VALIDATION REPORT

Energest S.A.

São João hydro power plant project

SGS Climate Change Programme
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Summary

SGS has performed a validation of the project: São João hydro power plant project. The Validation was performed on the basis of the UNFCCC criteria and host country criteria, as well as criteria given to provide for consistent project operations, monitoring and reporting. Using a risk based approach, the review of the project design documentation and the subsequent follow-up interviews have provided SGS with sufficient evidence to determine the fulfilment of the stated criteria.

The project activity consists of the construction of a new small hydro power plant with 25 MW total installed capacity and a small reservoir. The plant is being installed in the South East region of Brazil, in Castelo river.

Total amount of emission reductions estimated for the first crediting period is 226,408tCO_2e.

The SGS will request the registration of the São João hydro power plant as a CDM project activity, once the written approval by the DNA of the participating Parties and the confirmation by the DNA of Brazil that the project assists in achieving sustainable development has been received.

Subject.:			
CDM validation			**Indexing terms**
Work carried out by			
Fabian Gonçalves- Lead Assessor Áurea Nardelli - Assessor Geisa Principe – Local Assessor			
Technical review			
Irma Lubrecht			☒ No distribution without permission from the Client or responsible organisational unit
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Abbreviations

AM	Approved Methodology
CAR	Corrective Action Request
CER	Certified Emission Reduction
DNA	Designated National Authority
MP	Monitoring Plan
NIR	New Information Request
PDD	Project design Document
SGS	Société Générale de Surveillance
EF	Emission Factor

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1. Introduction

1.1 Objective

The ENERGEST S.A have commissioned SGS to perform the validation of the project: São João hydro power plant project with regard to the relevant requirements for CDM project activities. The purpose of a validation is to have an independent third party assess the project design. In particular, the project's baseline, the monitoring plan (MP) and the project's compliance with relevant UNFCCC and host country criteria are validated in order to confirm that the project design as documented is sound and reasonable and meets the stated requirements and identified criteria. Validation is seen as necessary to provide assurance to stakeholders of the quality of the project and its intended generation of Certified Emission Reduction (CER). UNFCCC criteria refer to the Kyoto Protocol criteria and the CDM rules and modalities and related decisions by the COP/MOP and the CDM Executive Board.

1.2 Scope

The scope of the validation is defined as an independent and objective review of the project design document, the project's baseline study and monitoring plan and other relevant documents. The information in these documents is reviewed against Kyoto Protocol requirements, UNFCCC rules and associated interpretations. SGS has employed a risk-based approach in the validation, focusing on the identification of significant risks for project implementation and the generation of CERs.

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

1.3 GHG Project Description

This report summarizes the results of the validation of São João hydro power plant project, performed on the basis of UNFCCC criteria. The validation has been performed as a desk review of the project documents presented by Energest S.A and a site visit to São João Hydro Power Plant (under construction), located in Conceição do Castelo, Espírito Santo, Brazil. During site visit, Energest managers and Ecológica consultant were interviewed.

The project activity consists of the construction of a new small hydro power plant with 25 MW total installed capacity and a small reservoir. The plant is being installed in the South East region of Brazil, in Castelo River.

The project aims to generate clean energy from hydropower. The project is being carry out by Energest an energy generation facility which is part of the EDP group.
The power station is subterraneous, with 2 horizontal Francis turbines.

The yearly minimum energy output expected for the project is 123,516 MWh. The project is connected to interconnected grid South-Southeast-Midwest.

Total amount of emission reductions estimated for the first crediting period is 226,408 tCO_2e.

Baseline Scenario:
No investment in clean power generation; electricity generation from fossil-fuel thermal plants that would have otherwise been delivered to the interconnected grid and to isolated systems.

With-project scenario:
The project activity consists of the construction of a new small hydropower plant with capacity of 25

MW. It will result in GHG emissions reductions avoiding the dispatch of same amount of energy produced by fossil-fuelled thermal plants to the grid.

Leakage:
No leakage is anticipated.

Environmental and social impacts:

With the use of hydropower facilities to generate electricity for local use and for delivery to the grid, the project displaces part of the electricity derived from finite fossil fuel, and gives less incentive for the construction of large hydro plants which can have major environmental and social impacts.
Regarding the compliance with environmental legislation of the host country, the Brazilian regulation requires an environmental licensing process, including: the preliminary license (Licença Prévia or LP), the construction license (Licença de Instalação or LI); and the operating license (Licenca de Operação or LO).
It was verified during the site visit that the plant obtained the LP and LI, and will require the LO license.
It is expected that the project activity will contribute to improve the supply of electricity.

1.4 The names and roles of the validation team members

Name	***Role***
Fabian Gonçalves	*Lead Assessor*
Geisa Principe	*Local assessor*
Aurea Nardelli	*Assessor*
Irma Lubrecht	*Technical reviewer*

2. Methodology

2.1 Review of CDM-PDD and additional documentation

The validation is performed primarily as a document review of the publicly available project documents. The assessment is performed by trained assessors using a validation protocol.

A site visit is usually required to verify assumptions in the baseline. Additional information can be required to complete the validation, which may be obtained from public sources or through telephone and face-to-face interviews with key stakeholders (including the project developers and Government and NGO representatives in the host country). These may be undertaken by the local SGS affiliate. The results of this local assessment are summarized in Annex 1 to this report.

2.2 Use of the validation protocol

The validation protocol used for the assessment is partly based on the templates of the IETA / World Bank Validation and Verification Manual and partly on the experience of SGS with the validation of CDM projects. It serves the following purposes:

- it organises, details and clarifies the requirements the project is expected to meet; and
- it documents both how a particular requirement has been validated and the result of the validation.

The validation protocol consists of several tables. The different columns in these tables are described below.

Checklist Question	*Means of verification (MoV)*	*Comment*	*Draft and/or Final Conclusion*
The various requirements are linked to checklist questions the project should meet.	*Explains how conformance with the checklist question is investigated. Examples of means of verification are document review (DR) or interview (I). N/A means not applicable.*	*The section is used to elaborate and discuss the checklist question and/or the conformance to the question. It is further used to explain the conclusions reached.*	*This is either acceptable based on evidence provided (**Y**), or a **Corrective Action Request (CAR)** due to non-compliance with the checklist question (See below). **New Information Request (NIR)** is used when the validation team has identified a need for further clarification.*

The completed validation protocol for this project is attached as Annex 2 to this report

2.3 Findings

As an outcome of the validation process, the team can raise different types of findings

In general, where insufficient or inaccurate information is available and clarification or new information is required the Assessor shall raise a **New Information Request (NIR)** specifying what additional information is required.

Where a non-conformance arises the Assessor shall raise a **Corrective Action Request (CAR).** A CAR

is issued, where:

I. mistakes have been made with a direct influence on project results;

II. validation protocol 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 verified.

The validation process may be halted until this information has been made available to the assessors' satisfaction. Failure to address a NIR may result in a CAR. Information or clarifications provided as a result of an NIR may also lead to a CAR.

Observations may be raised which are for the benefit of future projects and future verification or validation actors. These have no impact upon the completion of the validation or verification activity.

Corrective Action Requests and New Information Requests are raised in the draft validation protocol and detailed in a separate form (Annex 3). In this form, the Project Developer is given the opportunity to "close" outstanding CARs and respond to NIRs and Observations.

2.4 Internal quality control

Following the completion of the assessment process and a recommendation by the Assessment team, all documentation will be forwarded to a Technical Reviewer. The task of the Technical Reviewer is to

check that all procedures have been followed and all conclusions are justified. The Technical Reviewer will either accept or reject the recommendation made by the assessment team.

3. Determination Findings

3.1 Participation requirements

Brazil is listed as the host Party. Brazil has ratified the Kyoto Protocol on 23rd August 2002 (http://unfccc.int/files/essential_background/kyoto_protocol/application/pdf/kpstats.pdf).

At time of the draft validation, no Letter of Approval from the host country had been provided. The Letter of Approval will be signed when the DNA of Brazil has received and analyzed the validation report.

3.2 Baseline selection and additionality

The methodology applied to this Project Activity is: ACM0002 – "Consolidated baseline methodology for grid-connected electricity generation from renewable sources/ Consolidated monitoring methodology for grid-connected electricity generation from renewable sources" (version 06, issued on 19th May, 2006).

ACM 0002 (version 6) is applicable to grid-connected renewable power generation project activities which include among other conditions "new hydro plant with small reservoir".

The project consists of the construction of a new hydro power plant. The project boundaries are defined by the emissions targeted or directly affected by the project activities. It encompasses the physical, geographical site of the hydropower generation and the interconnected grid. The baseline calculation boundary is covered by the South-Southeast-Midwest interconnected grid and all plants are connected to this grid and baseline calculations use the electric generation data from this region.
As required in the ACM 0002, the project demonstrated additionality using the "Tool for the demonstration and assessment of additionality".

Step 0 of the Tool for the demonstration and assessment of additionality is not applicable, because the crediting period will not start prior registration. To include the information under sub-step 4a. CAR 1 was raised.

The information was revised in the version 2 of the PDD. CAR 1 was closed out.

The hydro power plant São João was planned in 1999. The Engineering Procurement and Construction (EPC) plan was made, but due to economic problems faced, the project stopped before start the construction.

After that a new EPC was made and the project started the process to obtain ANEEL license, environmental license and the power purchase agreement. During these years more financial and economic barriers were faced. In 2005 a new EPC was made and Energest (EDP group) decided to re-take the hydro power plant, at this time the costs were much higher than other EPC made.

In 2003 the EDP group decided to consider the CER revenue in all projects. It was possible to re-take the hydro power plant as a CDM project, considering CER to make the project financial viable due to the barriers faced in the past and actually

In the discussion of additionality, the project uses a benchmark analysis. The decision to go on with the project activity in 2005 does not consider the carbon credit revenue. To revise the IRR using the data that was used by Energest in the decision to re-take the construction of São João plant.
Provide copy of the EPC signed in 2002 and 2005. CAR 2 was raised.
Copy of the financial study was provided. The project uses benchmark analysis as a tool to assess the

potential generation project. The internal benchmark (Energest) for the year 2005 is 15% and the project used another value as reference, the National treasury notes (NTN-C), reference year 2005 = 16.42%. The NTN-C is an option to the project activity to invest in the Brazilian financial market which is the government bond rates. The NTN-C IRR is higher than the internal benchmark. The financial analysis demonstrates that the IRR without CDM revenue is 10.71% and with CDM revenue is 13.51% which is lower than internal benchmark or NTN-C. CAR 2 was closed out.
Barrier analysis:
It was verified during site visit that the project takes 30 years to install the 4th generator.
To provide more information regarding why Escelsa was focused exclusively on the distribution activities due to the increasing opportunities on the energy market.
It was verified during site visit the infrastructure barrier: the location of the project and the condition to build the generation room, to install the equipments, the tunnel (7Km) inside the rock. NIR 3 was raised.
A barrier analysis was made to prove additionality of the project activity. The barriers presented were investment and uncertainties on the energy regulatory market, prevailing business practice, difficulties on construction. The information was provided in the revised PDD. NIR 3 was closed out.

Escelsa was focused exclusively in energy distribution because of the characteristic of the Brazilian market. Most recently the market changed and it was possible to obtain concession to act as a generator. The energy prices are a barrier to the project. The government established the Thermoelectric Priority Plan. The thermal energy price is lower than hydro and this energy market is growing.

Verified that there are other similar generation plants, but not applicable as a CDM project activity. In 2003 the EDP that owns Energest decided to consider CERs revenue for all generation activities in Brazil, and this is applicable for São João plant (MDL distribuidoras Brasil).

Besides the financial analysis and barriers presented, the project decided to implement the São João plant.

The sources and information mentioned (data available in ONS, ANEEL websites) were confirmed by the assessors. The alternative to the project activity is the continuation of the current (previous) situation of electricity supplied by thermal power stations. As an alternative for the group company, there is the investment in other opportunities, like the financial market.

3.3 Application of Baseline methodology and calculation of emission factors

Considering that the project emissions and leakage are zero, the emission reductions by the project activity (ER_y) during a given year y will be the product of the baseline emissions factor (EF_y, in tCO_2e/MWh) times the electricity supplied by the project to the grid (EG_y, in MWh).

As defined in the ACM0002, the baseline emission factor is calculated as a combined margin, consisting of the combination of operating margin and the build margin factors. The calculation of the emission factor of Brazilian South-Southeast-Midwest grid is based on data from the National Electric System Operator (ONS – Operador Nacional do Sistema Elétrico) covering years 2003 -2005.

The baseline emission factor is defined as (EF_y) and is calculated as a combined margin (*CM*), consisting of the combination of operating margin (OM) and build margin (BM) factors.

The methodology mentions that the baseline emission factor is calculated considering the generation for the most recent 3 years available at the time of the PDD submission. Annex 3 of the PDD presents data for the most recent 4 years. To revised the baseline emission factor (2003-2005). CAR 7 was raised.

The emissions factor was revised and included in the PDD version 2. CAR 7 was closed out.

Baseline emissions are calculated by using the annual generation (project annual electricity dispatched to the grid) times the CO_2 average emission rate of the estimated baseline, as follows:

(A) Monitored project power generation (MWh) (B) Baseline emission rate factor (tCO_2/MWh)

BE= (A) x (B) (tCO_2)

The EF calculated (after CAR 7 closing out) was 0.262 tCO_2e/MWh.

The version 6 of the ACM0002 requires that the PE should be calculated from the "power density".

Verified:

Reservoir area = 0,21Km²

Installed capacity = 25MW

Power density = 119W/m²

The power density is higher than 4W/m², project emissions is not applicable according ACM0002 methodology.

3.4 Application of Monitoring methodology and Monitoring Plan

During the draft validation, it was verified that the monitoring plan did not cover all requirements of ACM0002. Issues were raised, as described below:

CAR 5 was raised: to correct table presented in section D of the PDD according to project scenario and considering that Emission Factor was calculated ex-ante.
Recording frequency for items 2, 3, 4 and 10: At the validation and will be recalculated at any renewal crediting period.

Some items are not applicable for this project. To revise the QC/QA according section D.2.1.3 when revised.

The PDD was revised; all item related to the EF was defined as ex-ante. CAR 5 was closed out.

PE is dependent on the reservoir area and capacity installed of the plant. The project has a small reservoir area. The power density is 119W/m² (higher than 4W/m²). PE=0.

The project does not create any leakage as defined in the methodology.

The project developer will be responsible for the management. During site visit it was confirmed the structure described in the PDD (section B.7.2). As informed during site visit, the project will prepare the Operation and Maintenance Manual. Verified that the project developer is responsible for the operation, monitoring and registration and will ensure resources for the activities of monitoring.
Observation 1: Specific procedure needs to be available before project operation and during verification assessment (procedures for monitoring data adjustments, review of reported data/ results, internal audit, review data before verification assessment, corrective action).

3.5 Project design

The project's starting date (14/02/2007) and operational lifetime (22years) were clearly defined in the PDD and are reasonable. It was assumed a renewable crediting period. The operational lifetime exceeds the crediting period.

To correct the lifetime of the project according documents presented during validation assessment. CAR 4 was raised.

The lifetime was revised in version 2 of the PDD. CAR 4 was closed out.

Section E.6 of the PDD version 1: to present the correct table, according PDD template. CAR 8 was

raised.

The PDD was revised using the new template (version 3). Table was revised. CAR 8 was closed out.

The project design engineering reflects current good practices and is not likely to be substituted by other or more efficient technologies within the project period.

3.6 Environmental Impacts

Verified that the project obtained the required installation license, to obtain this license an EIA was performed.

The following documents were verified during the site visit:

Attendance list of the requests described in the operation license PCH São João – LI180/2005.

Installation license LIGCA/180/2005, 17 June 2005, issued by IEMA.

The environmental effects were considered by the environmental agency during the licensing process. Transboundary environmental impact was considered in the licensing process. The project obtained the licenses required by the Brazilian environmental regulation.

3.7 Local stakeholder comments

Local stakeholders have been invited by letters to comment on the São João hydro power plant project.

The invitation was sent to specific stakeholders, considered representative of the general public, as defined in the Resolution n° 1 (Brazilian DNA requirement).

To provide copy of the letters and delivery receipts sent to local stakeholders and up date the PDD with comments received. CAR 6 was raised.

Copy of the letters and delivery receipts were provided. CAR 6 was closed out.

One comment was received (from Public Ministry) asking for a meeting with project developer. The project sent a letter to Public Ministry but no answer was received.

4. Comments by Parties, Stakeholders and NGOs

In accordance with sub-paragraphs 40 (b) and (c) of the CDM modalities and procedures, the project design document of a proposed CDM project activity shall be made publicly available and the DOE shall invite comments on the validation requirements from Parties, stakeholders and UNFCCC accredited non-governmental organizations and make them publicly available. This chapter describes this process for this project.

4.1 Description of how and when the PDD was made publicly available

The PDD and the monitoring plan for this project were made available on the SGS website http://cdm.unfccc.int/Projects/Validation/DB/DBZ9F9HIOYOSTHM637WFDVNTQM9D8O/view.html and were open for comments from 06 July 2006 until 04 August 2006. Comments were invited through the UNFCCC CDM homepage

4.2 Compilation of all comments received

Comment number	*Date received*	*Submitter*	*Comment*

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No comments were received during the 30 days commenting period.

4.3 Explanation of how comments have been taken into account

No comments were received.

5. Validation opinion

Steps have been taken to close out 8 findings. The observation raised does not preclude the validation of the project, but should be considered as an opportunity for improvement for the verification process.

SGS has performed a validation of the project: São João hydro power plant project.
The Validation was performed on the basis of the UNFCCC criteria and host country criteria, as well as criteria given to provide for consistent project operations, monitoring and reporting. Using a risk based approach, the review of the project design documentation and the subsequent follow-up interviews have provided SGS with sufficient evidence to determine the fulfilment of the stated criteria.

By the displacement of fossil fuels by renewable energy sources in the generation of electricity, the project results in reductions of greenhouse gas emissions that are real, measurable and give long-term benefits to the mitigation of climate change. A review of the financial analysis and barriers presented demonstrates that the proposed project activity is not a likely baseline scenario. Emission reductions attributable to the project are hence additional to any that would occur in the absence of the project activity. If the project is implemented as designed, the project is likely to achieve the estimated amount of emission reductions.

The validation is based on the information made available to SGS and the engagement conditions detailed in the report. The validation has been performed using a risk based approach as described above. The only purpose of this report is its use during the registration process as part of the CDM project cycle. Hence SGS can not be held liable by any party for decisions made or not made based on the validation opinion, which will go beyond that purpose.

6. List of persons interviewed

Date	***Name***	***Position***	***Short description of subject discussed***
24-08-2006	Pedro Sirgado	ENVIRONMENT	Environmental license.
23-08-2006	Sávio da Rós	PRODUCTION MANAGER	Project details, financial analysis.
23-08-2006	José Augusto Sava	MAITENANCE MANAGER	Project details, operation.
20-10-2006	Alejandro Bango	CDM CONSULTANT	PDD developing, monitoring plan, baseline study.
20-10-2006	Flávia Takeuchi	CDM CONSULTANT	PDD developing, monitoring plan, baseline study.

7. Document references

Category 1 Documents (documents provided by the Client that relate directly to the GHG components of the project, (i.e. the CDM Project Design Document, confirmation by the host Party on contribution to sustainable development and written approval of voluntary participation from the designated national authority):

/1/ Project Design Document, São João hydro power plant. Version 01, 05/06/2006; version 02, 05/11/2006; version 03, 06/03/2007.

/2/ Approved consolidated baseline and monitoring methodology ACM0002 – Consolidated baseline and monitoring methodology for grid-connected electricity generation from renewable sources, version 6, 19/05/2006.

/3/ Tool for the demonstration and assessment of additionality, version 2, 28/11/2005.

Category 2 Documents (background documents used to check project assumptions and confirm the validity of information given in the Category 1 documents and in validation interviews):

/4/ ANEEL license number 406, 18 October 2000.

/5/ Attendance list of the requests described in the operation license PCH São João – LI180/2005.

/6/ Installation license LIGCA/180/2005, 17 June 2005, issued by IEMA.

/7/ Power purchase agreement signed between Escelsa (energy buyer) and Castelo Energética SA (CESA). Escelsa and CESA are part of the EDP group.

/8/ Technical description of the hydro power plant (General description PCH São João).

/9/ Financial analysis and cash flow.

/10/ Emission factor and CER worksheet.

/11/ Energest presentation about CERs income for all generation activities in Brazil (MDL distribuidoras Brasil).

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