-time meters installed at sample of CFLs. Meter technology and calibration and metering procedures have been provided by the manufacturer	OK	OK

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Checklist Question	Ref	Comments	Draft conclusion	Final conclusion
<i>with the monitoring plan?</i>				
Accuracy <i>In case of measured (or estimated) values, check whether significant inaccuracies occur; in this case, make sure that appropriate discounts have been considered for ER calculation.</i>	7.11.3.	N/A. No significant inaccuracies occur	N/A	N/A
Monitoring results <i>Are monitoring results consistently recorded as per approved frequency?</i>	7.11.4.	Yes, monitoring results are consistently recorded	CAR 3	OK
Quality assurance and quality control procedures <i>Have quality assurance and quality control procedures been applied in accordance with the monitoring plan to prevent or identify and correct any errors or omissions in the reported monitoring parameters?</i>	7.11.5.	Yes. Meter technology and calibration and metering procedures have been provided by the manufacturer. Control tests have been provided to the verification team.	OK	OK
8. Compliance with the calibration frequency requirements for measuring instruments				
<i>Has the calibration been delayed and the calibration has been implemented after the monitoring period in consideration (results of delayed calibration are available)?</i> <i>If so, which conservative approach has been adopted:</i> <i>a) Applying the maximum permissible error of the instrument to the measured values taken during the period between the schedule date</i>	8.1	N/A. Calibration has not been delayed.	N/A	N/A

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Checklist Question	Ref	Comments	Draft conclusion	Final conclusion
<p><i>of calibration and the actual date of calibration, if the results of the delayed calibration do not show any error, or if the error is smaller than maximum permissible error, or</i></p> <p><i>b) Applying the error identified in the delayed calibration test, if the error is beyond the maximum permissible error.</i></p>				
<p><i>Has the error been applied:</i></p> <p><i>a) In a conservative manner, such that the adjusted measured values of the delayed calibration has result in fewer claimed emission reductions?, and</i></p> <p><i>b) For all measures taken during the period between the scheduled date of calibration and the actual date of calibration.</i></p>	8.2	N/A	N/A	N/A
<p><i>If the results of the delayed calibration are not available, or the calibration has not been conducted at the time of the verification; has been request to the project participants to conduct the required calibration? If so, has the project participants calculated the emission reductions conservatively?</i></p>	8.3	N/A	N/A	N/A
<p><i>If it is not possible for the project participant to conduct the calibration at a frequency specified by either the applied methodology, guidance provided by the Board, and/or registered monitoring plan due to reasons beyond the control of project participants; has been followed the requirements for post registration changes in accordance with VVS?</i></p>	8.4	N/A	N/A	N/A

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<i>If calibration frequency for measuring equipments are not specified neither the monitoring methodology nor the monitoring plan; has the equipments been calibrated in accordance with specifications of the local/national standards, or as manufacturer's specification, or international standards?</i>	8.5	As per the meter manufacturer specification, there is no calibration needed for the hour meters	CAR 3	OK
<i>Has the project participant provided information regarding the accreditation of the entity performing the test of the measurement equipment and/or standard/regulation against which calibration was done and/or acceptance criteria for the calibration of the measurement equipment?</i>	8.6	All the information requested has been provided and it is deemed to be correct	CAR 3	OK
9. Assessment of data and calculation of greenhouse gas emission reductions				
<i>It is assessed if GHG emission reductions achieved by the proposed CDM project activity are calculated applying the selected methodology.</i>	9.1.	Yes, the emissions reductions are calculated following the methodologies included in the registered PDD. The methodology applied to this project are: AMS-II.J. ver. 3 - Demand-side activities for efficient lighting technologies. AMS-II.C. ver. 11 - Demand-side energy efficiency activities for specific technologies.	OK	OK
<i>Is a complete set of data for the specified monitoring period available? Are available evidences sufficient both in terms of frequency and in covering the full monitoring period? Are the source and the nature of evidences identified (external or internal, oral or documented, etc.)?</i>	9.2.	Yes, data are available for all the monitoring period. Evidences are sufficient for the full monitoring period. The source and the nature of evidences are identified	OK	OK
<i>Whether data were not available because activity levels or non-activity parameters were not monitored in accordance with the registered monitoring plan has the most conservative assumption theoretically possible been made?</i>	9.3.	N/A	N/A	N/A

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<i>Assess if the calculation is fully traceable. In case of complex calculations an Excel calculation spreadsheet shall be used. All applied formulae must be visible.</i>	9.4	The calculation is fully traceable. An Excel calculation spreadsheet has been provided to the verification team	OK	OK
<i>Is the spreadsheet with the emission reductions calculations provided complete in accordance with latest applicable version of the Issuance information and reporting checklist?</i>	9.5.	Yes, the spreadsheet with the emission reductions calculations is provided complete	OK	OK
<i>Has information provided in the monitoring report been cross-checked with other sources such as plant log books, inventories, purchase records, laboratory analysis?</i>	9.6.	Information has been correctly cross-checked with other sources such as plant log books, inventories, and purchase records.	OK	OK
<i>Have calculations of baseline emissions, CDM project activity emissions and leakage, as appropriate, been carried out in accordance with the formulae and methods described in the monitoring plan and the applied methodology document?</i>	9.7.	Yes, calculations have been correctly carried out in accordance with the formulae and methods described in the monitoring plan and the applied methodology.	OK	OK
<i>Have any assumptions used in emission calculations been justified?</i>	9.8.	Assumptions used in emission calculations have been correctly justified	OK	OK
<i>Have appropriate emission factors, IPCC default values and other reference values been correctly applied? Are the most recent data incorporated into the calculation of the ex-post grid emission factor?</i>	9.9.	Reference and default values are correctly applied. The grid emission factor is calculated ex-ante.	OK	OK
10. Quality Management; defined organizational structure, responsibilities and competencies Internal QA/QC and document control				
Management System <i>Have the GHG data monitoring system and all CDM monitoring procedures been Implemented? Do they comply with the monitoring systems and procedures described in the monitoring plan and the approved methodology?</i>	10.1.	Yes. The GHG data monitoring system and all CDM monitoring procedures have been implemented and they comply with what is stated in the monitoring plan and the approved methodology	OK	OK
Roles and Positions	10.2.	Yes, all roles and positions are clearly defined	OK	OK

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Checklist Question	Ref	Comments	Draft conclusion	Final conclusion
<i>Check if all roles and positions of each person in the GHG data management process are clearly defined and implemented, from raw data generation to submission of the final data. Check further if only duly qualified personnel is involved in the monitoring procedures.</i>				
Trainings <i>Check if initial trainings have been carried out, in case deemed necessary.</i>	10.3.	Trainings for personnel involved in the monitoring procedures have been carried out	OK	OK
Troubleshooting procedures <i>Assess whether troubleshooting procedures have been implemented.</i>	10.4.	Yes, troubleshooting procedures have been implemented and included in the quality management system	CAR 3	OK
Maintenance procedures <i>Are appropriate maintenance procedures in place?</i>	10.5.	Yes, appropriate maintenance procedures are in place as part of the quality management system	CAR 3	OK
Reporting procedures <i>Check how reports with relevance for the later determination of emission reductions will be generated. Is the frequency of emissions reports established?</i>	10.6.	All reports are recorded in a central database, or in a spread sheet and then in the database. Reports are generated monthly.	CAR 3	OK
Internal QA/QC <i>Assess whether there are any procedures in place on when, where and how checks and reviews are to be carried out, and what evidence needs to be documented? (This might include spot checks by a second person not performing the calculations over manual data transfers, changes in assumptions and the overall reliability of the calculation processes.)</i>	10.7.	The project proponent has implemented a quality management system (QMS). All the monitoring system is integrated in this QMS. Internal QA/QC is deemed to be correct.	CAR 3	OK
Data collection and data processing systems <i>Check the eligibility of used systems.</i>	10.8.	Yes, data collection system meets the requirements of the monitoring plan	CAR 3	OK

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<i>Does data collection system meet the requirements of the monitoring plan as per the applied methodology?</i>				
Data archive <i>Check whether all data of monitoring parameters are recorded and archived according to the monitoring plan and the approved methodology.</i>	10.9.	All records of monitoring parameters are archived according to the monitoring plan.	CAR 3	OK
Data protection <i>Assess whether appropriate measures have been take in order to avoid unintended or intended manipulation of the measured data.</i>	10.10.	The access to the databases is controlled and available only for authorized personnel.	CAR 3	OK

ANNEX 2. APPOINTMENT CERTIFICATES

CERTIFICATE OF QUALIFICATION

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

Madrid, 16th October 2013

Hereby I confirm the following records of qualification, according with AENOR internal instruction "Specific Instruction for the 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: **Pablo Taboada Utrera**

CDM Chief Validator: N/A


CDM Validator: N/A

CDM Chief Verifier: YES

CDM Verifier: YES

External Technical Expert: N/A

Technical areas related with the project activity:



José Luis TEJERA OLIVER
CDM Operational Director

"1st" PERIODIC VERIFICATION

"Rwanda Electrogaz Compact Fluorescent Lamp (CFL) distribution project"

CERTIFICATE OF QUALIFICATION

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Name: **José Luis Fuentes Pérez**

CDM Chief Validator: N/A

CDM Validator: N/A

CDM Chief Verifier: YES

CDM Verifier: YES

External Technical Expert: N/A

Technical areas related with the project activity:



José Luis TEJERA OLIVER
CDM Operational Director

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CERTIFICATE OF QUALIFICATION

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Name: **Mercedes García Madero**

CDM Chief Validator: N/A

CDM Validator: N/A


CDM Chief Verifier: YES

CDM Verifier: YES

External Technical Expert: N/A

Technical areas related with the project activity:

TA 3.1: Energy demand



José Luis TEJERA OLIVER
CDM Operational Director

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"Rwanda Electrogaz Compact Fluorescent Lamp (CFL) distribution project"

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Name: **Raquel del Castillo**

CDM Chief Validator: N/A


CDM Validator: N/A

CDM Chief Verifier: N/A

CDM Verifier: TRAINEE

External Technical Expert: N/A

Technical areas related with the project activity:



José Luis TEJERA OLIVER
CDM Operational Director

"1st" PERIODIC VERIFICATION

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Name: **José Antonio GESTO**

CDM Chief Validator: N/A

CDM Validator: N/A

CDM Chief Verifier: YES

CDM Verifier: YES

External Technical Expert: N/A

Technical areas related with the project activity:

TA 3.1: Energy demand



José Luis TEJERA OLIVER
CDM Operational Director

"1st" PERIODIC VERIFICATION

"Rwanda Electrogaz Compact Fluorescent Lamp (CFL) distribution project"

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Madrid, 16th October 2013

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Name: **Marcelino PELLITERO**

CDM Chief Validator: N/A

CDM Validator: N/A

CDM Chief Verifier: YES

CDM Verifier: YES

External Technical Expert: N/A

Technical areas related with the project activity:

TA 3.1: Energy Demand



José Luis TEJERA OLIVER
CDM Operational Director