



# VALIDATION REPORT

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## “Electricity Grid Interconnection San Gabán – Mazuko – Puerto Maldonado” in Peru

REPORT No. 2007-1784

REVISION No. 01



## VALIDATION REPORT

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Client: Deuman SAC	Client ref.: Michael Moleros

**Project Name:** "Electricity Grid Interconnection San Gabán – Mazuko – Puerto Maldonado"

**Country:** Peru

**Methodology:** AM 0045

**Version:** 1

**GHG reducing Measure/Technology:** "Electric Energy Transmission and Distribution"

**ER estimate:** 124 736 over 7-years

**Size**

☒ Large Scale

☐ Small Scale

**Validation Phases:**

☒ Desk Review

☒ Follow up interviews

☒ Resolution of outstanding issues

**Validation Status**

☒ Corrective Actions Requested

☒ Clarifications Requested

☒ Full Approval and submission for registration

☐ Rejected

In summary, it is DNV's opinion that the "Electricity Grid Interconnection San Gabán – Mazuko – Puerto Maldonado", as described in the PDD version 02 of 10 April 2008, meets all relevant UNFCCC requirements for the CDM and all relevant host Party criteria and correctly applies the baseline and monitoring methodology AM 0045 version 1. DNV thus requests the registration of the project as a CDM project activity

Report No.: 2007-1784	Date of this revision: 2008-06-30	Rev. No. 01
Report title: "Electricity Grid Interconnection San Gabán – Mazuko – Puerto Maldonado" in Peru		
Work carried out by: Felipe Lacerda Antunes; Michael Lehmann		
Work verified by: Anu Chaudhary		

Key words:

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### Abbreviations

CAR	Corrective Action Request
CDM	Clean Development Mechanism
CEF	Carbon Emission Factor
CER	Certified Emission Reduction
CH <sub>4</sub>	Methane
CL	Clarification request
CO <sub>2</sub>	Carbon dioxide
CO <sub>2e</sub>	Carbon dioxide equivalent
DNV	Det Norske Veritas
DNA	Designated National Authority
EIA	Environmental Impact Assessment
ELSE	Electro Sur Este S.A.A.
GHG	Greenhouse gas(es)
GWP	Global Warming Potential
IPCC	Intergovernmental Panel on Climate Change
MP	Monitoring Plan
MVP	Monitoring and Verification Plan
N <sub>2</sub> O	Nitrous oxide
NGO	Non-governmental Organisation
ODA	Official Development Assistance
PDD	Project Design Document
SEIN	Peruvian National Interconnection Grid System
UNFCCC	United Nations Framework Convention on Climate Change




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Appendix A: Validation Protocol

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### 1. EXECUTIVE SUMMARY – VALIDATION OPINION

*Det Norske Veritas Certification AS (DNV) has performed a validation of the “Electricity Grid Interconnection San Gabán – Mazuko – Puerto Maldonado” in Peru. The validation was performed on the basis of UNFCCC criteria for the Clean Development Mechanism 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 and the subsequent follow-up interviews have provided DNV with sufficient evidence to determine the fulfillment of stated criteria.*

*The project participant is Electro Sureste S.A.A.. No Annex I Party has been identified yet. The host Party Peru meets all relevant participation requirements and has provided written approval of voluntary participation in the project. The DNA of Peru confirmed that the project assists in achieving sustainable development.*

*The project involves the construction of a transmission electric line between San Gaban (Puno) and Puerto Maldonado (Madre de Dios). The transmission line will be built in such a way that isolated systems located between San Gaban and Puerto Maldonado will be connected to the Peruvian National Interconnection Grid System (SEIN).*

*The project correctly applies AM0045 (Version 1 of 22 December 2006) - “Grid connection of isolated electricity systems”.*

*By displacing fossil fuel generation and consuming electricity from SEIN in which 70% is supplied from hydroelectric generation, the project results in reductions of CO<sub>2</sub> emissions that are real, measurable and give long-term benefits to the mitigation of climate change. It is demonstrated that the project 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.*

*The total emission reductions from the project are estimated to be on the average 17 819 over the selected 7 year crediting period. The emission reduction forecast has been checked and is deemed likely that the state amount is achieved given that the underlying assumptions do not change.*

*The monitoring methodology has been correctly applied. The monitoring plan sufficiently specifies the monitoring requirements. Adequate monitoring procedures have been implemented.*

*Local stakeholders were invited through public discussion.*

*In summary, it is DNV’s opinion that the “Electricity Grid Interconnection San Gabán – Mazuko – Puerto Maldonado”, as described in the revised and submitted project design document version 2 of 10 April 2008, meets all relevant UNFCCC requirements for the CDM and all relevant host country criteria and correctly applies the baseline and monitoring methodology AM0045 (Version 1 of 22 December 2006). Hence, DNV requests the registration of the “Electricity Grid Interconnection San Gabán – Mazuko – Puerto Maldonado” as a CDM project activity.*



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### 2. INTRODUCTION

Deuman SAC has commissioned Det Norske Veritas Certification AS (DNV) to perform a validation of the “Electricity Grid Interconnection San Gabán – Mazuko – Puerto Maldonado”, located in Puno and Madre de Dios regions in Peru (hereafter called “the project”). This report summarises the findings of the validation of the project, performed on the basis of UNFCCC criteria for the CDM, as well as criteria given to provide for consistent project operations, monitoring and reporting. UNFCCC criteria refer to Article 12 of the Kyoto Protocol, the CDM modalities and procedures and the subsequent decisions by the CDM Executive Board.

#### 2.1. Objective

The purpose of a validation is to have an independent third party assess the project design. In particular, the project's baseline, monitoring plan, and the project's compliance with relevant UNFCCC and host Party criteria are validated in order to confirm that the project design, as documented, is sound and reasonable and meets the identified criteria. Validation is a requirement for all CDM projects and is seen as necessary to provide assurance to stakeholders of the quality of the project and its intended generation of certified emission reductions (CERs).

#### 2.2. Scope

The validation scope is defined as an independent and objective review of the project design document (PDD). The PDD is reviewed against the criteria stated in Article 12 of the Kyoto Protocol, the CDM modalities and procedures as agreed in the Marrakech Accords, and the relevant decisions by the CDM Executive Board, including the approved baseline and monitoring methodology AM 0045 version 1. The validation team has, based on the recommendations in the Validation and Verification Manual employed a risk-based approach, focusing on the identification of significant risks for project implementation and the generation of CERs.

The validation is not meant to provide any consulting towards the project participants. However, stated requests for clarifications and/or corrective actions may have provided input for improvement of the project design.

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### 3. METHODOLOGY

The validation consisted of the following three phases:

- I a desk review of the project design documents
- II follow-up interviews with project stakeholders
- III the resolution of outstanding issues and the issuance of the final validation report and opinion.

The following sections outline each step in more detail.

#### 3.1. Desk Review of the Project Design Documentation

The following table lists the documentation that was reviewed during the validation:

- /1/ Deuman SAC: Project Design Document for the “Electricity Grid Interconnection San Gabán – Mazuko – Puerto Maldonado”. Version 01 of 13 March 2007.
- /2/ Deuman SAC: Project Design Document for the “Electricity Grid Interconnection San Gabán – Mazuko – Puerto Maldonado”. Version 02 of 10 April 2008.
- /3/ Letter of Approval (LoA) issued by Peruvian DNA on 8 June 2007.
- /4/ Economical and Financial Ministry: letter approving the project’s feasibility dated 31 March 2006.
- /5/ Eng. Luis Torres: “CDM Study for the transmission line San Gabán – Puerto Maldonado”, dated January 2006.
- /6/ Deuman SAC: Spreadsheets for emission reduction calculation
- /7/ Deuman SAC: Spreadsheets for the grid emission factor calculation
- /8/ Economical and Financial Ministry: message from Mr. Fernando Valenzuela confirming that the parameters considered for investment analysis were assessed for project’s feasibility approval.
- /9/ Deuman SAC: Spreadsheets for investment analysis calculation
- /10/ Evidences of transmission line costs:
  - Ministry of Mining and Energy: Transmission Projects Portfolio dated November 2006  
([http://www.minem.gob.pe/archivos/dge/publicaciones/Portafolio\\_%20LLTT.pdf](http://www.minem.gob.pe/archivos/dge/publicaciones/Portafolio_%20LLTT.pdf));
  - ELSE: Definitive Study of the 138 kV line San Gabán – Mazuko and the 66 kV line Mazuko – Puerto Maldonado and substations – July 2006
  - GyM: Proposal for the construction of the Transmission Line San Gabán – Mazuko – Puerto Maldonado dated 05 February 2007
- /11/ Evidence of tariff costs: Ministry of Mining and Energy / OSINERG 04 February 2006  
(<http://www2.osinerg.gob.pe/Tarifas/Electricidad/PliegosTarifariosUsuarioFinal.aspx?I>)



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- /12/ Average costs of fuel D2 evidences: ELSE Purchase Orders to Petroperu from 01 July 2005 to 05 September 2005.
- /13/ Ministry of Mining and Energy: Resolution 106-2007-MEM/AEE approving the Environmental Impact Assessment on 29 January 2007
- /14/ Ministry of Mining and Energy: Decree Law 25844 – Electricity concessions law
- /15/ Ministry of Mining and Energy: Resolution 552-2006-MEM/DM approving the Transitory Transmission Plan on 23 November 2006
- /16/ ELSE: Definitive Study of the 138 kV line San Gabán – Mazuko and the 66 kV line Mazuko – Puerto Maldonado and substations – July 2006
- /17/ ELSE: Stakeholders consultation
- /18/ International Emission Trading Association (IETA) & the World Bank’s Prototype Carbon Fund (PCF): *Validation and Verification Manual*.
- /19/ CDM-EB: AM0045 – “*Grid connection of isolated electricity systems*” for Type I – *Renewable Energy Projects*. Version 1 of 22 December 2006.
- /20/ CDM-EB: Approved Consolidated Baseline and Monitoring Methodology ACM0002 - “Consolidated baseline methodology for grid-connected electricity generation from renewable sources”, version 06 of 19 May 2006
- /21/ CDM Executive Board: Tool for the demonstration and assessment of additionality. Version 3 of 16 February 2007.
- /22/ Ministry of Mining and Energy:  
<http://www.minem.gob.pe/archivos/dge/publicaciones/plananual2003/parteiv.pdf>
- /23/ ELSE: Historical records of the electricity supplied to the isolated system and the amount of fossil fuel consumed by each power plant in Puerto Maldonado (2005-2007)
- /24/ Electricity Supply National Code, 2002
- /25/ CODESU, Sepia and Universidad Nacional de Ucayali: Study: “Environmental services from carbon storage as an assets for development in the Peruvian Amazon: Progress and Challenges”, 22 August 2003.

Main changes between the version published for the 30 days stakeholder commenting period and the final version submitted for registration:

- Project boundary was limited to Puerto Maldonado in the first years of crediting period;
- Corrections in the grid emission factor calculations;
- Changes in the crediting period starting date;
- The IRR analysis was adjusted in order to consider budget data by the time of the project decision.





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### 3.2. Follow-up Communication with Project Stakeholders

DNV performed interviews with project stakeholders on 20 December 2007 to confirm selected information and to resolve issues identified in the document review. Representatives of the project owner, ELSE and the consultant Deuman SAC were interviewed /22/ - /25/.

*Persons interviewed during the validation, or persons who contributed with other information that are not included in the documents listed above:*

- /26/ Luis Grajeda Puelles – Planning Manager - ELSE
- /27/ Michael Moleros – Consultant - Deuman SAC
- /28/ Jaime Parada – Consultant - Deuman SAC
- /29/ Isabel Málaga - – Consultant - Deuman SAC

The main topics of the interviews were:

- Additionality and CDM considered in the decision to go ahead with the project
- Feasibility study
- EIA
- Consultation of Local stakeholders
- Emissions reduction calculations
- Grid emission factor

### 3.3. Resolution of Outstanding Issues

The objective of this phase of the validation was to resolve any outstanding issues which needed to be clarified prior to DNV's positive conclusion on the project design. In order to ensure transparency a validation protocol was customised for the project. The protocol shows in a transparent manner the criteria (requirements), means of verification and the results from validating the identified criteria. The validation protocol serves the following purposes:

- It organises, 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 the figure below. The completed validation protocol for the "Electricity Grid Interconnection San Gabán – Mazuko – Puerto Maldonado" is enclosed in Appendix A to this report.

Findings established during the validation can either be seen as a non-fulfilment of CDM criteria or where a risk to the fulfilment of project objectives is identified. Corrective action requests (CAR) are issued, where:

- i) mistakes have been made with a direct influence on project results;
- ii) CDM and/or methodology specific requirements have not been met; or
- iii) there is a risk that the project would not be accepted as a CDM project or that emission reductions will not be certified.

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A request for clarification (CL) may be used where additional information is needed to fully clarify an issue.

<b>Validation Protocol Table 1: Mandatory Requirements for CDM Project Activities</b>		
<b>Requirement</b>	<b>Reference</b>	<b>Conclusion</b>
<i>The requirements the project must meet.</i>	<i>Gives reference to the legislation or agreement where the requirement is found.</i>	This is either acceptable based on evidence provided ( <b>OK</b> ), a <b>Corrective Action Request (CAR)</b> of risk or non-compliance with stated requirements or a request for <b>Clarification (CL)</b> where further clarifications are needed.

<b>Validation Protocol Table 2: Requirement checklist</b>				
<b>Checklist Question</b>	<b>Reference</b>	<b>Means of verification (MoV)</b>	<b>Comment</b>	<b>Draft and/or Final Conclusion</b>
<i>The various requirements in Table 2 are linked to checklist questions the project should meet. The checklist is organised in different sections, following the logic of the large-scale PDD template, version 03 - in effect as of: 28 July 2006. Each section is then further sub-divided.</i>	<i>Gives reference to documents where the answer to the checklist question or item is found.</i>	<i>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.</i>	<i>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.</i>	<i>This is either acceptable based on evidence provided (<b>OK</b>), or a <b>corrective action request (CAR)</b> due to non-compliance with the checklist question (See below). A request for clarification (CL) is used when the validation team has identified a need for further clarification.</i>

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

**Figure 1 Validation protocol tables**



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### 3.4. Internal Quality Control

The draft validation report including the initial validation findings underwent a technical review before being submitted to the project participants. The final validation report underwent another technical review before requesting registration of the project activity. The technical review was performed by a technical reviewer qualified in accordance with DNV's qualification scheme for CDM validation and verification.

### 3.5. Validation Team

Role/Qualification	Last Name	First Name	Country
Team leader/ CDM Validator	Antunes	Felipe	Brazil
Sector expert	Lehmann	Michael	Norway
Technical reviewer	Chaudhary	Anu	India

The qualification of each individual validation team member is detailed in Appendix B to this report.



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### 4. Validation Findings

The preliminary findings of the validation are stated in the following sections. The validation criteria (requirements), the means of verification and the results from validating the identified criteria are documented in more detail in the validation protocol in Appendix A.

#### 4.1. Participation Requirements

The project participant is Electro Sureste S.A.A. (ELSE). The host Party Peru meets all relevant participation requirements. No participating Annex I Party is yet identified.

The Peruvian DNA has issued the LoA on 8 June 2007 authorizing ELSE as project participant and confirmed that the project is contributing to sustainable development in Peru /3/.

#### 4.2. Project Design

The “Electricity Grid Interconnection San Gabán – Mazuko – Puerto Maldonado” project involves the construction of a transmission electric line between San Gaban (Puno) and Puerto Maldonado (Madre de Dios). The transmission line will be built in such a way that isolated systems located between San Gaban and Puerto Maldonado will be connected to the Peruvian National Interconnection Grid System (SEIN). Installed capacity in 2005 in Madre de Dios isolated system was as follows: 7.11 MW in Puerto Maldonado, 2.08 MW in Mazuko and 5.24 MW in the mining companies. The growth in energy demand in the project area is expected and thus lack of capacity in the short term is very likely to occur. Current installed capacity is mainly fuelled by diesel generators, operating with low energy efficiency technologies and consequently intense carbon emissions. DNV could confirm all technical specifications during the site visit /16/.

The contribution of the project to the sustainable development was confirmed by the DNA of Peru /3/.

A renewable 7-years crediting period is selected, starting on 01 September 2008 or the project’s registration date, whichever occurs later. The starting date of the project activity is 31 March 2006, corresponding to the feasibility study approval /4/, with an expected operational lifetime of 30 years.

The development of the project will reduce greenhouse gas emissions by implementing two main actions: displacement of fossil fuels through shutting down each fossil fuel fired power plant; and electricity consumption from SEIN in which 70% is supplied from hydroelectric generation. Estimated GHG emission reductions from the project are 124 736 tonnes CO<sub>2</sub> equivalent (tCO<sub>2</sub>e) during the 7-years crediting period, which result in estimated average annual emission reductions of 17 819 tCO<sub>2</sub>e.

The validation did not reveal any information that indicates that the project can be seen as a diversion of ODA funding towards Peru.



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### 4.3. Baseline Determination

The project applies the approved baseline methodology AM 0045 - “Electric Energy Transmission and Distribution”, Version 1 of 22 December 2006 /19/. This category is applicable as the project consists of : i) the expansion of an interconnected electricity grid (SEIN) to isolated systems (Puerto Maldonado, Mazuko and loads from mining in Huepetue – Mazuko); ii) the displacement of power generation in isolated systems by more efficient, less carbon intensive power generation from the interconnected grid. In addition, all the applicable conditions are met by the project activity: i) baseline emission factors were estimated considering increase of demand and remaining life of the equipments; ii) there is not any renewable energy based electricity generation system within the isolated systems; and iii) all fuel fired power plants in the isolated system will be displaced. A total of 114 existing generation equipments located in the isolated systems (Puerto Maldonado, Mazuko and loads from mining in Huepetue – Mazuko) will be displaced after the connection to the SEIN; according to the Feasibility Study, transmission losses will be 3.6%.

The project boundary includes all power plants connected to the Puerto Maldonado isolated system: Puerto Maldonado, Iberia, Iñapari, Mazuko and small power plants from the mining companies. However, the plants from Mazuko and the mining companies do not have a three-year historical record of electricity generation and fossil fuel consumption available. Therefore, for the first years of crediting period only the power plants of Puerto Maldonado, Iberia and Iñapari will be considered. The other plants will be considered as long as they are able to collect the required historical data at the moment of their connection to the grid.

According to AM0045, the baseline scenario is determined through the following steps:

- 1) Identification of realistic and credible alternative scenarios that are consistent with applicable laws and regulations;
- 2) Identification of barriers and assessment of alternative scenarios that are not prevented by these barriers;
- 3) Investment analysis.

These steps are presented in detail in the Additionality section. The baseline scenario determined is the expansion of the actual installed capacity using diesel as fuel. The baseline determination is transparent and deemed reasonable.

### 4.4. Additionality

In accordance with AM0045, the additionality of the project is demonstrated through the “*Tool for the demonstration and assessment of additionality*”/21/, which includes the following steps:

*Step 1 - Identification of alternatives to the project activity consistent with current laws and regulations:*

Alternative 1: Grid connection with isolated electricity systems within the complementary transmission system not undertaken as a CDM project activity; the “*complementary transmission system*” consists of projects promoted as individual initiatives from one or more agents with no public funding. This alternative corresponds to the proposed project activity undertaken without being registered as a CDM project activity.



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Alternative 2: Expansion of the actual installed capacity using diesel as fuel.

Alternative 3: Thermal generation using natural gas from CAMISEA. This alternative is eliminated considering that the distance between the gas pipeline and the project area is approximately 400 km.

Alternative 4: Rural electrification with renewable energy. This alternative is eliminated considering that only small scale renewable energy projects have been developed in Peru due to the risks associated with the nature of the project and the high initial investment costs.

Alternative 5: Grid connection with isolated electricity systems within the guaranteed transmission system not undertaken as a CDM project activity. In comparison with the “complementary transmission system” explained above, in the guaranteed transmission system the project would have incentives and subsidies from the government because has certain mandatory nature. It was confirmed by the Transitory Transmission Plan /15/ that the project was not classified as an energy priority; therefore, it is considered to be part of the complementary transmission system, and this alternative is not considered.

DNV could confirm that both alternatives 1 and 2 are in compliance with all regulatory national requirements.

*Step 2 - Investment analysis:* The feasibility report approved on 31 March 2006 /4/ is the basis for the investment analysis. DNV could confirm with the Ministry of Economy /8/ that all parameters used in the investment analysis were assessed for project’s feasibility approval /4/. Besides that, the values considered for the tariff and fuel oil costs /11/ /12/ were crosschecked and found reasonable. The real construction costs of the transmission line /10/ were higher than the budget considered for investment analysis, which makes the budget values conservative,

The Net Present Value (NPV) was selected as the most suitable financial indicator for investment comparison of alternative 1 and 2. A discount rate of 12% was used, according to that established by the Ministry of energy and mining in the Decree Law 25844 /14/. The results of the analysis were:

For alternative 1: NPV of US\$ -4,451;

For alternative 2: NPV of US\$ -2,974.

It has been also demonstrated /9/ that the project activity has an IRR of 7.54% without considering CDM revenues, which does not attain the discount rate of 12% established by the government within the Electric Concession Law /14/ to determine electricity tariff and evaluate investments.

A sensitivity analysis considering at which value each parameter touches the benchmark was carried out, and the results were -10.22% in investment, +12.25% in the tariff and +86% in the electricity demand. Considering that: (i) evidences related to project costs were provided, and the values are compatible to other similar projects in Peru; and (ii) COES projections show that it is expected that the tariff will decrease in the future, DNV could confirm that the probability for any of the parameters reach those values is very low, and this confirms that the project is not financially attractive for private investors /9/.

*Step 3 - Barrier analysis:* Not selected

*Step 4 - Common practice analysis:* It was verified by the Transitory Transmission Plan /15/ that government’s priorities are focused on those projects with higher transmission capacity.



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Other isolated systems are also analyzed. DNV could confirm that there is one more project of interconnection of an isolated system (Jaen – Bagua); however, this project may be considered different as it has a considerably shorter transmission line (140 km versus 225 km from the project activity) for a system with higher demand. DNV could confirm /22/ that the demand in Jaen – Bagua isolated system is almost twice higher than the demand in the project activity (45 GWh in 2007 versus 26.57 GWh). Consequently, the project activity is not considered to be a common practice in Peru.

DNV was able to verify that CDM benefits were taken into account before the starting date of the project. The starting date of the project activity is 31 March 2006, corresponding to the feasibility study approval /4/. On January 2006, a formal study was carried out to verify the eligibility of the project as a CDM project activity /5/. The long time from the date of decision making and the start of the validation has been justified as the consultant Deuman was hired to start the validation process by developing a new methodology during the year of 2006, considering that no approved methodology was available at that time. Finally, after the approval of AM0045 in December 2006, a new PDD was prepared based on the methodology AM0045. During July to October 2007, Deuman started the negotiation with DNV, and finally in October 2007 the validation process started.

In conclusion, the assessment of the arguments presented above is deemed to sufficiently demonstrate that the project is not a likely baseline scenario, and that emission reductions resulting from the project are additional.

### 4.5. Monitoring

The project applies the approved monitoring methodology AM 0045 - “Electric Energy Transmission and Distribution”, Version 1 of 22 December 2006 /19/.

Details of the data to be collected, the frequency of data recording and its format are clearly described in the monitoring plan and deemed to be adequate. The authority and responsibility for project management, monitoring, measurement, training, review and reporting have been clearly described in the PDD.

#### 4.5.1. Parameters determined ex-ante

The parameters used in the emission reduction calculations that are available *ex ante* are as given below:

- $COF_{i,j}$  : Fuel emission factor [ $tCO_2e/ m^3$ ] – 2006 IPCC default values have been used since local country specific values are not available.
- $GEN_{i,j}$  : Electricity dispatched to the isolated grid, each year by the source  $j$  [MWh] in Puerto Maldonado – Confirmed with ELSE’s historical records from 2005 to 2007.
- $F_{i,j,bl}$  : Fuel consumption  $i$  of the Power plant  $j$ . [ $m^3$ ] in Puerto Maldonado – Confirmed with ELSE’s historical records from 2005 to 2007.
- $LT_{avg}$  : Average lifetime of the power plants in the isolated system. According to the feasibility study a maximum 12 years of lifetime was considered. DNV considers this assumption reasonable.



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- $EF_{BAT}$ : Baseline emission factor (in tCO<sub>2</sub>e/MWh) for the best available kind of technology in the isolated system; with the lowest CO<sub>2</sub> emission factor at the beginning of the project activity. According to the historical records this value is equal to 0.74 tCO<sub>2</sub>e/MWh
- $EF_{bl,ini}$ : Baseline scenario emission factor, estimated using historical data from the last 3 years. [MWh/ tCO<sub>2</sub>e]
- Area of land deforested in the construction of the interconnection lines: The value of 0.4518 ha corresponds to the multiplication of the length of the transmission line and the width trail of 20 m for the transmission lines laying established in the Electricity Supply National Code /24/.
- $L_c$ : Carbon stock per area, determined as 405.36 tCO<sub>2</sub>/ha in a scientific study carried on in Peru /25/.
- $EF_{p,y}$ : National grid emission factor, calculated *ex-ante* as demonstrated in section 4.6.

### 4.5.2. Parameters monitored ex-post

According to AM0045, the following data is to be monitored:

- $EG_y$ : Electricity generation from the project activity;
- $M_{SF6}$ : SF<sub>6</sub> leaks in the new equipment (directly measured);
- $D_{yp}$ : Power demand in the project activity scenario;
- $S_{yp}$ : Power supply of the displaced power plants in the isolated area in the baseline scenario;
- Number of years since the isolated area is connected to the grid;
- Financial and/or institutional arrangements that could help the project to overcome identified barriers during the crediting period;
- $TL$ : Additional transmission losses.

Considering that the plants from Mazuko and the mining companies do not have a three-year historical record of electricity generation and fossil fuel consumption available, the required historical data will be monitored and at the moment of their connection to the grid the baseline scenario emission factor will be updated.

In conclusion, it is DNV's opinion that the monitoring plan correctly addresses the requirements of the methodology AM0045.

### 4.5.3. Management system and quality assurance

The electrical meters used will be tested with an equipment of reference once a year, and calibrated every three years. The operation of the transmission line will be with the SCADA system. The values could be double checked by receipt of payments.

For the plants from Mazuko and the mining companies do not have a three-year historical record of electricity generation and fossil fuel consumption available, all the historical data will be confirmed through a sit visit carried on by the project proponent to corroborate the information of the equipments. Besides that, for the parameters historical electricity



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generation and fossil fuel consumption, default data and literature statistics will be used to checking, and for the units that report to official entities the data shall be corroborated with its annual statistics.

The project developer's Head Office will have final responsibility for all aspects related to data measurements, monitoring of data recording and emissions. Data will be collected and consolidated by the on-site technician and chief of operation area. The last one will also draw up the monthly and annual emission reduction monitoring reports. Data will be recorded at regular intervals.

### 4.6. Estimate of GHG Emissions

The baseline emissions include emissions from the power plants connected to the isolated system. The emission is estimated taking into account the increase of the demand over the time and the remaining lifetime of the existing power plants.

The following formula is used to estimate the baseline emission factor:

$$EF_{bl} = \frac{\sum_{i,j} F_{i,j,bl} \times COF_{i,j}}{\sum_j GEN_{j,bl}}$$

The life time and power production of each power plant may influence the emission factor. The influence is determined using the following formula:

$$LT_{avg} = \frac{\sum (S_{e,ini} \cdot LT_{e,ini})}{\sum S_{e,ini}}$$

S<sub>yp</sub> is calculated comparing yp y LT<sub>avg</sub>:

$$S_{yp} = S_{ini} - S_{ini} \cdot \frac{yp}{(2 \times LT_{avg})} \quad \text{if: } yp < 2LT_{avg}$$

or S<sub>yp</sub> = 0 if yp ≥ 2 LT<sub>avg</sub>.

S<sub>yp</sub> is contrasted with the demand D<sub>yp</sub> and the final baseline emission factor is calculated with the following formula:

$$EF_{bl,yp} = EF_{bl,ini} \quad \text{if } S_{yp} > 0 \text{ and } S_{yp} > D_{yp}$$

$$EF_{bl,yp} = \frac{EF_{bl,ini} \times S_{yp} + EF_{BAT} \times (D_{yp} - S_{yp})}{D_{yp}} \quad \text{if } S_{yp} > 0 \text{ and } S_{yp} < D_{yp}$$

$$EF_{bl,yp} = EF_{BAT} \quad \text{if } S_{yp} = 0$$

Baseline emissions are the product of the baseline emission factor and electricity supplied to the isolated area by the grid in the project activity.

Considering that in the beginning of the project the power plants located in Mazuko and the ones from the mining company will not be considered for emission reduction calculation because of the unavailable historical data, baseline emission factor will be calculated only based on the generators from Puerto Maldonado, Iberia and Iñapari. In future, when the remaining plants will connect to the grid, the baseline emissions will be updated accordingly. DNV considers this approach reasonable and conservative.



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The emissions from the project activity are: those due to the electricity generated by the interconnected national grid and the SF<sub>6</sub> emissions due to possible losses in the new installations (switches, cells and encapsulated substations):  $PE_y = (EG_y \cdot EF_{p,y}) \cdot (TL + 1) + PE_{SF6, y}$   
Where:

$PE_{SF6, y}$ : CO<sub>2</sub> emissions in year y, due to SF<sub>6</sub> emissions from new equipment [tCO<sub>2e</sub>]

The combined margin emission coefficient for the grid is determined *ex-ante* in accordance with ACM0002 version 06 /20/. The calculations are based on electricity generation data provided by the spot market administrator (Committee of Economic Operation of the National Interconnected System) for the electricity generated in the grid in the years 2004-2006.

According to ACM0002, the dispatch data analysis method should be the first methodological choice. However, this method is based on the energy generated by the project, so it is not applicable to electric energy transmission and distribution projects. Considering that the national grid is more than 50% low cost/must run generation the operating margin (OM) is calculated using the “simple adjusted OM”. Local default values for net calorific values (NCV) of each type of fossil fuel, the IPCC’s oxidation factor of each type of fossil fuel and the total electricity delivered to the SEIN selected are deemed reasonable. Vintage data for the years 2004, 2005 and 2006 are used for operating margin calculation. The OM is evaluated to be 0.6855 tCO<sub>2</sub>/MWh.

The local values of net calorific value, carbon content of the coal and the IPCC default value of carbon oxidation factor of 100% are used to calculate the BM. The BM is calculated as 0.2879 tCO<sub>2</sub>/MWh.

The weights  $\omega_{OM}$  and  $\omega_{BM}$  are selected as 0.50 and 0.50 respectively and the combined margin of 0.4867 tCO<sub>2</sub>/MWh is calculated /7/.

The new equipment could be a source of SF<sub>6</sub> emissions. Those emission will be calculated using the following:  $PE_{SF6, y} = M_{SF6, y} \cdot GWP_{SF6}$

Where:

$GWP_{SF6}$  SF6 Global warming potential (23900)

Finally, leakage emissions are calculated by the product of the area of land deforested and the carbon stock per unit area. Considering that it corresponds to less than 1% from the total emission reduction, leakage emissions are not considered as per AM0045.

The estimated amount of GHG emission reductions from the project is 124 736 tCO<sub>2e</sub> during the first renewable 7-years crediting period, resulting in estimated average annual emission reductions of 17 819 tCO<sub>2e</sub> /6/.

### 4.7. Environmental Impacts

The environmental impact assessment (EIA) was approved by Resolution 106-2007-MEM/AAE /13/. The PDD presents a summary of the environmental impacts. No significant adverse environmental impacts have been identified during this assessment.



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### 4.8. Comments by Local Stakeholders

ELSE invited stakeholders for two informative workshops that were carried out in Puerto Maldonado and Mazuko. Institutions, organizations and public in general were invited through letters, press notes and public information. DNV could assess all stakeholders consultation evidences /17/.

In Mazuko all comments were positive. In Puerto Maldonado stakeholders commented that the profits through selling CERs should be reinvested on social projects in the region. ELSE's director in Puerto Maldonado replied that any income from CER's commercialization has been included for budget purposes.

### 4.9. Comments by Parties, Stakeholders and NGOs

The PDD version 1 of 13 March 2007 was made publicly available on DNV's climate change website ([www.dnv.com/certification/climatechange](http://www.dnv.com/certification/climatechange)) and Parties, stakeholders and NGOs were through the CDM website invited to provide comments during a 30 days period from 11 October 2007 to 9 November 2007. No comments were received to the date.

## APPENDIX A

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### CDM VALIDATION PROTOCOL

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

Requirement	Reference	Conclusion
<b>About Parties</b>		
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 No participating Annex I Party is yet identified.
2. The project shall assist non-Annex I Parties in contributing to the ultimate objective of the UNFCCC.	Kyoto Protocol Art.12.2.	OK
3. The project shall have the written approval of voluntary participation from the designated national authority of each Party involved.	Kyoto Protocol Art. 12.5a, CDM Modalities and Procedures §40a	Letter of Approval issued by Peruvian DNA on 8 June 2007.
4. 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, CDM Modalities and Procedures §40a	Letter of Approval issued by Peruvian DNA on 8 June 2007.
5. In case public funding from Parties included in Annex I is used for the project activity, these Parties shall provide an affirmation that such funding does not result in a diversion of official development assistance and is separate from and is not counted towards the financial obligations of these Parties.	Decision 17/CP.7, CDM Modalities and Procedures Appendix B, § 2	OK. The project has no public funding.
6. Parties participating in the CDM shall designate a national authority for the CDM.	CDM Modalities and Procedures §29	The DNA of Peru is the Environmental National Council.
7. The host Party and the participating Annex I Party shall be a Party to the Kyoto Protocol.	CDM Modalities §30/31a	Peru ratified the Kyoto Protocol on 12 September 2002.
8. The participating Annex I Party's assigned amount shall have been	CDM Modalities and	No participating Annex I Party is

Requirement	Reference	Conclusion
calculated and recorded.	Procedures §31b	yet identified.
9. The participating Annex I Party shall have in place a national system for estimating GHG emissions and a national registry in accordance with Kyoto Protocol Article 5 and 7.	CDM Modalities and Procedures §31b	No participating Annex I Party is yet identified.
<b>About additionality</b>		
10. Reduction in GHG emissions shall be additional to any that would occur in the 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. 12.5c, CDM Modalities and Procedures §43	OK. Table 2, Section B.3.1
<b>About forecast emission reductions and environmental impacts</b>		
11. The emission reductions shall be real, measurable and give long-term benefits related to the mitigation of climate change.	Kyoto Protocol Art. 12.5b	OK. Table 2, Section B.4 to B.7
<b>About stakeholder involvement</b>		
12. Comments by local stakeholders shall be invited, a summary of these provided and how due account was taken of any comments received.	CDM Modalities and Procedures §37b	OK. Table 2, Section E.
Parties, stakeholders and UNFCCC accredited NGOs shall have been invited to comment on the validation requirements for minimum 30 days, and the project design document and comments have been made publicly available.	CDM Modalities and Procedures §40	OK. The PDD version 1 of 13 March 2007 was made publicly available on DNV's climate change website ( <a href="http://www.dnv.com/certification/climatechange">www.dnv.com/certification/climatechange</a> ) and Parties, stakeholders and NGOs were through the CDM website invited to provide comments during a 30 days period from 11 October 2007 to 9

Requirement	Reference	Conclusion
		November 2007. No comments were received to the date.
<b>Other</b>		
13. The baseline and monitoring methodology shall be previously approved by the CDM Executive Board.	CDM Modalities and Procedures §37e	OK - Table 2, Section B.1.1
14. A baseline shall be established on a project-specific basis, in a transparent manner and taking into account relevant national and/or sectoral policies and circumstances.	CDM Modalities and Procedures §45c,d	OK.
15. The baseline methodology shall exclude to earn CERs for decreases in activity levels outside the project activity or due to force majeure.	CDM Modalities and Procedures §47	OK.
16. The project design document shall be in conformance with the UNFCCC CDM-PDD format.	CDM Modalities and Procedures Appendix B, EB Decision	OK. The PDD is in accordance with CDM-PDD (version 3 of 28 July 2006).
17. Provisions for monitoring, verification and reporting shall be in accordance with the modalities described in the Marrakech Accords and relevant decisions of the COP/MOP.	CDM Modalities and Procedures §37f	OK.

**Table 2 Requirements Checklist**

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
<b>A. General Description of Project Activity</b> <i>The project design is assessed.</i>					
<b>A.1. Project Boundaries</b> <i>Project Boundaries are the limits and borders defining the GHG emission reduction project.</i>					
A.1.1. Are the project's spatial boundaries (geographical) clearly defined?	/1/	DR	The boundary of the project includes: Power plants connected to the Puerto Maldonado isolated system: Puerto Maldonado, Iberia, Iñapari, Mazuko and small power plants from the mining companies		OK
A.1.2. Are the project's system boundaries (components and facilities used to mitigate GHGs) clearly defined?	/1/	DR	Yes.		OK
<b>A.2. Participation Requirements</b> <i>Referring to Part A, Annex 1 and 2 of the PDD as well as the CDM glossary with respect to the terms Party, Letter of Approval, Authorization and Project Participant.</i>					
A.2.1. Which Parties and project participants are participating in the project?	/1/	DR	The project participant is Electro Sur Este S.A.A. (ELSE). The host Party Peru meets all relevant participation requirements. No participating Annex I Party is yet identified.		OK
A.2.2. Have all involved Parties provided a valid and complete letter of approval and have all private/public project participants been authorized	/1/	DR	The Letter of Approval from the DNA of Peru has not been provided.	<del>CAR-2</del>	OK

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CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
by an involved Party?					
A.2.3. Do all participating Parties fulfil the participation requirements as follows: - Ratification of the Kyoto Protocol - Voluntary participation - Designated a National Authority	/1/	DR	Yes, Peru fulfils all requirements		OK
A.2.4. Potential public funding for the project from Parties in Annex I shall not be a diversion of official development assistance.	/1/	DR	The project has no public funding.		OK
<b>A.3. Technology to be employed</b> <i>Validation of project technology focuses on the project engineering, choice of technology and competence/ maintenance needs. The validator should ensure that environmentally safe and sound technology and know-how is used.</i>					
A.3.1. Does the project design engineering reflect current good practices?	/1/	DR	Yes. The project design engineering is based on established technology suitable for electric energy transmission and distribution. DNV requests an explanation about <b>how</b> transmission losses were taken into account for the project activity.	<del>CL-21</del>	OK
A.3.2. Does the project use state of the art technology or would the technology result in a significantly better performance than any commonly used technologies in the host country?	/1/	DR	Yes. The project components are power transformers and substation cells at San Gabán, Mazuko and Puerto Maldonado substations, as well as transmission lines 138		OK

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CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
			/ 66 kV.		
A.3.3. Does the project make provisions for meeting training and maintenance needs?	/1/	DR	The PDD does not make any reference about training and maintenance needs.	<del>CL-16</del>	OK
<b>A.4. Contribution to Sustainable Development</b> <i>The project's contribution to sustainable development is assessed.</i>					
A.4.1. Has the host country confirmed that the project assists it in achieving sustainable development?	/1/	DR	The Letter of Approval from the DNA of Peru has not been provided.	<del>CAR-2</del>	OK
A.4.2. Will the project create other environmental or social benefits than GHG emission reductions?	/1/	DR	Yes. The project supplies cleaner energy from the grid to meet the energy demand, and in particular meets the foreseen growing energy demand. Besides that, end users will benefit from a tariff reduction.		OK
<b>B. Project Baseline</b> <i>The validation of the project baseline establishes whether the selected baseline methodology is appropriate and whether the selected baseline represents a likely baseline scenario.</i>					
<b>B.1. Baseline Methodology</b> <i>It is assessed whether the project applies an appropriate baseline methodology.</i>					
B.1.1. Does the project apply an approved methodology and the correct version thereof?	/1/	DR	Yes – The project applies the approved baseline methodology AM 0045 - “Electric Energy Transmission and Distribution”. The “Tool for the demonstration and assessment of additionality and the methodology ACM 0002 should be	<del>CL-1</del>	OK

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CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
			referenced in the PDD. The applied version of the methodology AM 0045 should be referenced also.		
B.1.2. Are the applicability criteria in the baseline methodology all fulfilled?	/1/	DR	Yes. The project consists of : i) the expansion of an interconnected electricity grid (SEIN) to isolated systems (Puerto Maldonado, Mazuko and loads from mining in Huepetue – Mazuko); ii) the displacement of power generation in isolated systems by more efficient, less carbon intensive power generation from the interconnected grid. All the applicable conditions are met by the project activity: i) baseline emission factors were estimated considering increase of demand and remaining life of the equipments; ii) there is not any renewable energy based electricity generation system within the isolated systems; and iii) all fuel fired power plants in the isolated system will be displaced.		OK
<b>B.2. Baseline Scenario Determination</b> <i>The choice of the baseline scenario will be validated with focus on whether the baseline is a likely scenario, and whether the methodology to define the baseline scenario has been followed in a complete and transparent manner.</i>					
B.2.1. What is the baseline scenario?	/1/	DR	The baseline scenario is the expansion of the actual installed capacity using Diesel as fuel.		OK

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CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
			The baseline determination is transparent and deemed reasonable.		
B.2.2. What other alternative scenarios have been considered and why is the selected scenario the most likely one?	/1/	DR	See B.3.3		OK
B.2.3. Has the baseline scenario been determined according to the methodology?	/1/	DR	Yes. See B.3.3		OK
B.2.4. Has the baseline scenario been determined using conservative assumptions where possible?	/1/	DR	See B.3.3		OK
B.2.5. Does the baseline scenario sufficiently take into account relevant national and/or sectoral policies, macro-economic trends and political aspirations?	/1/	DR	Yes. All relevant national and sectoral policies, regulations and department rules and disciplines are considered.		OK
B.2.6. Is the baseline scenario determination compatible with the available data and are all literature and sources clearly referenced?	/1/	DR	Yes.		OK
B.2.7. Have the major risks to the baseline been identified?	/1/	DR	No major risks are identified for the baseline.		OK
<b>B.3. Additionality Determination</b> <i>The assessment of additionality will be validated with focus on whether the project itself is not a likely baseline scenario.</i>					

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
B.3.1. Is the project additionality assessed according to the methodology?	/1/	DR	Yes. In accordance with AM0045, the additionality of the project is demonstrated through the “ <i>Tool for the demonstration and assessment of additionality</i> ”		OK
B.3.2. Are all assumptions stated in a transparent and conservative manner?	/1/	DR	Yes		OK
B.3.3. Is sufficient evidence provided to support the relevance of the arguments made?	/1/	DR	<p><i>Step 1 - Identification of alternatives to the project activity consistent with current laws and regulations:</i> Three alternatives to the project activity are considered:</p> <p>Alternative 1: Grid connection with isolated electricity systems within the guaranteed transmission system not undertaken as a CDM project activity; the guaranteed transmission system consists of priority projects with public funding.</p> <p>Alternative 2: Grid connection with isolated electricity systems within the complementary transmission system not undertaken as a CDM project activity; the complementary transmission system consists of projects promoted as individual initiatives from one or more agents with no public funding.</p> <p>Alternative 3: Expansion of the actual installed capacity using Diesel as fuel.</p> <p>The project was not classified as an energy</p>	<del>CL-3</del> <del>CL-4</del> <del>CL-25</del> <del>CL-24</del> <del>CL-22</del> <del>CL-23</del>	OK

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			<p>priority; therefore, alternative 1 is eliminated.</p> <p><i>Step 2 - Investment analysis:</i> Net Present Value (NPV) and internal rate of return (IRR) were selected as the most suitable financial indicators. The results of the analysis were:</p> <p>For alternative 2: NPV of US\$ -16,537.41 and IRR -4.47%;</p> <p>For alternative 3: NPV of US\$ 38.17 and IRR 9.89%;</p> <p>The investment analysis should be carried on considering the budget values of the project at the time of project decision, and not considering the real costs during project implementation. The related spreadsheet must be totally in English.</p> <p>A sensitivity analysis has been carried out with regards to revenue increase by 25% and reduction in investment costs by 25%. The sensitivity analysis shows that without the income from CERs sales the NPV of the proposed project is still negative.</p> <p>DNV requests an explanation about how the value of 25% in the sensitive analysis was established.</p> <p><i>Step 3 - Barrier analysis:</i> The following barriers are presented:</p>		

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CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
			<p>a) High investment costs;</p> <p>b) Insufficient demand which does not justifies investments;</p> <p>Please provide evidence that confirm this barrier.</p> <p>c) It is not mandatory for companies to invest in electricity supply to meet demand when this is not financially feasible.</p> <p>Please explain this barrier a little more and provide related evidence.</p> <p>None of these barriers would affect alternative 3.</p> <p>The PDD does not present a barrier analysis for the scenario presented as alternative 2</p> <p><i>Step 4 - Common practice analysis:</i> It was verified that government's priorities are focused on those projects with higher transmission capacity. Other isolated systems are also analyzed.</p> <p>According to the Electricity Reference Plan 2005 – 2014, the isolated system Bagua – Jaén will be connected to SEIN. Please consider this in the discussion of similar options that are occurring.</p>		
B.3.4. If the starting date of the project activity is before the date of validation, has sufficient evidence been provided that the incentive from the CDM	/1/	DR	DNV requires evidence of the project starting date and that CDM was considered for	<del>CL-10</del>	OK

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was seriously considered in the decision to proceed with the project activity?			project's approval.		
<b>B.4. Calculation of GHG Emission Reductions – Project emissions</b> <i>It is assessed whether the project emissions are stated according to the methodology and whether the argumentation for the choice of default factors and values – where applicable – is justified.</i>					
B.4.1. Are the calculations documented according to the approved methodology and in a complete and transparent manner?	/1/	DR	<p>Yes. The emissions from the project activity are: those due to the electricity generated by the interconnected national grid and the SF<sub>6</sub> emissions due to possible losses in the new installations (switches, cells and encapsulated substations).</p> <p>The combined margin emission coefficient for the grid is determined in accordance with ACM0002 version 06.</p> <p>The operating margin (OM) is calculated using the “simple adjusted OM”. Local default values for net calorific values (NCV) of each type of fossil fuel, the IPCC's oxidation factor of each type of fossil fuel and the total electricity delivered to the SEIN selected are deemed reasonable. The OM is evaluated to be 0.6910 tCO<sub>2</sub>/MWh.</p> <p>The data used for emission factor calculation</p>	<del>CAR-1</del> <del>CL-18</del> <del>CL-6</del>	OK

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			<p>were obtained from the period 2003 – 2005. However, according to methodology ACM 0002, version 6, for ex-ante emission factors calculation it is required to use the full generation-weighted average of the most recent 3 years for which data are available at the time of PDD submission. It was confirmed that data of 2006 is already available.</p> <p>The local values of net calorific value, carbon content of the coal and the IPCC default value of carbon oxidation factor of 100% are used to calculate the BM. The BM is calculated as 0.3765 tCO<sub>2</sub>/MWh.</p> <p>It is requested to be explained in the PDD how was calculated the build margin emission factor.</p> <p>The weights <math>\omega_{OM}</math> and <math>\omega_{BM}</math> are selected as 0.50 and 0.50 respectively and the combined margin of 0.5338 tCO<sub>2</sub>/MWh is calculated.</p> <p>It is requested that the PDD specify whether the Operating Margin, the Build Margin and the Emission Factor will be calculated <i>ex-ante</i> or <i>ex-post</i>.</p>		
B.4.2. Have conservative assumptions been used when calculating the project emissions?	/1/	DR	<p>See B.4.1.</p> <p>The data presented in section B.6.2 is the same of the data presented in section B.7.1.</p>	<del>CL5</del>	OK

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CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
			Section B.6.2 should provide all parameters that are available at validation for ex-ante calculation of emission reductions (not estimatives) and will not be monitored.		
B.4.3. Are uncertainties in the project emission estimates properly addressed?	/1/	DR	See B.4.1		OK
<b>B.5. Calculation of GHG Emission Reductions – Baseline emissions</b> <i>It is assessed whether the baseline emissions are stated according to the methodology and whether the argumentation for the choice of default factors and values – where applicable – is justified.</i>					
B.5.1. Are the calculations documented according to the approved methodology and in a complete and transparent manner?	/1/	DR	The baseline emissions include emissions from the power plants connected to the isolated system. The emission is estimated taking into account the increase of the demand over the time and the remaining lifetime of the existing power plants. Baseline emissions are the product of the baseline emission factor and electricity supplied to the isolated area by the grid in the project activity.		OK
B.5.2. Have conservative assumptions been used when calculating the baseline emissions?	/1/	DR	AM 0045 requires the electricity supplied to the isolated system in the baseline scenario by power generation during the last three years before the beginning of the project activity to be based on historic records based on electricity meters	CAR-3	OK

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			<p>recording. This value should also be double checked by receipt of sales / payment. Similarly, the amount of fossil fuel consumed by each power plant of the isolated system in the baseline scenario during the last three years before the beginning of the project activity must be based on historic records.</p> <p>However, it was informed that there is no registered historical data for the electricity generation and fossil fuel consumption used for the generators from Mazuko and from the mines.</p>		
B.5.3. Are uncertainties in the baseline emission estimates properly addressed?	/1/	DR	No. See B.5.2	<del>CAR-3</del>	OK
<b>B.6. Calculation of GHG Emission Reductions – Leakage</b>  <i>It is assessed whether leakage emissions are stated according to the methodology and whether the argumentation for the choice of default factors and values – where applicable – is justified.</i>					
B.6.1. Are the leakage calculations documented according to the approved methodology and in a complete and transparent manner?	/1/	DR	Leakage emissions are calculated by the product of the area of land deforested and the carbon stock per unit area.		OK
B.6.2. Have conservative assumptions been used when calculating the leakage emissions?	/1/	DR	See B.6.1		OK
B.6.3. Are uncertainties in the leakage emission estimates properly addressed?	/1/	DR	See B.6.1		

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CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
<b>B.7. Emission Reductions</b> <i>The emission reductions shall be real, measurable and give long-term benefits related to the mitigation of climate change.</i>					
B.7.1. Are the emission reductions real, measurable and give long-term benefits related to the mitigation of climate change.	/1/	DR	<p>The project is expected to reduce CO2 emissions to the extent of 124 736 tCO2e during the first renewable 7-years crediting period (17 819 tCO2e/year on average). The calculation of estimated average annual emission reductions is not correct.</p>	<del>CL-17</del>	OK
<b>B.8. Monitoring Methodology</b> <i>It is assessed whether the project applies an appropriate monitoring methodology.</i>					
B.8.1. Is the monitoring plan documented according to the approved methodology and in a complete and transparent manner?	/1/	DR	<p>According to AM0045, the following data is to be monitored:</p> <ul style="list-style-type: none"> <li>- Electricity generation from the project activity;</li> <li>- Data needed to recalculate the operating and build margin emission factors;</li> <li>- Financial and/or institutional arrangements that could help the project to overcome identified barriers during the crediting period.</li> </ul> <p>Official information from the government will be collected to calculate OM and BM emission factors.</p>		OK

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CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
B.8.2. Will all monitored data required for verification and issuance be kept for two years after the end of the crediting period or the last issuance of CERs, for this project activity, whichever occurs later?	/1/	DR	Some data variables have to be archived for a period of 2 years from the end of the crediting period (21 years) and the PDD doesn't make any reference to that.	<del>CL-19</del>	OK
<b>B.9. Monitoring of Project Emissions</b> <i>It is established whether the monitoring plan provides for reliable and complete project emission data over time.</i>					
B.9.1. Does the monitoring plan provide for the collection and archiving of all relevant data necessary for estimation or measuring the greenhouse gas emissions within the project boundary during the crediting period?	/1/	DR	<p>See B.8.1.</p> <p>It is not specified which option will be used regarding the QA/QC procedures to be applied to monitor the SF6 leakage from the new equipment installed during the project activity (direct measurements or using technology provider information).</p> <p>The monitoring frequency established for monitoring EGy is annual; AM0045 requires it to be hourly measured and monthly recorded.</p> <p>The monitoring frequency established for monitoring public policies is once before the implementation of the project; AM0045 requires it to be at every verification.</p>	<del>CL-8</del>	OK
<b>B.10. Monitoring of Baseline Emissions</b> <i>It is established whether the monitoring plan provides for reliable and complete baseline emission data over time.</i>					

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CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
B.10.1. Does the monitoring plan provide for the collection and archiving of all relevant data necessary for determining baseline emissions during the crediting period?	/1/	DR	Yes. See B.8.1		OK
B.10.2. Are the choices of baseline GHG indicators reasonable and conservative?	/1/	DR	Yes. See B.8.1		OK
B.10.3. Is the measurement method clearly stated for each baseline indicator to be monitored and also deemed appropriate?	/1/	DR	Yes.		OK
B.10.4. Is the measurement <i>equipment</i> described and deemed appropriate?	/1/	DR	No. The methodology AM 0045 requires the following information to be provided in the PDD: - the inventory, the identification and the description of the measurement equipments used; - the organization implemented and the responsibilities; - the calibration and verification of the measurement equipments; - the connection of the standard equipments to equipments of reference; - the recording. This information is not provided in the PDD.	<del>CL7</del>	OK
B.10.5. Is the measurement <i>accuracy</i> addressed and deemed appropriate? Are procedures in place on	/1/	DR	Yes. See B.10.3		OK

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CDM Validation 2007-1784, rev. 01

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
how to deal with erroneous measurements?					
B.10.6. Is the measurement <i>interval</i> for baseline data identified and deemed appropriate?	/1/	DR	Yes.		OK
B.10.7. Is the registration, <i>monitoring, measurement</i> and <i>reporting</i> procedure defined?	/1/	DR	No. See B.10.4	<del>CL7</del>	OK
B.10.8. Are procedures identified for <i>maintenance</i> of monitoring equipment and installations? Are the calibration intervals being observed?	/1/	DR	No. See B.10.4	<del>CL7</del>	OK
B.10.9. Are procedures identified for day-to-day records handling (including what records to keep, storage area of records and how to process performance documentation)	/1/	DR	No. See B.10.4	<del>CL7</del>	OK
<b>B.11. Monitoring of Leakage</b> <i>It is assessed whether the monitoring plan provides for reliable and complete leakage data over time.</i>					
B.11.1. Does the monitoring plan provide for the collection and archiving of all relevant data necessary for determining leakage?	/1/	DR	AM0045 does not require the monitoring of leakage.		OK
B.11.2. Are the choices of project leakage indicators reasonable and conservative?	/1/	DR	See B.11.1		OK

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CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
B.11.3. Is the measurement method clearly stated for each leakage value to be monitored and deemed appropriate?	/1/	DR	See B.11.1		OK
<b>B.12. Monitoring of Sustainable Development Indicators/ Environmental Impacts</b> <i>It is assessed whether choices of indicators are reasonable and complete to monitor sustainable performance over time.</i>					
B.12.1. Is the monitoring of sustainable development indicators/ environmental impacts warranted by legislation in the host country?	/1/	DR	Neither AM 0045 nor the Peruvian DNA require the monitoring of social or environmental indicators.		OK
<b>B.13. Project Management Planning</b> <i>It is checked that project implementation is properly prepared for and that critical arrangements are addressed.</i>					
B.13.1. Is the authority and responsibility of overall project management clearly described?	/1/	DR	No. The methodology AM 0045 requires the following information to be provided in the PDD: <ul style="list-style-type: none"> <li>- the inventory, the identification and the description of the measurement equipments used;</li> <li>- the organization implemented and the responsibilities;</li> <li>- the calibration and verification of the measurement equipments;</li> <li>- the connection of the standard equipments</li> </ul>	<del>CL</del> 7	OK



CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
			to equipments of reference; - the recording. This information is not provided in the PDD.		
B.13.2. Are procedures identified for training of monitoring personnel?	/1/	DR	The PDD does not make any reference about training and maintenance needs.	<del>CL-16</del>	OK
B.13.3. Are procedures identified for emergency preparedness for cases where emergencies can cause unintended emissions?	/1/	DR	Not applicable.		OK
B.13.4. Are procedures identified for review of reported results/data?	/1/	DR	Procedures for review of reported results have not been identified. Procedures for corrective actions have not been identified.	<del>CL-20</del>	OK
B.13.5. Are procedures identified for corrective actions in order to provide for more accurate future monitoring and reporting?	/1/	DR	See B.13.5	<del>CL-20</del>	OK
<b>C. Duration of the Project/ Crediting Period</b> <i>It is assessed whether the temporary boundaries of the project are clearly defined.</i>					
C.1.1. Are the project's starting date and operational lifetime clearly defined and evidenced?	/1/	DR	The project starting date is 31 March 2006 with an expected lifetime of 30 years.		
C.1.2. Is the start of the crediting period clearly defined and reasonable?	/1/	DR	A renewable 7-years crediting period was selected, starting on 01 September 2008. It is requested to provide a starting date of the	<del>CL-14</del>	OK

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CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
			crediting period that is later than a realistic date of CDM registration. Please specify in Table 8 on Section B.6.4 the correspondent years.		
<b>D. Environmental Impacts</b> <i>Documentation on the analysis of the environmental impacts will be assessed, and if deemed significant, an EIA should be provided to the validator.</i>					
D.1.1. Has an analysis of the environmental impacts of the project activity been sufficiently described?	/1/	DR	DNV requires evidence of the Environmental Impact Assessment.	<del>CL-12</del>	OK
D.1.2. Are there any Host Party requirements for an Environmental Impact Assessment (EIA), and if yes, is an EIA approved?	/1/	DR	The environmental impact assessment (EIA) was approved by Resolution 106-2007-MEM/AAE.		OK
D.1.3. Will the project create any adverse environmental effects?	/1/	DR	No significant adverse environmental impacts have been identified during the EIA. DNV requires evidence of the Environmental Impact Assessment.	<del>CL-12</del>	OK
D.1.4. Are transboundary environmental impacts considered in the analysis?	/1/	DR	See D.1.3	<del>CL-12</del>	OK
D.1.5. Have identified environmental impacts been addressed in the project design?	/1/	DR	See D.1.3	<del>CL-12</del>	OK
D.1.6. Does the project comply with environmental legislation in the host country?	/1/	DR	See D.1.2		OK

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CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
<b>E. Stakeholder Comments</b> <i>The validator should ensure that stakeholder comments have been invited with appropriate media and that due account has been taken of any comments received.</i>					
E.1.1. Have relevant stakeholders been consulted?	/1/	DR	ELSE invited stakeholders for two informative workshops that were carried out in Puerto Maldonado and Mazuko. Institutions, organizations and public in general were invited through letters, press notes and public information. DNV requires evidence of the stakeholders process consultation.	CL-13	OK
E.1.2. Have appropriate media been used to invite comments by local stakeholders?	/1/	DR	See E.1.1		OK
E.1.3. 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?	/1/	DR	See E.1.1		OK
E.1.4. Is a summary of the stakeholder comments received provided?	/1/	DR	In Mazuko all comments were positive. In Puerto Maldonado stakeholders commented that the profits through selling CERs should be reinvested on social projects in the region.		OK
E.1.5. Has due account been taken of any stakeholder comments received?	/1/	DR	ELSE's director in Puerto Maldonado replied that any income from CER's		OK

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CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
			commercialization has been included for budget purposes.		

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**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
<p><b>CAR 1</b></p> <p>The data used for emission factor calculation were obtained from the period 2003 – 2005. However, according to methodology ACM 0002, version 6, for ex-ante emission factors calculation it is required to use the full generation-weighted average of the most recent 3 years for which data are available at the time of PDD submission. It was confirmed that data of 2006 is already available.</p>	B.4.1	<p>Calculation of the emission factor has been done with years 2006, 2005 and 2004. The new version of the spreadsheet is attached. See file: EF Peru 2004-2006 (xls).</p> <hr/> <p>Fuel consumption data has been actualized (prior data from COES did not included one company consumption). BM input data and 2006 generation information has been revised. Now values of thermal and hydro generation in 2006 are the same than the ones presented in COES website. 2). The generation of Yuncan power plant has been modified.</p> <p>See file: EF_Peru-2004 2006 (2) (xls) and since, the EF grid is part of ER calculations, see file: ELSE - ER (2)</p>	<p>1) The values of thermal and hydro generation in 2006 are different than the ones presented in COES website;</p> <p>2) The generation of Yuncan power plant considered for BM calculation is not correct.</p> <hr/> <p>Therefore this CAR remains opened.</p> <hr/> <p>The corrections were made accordingly. Therefore this CAR is closed.</p>

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
<b>CAR 2</b> The Letter of Approval from the DNA of Peru has not been provided.	A.2.2 A.4.1	The documents were sent to the audit team. See file: LoA ELSE (doc)	The Letter of Approval was provided. Therefore this CAR is closed.
<b>CAR 3</b> AM 0045 requires the electricity supplied to the isolated system in the baseline scenario by power generation during the last three years before the beginning of the project activity to be based on historic records based on electricity meters recording. This value should also be double checked by receipt of sales / payment. Similarly, the amount of fossil fuel consumed by each power plant of the isolated system in the baseline scenario during the last three years before the beginning of the project activity must be based on historic records. However, it was informed that there is no registered historical data for the electricity generation and fossil fuel consumption used for the generators from Mazuko and from the mines.	B.5.2 B.5.3	Else has developed an interconnection project activity for isolated power generators in Puerto Maldonado (property of Else), Mazuco and Mines, but taking into account 1) the present difficulty to collect complete records of historic data for all the very small mines (ninety six - 96) and Mazuco (very small town in the middle of the forest) and 2) that every one of them will be connected to the transmission line independently of each other, their contribution to the emission reductions attributable to the project activity will be taken into account (in a future and pertinent verification process) when the interconnection is done (calculation uses data at the moment of interconnection, as stated in the AM0045, v1). Else will have direct communications with every generator willing to connect to the grid. The generation units to be considered in the CDM project activity will only be the ones with complete data for generation and/or fuel consumption. Demand and fuel consumption projections are still in the ER spreadsheet presented, but their contribution is not considered at	Only the units with available records of energy generation and fuel consumption were considered for ER calculation. Therefore 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
		<p>the moment of presenting this PDD to Validation in order to be conservative in the estimations and consider only units with complete and checked data at this stage. When the mines and Mazuco interconnection is done, their information will be used and the emission reductions will be considered and verified.</p> <p>The generation and fuel consumption considered at this moment are the ones that are property of ELSE (Puerto Maldonado) which has complete and validated records of generation and fuel consumption for the past 3 years at the moment of validation Taking into account that the project expects to be implemented by September 2008 the data used is correct, but in case the interconnection is done in 2009 data for Puerto Maldonado will be updated.</p>	

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
<b>CL 1</b> The “Tool for the demonstration and assessment of additionality and the methodology ACM 0002 should be referenced in the PDD. The applied version of the methodology AM 0045 should be referenced also.	B.1.1	The “Tool for the demonstration and assessment of additionality” and the methodology ACM0002, and the applied version of the methodology AM 0045 are referenced in the new version of the PDD.  <hr/> ACM0002 is referenced in section B.1. in the new version of the PDD. The additionality tool used and referenced is the version 4.	ACM0002 should be referenced in section B.1. Latest version 4 of the additionality tool should be used. Therefore this CL remains opened.  <hr/> OK, this CL is closed.
<b>CL 2</b> According to the Guidelines for completing the Project Design Document: a) section B.6.1 should describe how the procedures are applied to the project activity and also the equations that will be used in calculating emission reductions. b) section B.6.3 should provide a transparent ex-ante calculation of all relevant equations provided, documenting how each equation is applied.		Changes are provided in the new version of the PDD.	This CL is closed.
<b>CL 3</b> The PDD does not present a barrier analysis for the scenario presented as alternative 2 – “Grid connection of isolated electricity systems with the complementary transmission system not undertaken as a CDM project”.	B.3.3	A barrier analysis is presented in the new version of the PDD	OK, this CL is closed.
<b>CL 4</b> According to the Electricity Reference Plan 2005 – 2014, the isolated system Bagua – Jaén will be connected to SEIN. Please consider this in the	B.3.3	The interconnection of the isolated system Bagua – Jaén is considered in the discussion of similar options that are	Discussion was presented accordingly. Therefore 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
discussion of similar options that are occurring.		occurring in the new version of the PDD. Also see: Jaen bagua (doc)	
<p><b>CL 5</b> The data presented in section B.6.2 is the same of the data presented in section B.7.1. Section B.6.2 should provide all parameters that are available at validation for ex-ante calculation of emission reductions (not estimatives) and will not be monitored.</p>	B.4.2	<p>Changes are provided in the new version of the PDD.</p> <hr/> <p>EG<sub>y</sub> → Data will be measured every 15 minutes and aggregated hourly, monthly and yearly.</p> <p>MSF6,y → There will be a constant control of the pressure gauges that monitor the variations of SF6, in case of leaks (evident when there is a change in the pressure levels above the limits established).</p> <p>Public policies → Will be monitored at every verification</p> <p>D<sub>yp</sub> → Directly measured every 15 minutes. Every month these values are used for the monthly invoices.</p> <p>S<sub>yp</sub> → Calculated as stated in methodology AM0045 version 1.1 every year (or for a monitoring period).</p> <p>TL → Will be measured through the balance of energy and a power flow. The balance of energy is done monthly and the model, once a year.</p>	<p>The monitoring frequency of each variable must be clearly stated in section B.7.1. Therefore this CL remains opened.</p> <hr/> <p>The monitoring frequencies were established as required. Therefore this CL is closed.</p>
<p><b>CL 6</b> It is requested that the PDD specify whether the Operating Margin, the Build Margin and the Emission Factor will be calculated <i>ex-ante</i> or <i>ex-</i></p>	B.4.1	Changes are provided in the new version of the PDD.	The new version of the PDD clearly determines that the emission factor will be calculated <i>ex ante</i> .

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
<i>post.</i>			Therefore this CL is closed.
<p><b>CL 7</b> The methodology AM 0045 requires the following information to be provided in the PDD:</p> <ul style="list-style-type: none"> <li>- the inventory, the identification and the description of the measurement equipments used;</li> <li>- the organization implemented and the responsibilities;</li> <li>- the calibration and verification of the measurement equipments;</li> <li>- the connection of the standard equipments to equipments of reference;</li> <li>- the recording.</li> </ul> <p>This information is not provided in the PDD.</p>	B.10.4 B.10.7 to B.10.9 B.13.1	<p>Measurement equipments used in the project activity is listed in Annex 5 of the new version of the PDD. Also see: “Ob-Electromecánicas-San Gabán”, “Ob-Electromecánicas-SE. Puerto” and “Ob-Electromecánicas-SE.Mazuko” (xls) to see the original list of equipments and “Parte 01 Suministro” (doc) for description of equipment.</p> <p>The organization implemented and the responsibilities are presented in Annex 6 of the new version of the PDD.</p> <p>Calibration and verification of the measurement equipments, and the necessity to connect to equipments of reference will be contemplated in the procedures described in the new version of the PDD, and is stated in the description of the variable it monitors.</p> <p>The recording is contemplated in the monitoring plan in the new version of the PDD.</p>	<p>Information were provided as required.</p> <p>Therefore this CL is closed.</p>
<p><b>CL 8</b> It is not specified which option will be used regarding the QA/QC procedures to be applied to monitor the SF6 leakage from the new equipment installed during the project activity (direct measurements or using technology provider information).</p>	B.9.1	<p>Changes are provided in the new version of the PDD. In order to monitor the SF6 leakage from the new equipment installed during the project activity the PP collects the information through direct measurements.</p> <p>Changes are provided in the new version of</p>	<p>Corrections were considered accordingly.</p> <p>Therefore this CL is closed.</p>

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
<p>The monitoring frequency established for monitoring EG<sub>y</sub> is annual; AM0045 requires it to be hourly measured and monthly recorded.</p> <p>The monitoring frequency established for monitoring public policies is once before the implementation of the project; AM0045 requires it to be at every verification.</p>		<p>the PDD. Data will be measured every 15 minutes and aggregated hourly, monthly and yearly.</p> <p>Changes are provided in the new version of the PDD. The monitoring frequency established for monitoring public policies is at every verification.</p>	
<p><b>CL 9</b></p> <p>It is requested to specify the date of completion of the application of the methodology to the project activity in Section B.8.</p>		<p>Changes are provided in the new version of the PDD.</p>	<p>OK, this CL is closed.</p>
<p><b>CL 10</b></p> <p>DNV requires evidence of the project starting date and that CDM was considered for project's approval.</p>	<p>B.3.4</p>	<p>Electro Sur Este S.A.A. (ELSE), as stated in the PDD, is a distribution company with capital majority from FONAFE (Fondo Nacional de Financiamiento de la Actividad Empresarial del Estado - National Fund of Financing Government Activities) in which Peru's government has a capital majority share. This is why ELSE has to have the approval of the Economy and Finance Ministry through the National System of Public Investment (SNIP, by the Acronyms in Spanish) even when ELSE is ruled by a private regime and its expenses, investments and projects are to be covered only by profits from its own activities (assessed at private prices).</p> <p>After the pre investment studies (feasibility study in this case), where the project activity is assessed, one requirement to go</p>	<p>The project starting date must be updated in the PDD, section C.1.</p> <p>Therefore this CL remains opened.</p>

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
		<p>forward with the project activity is the approval of the Economy and Finance Ministry (assessed by law at social prices). This approval is officially communicated to the Energy and Mines Ministry. Only after this approval a company can really decide to implement or not the project activity, taking into account the economic indicators and its internal policy. If it is decided to implement the project activity, they pass to the investment phase, where is developed the final study, which is used to determine the final technical data and costs of the project activity (in this study, differences from the feasibility study may occur, when these are too big, the project may not be developed). Finally the project passes to the construction stage.</p> <p>With the entire law requirements approved, and taking into account social benefits and the sensitivity analysis which includes CERs incomes, ELSE decides to go forward with the project activity and ordered the develop of the Final Study (investment phase) which is the step previous to the construction stage.</p> <p>For the present project activity, the feasibility approval is considered the start date of the project activity in order to be conservative, since the final study started soon after this approval).</p>	

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
		<p>The approval of the project was March 31st, 2006.</p> <p>See file: Start Date Else (doc)</p> <p>The CDM factor was considered at the moment of evaluation of the project activity before the start date. At the moment of developing the feasibility study, CERs were taken into account.</p> <p>See original file: “Formatos-MEF-ok v2 Evaluación económica – From Feasibility Study” (xls), specially spreadsheet F-07 and F-09.</p> <p>There was a CDM study of the interconnection project activity before the start date with the title: “Estudio sobre bonos de carbono para la Línea de Transmisión San Gabán Puerto Maldonado” (Study on carbon bonds for Transmission Line St. Gabán Puerto Maldonado). The final version was presented on January 2006.</p> <p>See file: Informe_Final_ELSE-LuchoG (doc)</p> <hr/> <p>The project starting date has been updated in the PDD, section C.1. The start date of the CDM project activity is March 31st, 2006 and the project activity will start operations on 01/09/2008 approximately.</p>	<hr/> <p>The project starting date was updated accordingly.</p> <p>Therefore this CL is closed.</p>

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
<b>CL 11</b> It is requested to provide a starting date of the crediting period that is later than a realistic date of CDM registration. Please specify in Table 8 on Section B.6.4 the correspondent years.	C.1.2	Changes are provided in the new version of the PDD. The crediting period is considered since 2008, even when the project activity will not operate the entire year. The crediting period, will only start as soon as it is officially registered as a CDM activity	OK, this CL is closed.
<b>CL 12</b> DNV requires evidence of the Environmental Impact Assessment.	D.1.1 D.1.3 to D.1.5	The official approval document for the Environmental Impact Assessment is attached. See file: EIA (doc). The complete EIA presented to the audit team is also attached. See original files: “EIA 0 Introducción” “EIA 1 Descripción del Proyecto” “EIA 2 Marco Legal e Institucional” “EIA 3 Línea Base Ambiental” “EIA 4 Identificación de Impactos Ambientales” “EIA 5 Plan de Manejo Ambiental” “EIA 6 Conclusiones y Recomendaciones” “EIA Anexo A San Gabán” “EIA Anexo B San Gabán” “EIA Anexo C San Gabán” “EIA Anexo D Inf. Eval. Arqueológica” “EIA Bibliografía” “EIA caratula” “EIA Índice” “EIA Panel Fotográfico”	Evidences were provided to DNV's satisfaction. Therefore 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
		“EIA Resumen Ejecutivo”	

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
<b>CL 13</b> DNV requires evidence of the stakeholders process consultation.	E.1.1	The DNA has assessed and approved the stakeholder process consultation developed by ELSE. Physical documentation has been checked at the visit of the audit team.  Evidence of the communications, assistance and accords presented to the audit team are attached. See file: Stakeholder consultation	Evidences were provided to DNV's satisfaction. Therefore this CL is closed.
<b>CL 14</b> According to the Guidelines for completing the Project Design Document the title of Annex 3 should be "Baseline Information".		Changes are provided in the new version of the PDD.	This CL is closed.
<b>CL 15</b> The PDD has to be presented in English. The Spanish parts of the PDD are requested to be removed/translated.		Changes are provided in the new version of the PDD.	This CL is closed.
<b>CL 16</b> The PDD does not make any reference about training and maintenance needs.	A.3.3 B.13.2	Is establish in the new version of the PDD the training and maintenance requirements, that is why is stipulated procedures for maintenance of equipment and identification of training needs to enable operational staff to meet the needs of the project and the monitoring plan.  Else has experience in distribution of electricity but do not have experience in a project like the present one (size and localization of the transmission line, new modern equipment, etc.) nor CDM procedures.  At the moment of presentation of the PDD, personnel have received training for the	Training and maintenance needs are addressed in the new version of the PDD. Therefore 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
		<p>implementation of the project activity (which is in construction) and operation and maintenance staff will receive training during the month of experimental operation.</p> <p>See file: Training – Contract</p>	

<b>Draft report clarifications and corrective action requests by validation team</b>	<b>Ref. to checklist question in table 2</b>	<b>Summary of project owner response</b>	<b>Validation team conclusion</b>
<b>CL 17</b> The calculation of estimated average annual emission reductions is not correct.	B.7.1	Changes are provided in the new version of the PDD.	OK, this CL is closed.
<b>CL 18</b> It is requested to be explained in the PDD how was calculated the build margin emission factor.	B.4.1	The explanation of how the BM was calculated is in the new version of the PDD.	OK, this CL is closed.
<b>CL 19</b> Some data variables have to be archived for a period of 2 years from the end of the crediting period (21 years) and the PDD doesn't make any reference to that.	B.8.2	Changes are provided in the new version of the PDD.	OK, this CL is closed,
<b>CL 20</b> Procedures for review of reported results have not been identified. Procedures for corrective actions have not been identified.	B.13.4 B.13.5	Is establish in the new version of the PDD that before the start of the crediting period of the project activity, different procedures will be implemented / adapted, included the ones related to review of reported results and corrective actions since ELSE is implementing the ISO9001 management system.	The PDD establishes procedures for project review and corrective actions. Therefore this CL is closed,
<b>CL 21</b> DNV requests an explanation about how transmission losses were taken into account for the project activity.	A.3.1	According to the feasibility study transmission losses are estimated at the moment of evaluation of the project. Losses are estimated to be around 3.6% which is considered acceptable. See doc: Losses Else (doc)	Evidences were provided to DNV's satisfaction. Therefore this CL is closed.
<b>CL 22</b> One of the barriers presented states that eventually the demand for electricity could not be big enough to justify the investments. DNV considers this	B.3.3	Isolated systems, that are not in the guaranteed transmission system where the government helps the implementation of	The economic assessment clearly demonstrate that the project activity is not financially attractive.

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
very unlikely to happen. Please provide evidence that confirm this barrier.		<p>projects, do not interconnect to the grid because the costs (transmission line) are not covered by the incomes (<u>from the demand of electricity</u>) and savings (fee, tolls form energy distribution and baseline costs), making the projects economically unfeasible.</p> <p>This is a barrier for many rural electricity projects which have small energy demands and are far away from the grid.</p> <p>An example is the present project activity which even counting the baseline saving is not economically attractive.</p> <p>The proposed project activity will interconnect an isolated system located 225 km from the grid and considers the demand grow in the assessment of the project. In these conditions the economic assessment shows that the demand for electricity will not be big enough to justify the investments.</p>	Therefore this CL is closed.
<p><b>CL 23</b></p> <p>The barrier that states that it is not mandatory for companies to invest in electricity supply to meet the demand when this is not financially feasible does not seem very clear. Please explain this barrier a little more and provide related evidence.</p>	B.3.3	<p>The Electricity Concessions Law states that the company has to supply electricity for the people into their concession, this is currently done by ELSE (representing economic losses in Puerto Maldonado). This is the reason why the Base Line (on site generation) would not disappear.</p> <p>According to Article 79°, the profitability of the project should be evaluated at a 12%</p>	<p>DNV requests this discussion to be inserted in the PDD.</p> <p>Therefore this CL remains opened.</p>

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
		<p>discount rate (in private prices), but the law do not order in any article the implementation of projects below a 12% profitability margin inside the concession. This is why a private company may or may not develop a project if this has an indicator below 12%, i.e., the company may choose to invest the money in the energy project or in other investment alternative. ELSE decides to go forward with the project activity <u>because they take into account the social benefits and the sensitivity analysis which includes CERs incomes.</u></p> <p>See file: “Ley de concesiones eléctricas y reglamento” (Electricity concessions law (pdf)).</p> <hr/> <p>This discussion has been inserted in the new version of the PDD.</p>	<hr/> <p>OK, this CL is closed.</p>

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
<b>CL 24</b> DNV requests an explanation about how the value of 25% in the sensitive analysis was established.	B.3.3	<p>In order to develop a more standard sensitive analysis, it has been done an analysis with <math>\pm 10\%</math> range as recommended by the approval system guidelines. See file: "Investment analysis" (xls) and "Sensitivity analysis" (doc).</p> <hr/> <p>The required sensitivity analysis has been incorporated in the new version of the PDD. Also see file: Investment analysis (2) (xls), Operacion y Mantenimiento (doc) and Sensitivity analysis (2) (doc).</p>	<p>It is required to develop a sensitive analysis showing at what deviation the benchmark is crossed and the likelihood of that being achieved. Therefore this CL remains opened.</p> <hr/> <p>A sensitive analysis was conducted accordingly. Therefore this CL is closed.</p>
<b>CL 25</b> The investment analysis should be carried on considering the budget values of the project at the time of project decision, and not considering the real costs during project implementation. The related spreadsheet must be totally in English.	B.3.3	<p>The investment analysis has been carried on considering the budget values of the project at the time of the start of the project activity, which is 13.4 million USD (feasibility study). The related spreadsheets are totally in English. See file: "Investment analysis" (xls) and the source of information: "Anex- E - Formatos-MEF-ok v2 Evaluación economica – From Feasibility Study" (xls)</p> <hr/> <p>The Peruvian Economy and Finance Ministry (MEF) have sent a communication regarding the evaluation requirements for the projects in the National Public Investment System (SNIP). They inform that the national legislation demands an</p>	<p>DNV requires the following evidence that confirms the values used in the investment analysis:</p> <ul style="list-style-type: none"> <li>- Electric tariffs;</li> <li>- Direct costs of LT-66kV Mazuko – Puerto Maldonado Tramo II</li> <li>- Energy purchase costs;</li> <li>- Combustibles costs (baseline scenario);</li> <li>- Demand analysis.</li> </ul> <p>Therefore this CL remains opened.</p> <hr/> <p>According to the communication of MEF, all parameters considered in the investment analysis of the project were evaluated and approved. Therefore this CL is closed.</p>

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
		<p>evaluation of technical and methodological aspects and parameters used in the project. They also had to take into account legal and institutional aspects related to the formulation and implementation. The MEF only approves the projects that have passed all the technical and legal requirements established by law.</p> <p>This approval is officially communicated to the Energy and Mines Ministry, which emit another official communication to the project developer (document previously attached).</p>	

## **APPENDIX B**

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### **CERTIFICATES OF COMPETENCE**



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## CERTIFICATE OF COMPETENCE

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### *Felipe Antunes*

Qualification in accordance with DNV's Qualification scheme for CDM/JI (ICP-9-8-i1-CDMJ1-i1)

<b>GHG Auditor:</b>	Yes		
<b>CDM Validator:</b>	Yes	<b>JI Validator:</b>	--
<b>CDM Verifier:</b>	--	<b>JI Verifier:</b>	--
<b>Industry Sector Expert for Sectoral Scope(s):</b>	--		

Høvik, 30 October 2007

*Michael Lehmann*

Michael Lehmann

*Technical Director, International Climate Change Service*

### *Anu Chaudhary*

Qualification in accordance with DNV's Qualification scheme for CDM/JI (ICP-9-8-i1-CDMJ1-i1)

<b>GHG Auditor:</b>	Yes		
<b>CDM Validator:</b>	Yes	<b>JI Validator:</b>	Yes
<b>CDM Verifier:</b>	--	<b>JI Verifier:</b>	--
<b>Industry Sector Expert for Sectoral Scope(s):</b>	--		

**Technical Reviewer for (group of) methodologies:**

ACM002, AMS-I.A-D, AM0019, AM0026, AM0029, AM0045	Yes
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Høvik, 26 September 2007

*Einar Telnes*

Einar Telnes

*Director, International Climate Change Services*

*Michael Lehmann*

Michael Lehmann

*Technical Director*





## CERTIFICATE OF COMPETENCE

### *Michael Lehmann*

Qualification in accordance with DNV's Qualification scheme for CDM/JI (ICP-9-8-i1-CDMJ1-i1)

<b>GHG Auditor:</b>	Yes		
<b>CDM Validator:</b>	Yes	<b>JI Validator:</b>	--
<b>CDM Verifier:</b>	Yes	<b>JI Verifier:</b>	--
<b>Industry Sector Expert for Sectoral Scope(s):</b>	Sectoral scope 1, 2, 3		
<b>Technical Reviewer for (group of) methodologies:</b>			
ACM0001, AM0002, AM0003, AM0010, AM0011, AM0012, AMS-III.G	Yes	AM0023	Yes
ACM002, AMS-IA-D, AM0019, AM0026, AM0029, AM0045	Yes	AM0024	Yes
ACM003, ACM0005, AM0033, AM0040	Yes	AM0027	Yes
ACM0004, ACM0012	Yes	AM0030	Yes
ACM0006, AM0007, AM0015, AM0036, AM0042	Yes	AM0031	Yes
ACM0007	Yes	AM0032	Yes
ACM0008	Yes	AM0035	Yes
ACM0009, AM0008, AMS-III.B	Yes	AM0038	Yes
AM0006, AM0016, AMS-III.D, ACM0010	Yes	AM0041	Yes
AM0009, AM0037	Yes	AM0034	Yes
AM0013, AM0022, AM0025, AM0039, AMS-III.H, AMS-III.I	Yes	AM0043	
AM0014	Yes	AM0046	
AM0017	Yes	AM0047	
AM0018	Yes	AMS-II.A-F, AM0044	Yes
AM0020	Yes	AMS-III.A	Yes
AM0021, AM0028, AM0034, AM0051	Yes	AMS-III.E, AMS-III.F	Yes

Høvik, 5 February 2007

**Einar Telnes**  
*Director, International Climate Change Services*

**Michael Lehmann**  
*Technical Director*