CDM VALIDATION REPORT

WORLD BANK-IBRD

VALIDATION OF THE SMALL-SCALE PROJECT ACTIVITY:

Rwanda Electrogaz Compact Fluorescent Lamp (CFL) Distribution project

REFERENCE NUMBER: 2008/0018/CDM/005

REPORT NUMBER: 01

Validation Report Type	
☐ Draft ☒ Final	☒ Unqualified ☐ Qualified
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VALIDATION REPORT

Date of first issue:	**Reference No:**
2010-01-18	2008/0018/CDM/005
Client: WORLD BANK-IBRD	

Summary:

The Spanish Association for Standardization and Certification (AENOR) has carried out the validation of the **" Rwanda Electrogaz Compact Fluorescent Lamp (CFL) Distribution project"** *located in the whole country of Rwanda, on the basis of UNFCCC criteria for the CDM, as well as relevant decisions of the EB.*

The objectives of the validation are to confirm that the project follows the above criteria and the approved methodology and that the PDD presented by WORLD BANK-IBRD will lead to a realistic determination of the emissions reductions of the project activity. The scope of the validation covers the additionality assessment, the environmental impact study and the stakeholder consultation. In addition it covers the baseline methodology, the calculation of the emission factor (ex-ante) and the monitoring methodology to quantify the emissions reductions during the operational life of the project activity.

The validation carried out by AENOR, involved a desk study of the PDD, associated documentation and the approved methodology. The next step was the visit of the validation team to Rwanda, where not only key personnel involved in the project, but also different stakeholders were interviewed. The audit team also visited the DNA representative who worked on the project, in order to know the stakeholders consultations process developed. Conformance with legal and environmental regulations was also confirmed during the same meeting.

Clarifications and corrective actions on a number of issues were requested by AENOR according to desk review and on-site visit conclusions. AENOR raised the need to request a deviation from applicability criteria of the methodology requiring exact lumen equivalence between the old and new lighting technology. Those issues were amended satisfactorily by the project developer and resulted in a new version of the original PDD (version 12). A Forward Action Request has been included in this report with the aim to notice the need to assess, during the verification stage of the project, the implementation of the environmental mitigation measures.

In the opinion of AENOR the project meets all relevant UNFCCC requirements for the CDM and all relevant host country criteria, therefore the project shall be recommended for registration.

Report No.:	
2008/0018/CDM/005	

Report title:

VALIDATION REPORT ***Rwanda Electrogaz Compact Fluorescent Lamp (CFL) Distribution project***

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Indexing terms

Energy efficiency, CFLs lamps, CO_2, climate change, CDM project, Rwanda national grid, GHG emissions

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
GHG	Greenhouse Gasses
$GWhB_{eB}$	Electrical Giga Watt hour
$GWhB_{tB}$	Thermal 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. Former name of the Rwandan utility Electrogaz
tC	Carbon tonnes
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
VVM	Validation and Verification Manual

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1 INTRODUCTION

This validation concerns a small scale project activity implemented by World Bank (through the International Bank for Reconstruction and Development –IBRD-) and the Rwandan utility Rwanda Electricity Corporation&Rwanda Water and Sewerage Corporation -RECO-RWASCO- (the former name was Electrogaz), in Rwanda to reduce emissions of CO2 by expanding the use of high-efficiency lighting technology in Rwanda's residential sector through the distribution of high-quality Compact Fluorescent Lamps. The objectives of the validation exercise are to confirm that the project meets the necessary CDM criteria, that the project follows the approved methodologies, ASM-II.C (version 11) and AMS-II.) (Version 3), and that the proposals presented by RECO-RWASCO in the PDD will lead to a realistic determination of the emissions reduction.

The scope of the validation covers the additionality assessment, the environmental impact analysis and the stakeholder consultation. In addition it covers the application of the baseline methodology, the calculation of the emission factor and the monitoring methodology to quantify the emissions reductions during the operational life of the project.

The project activity is designed with two components: (1) 400,000 CFLs replace incandescent lamps for existing RECO-RWASCO customers, and (2) 400,000 CFLs are installed at new electricity customer houses.

The project activity is eligible to apply a small-scale methodology because the energy savings from the replacement of incandescent lamps by efficient CFLs and the CFLs installed at new sites under the project are estimated to be a maximum of 50 GWh annually, which is below the 60 GWh limit for Type II small-scale project activities in accordance with CMP/2006/10/Ad1, p8 para28(b) *Type II project activities or those relating to improvements in energy efficiency which reduce energy consumption, on the supply and/or demand side, shall be limited to those with a maximum output of* 60 *GWh per year (or an appropriate equivalent*"

Validation team:

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Marcelino Pellitero Martinez - Financial expert (MSc in Economics and Diploma in Operations, Logistics and Transportation) is one of the financial experts of AENOR for the Climate Change Unit. In addition, he has ten years work experience in economic and financial analysis of environmental projects, he has been

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Jose Antonio Gesto Vilacoba Technical Reviewer (Economy Degree) is financial expert of the Climate Change Unit of AENOR. He is 10 years of experience in environmental and quality management sector. He has developed plenty climate change activities, especially in CDM sector preparing Document Design Documents of several CDM project activities. Since he is working in AENOR, he has participated in CDM Validation and Verification processes specially the additionality assessment and technical reviews.

Luis Robles Olmos - Technical Reviewer, (Agronomic Engineering) is the Manager of the Climate Change Unit, qualified as chief validator and chief verifier. During his 15 years of experience in environmental and quality management sector, has developed plenty climate change activities, especially in CDM sector. Currently, he is developing validation and verification activities of the Climate Change Unit, and technical revisions as well.

1.1 Objective

The World Bank has commissioned AENOR to validate the "**Rwanda Electrogaz Compact Fluorescent Lamp (CFL) Distribution Project**". The purpose of a validation is to have an independent third party assessment of the project design. In particular, the project's baseline, the monitoring plan (MP), and the project's compliance with relevant UNFCCC and host country criteria are validated in order to confirm that the project design as documented is sound and reasonable and meets the stated requirements and identified criteria.

Validation is a requirement for all CDM projects and it is considered as necessary to provide assurance of the quality of the project and its intended generation of certified emission reductions (CERs).

UNFCCC criteria refer to the Kyoto Protocol criteria and the CDM rules and modalities as agreed in the Bonn Agreement and the Marrakech Accords.

1.2 Scope

The scope of the validation is to assess all aspects of GHG reduction involved in the small scale project, including the project design, the baseline, the determination of the emission factor of the grid and the procedures proposed for monitoring the emissions reductions in the future.

The following documents were reviewed as part of the scope of the activity:

- PDD (Ver 02) initially published and final version of PDD (ver 12) /1/, including baseline study and monitoring plan.
- Approved Methodology: AMS-II.C (Version 11) /2/
- Approved Methodology: AMS-II.J (Version 3) /3/
- Decision 3/CMP.1 and relevant decisions and guidelines from the EB.
- CDM Validation and Verification Manual (Version 01.1) /4/.
- Attached documentation (environmental requirements, investment analysis, etc.)

The validation scope is defined as an independent and objective review of the project design document, the project's baseline study and monitoring plan and other relevant documents. The information in these documents is reviewed against Kyoto Protocol requirements, UNFCCC rules and associated interpretations. AENOR, based on the Specific Instruction for the Processing and Conducting of Validation, Registration, Verification and Certification of Kyoto Protocol CDM Project Activities (IE/DTC/039.00), and the Validation

and Verification Manual, has used a risk-based approach in the validation, focusing on the identification of significant risks for project implementation and the generation of CERs.

The validation 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 PDD.

1.3 GHG Project Description

Title of the project activity: "Rwanda Electrogaz Compact Fluorescent Lamp (CFL) Distribution Project"

Project participants:

- RECO-RWASCO (former name was Electrogaz). The change of name was properly communicated to AENOR by letter on 15 December 2009) /7/
- International Bank for Reconstruction and Development (IBRD is one of the World Bank Group branches.

Host Party: Rwanda.

The CFL distribution project activity is implemented through several phases during the period mid-2007 to 2010:

- The Pilot Phase (or Phase 1) was completed during August-September 2007 with the distribution and exchange of 50,000 CFLs free of cost. A maximum of 2 CFLs were provided in exchange of incandescent lamps (ICLs).
- The second Phase, started in September 2008, distributing 150,000 CFLs over the residential sector, up to 5 CFLs per household at a price of RWF200 (US$0.37) per bulb and exchanging incandescent lamps.
- The third Phase (200,000 CFLs) will be implemented by the middle of 2009
- The fourth Phase (400,000 CFLs) will be implemented by the middle of 2010 to early 2011. New RECO-RWASCO customers will receive at the time of the connection a package containing a caped number of CFLs with their new electricity meter. Therefore, as the new customers did not have electric lighting spot in their unit before the connection to the grid, the CFLs are installed in new lighting spots, and there is no exchange with ICL in this case.

Emission reductions from phases 1 to 3 will be calculated in accordance with methodology AMS-II.J (version 3) and this is named as **Component 1**. Phase 4 will be calculated in accordance with AMS-II.C (version 11) and is named as **Component 2**.

Component 1. AMS-II.J (ver.11)	Phase 1	Phase 2	Phase 3
Component 2 AMS-II.C (ver. 03)	Phase 4		

The light bulb distribution will take place through the decentralized distribution outlets run by RECO-RWASCO (called "antennas" in Kigali and "stations" in the rural areas of the rest of the country).

The project activity is expected to displace **238,578** tons of carbon dioxide equivalents (tCO_2e) in the 10-years fixed crediting period, generating an equivalent amount of Certified Emission Reductions (CERs).

The contribution of the project activity to sustainable development can be summarized as follows:

- Reduction in grid electricity demand, including peak demand (in term of GWh or MW), which allows the utility to increase its consumer base and provide access to unelectrified households.
- Lower electricity bill for end-users as CFLs are 75% more energy efficient than incandescent lamps.
- Household education on energy efficiency.
- Carbon emission reduction linked with electricity generation.

2 METHODOLOGY

The validation of the project was started in October 2008 and concluded in February 2010. The validation was performed in the manner of an audit, where a desk review of the PDD was first undertaken against the approved methodology and CDM and other relevant criteria. The desk review was followed by a site visit to Electrogaz (currently RECO-RWASCO) offices and key stakeholders in Rwanda.

In order to ensure transparency, a validation protocol was customized for the project, according to AENOR Specific Instruction (IE/DTC/039.03). The protocol shows, in a transparent manner, criteria (requirements), means of verification and the results from validating the identified criteria. The validation protocol serves the following purposes:

- It organizes, provides details and clarifies the requirements a CDM project is expected to meet
- It ensures a transparent validation process where the validator will document how a particular requirement has been validated and the result of the validation.

The validation protocol consists of three tables. The different columns in these tables are described in Figure 1. The completed validation protocol is enclosed in Appendix A to this report.

Validation Protocol Table 1: Mandatory Requirements			
Requirement	**Reference**	**Conclusion**	**Cross reference**
The requirements the project must meet.	Gives reference to the legislation or agreement where the requirement is found.	This is either acceptable based on evidence provided (**OK**), or a **Corrective Action Request (CAR)** of risk or non-compliance with stated requirements. The corrective action requests are numbered and presented to the client in the Validation report.	Used to refer to the relevant checklist questions in Table 2 to show how the specific requirement is validated. This is to ensure a transparent Validation process.

Validation Protocol Table 2: Requirement checklist				
Checklist Question	**Reference**	**Means of verification (MoV)**	**Comment**	**Draft and/or Final Conclusion**
The various requirements in Table 1 are linked to checklist questions the project should meet. The checklist is organized in seven different sections. Each section is then further sub-divided. The lowest level constitutes a checklist question.	Gives reference to documents where the answer to the checklist question or item is found.	Explains how conformance with the checklist question is investigated. Examples of means of verification are document review (DR) or interview (I). N/A means not applicable.	The section is used to elaborate and discuss the checklist question and/or the conformance to the question. It is further used to explain the conclusions reached.	This is either acceptable based on evidence provided (**OK**), or a **Corrective Action Request (CAR)** due to non-compliance with the checklist question (See below). **Clarification** is used when the validation team has identified a need for further clarification.

Table 2.1 has been included in order to summarize the new requirements of the Validation and Verification Manual (version 01).

Validation Protocol Table 3: Resolution of Corrective Action and Clarification Requests			
Draft report clarifications and corrective action requests	**Ref. to checklist question in table 2**	**Summary of project owner response**	**Validation conclusion**
If the conclusions from the draft Validation are either a Corrective Action Request or a Clarification Request, these should be listed in this section.	Reference to the checklist question number in Table 2 where the Corrective Action Request or Clarification Request is explained.	The responses given by the Client or other project participants during the communications with the validation team should be summarized in this section.	This section should summarize the validation team's responses and final conclusions. The conclusions should also be included in Table 2, under "Final Conclusion".

Figure 1 Validation protocol tables

2.1 Review of Documents

The Project Design Document (ver.02) submitted by RECO-RWASCO and World Bank was reviewed against the approved methodologies and against CDM and other relevant criteria. Additional background documents related to the project design and baseline were also made available before and during the on-site visit in Rwanda. These documents were also reviewed.

A request for deviation from the methodology AMS-II.J ver. 03 was submitted on **15 September 2009** (M-DEV0264 /8/). The aim of the request for deviation was a deviation from the applicability criteria requiring exact lumen equivalence between the old and new lighting technology. This request for deviation of the methodology was specific to this project and was regarding the eligibility criteria of the replacement of a 100W ICL by a 20W CFL. The request was considered by SSC WG 23. The EB approved the request for deviation on **17 November 2009**. However, the Board instructed the DOE to consider 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) for the purpose of emission reduction calculations

To address the corrective actions and clarification requests that arose from desk review and on-site visit, to adopt new versions of the methodologies published during the validation process, and to adjust the PDD and calculations to the EB answer of the request for deviation, RECO-RWASCO revised several times the project design document and developed a final version (version 12) submitted to the validation team on 09 February 2010.

The final validation findings are presented in this report related to the project as described in the project design document version 12.

The reviewed documents used during all the validation process are detailed in the Chapter 6 of this report.

2.2 Follow-up Interviews

AENOR conducted interviews with project developers in Rwanda to confirm selected information and to resolve issues identified during the document review process.

On 01-04th December 2008, representatives of RECO-RWASCO and main stakeholders were interviewed in Rwanda: different antennas and stations (RECO-RWASCO offices for exchanging lamps) were visited by the validation team, the general manager of the company, the representatives of the National Designated Authority and representatives of the Ministry of Energy and Ministry of Environment also were interviewed in Kigali.

The main topics of the interviews are summarized in Table 1.

Table 1 Interview topics

Interviewed organization Person/Position	Interview topics
RECO-RWASCO ✓ Jean Paul Sebera. Head of legal unit ✓ David Karangwa. Head of customer CFL distribution unit ✓ Viator Mugeraneza Project coordinator. **World Bank** ✓ Sampath Kumar. Consultant **Ministry of Infrastructure** ✓ Gerard Hendrksen. Advisor Ministry **UERP** ✓ Félix Gakuba. Project manager	✓ Project design. ✓ Additionality assessment (investment barrier analysis). ✓ Baseline determination: OM & BM (power plants, start of operation, fuels, most recent data…), baseline survey. ✓ Environmental approval and related conditions. ✓ Monitoring of environmental impacts. ✓ Funding for the project ✓ Prior considerations of CDM
Antennas ✓ Nyaugenge ✓ Gikondo ✓ Remera **Stations** ✓ Rulindo. ✓ Ruhengueri ✓ Rubavu	✓ Opinion about the project from customers. ✓ Project design and development. ✓ Monitoring Plan.
DNA (REMA) ✓ Dr. Rose Mukankomeje. General Manager **Ministry of Environment** ✓ Advisor Ministry	✓ Project's sustainable development contribution. ✓ CFL waste management. ✓ DNA´s opinion. ✓ Environmental approval and related conditions ✓ Letter of Approval ✓ Environmental legislation

2.3 Resolution of Clarification and Corrective Action Requests

The objective of this validation phase was to solve the requests for corrective actions and clarifications and any other outstanding issues that needed to be clarified for AENOR's positive conclusion on the project design. The corrective action requests (CARs) and clarification requests (CLs) raised by AENOR were solved during communications with project participants. To guarantee the transparency of the validation process,

the concerns raised and responses given are summarized in chapter 3 below and documented in more detail in the validation protocol in Appendix A.

Since modifications to the Project design were necessary to resolve AENOR's concerns, the Client decided to revise several times the documentation and finally resubmitted the final project design document (ver.12) on 09 February 2010. After reviewing the revised and resubmitted project documentation, AENOR issued this final validation report and opinion.

3 VALIDATION FINDINGS

The main findings of the validation are stated in the following sections. The validation findings for each validation subject are presented as follows:

1) The findings from the desk review of the original project design documents and the findings from interviews during the on-site visit are summarized. A more detailed record of these findings can be found in the Validation Protocol in Appendix A.

2) Where AENOR had identified issues that needed clarification or that represented a risk to the fulfillment of the project objectives, a Clarification or Corrective Action Request, respectively, have been issued. The Clarification and Corrective Action Requests are stated, where applicable, in the following sections and are further documented in the Validation Protocol in Appendix A. During the validation process, sixteen Clarifications, nine Corrective Actions, and a Forward Action Request were requested.

3) Where Clarification or Corrective Action Requests have been issued, the exchanges between project participants and AENOR to resolve these Clarification or Corrective Action Requests are summarized.

4) The conclusions for validation subject are presented.

The final validation findings are related to the project design as documented and described in the revised and resubmitted project design documentation.

3.1 Participation Requirements

The project participants are: RECO – RWASCO (Rwanda Electricity Corporation – Rwanda Water and Sewerage Corporation), formerly this company was named Electrogaz, and the Word Bank through the International Bank for Reconstruction and Development (IBRD) as trustee of the Community Development Carbon Fund with The Netherlands as Party involved. The host Party Rwanda meets all relevant participation requirements following detailed:

- Rwanda has confirmed that is a party of the Kyoto Protocol (signed on 22nd July 2004)
- Rwanda has confirmed its voluntary participation and the contribution of the project to the sustainable development through the Letter of Approval [5] of the project (dated on 03th March 2009 and provided to the validation team as result of the CAR 1). The authenticity of the Letter of Approval was checked against the Rwanda DNA (Rwanda Environment Management Authority – REMA-).

The Annex I party is The Netherlands. The Annex I party meets also all relevant participation requirements above detailed:

- The Netherlands has confirmed that is a party of the Kyoto Protocol (signed on 2002, 31st May).

- The Netherlands has confirmed its voluntary participation to the project through the Letter of Approval.

The contribution of the project to the sustainable development of Rwanda was confirmed by the DNA of the Host Country. The validation did not reveal any information that indicates that the project can be seen as a diversion of ODA funding towards Rwanda.

3.2 Project Design

The PDD of **"Rwanda Electrogaz Compact Fluorescent Lamp (CFL) Distribution project"** has been prepared in accordance with latest template (version 03) and Guidelines for completing the CDM-SSC-PDD (version 05).

As it is detailed in the CDM-SSC-PDD, the "**Rwanda Electrogaz Compact Fluorescent Lamp (CFL) Distribution project**"is implemented through several phases during the period of time from mid-2007 to the beginning of 2010:

- The Pilot Phase (or Phase 1) was completed during August-September 2007 with the distribution and exchange of 50,000 CFLs free of cost. A maximum of 2 CFLs were provided in exchange of incandescent lamps (ICLs).
- The second Phase, started in September 2008, distributing 150,000 CFLs over the residential sector, up to 5 CFLs per household at a price of RWF200 (US$0.37) per bulb and exchanging incandescent lamps.
- The third Phase (200,000 CFLs) and the fourth Phase (400,000 CFLs) will be implemented respectively by the middle of 2009 and the middle of 2010. New RECO-RWASCO customers will receive at the time of the connection a package containing a caped number of CFLs with their new electricity meter. Therefore, as the new customers did not have electric lighting spot in their unit before the connection to the grid, the CFLs are installed in new lighting spots, and there is no exchange with ICL in this case.

The three first phases are expected to cover nearly all existing Electrogaz customers.

The fourth phase – amounting to 400,000 CFLs in accordance with the PDD – will therefore mainly focus on the new connection program. The additional 95,000 new customers will connected to the grid over 2010 and 2011.

The project's spatial (geographical) boundaries and the project's system (2 components and 4 phases, and the electrical devices used to mitigate GHGs) are clearly defined. The distribution of CFLs will be done through the 21 antennas/stations of the utility all around Rwanda (7 antennas in Kigali and 14 stations in the rest of the country), where customer information and, where applicable, details of exchanged bulbs will be recorded.

An ex-ante installation survey was conducted on a 200-household sample to establish the lighting baseline reference, to measure the market penetration, the potential CFL needs, the public awareness and the daily lighting time.

A post-installation survey following the pilot phase, conducted on a 50-household sample, showed increased interest of the population in this low energy device.

The project uses the state of the art technology to reduce electricity consumption and thus result in a fewer emissions than the current situation in accordance with the UNFCCC requirements.

This project activity is included under Type II – Energy Efficiency Improvement Project, and uses two SSC methodologies:

- AMS-II.J version 3 "*Demand-side activities for efficient lighting technologies*", which is presently used for the replacement of Incandescent Lamps (ICLs), and
- AMS-II.C version 11 "*Demand-side energy-efficiency activities for specific technologies*", which is used for the installation of CFLs at new customer sites.

Both methodologies are applicable to public or private sector initiatives that encourage the adoption of efficient lighting equipment that is more expensive and less GHG emitting than the baseline technology. The high-efficiency technology must be new equipment not transferred from another activity and may (i) replace existing equipment or (ii) be installed at new sites.

The project is eligible to apply a small-scale methodology because the energy savings from the replacement of incandescent lamps by efficient CFLs and the CFLs installed at new sites under the project are estimated to be a maximum of **50 GWh** annually, which is below the 60 GWh limit for Type II small-scale project activities.

In order to validate the design of the first stages of the project activity, the validation team visited the location of the Rwanda Electrogaz Compact Fluorescent Lamp (CFL) Distribution Project. Several antennas located in Kigali, and different stations located in different regions of Rwanda were visited as well. The design of the project activity included in the PDD reflect the current situation of the project activity

As it is referred in the PDD, the project boundary is the physical, geographical location of each CFL installed, within Rwanda's national border. The exact location is determined based on customer ID recorded at the time of the distribution. This enables a unique identification (i.e., name and address) of the project participants who are limited to Reco-Rwasco customers (existing and new ones). Since the project is connected to the national grid, it is included also in the project boundaries, in accordance with the approved methodologies.

The last version of the PDD (version 12) finally details the design of the project in precise manner, in accordance with the accuracy and completeness principles required for the CDM process.

3.2.1 Starting date of the Project Activity and CDM prior consideration

The starting date of the Project activity was 10th January, 2007, which was the date of signature of the purchase contract of the first batch (50,000 CFLs). The contract signed [9] was provided to the validation team as the documented evidence of the starting date of the project activity. This date is considered in accordance with the Glossary of terms (Version 5) of the UNFCCC.

The expected operational lifetime of the project is 13 years.

A fixed 10 years crediting period is selected, starting on 1st April 2010.

The demonstration of the prior consideration of the CDM is included in the additionality assessment in section 3.4.

3.3 Baseline methodology

The CDM-SSC-PDD describes the baseline methodology, which is in conformance with the approved baseline methodologies AMS II.C (version 11) "*Demand-side energy efficiency activities for specific technologies*" and

AMS II.J (version 03) "*Demand-side activities for efficient lighting technologies*". The key conclusions about the correct application are summarized below.

The baseline methodologies are the most applicable to this project, the appropiateness is clearly justified in the PDD and it demonstrates in a transparent way the applicability by fullfilling all applicability conditions.

The AMS-II.J (ver.11) is the most applicable because it "*comprises activities that lead to efficient use of electricity through the adoption of self-ballasted compact fluorescent lamps (CFLs) to replace incandescent lamps (ICLs) in residential applications*".

The AMS-II.C (ver.03) is the most applicable because it "*comprises activities that encourage the adoption of energy-efficient equipment, lamps, ballasts, refrigerators, motors, fans, air conditioners, appliances, etc. at many sites. These technologies may replace existing equipment or be installed at new sites*".

The baseline has been calculated according to the different methodologies (ASM II.C and ASM II.J) in a transparent manner.

The baseline scenario of the proposed project is assumed to be a continuation of current practice, which involves purchase and use of incandescent lamps (ICLs), by existing and future Reco-Rwasco customers.

The alternative presented is realistic and credible since current practice in Rwanda is the use of ILB. The end users can not support the additional investment cost associated with CFLs. The baseline is the use of standard incandescent lamps with wattages in a range of 25 to 100 watts

For the existing customers who exchange ICLs (Component 1), the baseline corresponds to the use of the exchanged ICLs uniquely recorded at the time of distribution. As specified in the Methodology AMS II.J, the baseline lighting time is set at the default value of 3.5 hours per day per lamp.

For the new customers benefiting from the new connection "package" (Component 2), the baseline is established based on a market survey. The baseline ICL power breakdown shows that the baseline power estimation is 83.3 W, on a pro rata basis. As specified in AMS-II.C, the operating time will be monitored.

The project boundary is the physical, geographical location of each measure installed, so they have been stated as the whole country. It is considered in accordance with both methodologies.

In Component 1, and regarding paragraph 7 of the AMS-II.J, the PDD explains, in the description of the project design and in the monitoring plan, the proposed method of distribution of CFLs, and the storage and destruction of the old incandescent lamps. It also explains the procedures to control all the process of recording the lamp distribution to avoid double counting. The validation team has checked the internal procedures to develop the monitoring plan |25| including the procedure to the destruction of the incandescent bulbs and has considered them as according to the methodology requirements. Also, and relating to paragraph 8 and the avoidance of leakage due to secondary market effects, the Project Activity implements different actions: restriction of the number of lamps to change and minimal price for efficient lighting equipment

In Component 2, and regarding paragraph 10 of the AMS-II.C, the leakage effect of the use of the replaced equipment in another activity is not considered because the Project Activity does not involve the replacement of equipment and the energy efficiency technology equipment is not transferred from another activity, and this assumption is considered in accordance with the methodology requirements.

The application of the methodology and the discussion and determination of the chosen baseline has been transparent.

Regarding relevant national or sectoral policies considered in the baseline scenario, there is not regulation in this field in the country. The macro-economic trends and political aspirations were considered in the additionality justification.

The project activity is not a debundled component of a larger activity according to Appendix C of the Simplified Modalities and Procedures for Small Scale CDM project activity. Neither there is any other project with the same technology, neither the same project developer. The non existence of other project activity has been assessed during the on site visit and through the interview with the DNA. The UNFCCC website has been used in order to check the non existence of other CFLs projects that accomplishes the bundled characteristics.

For Component 1, and in accordance with AMS- II.J (ver 03), the baseline is calculated taking into account the rated power of the baseline incandescent lamps, the hours of operation per 24 hrs period – the default value is 3.5-, net-to gross adjustment factor and the transmissions & distribution losses .

For Component 2, and in accordance with AMS- II.C (ver. 11), as the energy displaced is electricity, the emission baseline is determined as the product of the baseline energy consumption of the incandescent lamps and the emission factor for the electricity displaced.

In accordance with methodology ASM.II.C, the emission factor in a year has been calculated in accordance with provisions in AMS.I.D. According with this methodology, the emission factor of the national grid has been calculated using the "Tool to calculate the emission factor for an electricity system" (ver.02) /10/. The PDD clearly states the use of this tool in accordance with provisions of the relevant methodologies.

The baseline emission factor (EFy) included in the final PDD has been calculated **ex-ante** in a transparent and conservative manner as a combined margin (CM) consisting of the average of the operating margin (OM) and the build margin (BM) according to the steps stated in the Tool.

A spreadsheet /11/ has been used to make these calculations. The calculations have been reproduced by the validation team and found correct.

- **OM**: The Simple Operating Margin method is used since low cost, must-run resources constitute less than 50% of total grid generation in Rwanda in average of the five most recent years (2004 to 2008). This option has been correctly chosen and applied. The emission factor was calculated using the ex-ante option, using a 3-year generation-weighted average, as 2006 to 2008 data are readily available for the Project. The procedure followed for the calculation of the operating margin was correctly described in the PDD and the formulae have been assessed by the validation team against the methodology, the tool and the data provided by the Rwandan Utility during and after the on-site visit. /12/, /13/ and /14/. Those data were used in order to compare data of all the power plants of the National interconnected System and the coincidence was 100%.
- **BM**: the set of plants used for the calculation of the build margin factor was the five power units that have been built recently (Option a) of the Tool). This option has been correctly chosen because this set comprises the larger annual generation during 2008. CDM project activities are not included according to the guidelines of the tool. The Project participant has chosen an ex-ante approach. These calculations have been included in a transparent and open way in the Emission Reduction calculation spreadsheets.

The values of all plants in operation have been provided by the Utility and they were checked by the audit team against the web site (http://www.electrogaz.co.rw) and during the on site visit through an interview in RECO-RWASCO headquarters.

Several mistakes were found during the validation activities, so CAR 2 and CL 9 were raised. The new version of the PDD solved all the mistakes, and detailed a transparently application of the methodology and tool in order to calculate the emission reduction. Following sources of data were taken into account:

- "Electrogaz activity reports 2000-2007, 2008 /12/, /13/ and /14/.
- Fuel data 2009 /15/
- 2006 IPCC Guidelines for National Greenhouse Gas Inventories /16/.

3.4 Additionality

The validation team of AENOR has reviewed all the documents provided by the project participants to prove the additionality. The proofs for the early consideration of applying for CDM to support project activity have been verified. As early as in November 2006 it was decided from the start to develop Rwanda Electrogaz Compact Fluorescent Lamp (CFL) distribution project with CDM support, as could be evidenced by the letter sent by the World Bank to the Minister of Finance and Economic Planning of Rwanda regarding the Aide-Memoire for the Urgent Electricity Rehabilitation Project in which states that the project activity may be processed as a CDM project to bring additional revenue and address the barriers of high cost of CFLs. /17/

The starting date of the project is 10/01/2007 date of signature of the purchase contract of the first batch /9/, thus given the time sequence of events, it is concluded that CDM was seriously considered prior to the starting date.

The additionality of the Rwanda Electrogaz Compact Fluorescent Lamp (CFL) distribution project is demonstrated by applying the Attachment A to Appendix B to the Simplified Modalities and Procedures for Small-scale CDM Project Activities through demonstrating the existence of an investment barrier /18/.

During the validation activities, the origin of all the input values and the improvement of the barrier analysis as required in the Guidance for the investment analysis and the Guidelines for objective demonstration and assessment of barriers were requested (CAR 3).

Finally, all issues requested to the PP have been resolved in opinion of the validation team since the new criteria and assumptions considered fulfill with the methodology and tools/guidelines for the assessment and demonstration of additionality. Therefore the CAR 3 has been solved.

During the assessment of the presented barrier, the reasonableness of the parameters used in the NPV calculation were analyzed and checked by AENOR as follows:

Per unit cost for production of CFL has been checked by audit team with the CFL commercial invoices /19//9/. In addition, CFL selling Price and unit cost for distribution have been cross-checked with registered CFL projects (see table 2 below).

Table 2: Comparison among CFL distribution registered CDM projects

Project	Selling Price	Average Unitary CFL cost	Unitary Distribution Cost
Project 2476: Pune (India) OSRAM CFL distribution CDM Project /20/	US$0.30	US$3.91	US$0.39
Project 2457: Yamunanagar & Sonipat (India) OSRAM CFL distribution CDM Project /21/	US$0.30	US$3.91	US$0.39
Project 1754: Visakhapatnam (India) OSRAM CFL distribution CDM Project /22/	US$0.35	US$4.01	US$0.40
Rwanda Electrogaz Compact Fluorescent Lamp (CFL) distribution project	**US$0.37**	**US$1.40**	**US$0.30**

Source: http://cdm.unfccc.int/Projects/projsearch.html and Project Proponent

The CFL unitary cost and distribution costs were found to be lower than those used for similar registered projects, which is deemed conservative.

On the other hand, the CFLs selling price of US$0.37, compared to the average of US$0.32 observed in similar projects signed as CDM, can be also considered as conservative in the CDM/additionality context.

It has been demonstrated that the project NPV without any CDM revenues is estimated to be negative, even when discounts rate equals to zero (most conservative scenario). The NPV improves to **US$2,238,071** on considering CDM revenues which demonstrates that CDM provides the only financial incentive to implement the project activity /23/.

A sensitivity analysis has been carried out for variations in the range of +/- 10% for the parameters of CFL selling price and total costs which shows that without the income from CERs sales the NPV of the proposed project is always negative, even when the possible variations of the main parameters are considered. It was confirmed that the conclusion obtained in the analysis mentioned above was robust to conclude that the project activity is unlikely to be financially attractive.

In summary, it is AENOR's opinion that the additionality of the project is sufficiently demonstrated based on the investment barrier and thus it is demonstrated that the project is not a likely baseline scenario and those emissions reductions are therefore additional.

3.5 Monitoring Plan

As stated above, the project uses the approved methodologies AMS-II.C (ver. 11) and AMS-II.J (ver. 3) The appropriateness of the monitoring methodology is transparently justified in the PDD (Section B.7.2), since the monitoring methodologies applies to the installations of new CFLs lamps and the change for the old ICL lamps.

The application of the monitoring methodology has been developed according to the UNFCCC guidelines, and its application seems transparent. CL 10 was requested in order to improve the consistency of the Monitoring Plan stated in the PDD. The detail of these modifications is included in the Validation Protocol.

As stated in the methodology and in the PDD, the main monitoring parameters are the following:

Applicable for both Components 1 and 2:

- **Recording of lamps**. The following data are recorded: Date of distribution; customer ID to avoid duplicates; number of CFLs provided for each type and, only for Component 1, amount paid; number of ICLs exchanged. There is a data management and quality assurance system established, including procedures to collect and to destroy the ICLs.

Applicable only for Component 1:

- **Ex ante baseline survey:** The purpose of the ex ante baseline survey is to obtain information about existing light bulb market and baseline operating time. This information helps in CFL procurement and other aspects of the CDM project design. The survey was conducted during 2008. The questionnaire was consistent with the template provided in the Annex I of AMS-II.J. The validation team checked the questionnaires and the final report of the survey during the on-site visit /24/.
- **Ex-post monitoring survey:** carried out within the first year after installation and once for every 30% of the elapsed rated lifetime (or every 3 years) to confirm that equipment was installed and is still operating.

Applicable for Component 2:

- **Annual record of the device power and the operating hours:** The meter ID together with the name, address and customer ID will be recorded on the monitoring database. Run time meters are installed in a sample of the total number of CFLs installed. It will be done annually

The project participant has developed a Monitoring Plan /25/ in order to compile the guidelines for the emission reduction calculation detailed in the PDD. In accordance with this Monitoring Plan, the responsibilities are defined, and the people in charge of the monitoring will gather all the parameters and indicators used to calculate the emission reduction. A data management and quality assurance system is established, which includes evidencing and data entry forms.

AENOR has checked that the provisions included in the Monitoring Plan satisfy the purpose of guaranteeing that the project activity is correctly organized since the beginning. The validation team interviewed the person in charge of the supervision of the monitoring activities, and visited different antennas and stations in order to check the management system and the special software developed for the project, and the availability of information, and all of them are in conformance with the provisions detailed in the Monitoring Plan of the PDD. The confidentiality is assured since a user name and password is needed to get the data. Procedures for calibration and maintenance of monitoring equipment, day-to-day reporting, performance review, and, as well the procedure for the destruction of old incandescent lamps are also addressed in the procedure.

In the Monitoring works, personnel in charge of it should receive training about monitoring. There are provisions identified for training of monitoring personnel in the Monitoring Plan.

The Monitoring Plan includes quality and inspection procedures to ensure monitoring accuracy.

For all these above reasons, the Monitoring Plan provides the relevant data necessary for determinate and monitor the reduction emissions made by the project activity in accordance with the methodologies ASM.II.C (ver. 11) and ASM-II.) (ver. 03) The Monitoring Plan provides information about frequency and responsibility for controlling and reporting during the crediting period in a transparent and consistent way, complying with the requirements stated in the methodology, tool and in the Validation and Verification Manual.

3.6 Calculation of GHG Emission Reductions

The methodology for calculating emission reductions is transparently documented and it complies with existing good practice. The calculation methods applied to the determination of emission reduction are explained in detail in the PDD and they follow the procedures laid down in the approved methodologies ASM.II.C (ver. 11) and ASM-II.) (ver. 03), and the "Tool to calculate the emission factor for an electricity system" (Version 02).

Ex-ante estimation of emission reductions (Ers) due to the installation of energy efficient CFLs are also divided in two components. Calculation of Ers differs between Component 1: Using AMS II.), when the beneficiary is an existing Electrogaz customer (CFLs replacing ICLs) and Component 2: Using AMS II.C, when the beneficiary is a new customer (CFLs installed at new sites):

- Component 1: the emission reductions are calculated by multiplying the net electricity saved by the emission factor of the grid. The net electricity saved is calculated, among other parameters, by the difference between the rated power of the baseline lighting devices and the rated power of the project lighting devices.
- Component 2: the emission reductions are calculated by multiplying the difference between annual electricity consumption by the ICLs and by the CFl by the emission factor of the grid.

Formulas and factors used to calculate the Operating Margin Emission Factor and the Build Margin Emission Factor were also properly described in the PDD and were considered transparent and in accordance with the methodology and tool.

The final emission factors calculated in accordance with the ex-ante approach are following detailed:

EF_{OM}=	**0.6606**	tCO_2/MWh
EF_{BM} =	**0.6474**	tCO_2/MWh
EF_y =	**0.6540**	tCO_2/MWh

Assumptions made for estimating the grid emission factor, were considered in accordance with ASM.II.C (ver. 11) and ASM-II.) (ver. 03) requirements and the "Tool to calculate the emission factor for an electricity system" (Version 02)

CAR 2 was requested in order to improve the calculation of the emission reductions and in order to solve several mistakes detected by the validation team. Once every mistake was solved, the spreadsheets were analyzed by the validation team, and the calculation was repeated. The result was 100% correct.

For ex-ante calculations of emission reductions for the Component 1, it is considered that:

- For each phase, all the CFLs are installed/distributed in one month.

- A 20W CFL or a 15W CFL replace respectively a 75 W ICL or a 40 W ICL, which is consistent with the luminous output equivalence given in section A.4.2 of the PDD.

As it has been detailed in previous section, a Request for Deviation has been submitted and approved by the EB to allow under AMS-II.J the replacement of a 100W ICL by a 20W CFL in this specific project, and discount the electricity savings generated compared to a 22W CFL. Nevertheless, in order to make the ex ante calculations in the PDD, the project proponent (in accordance with the recommendation of the EB) uses a median value which is conservative as the power gap (75-20=55) is smaller compared to the 100W ICL situation (100-22=78). This assumption has been considered as conservative.

Considering the equipment lifetime, the Component 1 will generate ERs from April 2010 to March 2014 (the crediting period running until August 2020).

For simplification of the ex-ante calculations, the Component 2 is assumed to be implemented in one phase, at a regular pace of 40,000 CFLs per month during 10 months starting on July 2010, 50% are 15W CFLs and 50% are 20W CFLs.

A spreadsheet /28/ has been used to make the emission reductions calculations. The calculations have been reproduced by the validation team and found correct.

The total emission reductions during the crediting period (10 years) are as follows:

	Component 1	**Component 2**	**Total Project activity**
Total estimated reductions (t CO_{2eq})	38,137	200,441	238,578

Thus, the annual estimated reductions are **23,858 t CO_{2eq}**

As stated in Section 3.2, in order to validate the data and results included in the PDD, information regarding to the electrical system of Rwanda was checked by AENOR through the download of data by RESCO-RWASCO software application and official reports published. Calculations for the emission factor and for the emission reductions have been reproduced by the validation team and the same results have been obtained, achieving the transparency, accuracy and consistency principles required for the CDM projects.

3.7 Environmental Impacts

As it is transparently established in the Section D.1 of the PDD, in Rwanda, the Organic Law No.04/2005 of 08/04/2005 (Article 67) requires that projects, programs and policies that may affect the environment shall be subjected to environmental impact assessment before obtaining authorization for implementation.

Nevertheless, there is no regulation in Rwanda regarding the nature of projects subject to EIA neither the management of fluorescent lamp wastes. The validation team held a meeting with the REMA's director (Rwanda Environment Management Authority and DNA), in order to revise the environmental requirements for this kind of activities. Before this meeting, REMA sent to the project proponent an official notification /26/ requiring some issues to approve the project, among others, some voluntary measures regarding management of the wastes and a revision of the PDD. After a meeting held between REMA and the World Bank in February 2009 /29/, both agreed on the implementation of mitigations measures to avoid or minimize mercury pollution from the project activity (tubular CFLs contain a little amount of mercury). These measures, included in the monitoring plan of the project, include among others:

- A public awareness campaign.
- The Environmental and Social Management Framework (ESMF) update (as part of the Urgent Electricity Rehabilitation Project), and
- An Environmental Management Plan.

The PDD modified accordingly was submitted to the DNA of Rwanda in order to finalize the approval process, and the representative granted the letter of Approval of the project activity on 03-03-2009.

Is AENOR opinion that with the issuance of the Letter of Approval, the information provided by the DNA during the on-site visit and documentation from the project proponents, the Project Activity complies with the environmental requirements of Rwanda.

Nevertheless, 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**).

Additionally, under the World Bank policy, the CFL project was included in the Environmental and Social Management Framework update that was done in 2009 under the Rwanda Electricity Urgent Rehabilitation Project, including an environmental Analysis of the project activity. All documents were cleared and disclosed by the World Bank.

3.8 Comments by Local Stakeholders

A broad communication campaign has been organized by the project proponent just before and during the distributions of the pilot phase and the first phase. The information was available in different languages and by different ways:

- Billboards
- Lollipops
- TV and radio spots
- Posters in Resco-Rwasco stations
- Ads in mass media
- A stand at the Rwanda expo 2007 and 2008.
- A hotline

During the on-site visit to the project activity site in December 2008, those issues were verified and evidences were gathered by the validation team. No adverse comment on the project activity was received from any of the stakeholder parties as the validation team could check.

4 COMMENTS BY PARTIES, STAKEHOLDERS AND NGOS

According to Decision 3/CMP.1, the validator shall make publicly available the PDD and receive, within 30 days, comments on the validation requirements from parties, stakeholders and UNFCCC accredited NGOs and make them publicly available.

AENOR published the project documents on CDM website (http://unfccc.cdm.int) on 01st of November of 2008 and invited comments by Parties, stakeholders and non-governmental organizations. No comments were received during this period.

5 VALIDATION OPINION

AENOR has performed a validation of the "**Rwanda Electrogaz Compact Fluorescent Lamp *(CFL)* Distribution Project**" in Rwanda. The validation was performed on the basis of UNFCCC criteria and host country criteria, as well as criteria given to provide for consistent project operations, monitoring and reporting.

The review of the project design documentation, the on-site visit and the subsequent follow-up interviews have provided AENOR with sufficient evidence to determine the fulfillment of stated criteria. In our opinion, the project meets all relevant UNFCCC requirements for the CDM and all relevant host country criteria. Moreover, AENOR have received the written approval of voluntary participation from the DNA and the host Party confirmation that the project activity assists in achieving sustainable development of Rwanda, also AENOR has received the written approval of voluntary participation from the DNA of the Netherlands as project participant. A Forward Action Request has been included in this report with the aim to notice the need to assess, during the verification stage of the project, the implementation of the environmental mitigation measures.

The project will hence be recommended by AENOR for registration with the UNFCCC.

By the expansion of the use of high-efficiency lighting technology in Rwanda's residential sector and then the reduction of electricity consumption, the project results in reductions of CO_2 emissions that are real, measurable and give long-term benefits to the mitigation of climate change. These emission reductions are transparently calculated using the approved methodologies ASM.II.C *(*ver. 11*)* and ASM-II.J *(*ver. 03*)* and the latest Tool to calculate the emission factor for an electricity system *(*version 02*)* is also applied to determine the emission factor of the National Grid. An investment barrier analysis demonstrates that the proposed project activity is not a likely baseline scenario. Emission reductions attributable to the project are hence additional to any that would occur in the absence of the project activity. Given that the project will be implemented as designed, the project is likely to achieve the estimated amount of emission reductions **238,578 tCO_2eq** for the total crediting period of 10 years.

The validation is based on the information made available to us and the engagement conditions detailed in this report. The validation has been performed using a risk based approach, as described above.

The only purpose of this report is its use during the registration process as part of CDM project cycle. Hence, AENOR cannot be held liable by any party for decisions made or not made based on the validation opinion, which goes beyond the purpose.

Madrid, 10 February 2010

Luis Robles Olmos

Climate Change Unit Manager

Mª Carmen González Galán

Validation Team leader

6 REFERENCES

Category 1 documents: Documents provided by the project proponents that relate directly to the GHG components of the project. These have been used as direct sources of evidence for the determination conclusions.

Category 2 documents: Background documents related to the design and/or methodologies employed in the design or other reference documents. Where applicable, Category 2 documents have been used to check project assumptions and confirm the validity of information given in the category 1 documents.

Category	Ref	Document Name	Date	Author/Competent Authority
1	1	PDD Rwanda Electrogaz Compact Fluorescent Lamp (CFL) Distribution project (Version 12	09-02-2010	RECO-RWASCO/WB
2	2	Approved methodology ASM-II.C (version 11)	EB 41	CDM – EXECUTIVE BOARD
2	3	Approved methodology ASM-II.J (version 03)	EB 41	CDM – EXECUTIVE BOARD
2	4	Validation and Verification Manual (version 1.1)	EB 51	CDM – EXECUTIVE BOARD
1	5	Letter of Approval of Rwanda	03-03-2009	DNA of Rwanda
1	6	Letter of Approval of The Netherlands	08-05-2009	DNA of The Netherlands
1	7	Communication of change of name Electrogaz	15-12-2009	RECO-RWASCO (Formerly Electrogaz)
1	8	Request for deviation from AMS-II.) DEV0264	15-09-2009	RECO-RWASCO/ AENOR
1	9	Contract for supply of 50,000 Compact Fluorescent Lamps	10-01-2007	RECO-RWASCO (Formerly Electrogaz)
2	10	Tool to calculate the emission factor for an electricity system (version 02)	EB 50	CDM – EXECUTIVE BOARD
1	11	Rwandan grid Emission Factor Calculation	10-01-2010	RECO-RWASCO (Formerly Electrogaz)
1	12	Rwanda Electricity data summary 2000-2007	2008	RECO-RWASCO (Formerly Electrogaz)
1	13	Electrogaz activity report 2007	2008	RECO-RWASCO (Formerly Electrogaz)
1	14	Electrogaz activity report 2008	2009	RECO-RWASCO (Formerly Electrogaz)
1	15	Fuel data 2004-2009 (Electrical grid)	2009	RECO-RWASCO (Formerly Electrogaz)
2	16	2006 IPCC Guidelines for National Greenhouse Gas Inventories	2006	IPCC
1	17	The World Bank, Aide-Memoire for the Urgent Electricity Rehabilitation Project	24-11-2006	World Bank
2	18	Simplified Modalities and Procedures for Small-scale CDM Project Activities	30-09-2005	CDM – EXECUTIVE BOARD
1	19	Commercial invoice nº 952.8947-C	6-5-2008	Joh..Achelis&Söhne GmbH
2	20	Project 2476: Pune (India) OSRAM CFL distribution CDM Project	17-07-2009	CDM – EXECUTIVE BOARD
2	21	Project 2457: Yamunanagar & Sonipat (India) OSRAM CFL distribution CDM Project	16-07-2009	CDM – EXECUTIVE BOARD
2	22	Project 1754: Visakhapatnam (India) OSRAM CFL distribution CDM Project	12-02-2009	CDM – EXECUTIVE BOARD
1	23	Rwanda CFL Additionality Financial spreadsheet	01-02-2010	RECO-RWASCO (Formerly Electrogaz)
1	24	Residential Customer Lighting Survey	01-03-2008	Ministry of the Infrastructure of Rwanda

Category	Ref	Document Name	Date	Author/Competent Authority
1	25	Monitoring Plan Rwanda Electrogaz CFL	10-04-2009	RECO-RWASCO (Formerly Electrogaz)
1	26	Letter from REMA to Electrogaz with comments after analysis of the PDD	21-11-2008	Rwanda Environment Management Authority (REMA)
1	27	Urgent Rehabilitation Project	23-02-2005	RECO-RWASCO (Formerly Electrogaz)
1	28	ERs CalculationElectrogaz CFL spreadsheet	08-02-2010	RECO-RWASCO (Formerly Electrogaz
1	29	Minutes of meeting between REMA and Electrogaz	24-02-2009	Reco-RWASCO / REMA

SMALL-SCALE CDM VALIDATION PROTOCOL FOR

WORLD BANK-IBRD

VALIDATION OF THE SMALL-SCALE PROJECT ACTIVITY
Rwanda Electrogaz Compact Fluorescent Lamp (CFL) Distribution project

REFERENCE NUMBER: 2008/0018/CDM/005

REPORT NUMBER: 02

Validation Type Validation of a small-scale project activity	
Validation team: Mª Carmen GONZÁLEZ GALAN (Chief validator/team leader) Mª Mercedes GARCÍA MADERO (Validator) Pablo TABOADA UTRERA (Validator) Marcelino Pellitero Martinez (Validator trainee)	
Address: C/ Génova, 6 28004 – Madrid (Spain)	Date: 2010-02-03

Table 1 Mandatory Requirements for Small Scale Clean Development Mechanism (CDM) Project Activities

REQUIREMENT	REFERENCE	CONCLUSION	Cross Reference/Comment
1. The project shall assist Parties included in Annex I in achieving compliance with part of their emission reduction commitment under Art. 3	Kyoto Protocol Art. 12.2	OK	Netherlands is the sole Annex-1 country participant, a LOA has been provided
2. The project shall assist non-Annex I Parties in achieving sustainable development and shall have obtained confirmation by the host country thereof	Kyoto Protocol Art. 12.2, Simplified Modalities and Procedures for Small Scale CDM Project Activities §23a	OK	LOA from Netherlands and LOA from Rwanda have been provided
3. The project shall assist non-Annex I Parties in contributing to the ultimate objective of the UNFCCC	Kyoto Protocol Art. 12.2.	OK	Table 2, Section B.11
4. The project shall have written approval of voluntary participation from the designated national authorities of each party involved	Kyoto Protocol Art. 12.5a, Simplified Modalities and Procedures for Small Scale CDM Project Activities §23a	OK	LOA from Netherlands And LOA from Rwanda have been provided
5. The emission reductions should be real, measurable and give long-term benefits related to the mitigation of climate change	Kyoto Protocol Art. 12.5b	OK	The emissions reductions are real and measurable.
6. Reduction in GHG emissions must be additional to any that would occur in absence of the project activity, i.e. a CDM project activity is additional if anthropogenic emissions of greenhouse gases by sources are reduced below those that would have occurred in the absence of the registered CDM project activity	Kyoto Protocol Art. 12.5.c, Simplified Modalities and Procedures for Small Scale CDM Project Activities §26	OK	The demonstration of the additionality of the project is justified as ot has been following detailed.
7. Potential public funding for the project from Parties in Annex I shall not be a diversion of official development assistance	Marrakech Accords (Decision 17/CP.7)	OK	The funding of the project is not a diversion of official development assistance
8. Parties participating in the CDM shall designate a national authority for the CDM	Marrakesh Accords (CDM modalities§ 29)	OK	Rwanda and The Netherlands have designated a DNA
9. The host country shall be a Party to the Kyoto Protocol	Marrakesh Accords (CDM modalities§ 30)	OK	Rwanda has confirmed that is a party of the Kyoto Protocol

REQUIREMENT	REFERENCE	CONCLUSION	Cross Reference/Comment
			Date of ratification: 22/07/2004 Source: UNFCCC
10. The proposed project activity shall meet the eligibility criteria for small scale CDM project activities set out in § 6 *(c)* of the Marrakesh Accords and shall not be a debundled component of a larger project activity	Simplified Modalities and Procedures for Small Scale CDM Project Activities §12a,c	OK	Table 2, Section A.1
11. The project design document shall conform with the Small Scale CDM Project Design Document format	Simplified Modalities and Procedures for Small Scale CDM Project Activities, Appendix A	OK	The PDD is conform the with the Small Scale CDM Project Design Document format version 3
12. The proposed project activity shall confirm to one of the project categories defined for small scale CDM project activities and uses the simplified baseline and monitoring methodology for that project category	Simplified Modalities and Procedures for Small Scale CDM Project Activities §22e	OK	Table 2, Section A.1.3 and B.1
13. Comments by local stakeholders are invited, and a summary of these provided	Simplified Modalities and Procedures for Small Scale CDM Project Activities §22b	OK	Local stakeholder consultation is described in section E of the PDD
14. If required by the host country, an analysis of the environmental impacts of the project activity is carried out and documented	Simplified Modalities and Procedures for Small Scale CDM Project Activities §22c	OK	See point 3.7 of this report
15. Parties, stakeholders and UNFCCC accredited NGOs have been invited to comment on the validation requirements and comments have been made publicly available	Simplified Modalities and Procedures for Small Scale CDM Project Activities §23b,c,d	OK	The project design document has been made publicly available on 2008/11/01 on UNFCCC web site.

Table 2 Requirements Checklist

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
A. Project Description The project design is assessed.					
A.1. Small scale project activity It is assess whether the project qualifies as small scale CDM project activity.					
A.1.1. Does the project qualify as a small scale CDM project activity as defined in paragraph 6 *(c)* of decision 3/CMP.1 on the modalities and procedures for the CDM?		DR I	YES. The project is eligible to apply a small-scale methodology because the energy savings from the replacement of incandescent lamps by efficient CFLs and the CFLs installed at new sites under the project are estimated to be a maximum of 38 GWh annually, which is below the 60 GWh limit for Type II small-scale project activities.	OK	OK
A.1.2. The small scale project activity is not a debundled component of a larger project activity?		DR I	YES. It is the only CFL CDM project in Rwanda	OK	OK
A.1.3. Does proposed project activity confirm to one of the project categories defined for small scale CDM project activities?		DR	YES. This project activity is under Type II – Energy Efficiency Improvement Project, and uses two methodologies AMS-II.C and AMS-II.J	OK	OK

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
A.2. Project Design Validation of project design focuses on the choice of technology and the design documentation of the project.					
A.2.1. Are the project's spatial (geographical) boundaries clearly defined?	1	DR I	The project is country wide. **CL 4** The geographical boundaries of the project shall be defined in accordance with the approved methodologies. More detailed information (coordinates, exact location, etc) of the existing 21 antennas/stations of Electrogaz and private distributors should be included in the Section A.4.1.4 of the PDD. **CL closed. See Table 3**	CL	OK
A.2.2. Are the project's system (components and facilities used to mitigate GHG's) boundaries clearly defined?	2	DR I	**CL 5** The number of existing residential and tertiary customers of Electrogaz and the estimated number of new customers have to be clarified. **CL closed. See Table 3**	CL	OK
A.2.3. Does the project design engineering reflect current good practices?	3	DR I	**CL 8** Further information must be included in the PDD related to the technical description of the project (i.e. definition of antenna and stations) The project proponent explained the meaning of antenna and station. In fact, it means the same concept: an office to the distribution of CFL. The only difference is antennas are at Kigali and stations are in the rest of the country. It will be necessary to include the definition in the PDD **CL closed. See Table 3**	CL	OK
A.2.4. Will the project result in technology transfer to the host country?		DR I	YES. All the high-quality compact fluorescent lamps used in the project are from international manufacturers. In Rwanda this kind of technology does not exist	OK	OK
A.2.5. Does the project require extensive initial training and maintenance efforts in order to	4	DR I	**CL 10** The training methodology or and evidence of these provisions for the training should be provided to the	CL	OK

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
work as presumed during the project period? Does the project make provisions for meeting training and maintenance needs?			validation team. **CL closed. See Table 3**		
A.3. Contribution to Sustainable Development The project's contribution to sustainable development is assessed					
A.3.1. Will the project create other environmental or social benefits than GHG emission reductions?		DR I	OK. The project creates other environmental or social benefits than GHG emission reductions as it is described in the PDD Section A.2. These benefits are in relation to enable electricity access to a larger number of poorest clients and in relation to the develop awareness on energy efficiency and environmentally responsible behaviors.	OK	OK
A.3.2. Will the project create any adverse environmental or social effects?	5	DR I	**CL 3***:* A meeting with the environmental authority is necessary to clarify the legal situation of the project. **CAR 6***:* The validation team held a meeting with the REMA's director *(*Rwanda Environment Management Authority*)*. The REMA sent to the project proponent a letter with the requirements to approve the project. Those requirements include, among others, an environmental impact assessment and some issues about the waste management. Without the agreement of the REMA, the project will not be approved. **CL 13***:* The Mitigation Plan should be provided to the validation team. **CL and CR closed. See Table 3**	CAR CL	OK
A.3.3. Is the project in line with sustainable development policies of the host country?		DR I	**See A.3.2.**	CL	OK

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
A.3.4. Is the project in line with relevant legislation and plans in the host country?		DR I	**See A.3.2.**	CL	OK
B. Project Baseline and Monitoring The validation of the project baseline establishes whether the selected baseline methodology is appropriate and whether the selected baseline represents a likely baseline scenario.					
B.1. Baseline Methodology It is assessed whether the project applies an appropriate baseline methodology.					
B.1.1. Is the selected baseline methodology in line with the baseline methodologies provided for the relevant project category?		DR	YES. The PDD describes the baseline methodology, which is in conformance with the approved baseline methodologies ASM II.C *(version 10)* Demand-side energy efficiency activities for specific technologies and ASM II.J *(version 01)* Demand-side activities for efficient lighting technologies.	OK	OK
B.1.2. Is the baseline methodology applicable to the project being considered?		DR	YES. This project activity is under Type II – Energy Efficiency Improvement Project, and uses two SSC methodologies: • AMS-II.J "Demand-side activities for efficient lighting technologies", which is presently used for the replacement of Incandescent Bulbs *(IBs)*, and • AMS-II.C "Demand-side energy-efficiency activities for specific technologies", which is followed for the installation of CFLs at new customer sites.	OK	OK

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
B.2. Baseline Determination It is assessed whether the project activity itself is not a likely baseline scenario and whether the selected baseline represents a likely baseline scenario.					
B.2.1. Is it demonstrated that the project activity itself is not a likely baseline scenario due to the existence of one or more of the following barriers: investment barriers, technology barriers, barriers due to prevailing practice or other barriers?	6	DR I	**CAR 3:** The demonstration of the additionality of the project should be justified in more detail. The description of the barriers analysis shall be appropriately documented in conformance with the Annex 35 of the 39th Executive Board and the new CDM Validation and Verification Manual of the UNFCCC All the evidences to support the additionality have to be provided to the validation team and included in the PDD. **CR closed. See Table 3**	CAR	OK
B.2.2. Is the application of the baseline methodology and the discussion and determination of the chosen baseline transparent and conservative?	7	DR	**CAR 4:** All the applicable formulas of the updated methodologies have to be used and clearly explained in the PDD, i.e. Equation 2 in AMS II C. The methodologies are not correctly applied in almost two issues: AMS-II.J (first component): The total lumen output of the efficiencient lighting device should be equal to or more than that of the lighting device being replaced. This condition does not happens with IB 100W and CFL 20W. AMS-II.C (second component): For each replaced equipment the light output is not significantly smaller or larger than the baseline. The design of the project shall be revised according to the methodologies and the PDD has to be updated accordingly. **CL 7:** The criteria to match the CFLs lumen with the	CAR CL	OK

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
			households needs have to be detailed in the PDD. It has to be clarified the cathegories in wich the lamps are divided to do the calculations of the baseline because the methodologies don't let to get them into groups. **CL 9:** All literature and sources of information has to be clearly referenced. Official sources of data are a desirable condition **CL and CAR closed. See Table 3**		
B.2.3. Are relevant national and/or sectoral policies and circumstances taken into account?	8	DR I	**CL 3** A meeting with the environmental authority is necessary to clarify the legal situation of the project. **CAR 6:** The validation team held a meeting with the REMA's director (Rwanda Environment Management Authority). The REMA sent to the project proponent a letter with the requirements to approve the project. Those requirements include, among others, an environmental impact assessment and some issues about the waste management. Without the agreement of the REMA, the project will not be approved. **CL and CAR closed. See Table 3**	CL CAR	OK
B.2.4. Is the baseline selection compatible with the available data?		DR	**See B. 2.1**	CAR	OK
B.2.5. Does the selected baseline represent the most likely scenario describing what would have occurred in absence of the project activity?		DR	**See B. 2.1**	CAR	OK

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
Monitoring Plan The monitoring plan review aims to establish whether all relevant project aspects deemed necessary to monitor and report reliable emission reductions are properly addressed.					
B.3. Monitoring Methodology It is assessed whether the project applies an appropriate monitoring methodology.					
B.3.1. Is the selected monitoring methodology in line with the monitoring methodologies provided for the relevant project category?		DR	YES. The project applies approved monitoring methodologies AMS-II.C ver.10 and AMS-II.J ver. 01	OK	OK
B.3.2. Is the monitoring methodology applicable to the project being considered?		DR	YES. Both methodologies are applicable to the project activity, the AMS-II.J for the replacement of incandescent bulbs, and the AMS-II.C for the installation of CFLs for new customers.	OK	OK
B.3.3. Is the application of the monitoring methodology transparent?	9	DR I	**CL 10:** The monitoring Plan shall be improved according with the approved monitoring methodologies ASM.II.J and ASM.II.C. Some issues have been detected and they should be improved: • The ex-ante surveys and corresponding data base should be provided to the validation team. The ex-ante survey was given to the validation team. **CL 16:** The annex 3 of the PDD with the baseline survey has to be explained, because the results don't match with the survey report sent to the validation team. • The Urgent Electricity Rehabilitation Project (UER) shall be explained in the PDD, and the evidence should be submitted to the validation	CL	OK

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
			team. The UER was given to the validation team • The tender documents of the procurement process should be provided to the validation team. The tender documents was provided to the validation team • The methodology of the test of the CFLs and the IBs should be detailed in the Monitoring Plan Section of the PDD, and the evidences of this process should be provided to the validation team. • The spreadsheets used for the recording should be provided to the validation team. The quality assurance process and the software for the following phases shall be detailed in the PDD and provided to the validation team. • The inventory of the lamps and the certification of its destruction shall be provided to the validation team. • The ex-post surveys format shall be provided to the validation team. The ex-post surveys format was provided to the validation team • The statistic methodology to choose a sample of 100 (or 0.1%) for monitoring has to be described, referenced and justified. • The spreadsheets prepared for the emissions		

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
			reduction calculation monitoring should be provided to the validation team. The spreadsheets prepared for the emissions reduction calculation monitoring was provided to the validation team • Procedure for project performance reviews before data is submitted for verification, internally or externally has to be develop and detailed in the PDD. The evidences of this provisions should be submitted to the validation team. • Procedures identified for emergency preparedness for cases where emergencies can cause unintended emissions have to be forecasted and included in the PDD. • The training methodology or and evidence of these provisions for the training should be provided to the validation team.		
B.3.4. Will the monitoring methodology give opportunity for real measurements of achieved emission reductions?		DR	**See B. 3. 3.**	CL	OK
B.4. Monitoring of Project Emissions It is established whether the monitoring plan provides for reliable and complete project emission data over time.					
B.4.1. Are the choices of project emission indicators reasonable?		DR	**See B. 3. 3.**	CL	OK
B.4.2. Will it be possible to monitor / measure the		DR	**See B. 3. 3.**	CL	OK

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
specified project emission indicators?					
B.4.3. Do the measuring technique and frequency comply with good monitoring practices?		DR	**See B. 3. 3.**	CL	OK
B.4.4. Are the provisions made for archiving project emission data sufficient to enable later verification?		DR	**See B. 3. 3.**	CL	OK
B.5. Monitoring of Leakage It is assessed whether the monitoring plan provides for reliable and complete leakage data over time.					
B.5.1. If applicable, are the choices of leakage indicators reasonable?		DR I	Leakage is not calculate with those methodologies, but the project undertakes some measures to avoid it: • Charging a minimal price for the CFL • Restricting the number of lamps per household • Destroying replaced lamps Those measures limit secondary market effects **See B. 3. 3.**	CL	OK
B.5.2. If applicable, will it be possible to monitor / measure the specified leakage indicators?		DR I	**See B. 3. 3.**	CL	OK
B.5.3. If applicable, do the measuring technique and frequency comply with good monitoring practices?		DR I	**See B. 3. 3.**	CL	OK
B.5.4. If applicable, are the provisions made for archiving leakage data sufficient to enable later verification?		DR I	**See B. 3. 3.**	CL	OK

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
B.6. Monitoring of Baseline Emissions It is established whether the monitoring plan provides for reliable and complete project emission data over time.					
B.6.1. Is the choice of baseline indicators, in particular for baseline emissions, reasonable?		DR	**See B. 3. 3.**	CL	OK
B.6.2. Will it be possible to monitor / measure the specified baseline emission indicators?		DR	**See B. 3. 3.**	CL	OK
B.6.3. Do the measuring technique and frequency comply with good monitoring practices?		DR	**See B. 3. 3.**	CL	OK
B.6.4. Are the provisions made for archiving baseline emission data sufficient to enable later verification?		DR	**See B. 3. 3.**	CL	OK
B.7. Project Management Planning It is checked that project implementation is properly prepared for and that critical arrangements are addressed.					
B.7.1. Is the authority and responsibility of project management clearly described?		DR I	YES. The responsibility of project management is clearly described in the PDD. Electrogaz is the coordination entity. It conducts the implementation and the monitoring of the project.	OK	OK
B.7.2. Is the authority and responsibility for registration monitoring measurement and reporting clearly described?		DR I	YES. See B 7.1	OK	OK
B.7.3. Are procedures identified for training of monitoring personnel?		DR	There is a user guide for the software used for the monitoring. Is application software developed to keep	CL	OK

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
		I	information about the distribution of economical lamps to customers and to control the redistribution of lamps in case of faulty ones during the limit of guarantee. **See B. 3. 3.**		
B.7.4. Are procedures identified for emergency preparedness for cases where emergencies can cause unintended emissions?		DR I	**See B. 3. 3.**	CL	OK
B.7.5. Are procedures identified for calibration of monitoring equipment?		DR	For the second component of the Project the monitoring will be done with electricity meters. Meter technology and calibration and metering procedures will be described by the manufacturer at the time of purchase. The procedures are included in the monitoring manual.	OK	OK
B.7.6. Are procedures identified for maintenance of monitoring equipment and installations?		DR	See B.7.5	OK	OK
B.7.7. Are procedures identified for monitoring, measurements and reporting?		DR I	Electrogaz has a general instruction for the monitoring and an user manual for the software **See B.3.3.**	CL	OK
B.7.8. Are procedures identified for day-to-day records handling *(*including what records to keep, storage area of records and how to process performance documentation*)*		DR	**See B.3.3.**	CL	OK
B.7.9. Are procedures identified for dealing with possible monitoring data adjustments and uncertainties?		DR	**See B.3.3**	CL	OK
B.7.10. Are procedures identified for internal audits of GHG project compliance with operational requirements as applicable?		DR	**See B.3.3.**	CL	OK

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
B.7.11. Are procedures identified for project performance reviews?		DR	**See B.3.3.**	CL	OK
B.7.12. Are procedures identified for corrective actions?		DR	**See B.3.3.**	CL	OK
1. Calculation of GHG emission It is assessed whether all material GHG emission sources are addressed and how sensitivities and data uncertainties have been addressed to arrive at conservative estimates of projected emission reductions.					
B.8. Project GHG Emissions The validation of predicted project GHG emissions focuses on transparency and completeness of calculations.					
B.8.1. Are all aspects related to direct and indirect project emissions captured in the project design?		DR I	YES. Only the component 2 (methodology AMS_II.C) includes the project emissions following the methodology used. Those project emissions are calculated indirectly by the daily operating time of a consistent sample of CFls. Those measures will be done by meters installed in the new customer's houses.	OK	OK
B.8.2. Have all relevant greenhouse gases and sources been evaluated?		DR	YES. See B 8.1.	OK	OK
B.8.3. Do the methodologies for calculating project emissions comply with existing good practice?		DR	Yes. Meter technology and calibration and metering procedures will be described by the manufacturer at the time of purchase.	OK	OK
B.8.4. Are the calculations documented in a complete and transparent manner?	10	DR	**CAR 2:** The calculation of the emission factor of the grid shall be detailed in a transparent manner in the PDD according with the methodology AMS I.D. The	CAR CL	OK

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
			spreadsheets of this calculation should be provided to the validation team **CAR 4***:* All the applicable formulas of the updated methodologies have to be used and clearly explained in the PDD, i.e. Equation 2 in AMS II C. The methodologies are not correctly applied in almost two issues*:* AMS-II.J *(*first component*):* The total lumen output of the efficiencient lighting device should be equal to or more than that of the lighting device being replaced. This condition does not happens with IB 100W and CFL 20W. AMS-II.C *(*second component*):* For each replaced equipment the light output is not significantly smaller or larger than the baseline. The design of the project shall be revised according to the methodologies and the PDD has to be updated accordingly. **CL 5***:* The number of existing residential and tertiary customers of Electrogaz and the estimated number of new customers have to be clarified. **CL 9***:* All literature and sources of information has to be clearly referenced. Official sources of data are a desirable condition. **CL and CAR closed. See Table 3**		
B.8.5. Have conservative assumptions been used?		DR	**See B 8.4.**	CAR	OK
B.8.6. Are uncertainties in the project emissions estimates properly addressed?		DR	**See B 8.4**.	CAR	OK
B.9. Leakage					

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
It is assessed whether there leakage effects, i.e. change of emissions which occurs outside the project boundary and which are measurable and attributable to the project, have been properly assessed.					
B.9.1. Are leakage calculation required for the selected project category and if yes, are the relevant leakage effects assessed?		DR I	Leakage is not calculate with those methodologies, but the project undertakes some measures to avoid it: • Charging a minimal price for the CFL • Restricting the number of lamps per household • Destroying replaced lamps Those measures limit secondary market effects	OK	OK
B.9.2. Are potential leakage effects properly accounted for in the calculations (if applicable)?		DR	See B 9.1	OK	OK
B.9.3. Do the methodologies for calculating leakage comply with existing good practice (if applicable)?		DR	See B 9.1	OK	OK
B.9.4. Are the calculations documented in a complete and transparent manner and (if applicable)?		DR	See B 9.1	OK	OK
B.9.5. Have conservative assumptions been used (if applicable)?		DR	See B 9.1	OK	OK
B.9.6. Are uncertainties in the leakage estimates properly addressed (if applicable)?		DR	See B 9.1	OK	OK
B.10. Baseline GHG Emissions The validation of predicted baseline GHG emissions focuses on transparency and completeness of calculations.					

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
B.10.1. Are the baseline emission boundaries clearly defined and do they sufficiently cover sources for baseline emissions?	11	DR	**CAR 5:** The baseline survey was done after the start of the project (after the implementation of the first phase). **CL 7:** The criteria to match the CFLs lumen with the households needs have to be detailed in the PDD. It has to be clarified the categories in which the lamps are divided to do the calculation of the baseline because the methodologies don't let to get them into groups. **CL 16** The annex 3 of the PDD with the baseline survey has to be explained, because the results don't match with the survey report sent to the validation team **CL and CAR closed. See Table 3**	CAR CL	OK
B.10.2. Are all aspects related to direct and indirect baseline emissions captured in the project design?		DR	**See B.10.1**	CAR	OK
B.10.3. Have all relevant greenhouse gases and sources been evaluated?		DR	YES. The emissions are calculated from the electricity consumption from the grid.	OK	OK
B.10.4. Do the methodologies for calculating baseline emissions comply with existing good practice?		DR	**See B.10.1**	CAR	OK
B.10.5. Are the calculations documented in a complete and transparent manner?		DR	**See B.10.1**	CAR	OK
B.10.6. Have conservative assumptions been used?		DR	**See B.10.1**	CAR	OK
B.10.7. Are uncertainties in the baseline emissions estimates properly addressed?		DR	**See B.10.1**	CAR	OK
B.11. Emission Reductions Validation of baseline GHG emissions will focus on					

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
methodology transparency and completeness in emission estimations.					
2. B.11.1 Will the project result in fewer GHG emissions than the baseline case?	12	DR I	**CAR 4***:* All the applicable formulas of the updated methodologies have to be used and clearly explained in the PDD, i.e. Equation 2 in AMS II C. The methodologies are not correctly applied in almost two issues*:* AMS-II.J *(*first component*):* The total lumen output of the efficiencient lighting device should be equal to or more than that of the lighting device being replaced. This condition does not happens with IB 100W and CFL 20W. AMS-II.C *(*second component*):* For each replaced equipment the light output is not significantly smaller or larger than the baseline. The design of the project shall be revised according to the methodologies and the PDD has to be updated accordingly. **CAR 5** The baseline survey was done after the start of the project *(*after the implementation of the first phase*).* **CAR closed. See Table 3**	CAR	OK
C. **Duration of the Project / Crediting Period** **3.** It is assessed whether the temporary boundaries of the project are clearly defined.					
4. C.1.1 Are the project's starting date and operational lifetime clearly defined?	13	DR	**CL 11***:* The start date of the project shall be in accordance to the version 04 of the Glossary of terms *(*EB 41*):* "the start date shall be considered to be the date on which the project participant has committed to expenditures related to the implementation or related to the construction of the project activity" Documented evidence of the start	CL	OK

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
			date of the project has to be submitted to the validation team. **CL closed. See Table 3**		
5. C.1.2. Is the crediting period clearly defined *(*seven years with two possible renewals or 10 years with no renewal*)*?	14	DR	**CL 12***:* A specific start date of the crediting period should be detailed in the PDD. The evidence of this date should be provided to the Validation team **CL closed. See Table 3**	CL	OK
D. **Environmental Impacts** It is assessed whether environmental impacts of the project are sufficiently addressed.					
6. D.1.1 Does host country legislation require an analysis of the environmental impacts of the project activity?	15	DR I	**CL 3***:* A meeting with the environmental authority is necessary to clarify the legal situation of the project. **CAR 6***:* The validation team held a meeting with the REMA's director *(*Rwanda Environment Management Authority*)*. The REMA sent to the project proponent a letter with the requirements to approve the project. Those requirements include, among others, an environmental impact assessment and some issues about the waste management. Without the agreement of the REMA, the project will not be approved. **CL and CAR closed. See Table 3**	CL CAR	OK
7. D.1.2 Does the project comply with environmental legislation in the host country?		DR I	**See D.1.1**	CL	OK
8. D.1.3 Will the project create any adverse environmental effects?		DR I	**See D.1.1**	CL	OK
9. D.1.4 Have environmental impacts been identified		DR	**See D.1.1**	CL	OK

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
and addressed in the PDD?		I	**CL 13:** The Mitigation Plan should be provided to the validation team. **CL closed. See Table 3**		
E. **Comments by Local Stakeholder** Validation of the local stakeholder consultation process.					
10. E.1.2 Have relevant stakeholders been consulted?	15	Dr I	A description of the stakeholders consultation is included in the PDD, section E.1 **CL 14:** The evidences of the communication campaigns and the stand in the EXPO should be provided to the validation team. The raised questions via hot line, communication campaign and EXPO stand (or any stakeholder consultation process) have to be also provided to the validation team and summarized in the section E.2 of the PDD. Evidences of the communication campaigns and the stand in the EXPO have been provided to the validation team. **CL and CAR closed. See Table 3**	CL	OK
11. E.1.3 Have appropriate media been used to invite comments by local stakeholders?			**See E.1.2**	CL	OK
12. E.1.4 If a stakeholder consultation process is required by regulations/laws in the host country, has the stakeholder consultation process been carried out in accordance with such regulations/laws?			**CL 3:** A meeting with the environmental authority is necessary to clarify the legal situation of the project. **CAR 6:** The validation team held a meeting with the REMA's director (Rwanda Environment Management Authority). The REMA sent to the project proponent a letter with the requirements to approve the project. Those requirements include, among others, an environmental	CL CAR	OK

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
			impact assessment and some issues about the waste management. Without the agreement of the REMA, the project will not be approved. **CL and CAR closed. See Table 3**		
13. E.1.5 Is a summary of the comments received provided?			**See E.1.2**	CL	OK
14. E.1.6 Has due account been taken of any comments received?			**See E.1.2**	CL	OK

Table 3 Resolution of Corrective Action and Clarification Requests

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in table 2	Summary of project owner response	Validation team conclusion
CAR.1*:* The project participant *(*PP*)* shall provide to the validation team the Letter of Approval of the two parties before the request for registration of the Project.		LOA from Netherlands And LOA from Rwanda have been provided	**OK. This CAR is closed**
CAR 2*:* The calculation of the emission factor of the grid shall be detailed in a transparent manner in the PDD according with the methodology AMS I.D. The spreadsheets of this calculation should be provided to the validation team	10	Details of calculation of Emission Factor for the Rwandan Grid are included in the PDD and calculation tables have been provided	The calculations of the emission factor of the grid were done finally by the "Tool to calculate the emission factor for an electricity system" **OK. This CAR is closed**
CAR 3*:* The demonstration of the additionality of the project should be justified in more detail. The description of the barriers analysis shall be appropriately documented in conformance with the Annex 35 of the 39th Executive Board and the new CDM Validation and Verification Manual of the UNFCCC All the evidences to support the additionality have to be provided to the validation team and included in the PDD.	6	New demonstration of additionality is included in the PDD	The demonstration of additionality is correct. **OK. This CAR is closed**
CAR 4*:* All the applicable formulas of the updated methodologies have to be used and clearly explained in the PDD, i.e. Equation 2 in AMS II C. The methodologies are not correctly applied in almost two issues*:* AMS-II.] *(*first component*):* The total lumen output of the efficiencient lighting device should be equal to or more than that of the lighting device being replaced. This condition does not happens with IB 100W and CFL 20W. AMS-II.C *(*second component*):* For each replaced	7, 10, 12	Equivalence is explained in the PDD to better explain the ER calculation. EB agreed on the request for deviation. Changes have been made in the PDD accordingly.	**OK. This CAR is closed**.

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in table 2	Summary of project owner response	Validation team conclusion
equipment the light output is not significantly smaller or larger than the baseline. The design of the project shall be revised according to the methodologies and the PDD has to be updated accordingly.			
CAR 5*:* The baseline survey was done after the start of the project *(*after the implementation of the first phase*)*.	11, 12	As the methodology applied is AMS-II.J version 3, which doesn't require anymore a baseline survey, but only "estimation of nameplate/rated power of the baseline ICLs to be replaced" for ex-ante calculations.	**OK. This CAR is closed**
CAR 6*:* The validation team held a meeting with the REMA's director *(*Rwanda Environment Management Authority*)*. The REMA sent to the project proponent a letter with the requirements to approve the project. Those requirements include, among others, an environmental impact assessment and some issues about the waste management. Without the agreement of the REMA, the project will not be approved.	5, 8, 15	Project proponent submitted a revised PDD addressing all of the concerns expressed by REMA. After reviewing the PDD submitted, REMA has issued a LOA to the project.	**OK. This CAR is closed** **FAR 1 is raised**
CAR 7 It is not possible to include more annexes in the PDD. The official template only allows 4 annexes *(*1 Contact Information, 2 Information public funding, 3 Baseline information and 4 monitoring plan*)*. You shall remove the annexes 5 and 6 and to move the information either to the PDD text or to the annex 3.		PDD has been corrected accordingly	**OK. This CAR is closed**

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in table 2	Summary of project owner response	Validation team conclusion
CAR 8 In the PDD At the point A.4.3. *(pg. 8)* you shall include the annual average of the estimated reduction of the crediting period.		PDD has been corrected accordingly	**OK. This CAR is closed**
CAR 9. In the PDD At the point B.6.1. "Explanation of methodological choices: Component 2. CFLs installed at new sites" *(pg.12)*, you shall correct the formula and to include the factor for transmission & distribution loss.		PDD has been corrected accordingly	**OK. This CAR is closed**

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in table 2	Summary of project owner response	Validation team conclusion
CL 1*:* The evidence to justify the only participation of The Netherlands as PP, has to be provided to the validation team. This issue shall be specified in the CDM-SSC-PDD		Netherlands is the sole Annex-1 country participant, a LOA has been provided	**OK. This CL is closed**
CL 2*:* It is necessary to clarify what organization is the National Authority in Rwanda. This is because at the UNFCCC website there is a different one that the PP told to the DOE.			**CLOSED**. The new Rwandan DNA is the Rwanda Environment Management Authority *(*REMA*)*. The validation team held a meeting with the REMA's director.
~~**CL 3***:* A meeting with the environmental authority is necessary to clarify the legal situation of the project.~~ **SEE CAR 6**	5, 15		**CLOSED as clarification**. **New CAR 6**
CL 4*:* The geographical boundaries of the project shall be defined in accordance with the approved methodologies. More detailed information *(*coordinates, exact location, etc*)* of the existing 21 antennas/stations of Electrogaz and private distributors should be included in the Section A.4.1.4 of the PDD.	1	The project participant has included the list and location of the antennas and stations in the PDD, and an explanation about the private distributors. The private distributors have been eliminated in the project design	**OK. This CL is closed**
CL 5*:* The number of existing residential and tertiary customers of Electrogaz and the estimated number of new customers have to be clarified.	2, 10	Extract from customer database, as of December 2008 is provided Latest data on the electricity access program as per the Castalia study, completed and presented in February 2009, is provided	**OK. This CL is closed**

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in table 2	Summary of project owner response	Validation team conclusion
CL 6*:* The inclusion of the phase 4 in the scope of the extension of the National Grid Extension Program has to be clarified.		Phases and components are not linked. The components are related to the methodologies used in this PDD, the phases are time related. Component 2 is part of the National Grid Extension Program. The program aims to educate the new costumers to efficient technologies since the beginning when they are connected to the grid, and mitigate the electricity consumption.	**OK. This CL is closed**
CL 7*:* The criteria to match the CFLs lumen with the households needs have to be detailed in the PDD. It has to be clarified the categories in which the lamps are divided to do the calculations of the baseline because the methodologies don't let to get them into groups.	7, 11	Equivalence is explained in the PDD to better explain the ER calculation. EB agreed on the request for deviation. Changes have been made in the PDD accordingly.	**OK. This CL is closed**
CL 8*:* Further information must be included in the PDD related to the technical description of the project *(*i.e. definition of antenna and stations*)*	3	The project proponent explained the meaning of antenna and station. In fact, it means the same concept: an office to the distribution of CFL. The only difference is antennas are at Kigali and stations are in the rest of	**OK. This CL is closed**

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in table 2	Summary of project owner response	Validation team conclusion
		the country.	
CL 9: All literature and sources of information has to be clearly referenced. Official sources of data are a desirable condition.	7, 10	Data sources for a. Population *(*The Little Data Book, the World Bank*)* b. Income levels *(*The Little Data Book, the World Bank*)* c. Electrogaz customers *(*source: Electrogaz database*)* d. National Electricity Access Program, e. Early consideration of CDM *(*Project Implementation Framework and Program f. Starting date of the project g. Electricity generation data and fuel consumption *(*source: Electrogaz Electricity Department*)* h. FAQ *(*source: Electrogaz hotline*)* is provide	All the information has been provided and referred. **OK. This CL is closed**
CL 10: The Monitoring Plan shall be improved according with the approved monitoring methodologies ASM.II.J and ASM.II.C. Some issues have been detected and they should be improved:	4, 9	Monitoring plan in the PDD has been strengthened. The Baseline survey provided.	All the information has been provided and the PDD was modified accordingly **OK. This CL is closed**

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in table 2	Summary of project owner response	Validation team conclusion
• The ex-ante surveys and corresponding data base should be provided to the validation team. The ex-ante survey was given to the validation team. **CL 16: The annex 3 of the PDD with the baseline survey has to be explained, because the results don't match with the survey report sent to the validation team** • The Urgent Electricity Rehabilitation Project (UER) shall be explained in the PDD, and the evidence should be submitted to the validation team. • The tender documents of the procurement process should be provided to the validation team. • The methodology of the test of the CFLs and the IBs should be detailed in the Monitoring Plan Section of the PDD, and the evidences of this process should be provided to the validation team. • The spreadsheets used for the recording should be provided to the validation team. The quality assurance process and the software for the following phases shall be detailed in the PDD and provided to the validation team. • The inventory of the lamps and the certification of its destruction shall be provided to the validation team. • The ex-post surveys format shall be provided to the validation team. • The statistic methodology to choose a sample of 100 (or 0.1%) for monitoring has to be described, referenced and justified. • The spreadsheets prepared for the emissions reduction calculation monitoring should be			

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in table 2	Summary of project owner response	Validation team conclusion
provided to the validation team. • Procedure for project performance reviews before data is submitted for verification, internally or externally has to be develop and detailed in the PDD. The evidences of this provisions should be submitted to the validation team. • Procedures identified for emergency preparedness for cases where emergencies can cause unintended emissions have to be forecasted and included in the PDD. • The training methodology or and evidence of these provisions for the training should be provided to the validation team.			

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in table 2	Summary of project owner response	Validation team conclusion
CL 11*:* The start date of the project shall be in accordance to the version 04 of the Glossary of terms *(*EB 41*)*: "the start date shall be considered to be the date on which the project participant has committed to expenditures related to the implementation or related to the construction of the project activity" Documented evidence of the start date of the project has to be submitted to the validation team.	13	First contract signed for the first 50,000 CFLs has been provided to the validation team	Starting date of the project has been correctly justified with the first purchase of CFLs. **OK. This CL is closed**
CL 12*:* A specific start date of the crediting period should be detailed in the PDD. The evidence of this date should be provided to the Validation team	14	Start date of the crediting period is changed in the PDD	**OK. This CL is closed**
CL 13*:* The Mitigation Plan should be provided to the validation team.	5	There is no formal Mitigation Plan, thus language has been changed for mitigation measures. The last meeting minutes with REMA, with the list of measures agreed between REMA and Electrogaz, is provided.	**OK. This CL is closed. See FAR 1**
CL 14*:* The evidences of the communication campaigns and the stand in the EXPO should be provided to the validation team. The raised questions via hot line, communication campaign and EXPO stand *(*or any stakeholder consultation process*)* have to be also provided to the validation team and summarized in the section E.2 of the PDD.	15	The evidences of the communication campaigns and the stand in the EXPO have been provided to the validation team.	**OK. This CL is closed**
CL 15*:* The origin of the funding to the project has to be clarified in the PDD		The project is financed through a WB loan, a part of equity and potentially an advance payment on carbon revenues. This has	**OK. This CL is closed**

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in table 2	Summary of project owner response	Validation team conclusion
		been clarified in the PDD.	
CL 16*:* The annex 3 of the PDD with the baseline survey has to be explained, because the results don't match with the survey report sent to the validation team	9, 11	The correct baseline survey document has been provided and Annex 3 of the PDD has been corrected accordingly	**OK. This CL is closed**
FORWARD ACTION REQUEST *(FAR 1)*: The implementation of the environmental mitigations measures shall be assessed at the verification stage of the project	-	**-**	**-**