



VALIDATION OPINION

FOR RENEWAL OF CREDITING PERIOD

“Incomex Hydroelectric Project” in Brazil

CDM REGISTRATION NUMBER: 0968

REPORT NO. 2008-1383

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DET NORSKE VERITAS



 VALIDATION OPINION FOR RENEWAL OF CREDITING PERIOD

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Approved by: Michael Lehmann	Organisational unit: Climate Change Services
Client: Incomex / EcoSecurities Group plc	Client ref.: Reditário Cassol and Patrick Browne

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 CERTIFICATION AS

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Project Name: "Incomex Hydroelectric Project"
UNFCCC Ref No: 0968
Country: Brazil
Methodology: AMS-I.D
Version: 13
GHG reducing Measure/Technology: Grid connected renewable electricity generation
ER estimate: 600 515 over 7-years

Size

- ☐ Large Scale
☒ Small Scale

In summary, it is DNV's opinion that the "Incomex Hydroelectric Project", as described in the project design document version 14 of 24 June 2009, meets the requirements for the renewal of the crediting period stated in the "Procedures for renewal of a crediting period of a registered CDM project" (version 05). Hence, DNV requests the renewal of the crediting period of project activity 0968 entitled "Incomex Hydroelectric Project" in Brazil.

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Work verified by: Cuiping Deng		

Key words:

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 Clean Development Mechanism

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☐ Limited distribution
☐ Unrestricted distribution



Abbreviations

ANEEL	Agência Nacional de Energia Elétrica (Brazilian National Electricity Agency)
BM	Build margin
BNDES	Brazilian Bank for Development
CAR	Corrective Action Request
CCC	Conta de Consumo de Combustível (Fuel Consumption Account)
CDM	Clean Development Mechanism
CEF	Carbon Emission Factor
CER	Certified Emission Reduction
CERON	Centrais Elétricas de Rondônia S.A. (Rondônia State Electricity Company)
CH ₄	Methane
CL	Clarification request
CM	Combined Margin
CO ₂	Carbon dioxide
CO ₂ e	Carbon dioxide equivalent
DNV	Det Norske Veritas
DNA	Designated National Authority
ELETRONBRAS	Brazilian Electric Company
FEMA (SEMA)	Secretaria de Estado do Meio Ambiente (Mato Grosso State Environmental Agency)
GTON	Grupo Técnico Operacional Região Norte (North Region Technical Operational Group)
GHG	Greenhouse gas(es)
GWP	Global Warming Potential
IPCC	Intergovernmental Panel on Climate Change
MP	Monitoring Plan
NGO	Non-governmental Organisation
ODA	Official Development Assistance
OM	Operation Margin
PDD	Project Design Document
SHP	Small Hydro Power
UNFCCC	United Nations Framework Convention on Climate Change



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1 EXECUTIVE SUMMARY – VALIDATION OPINION

It is DNV's opinion that the "Incomex Hydroelectric Project", as described in the project design document version 14 of 24 June 2009, meets the requirements for the renewal of the crediting period stated in the "Procedures for renewal of a crediting period of a registered CDM project" (version 05). Hence, DNV requests the renewal of the crediting period of project activity 0968 entitled "Incomex Hydroelectric Project" in Brazil.

2 INTRODUCTION

EcoSecurities Group plc has commissioned Det Norske Veritas Certification AS (DNV) to perform an assessment of the continued validity of the baseline for the renewal of the crediting period of the "Incomex Hydroelectric Project", located at Alta Floresta D'Oeste Municipality, Rondônia State and Comodoro Municipality, Mato Grosso State, Brazil.

This report summarises the findings of the assessment of the continued validity of the baseline.

The "Incomex Hydroelectric Project" was registered as a CDM project (0968) with a renewable 7 years crediting period from 01 Feb 2001 to 31 Jan 2008.

The validation team consisted of the following personnel:

<i>Role/Qualification</i>	<i>Last Name</i>	<i>First Name</i>	<i>Country</i>	<i>Type of involvement</i>					
				Desk review	Site visit / Interviews	Reporting	Supervision of work	Technical review	Expert input
CDM validator / technical team leader	Tavares	Luis Filipe	Brazil	x	x	x			
Technical reviewers	Deng	Cuiping	China					x	

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

3 SCOPE

The scope of this validation is the assessment of the continued validity of the baseline, performed on the basis of the *Tool to assess the validity of the original/current baseline and to update the baseline at the renewal of a crediting period* contained in the "Procedures for Renewal of the Crediting Period of a Registered CDM Project Activity" "(version 05).



4 METHODOLOGY

The assessment 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 opinion.

The following sections outline each step in more detail.

4.1 Desk Review of the Project Design Documentation

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

- /1/ Project Design Document for the “Incomex Hydroelectric Project”. Version 13 of 01 September 2008.
- /2/ Project Design Document for the “Incomex Hydroelectric Project”. Version 14 of 24 June 2009.
- /3/ Emission reduction calculation spreadsheets Incomex calculator 2009-06-22.xls
- /4/ EcoSecurities/Incomex – *Datasheet to calculate the Combined Margin for Rondônia – Acre and Cone Sul Isolated Grids*, 2003 to 2005 Rondônia Acre + Cone Sul-2009.05.15
- /5/ EcoSecurities/Incomex – *Datasheet to calculate the Combined Margin for Rondônia – Acre Isolated Grid*, 2003 to 2005 Rondônia Acre -2009.05.15
- /6/ ANEEL “Small Hydroelectric Units Accompaniment” <http://www.aneel.gov.br/37.htm>
- /7/ CERON – UNS/UNSG: Resumo de Geração das PCHs 2003-2005
- /8/ Eletrobras-GTON Isolated Systems Operational Plan
http://www.eletrobras.gov.br/EM_Atualizacao_SistIsolados/default.asp
- /9/ Eletrobras-GTON Isolated Systems Operational Plan 2008
<http://www.eletrobras.gov.br/ELB/main.asp?Team={CAF80669-3302-4273-A91E-392DC1F643D8}&Planos%20de%20Operacao>
<http://www.eletrobras.gov.br/ELB/services/DocumentManagement/FileDownload.EZTSvc.asp?DocumentID={46317A08-7831-42F0-8DB9-590BDE0FC90C}&ServiceInstUID={0935FE18-D0D5-4F86-86CD-E90163C6FB38}>
- /10/ 2008 Isolated Systems Operation Plan – ELETROBRÁS – GTON
- /11/ Rondônia electricity tariffs <http://www.ceron.com.br/corp/comercial.htm>
- /12/ Start up generation of Jirau and Santo Antonio Hydroelectric Plants
http://www.estadao.com.br/economia/not_econ208317.0.htm
- /13/ Brazilian grid emission factor according Brazilian DNA
<http://www.mct.gov.br/index.php/content/view/72764.html>
- /14/ CDM Executive Board: Validation and Verification Manual Version 01.
http://cdm.unfccc.int/EB/044/eb44_repan03.pdf
- /15/ CDM Executive Board: *Indicative simplified baseline and monitoring methodologies for selected small-scale CDM project activity categories: AMS-I.D – “Grid connected renewable electricity generation”* for Type I – *Renewable Energy Projects*. Version 13.
- /16/ CDM Executive Board: “Tool to calculate the emission factor for an electricity system” Version 01.1.
- /17/ CDM Executive Board: “Procedures for Renewal of the Crediting Period of a Registered CDM Project Activity”. Version 03
- /18/ Det Norske Veritas Certification Ltd: Validation Report – “Incomex Hydroelectric Project”. DNV Report 2005-0989 Rev 06A, 22 February 2007.



4.2 Follow-up Interviews with Project Stakeholders

On 14 to 17 May 2008 DNV performed the site visit to the facilities of Rio Branco, Monte Belo and Cabixi II hydropower plants. During this visit, the baseline, monitoring plan and QA/QC procedures were confirmed.

On 14 October 2008, DNV performed interviews with project stakeholders to confirm selected information and to resolve issues identified in the document review. Representatives of EcoSecurities, Cassol Energia and Incomex were interviewed. The main topics of the interviews are summarized in the table below.

- /19/ Adriano Jackson Gomes - Incomex
- /20/ Marco Fabio Yoshii – Cassol Energia
- /21/ César Augusto – Hidrossol Hidroelétricas Cassol Ltda.
- /22/ Mauro Fadda Gacitua – EcoSecurities
- /23/ Pablo Fernandes - EcoSecurities
- /24/ Thiago Viana- EcoSecurities

The main topics of the interviews are summarized in the table below.

Interviewed organisation	Interview topics
EcoSecurities	<ul style="list-style-type: none">• Baseline scenario• Monitoring plan• Emission reductions estimation• Legal compliance of project and baseline /new policies/ circumstances

4.3 Resolution of Outstanding Issues

The objective of this phase of the validation was to resolve any outstanding issues regarding the continuation of the baseline scenario, which needed be clarified prior to DNV's positive conclusion on the project design.

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.

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

4.4 Internal Quality Control

The validation opinion underwent technical review. The technical review was performed by a technical reviewer qualified in accordance with DNV's qualification scheme for CDM validation and verification.



5 VALIDATION FINDINGS

The findings of the assessment of the continued validity of the baseline are stated in the following sections. The final validation findings relate to the project design as documented and described in the revised project design document of 24 June 2009.

5.1 Application of latest approved version of baseline and monitoring methodology

The project was originally registered based on of AMS-I.D version 08. The PDD submitted for renewal of the crediting period (dated on 24 June 2009) applies AMS-I.D Version 13.

5.2 Validity of the original baseline scenario or its update

The project consists of a bundle of three small run-of-river hydroelectric power plants:

- Rio Branco, installed on Branco River, located at Alta Floresta D'Oeste municipality in Rondônia State with 6.9 MW of installed capacity; started operation on 31 December 2004, according to the Dispatch ANEEL 1118/2004 and ANEEL report /6/.
- Monte Belo, installed on Saldanha River, located at Alta Floresta d'Oeste municipality in Rondônia State with 4.8 MW of installed capacity, started operation on 01 January 2001 according to the ANEEL report /6/.
- Cabixi II, installed on Lambari River, located at Comodoro municipality, in the Mato Grosso State with 2.8 MW of installed capacity and started operation on 01 August 2002 according to the CERON generation report /7/.

Emission reductions are claimed from displacing the isolated grid electricity with electricity generated by these small hydroelectric power plants.

“Incomex Hydroelectric Project” has been granted the following Operational Environmental Licenses:

- Monte Belo - NUCOF/SEDAM/RO 004138 (06/11/2007), valid until 06/11/2009.
- Rio Branco - NUCOF/SEDAM/RO 004141 (06/11/2007), valid until 06/11/2009.
- Cabixi II - SEMA/MT 297102/2009 (23/03/2009), valid until 23/03/2012.

The units were authorized by ANEEL through the following resolution:

- Rio Branco – ANEEL 310 (28 May 2001)
- Monte Belo – ANEEL 589 (20 March 2006)
- Cabixi II- ANEEL 435 (25 December 2002).

The baseline for the project remains to be the kWh produced by the renewable generating unit multiplied by the Rondônia isolated grid emission coefficient (measured in kg CO₂e/kWh) calculated in accordance with “Tool to calculate the emission factor for an electricity system” as documented in the spreadsheet EcoSecurities/Incomex – *Datasheet to calculate the Combined Margin for Rondônia – Acre and Cone Sul Isolated Grids*, 2003 to 2005 Rondônia Acre + Cone Sul-2009.05.15 /3/.

In accordance with AMS-I.D Version 13, the project boundary encompasses the physical and the geographical site of the renewable generation source. The system boundary for the determination of the grid emission coefficient is the Rondônia-Acre isolated grid system to



which the project plant is connected through a transmission line. If the Rondônia grid will be integrated into the Brazilian Grid, the system boundary will become the Brazilian grid.

Step 1.1: Assess compliance of the current baseline with relevant mandatory national and/or sectoral policies

During validation, the possible baseline scenarios considered are: a) the continuation of the current situation with the Rondônia-Acre and Cone Sul electricity grid being supplied by significant proportion fossil fuel power plants and b) construction of a small hydro generation plant undertaken without being registered as a CDM project activity. Both scenarios are still in compliance with all applicable legal and regulatory requirements. In addition, as verified by reviewing the CERON website, there were no changes to the policies for hydropower projects in Rondônia, such as special electricity tariffs /11/.

Step 1.2: Assess the impact of circumstances

The units are connected to the Rondônia-Acre isolated electricity system, located in the Rondônia State, the North region of Brazil. This grid was created when Cone Sul isolated grid and Rondônia Acre isolated grid were interconnected in May 2008 through the link of Vilhena-Colorado substations /9/. The impact of this is the change of grid emission factor for the interconnected Rondônia grid after 01 May 2008.

In addition, the implementation of Jirau and Santo Antonio hydroelectric plant at Madeira River on Porto Velho municipality, Rondônia state, is expected to interlink the Rondônia grid with the interlinked Brazilian grid by 2012 /12/. The impact of this on the baseline is considered by determining the operating margin emission factor ex-post. After the implementation of this interlink, the operating margin emission factor will be the operating margin emission factor for the interconnected Brazilian grid.

Step 1.3: Assess whether the continuation of the use of current baseline equipment(s) is technically possible

This step is not applicable as the baseline is not the continuation of the current practice in the sense of the *Tool to assess the validity of the original/current baseline and to update the baseline at the renewal of a crediting period* contained in the “Procedures for renewal of the crediting period of a registered CDM project activity” (version 05)

Step 1.4: Assessment of the validity of the data and parameters

The project applies AMS-I.D - *Renewable electricity generation for a grid*, Version 13 /15/.

The baseline methodology AMS-I.D Version 13 is applicable for the project consisting of renewable energy generation units that supply electricity to an electricity distribution system (i.e. the Isolated Rondônia-Acre and Cone Sul grids - North region of Brazil) that is supplied by at least one fossil fuel generating unit.

Baseline emissions are calculated by multiplying the electricity exported by the project activity to the Rondônia-Acre/Cone Sul grid by the determined baseline grid emission factor.

As stipulated in AMS-I.D and “*Tool to calculate the emission factor for an electricity system*” the emission factor is the combined margin. The electricity generation data by the units connected to these isolated grids were provided by CERON for the Cone Sul grid /7/, and the Eletrobras-GTON Isolated Systems Operational Plan for the Rondônia-Acre grid /8/.



The following date vintage is considered:

- The OM emission factor will be calculated *ex-post*, using the full generation-weighted average for the year in which the project activity displaces grid electricity, requiring the emissions factor to be updated annually during monitoring with the most recent data available. Once the Rondônia grid will be integrated with Brazilian interconnected grid, the OM will be calculated *ex-post* considering the electric system that best represents the project baseline.
- The BM emission factor was calculated and defined *ex-ante* based on the most recent information available on units already built at the time of submission of the request for renewal of the crediting period. Due to the interconnection of Rondônia-Acre and Cone Sul grids the BM is determined considering two periods with different emission factors:
 - From the 01 February 2008 until 31 April 2008, before the Rondônia-Acre and Cone Sul interconnection;
 - From 01 May 2008 to 31 January 2015, after the the Rondônia-Acre and Cone Sul interconnection;

Regarding leakage, as the project was implemented with new equipment, no leakage is expected and required to be considered.

The estimation of emission reductions for the second period of the second crediting period are 600 515 tonCO₂e.

The methodologies for calculating emission reductions are transparently documented and the accuracy of the calculations has been verified. /3/

A spreadsheet for the calculation of the emission reductions was provided and checked to confirm the estimated emission reductions. /3/ A spreadsheet for the calculation of the emission reductions was provided and checked to confirm the estimated emission reductions through spreadsheet Incomex calculator 2009-06-22.xls /3/.

5.3 Monitoring

The project applies the approved monitoring methodology AMS-I.D - *Renewable electricity generation for a grid*, Version 13 /15/.

The monitoring plan methodology will give opportunity for real measurements of achieved emission reductions

According to the monitoring methodology AMS-I.D Version 13, the data to be monitored are the net electricity generated exported to the grid. According “Tool to calculate the emission factor for an electricity system”, the emission factor will be calculated determining the BM emission factor *ex-ante* and the OM emission factor *ex-post*

Project emissions and leakage are considered zero for this project.

5.3.1 Parameters determined ex-ante

According to the “Tool to calculate the emission factor for an electricity system”, the BM emission factor (EF_{grid,BM,y}) of emission factor calculation is calculated *ex ante* for two grid systems, i.e. Rondônia Acre system (1,0704 tCO₂/MWh) and Cone Sul system (0,0266 tCO₂/MWh) for the period February to April 2008. After 1 May 2008, after the



interconnection of these two grids, the BM emission factor was calculated as the BM for the linked Rondônia acre-Cone Sul system (1.0479 tCO₂/MWh).

The weights for determining the combined margin emissions factor is 0.25 for the OM emission factor and 0.75 for the BM emission factor according to the “Tool to calculate the emission factor for an electricity system”;

5.3.2 Parameters monitored ex-post

The parameters used for the emission reduction calculations that will be monitored *ex post* as listed in the PDD include:

- Annual net electricity supplied to the grid (**EG_y**). The net electricity generated and injected by the SHP Monte Belo, SHP Rio Branco and SHP Cabixi II into the grid will be measured by exclusive calibrated electricity meter installed at the CERON substation and it will be used for sales receipt issuance;
- OM emission factor (**EF_{grid,OMsimple,y}**), according to the “Tool to calculate the emission factor for an electricity system”, the OM emission factor calculation will be calculated *ex post* for two grids: Rondônia Acre system (2005 calculated as 0.9441 tCO₂/MWh) and Cone Sul system (2005 calculated as 0.5870 tCO₂/MWh) from February to April 2008.

After 1 May 2008, following the interconnection of these two grids the OM will be calculated as the OM for the linked Rondônia Acre-Cone Sul system (2005 calculated as 0.9415 tCO₂/MWh).

After the future interconnection of Rondônia Acre/Cone Sul grid with Brazilian grid, the OM grid emission factor will be calculated ex-post according to the latest approved version of the “Tool to calculate project emission from electricity consumption” for the whole Brazilian grid. The Brazilian DNA makes available the Brazilian grid emission factor.

5.3.3 Management system and quality assurance

Detailed monitoring procedures, including responsibilities for project management, procedures for QA/QC of monitoring reports and calibration, have been developed.

APPENDIX A

RESOLUTION OF CORRECTIVE ACTION AND CLARIFICATION REQUESTS

Clarifications and corrective action requests	Summary of project participant's response	Validation conclusion
CL 1 Further clarifications are requested with regard to the determination of the CM/OM/BM emission factor for both periods of the Rondônia-Acre and Cone Sul, and the integrated Rondônia grid.	From February to April 2008, the electric system configuration was the same of the first crediting period, hence the project supplied two different grids and the calculation was done using two different grid emission factors, which are described in registered PDD for the first crediting period. From May 2008 onwards, the Project has been supplying only one grid and the calculation is been done using a unique emission factor, described in section B.7.1. of the PDD. If at any time of the crediting period, the grid configuration changes, the OM will be calculated for the electric system that best represents the Project baseline. The version 14 of the PDD was issued to correctly address the CL.	The PDD of 24 June 2009 includes the requested details.. Therefore this CL is closed
CL 2 The PDD does not explain how ex post option will be selected for simple OM calculation and how to select the available data to calculate the OM.	The Brazilian government long term objective is to interconnect all electric systems in the country; therefore the ex-post option was chosen. At the time when the project starts to supply the Brazilian Interconnected System (SIN), or any other grid, the emission factor used will be the one that best reflects the baseline. Data will be acquired by governmental companies that control the electricity grid and calculation will be verified by the DOE, or another competent party, in order to assure and guarantee quality. Version 14 of the PDD was issued to correctly address the CL.	The reviewed PDD of 24 June 2009 clarify the OM calculation approach and it is complying with the "Tool to calculate the emission factor for an electricity system". Therefore this CL is closed

APPENDIX B

CERTIFICATES OF COMPETENCE



CERTIFICATE OF COMPETENCE

Luis Filipe Tavares

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

<i>GHG Auditor:</i>	Yes				
<i>Technical Area</i>	<i>CDM Validator</i>	<i>CDM Verifier</i>	<i>Sector Expert</i>	<i>Methodology Expert</i>	<i>Technical Reviewer</i>
<i>Landfill gas</i>	Jan 2009	Jan 2009			
<i>Hydro power</i>	Jan 2009	Jan 2009			
<i>Renewables</i>					
<i>Wind power</i>					
<i>Other renewable</i>					
<i>Biomass</i>					
<i>Grid connection of isolated system</i>					
<i>Cement</i>					
<i>Waste-heat / waste-gas recovery</i>	Jan 2009				
<i>Efficiency of thermal power plants</i>					
<i>Coal mine methane</i>					
<i>Fuel switch</i>					
<i>Manure management</i>	Jan 2009	Jan 2009	Jan 2009		
<i>Waste / wastewater treatment</i>	Jan 2009	Jan 2009	Jan 2009		
<i>Energy efficiency</i>					
<i>N₂O</i>					
<i>HFCs</i>					
<i>Flare reduction</i>					
<i>PFCs</i>					
<i>Charcoal</i>					
<i>CO₂ recovery</i>					
<i>Transport</i>					
<i>Non-renewable biomass</i>					
<i>Biofuel</i>					
<i>Pipeline leakage reduction</i>					
<i>SF₆</i>					

Høvik, 9 January 2009

Michael Lehmann

Michael Lehmann

Technical Director, Climate Change Services



CERTIFICATE OF COMPETENCE

Cuiping Deng

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

<i>GHG Auditor:</i>	<i>Yes</i>				
<i>Technical Area</i>	<i>CDM Validator</i>	<i>CDM Verifier</i>	<i>Sector Expert</i>	<i>Methodology Expert</i>	<i>Technical Reviewer</i>
<i>Landfill gas</i>					
<i>Hydro power</i>	Jan 2009	Jan 2009			
<i>Renewables Wind power</i>	Jan 2009	Jan 2009		Jan 2009	Jan 2009
<i>Other renewable</i>					
<i>Biomass</i>					
<i>Grid connection of isolated system</i>					
<i>Cement</i>					
<i>Waste-heat / waste-gas recovery</i>					
<i>Efficiency of thermal power plants</i>					
<i>Coal mine methane</i>					
<i>Fuel switch</i>					
<i>Manure management</i>					
<i>Waste / wastewater treatment</i>					
<i>Energy efficiency</i>					
<i>N₂O</i>		Jan 2009			
<i>HFCs</i>					
<i>Flare reduction</i>					
<i>PFCs</i>					
<i>Charcoal</i>					
<i>CO₂ recovery</i>					
<i>Transport</i>					
<i>Non-renewable biomass</i>					
<i>Biofuel</i>					
<i>Pipeline leakage reduction</i>					
<i>SF₆</i>					

Høvik, 9 January 2009

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