CLEAN DEVELOPMENT MECHANISM
SIMPLIFIED PROJECT DESIGN DOCUMENT
FOR SMALL-SCALE PROJECT ACTIVITIES (SSC-CDM-PDD)
Version 02

CONTENTS

Revision history of this document

Version Number	Date	Description and reason of revision
01	21 January 2003	Initial adoption
02	8 July 2005	• The Board agreed to revise the CDM SSC PDD to reflect guidance and clarifications provided by the Board since version 01 of this document. • As a consequence, the guidelines for completing CDM SSC PDD have been revised accordingly to version 2. The latest version can be found at <http://cdm.unfccc.int/Reference/Documents>.

SECTION A. General description of the small-scale project activity

A.1. Title of the small-scale project activity:

Poza Honda & La Esperanza Small Hydroelectric Projects (hereafter referred to as PROJECT).

PDD version number: 1

Date: February 03, 2006

A.2. Description of the small-scale project activity:

The objective of the PROJECT is to help meet Ecuador's rising demand for energy, reduce the oil expenses of the country and to improve the supply of electricity, while contributing to the environmental, social and economic sustainability by increasing renewable energy's share of the total Ecuadorian (and the Latin America and the Caribbean region's) electricity consumption.

In the last 10 years, total power generated has been growing up at an average of 6% per year (CONELEC Statistics, 2006) due to economic growth.

Latin American and Caribbean countries have expressed their commitment towards achieving a target of 10% renewable energy of the total energy use in the region. Through an initiative of the Ministers of the Environment in 2002 (UNEP-LAC, 2002), a preliminary meeting of the World Summit for Sustainable Development (WSSD) was held in Johannesburg in 2002. In the WSSD final Plan of Implementation no specific targets or timeframes were stated, however, their importance was recognized for achieving sustainability in accordance with the Millennium Development Goals[1].

The PROJECT is located in the Manabí province of Ecuador, which is the third most populated province in the country, and it also has the second most important Marine Port in Ecuador, "Manta". Manta is the most developed city in Manabí and the first fish manufacturing and exporting center in the country. It also has the second largest tuna fishing fleet in the American pacific coastline.

Presently, Manta does not have an adequate supply of electricity, although the most important fresh fish industrial plants are located there. These manufacturers are forced to generate their own electricity power with small diesel electric power plants due to continual public power generation failure.

The Water Management Corporation of Manabí (CRM) built both Poza Honda and La Esperanza Dams in order to provide irrigation and drinking water to the central zone in the Province of Manabí. The

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[1] WSSD Plan of Implementation, Paragraph 19 (e): "Diversify energy supply by developing advanced, cleaner, more efficient, affordable and cost-effective energy technologies, including fossil fuel technologies and renewable energy technologies, hydro included, and their transfer to developing countries on concessional terms as mutually agreed. With a sense of urgency, substantially increase the global share of renewable energy sources with the objective of increasing its contribution to total energy supply, recognizing the role of national and voluntary regional targets as well as initiatives, where they exist, and ensuring that energy policies are supportive to developing countries' efforts to eradicate poverty, and regularly evaluate available data to review progress to this end."

project owners will use the discharged water from these dams to generate electricity, without affecting their primary functions of providing irrigation and drinking water.

Therefore, Poza Honda and La Esperanza hydropower projects cannot be claimed for building new reservoirs, since they will take advantage of existing reservoirs whose volumes will not increase. Poza Honda was built in the sixties and its current reservoir has 100M m^3 and La Esperanza was put in place in 1996 and its dam currently stores 500M m^3. Since they were built, these two dams have been used only for these purposes (irrigation and drinking water supply). In September 2003, ManagENERACIÓN started assembling two hydro power plants, using these reservoirs.

Managerneración, which is a "Special Purpose Company" owned more than 99% by La Fabril, improves the supply of electricity with clean, renewable hydroelectric power plants while contributing to the regional/local economic development. Small-scale hydropower with existing reservoirs whose volumes are not increased, provide local distributed generation and these small-scale projects provide site-specific reliability and transmission and distribution benefits including:

- increased reliability and shorter and less extensive outages
- lower reserve margin requirements
- improved power quality
- reduced lines losses
- reactive power control
- mitigation of transmission and distribution congestion, and
- increased system capacity with reduced T&D investment.

A.3. Project participants:

Detailed contact information on parties and private/public entities involved in the project activity listed in Annex 1.

Name of Party involved (*) ((host) indicates a host Party)	Private and/or public entity(ies) project participants (*) (as applicable)	Kindly indicate if the Party involved wishes to be considered as project participant (Yes/No)
Ecuador (host)	La Fabril S.A.	No
Brazil	Ecoinvest Carbon Assessoria	No
(*) In accordance with the CDM modalities and procedures, at the time of making the CDM-PDD public at the stage of validation, a Party involved may or may not have provided its approval. At the time of requesting registration, the approval by the Party(ies) involved is required.		

Table 1 – Parties and private/public entities involved in the project activity

A.4. Technical description of the small-scale project activity:

These two hydro power plants (Figure 1) are being constructed since September 2003. Poza Honda will utilize two turbo hydraulic generators for a combined capacity of 3 MW. This station will produce around 19 GWh/year. La Esperanza will have a combined capacity of 6.2 MW through the use of two turbo hydraulic generators of 3 MW. This station will produce 39 GWh/year, making a total hydraulic energy production of 58 GWh/year.

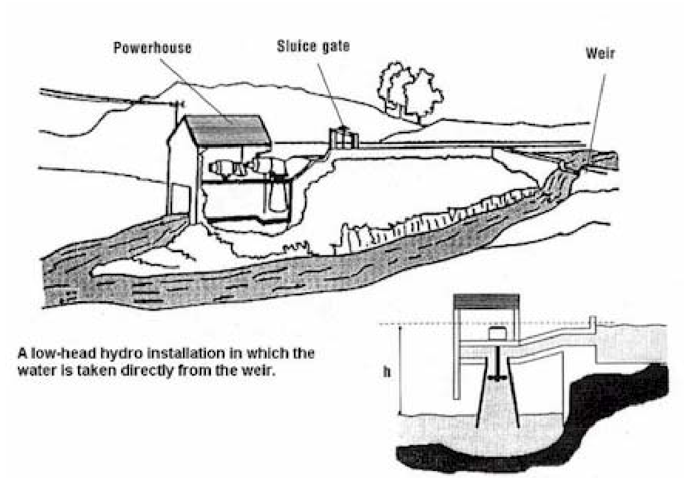

Figure 1 – Schematic view of a hydro power plan

The PROJECT utilizes water from the Portoviejo River and Carrizal River to generate electricity (total installed power, 9.2 MW). The facilities use existing dams, whose volumes were not increased..

Poza Honda and La Esperanza will set up four Kaplan turbines (Figure 2), which are well suited to situations with a low head and a large amount of discharge. The adjustable runner blades enable high efficiency during partial load periods, and there is a very small decrease in efficiency due to head variation or load. As a result of recent developments, the range of Kaplan turbine applications have been greatly increased. They are being applied, for example, in exploiting many hydro sources previously discarded for economic or environmental reasons. The adjustable runner blades add to the complexity of the construction of a Kaplan turbine. The runner blade operating mechanism consists of a pressure oil head, a runner servomotor, and the blade-operating rod inside the shaft.

Poza Honda:

- Average flow rate (long time period): 12.24 m^3/s;
- Installed capacity 3,096 kW (2 x 1,546 kW);
- Turbine: 2 Kaplan turbines, vertical, double regulation.
- Height from the waterbed of the river: 25m
- Poza Honda has a capability factor of 55%
- The power station will be interconnected to the 69.0 kV electric utility distribution systems, in the town of Santa Ana, located at 29 km from the power station.

- Main pipe Ø 2,0 m
- Pipes by unitØ 1,60 m
- Plate width: 12 mm
- Butterfly valves : 2 x Ø 1,60 m c/u + 1 x Ø 2,00 m

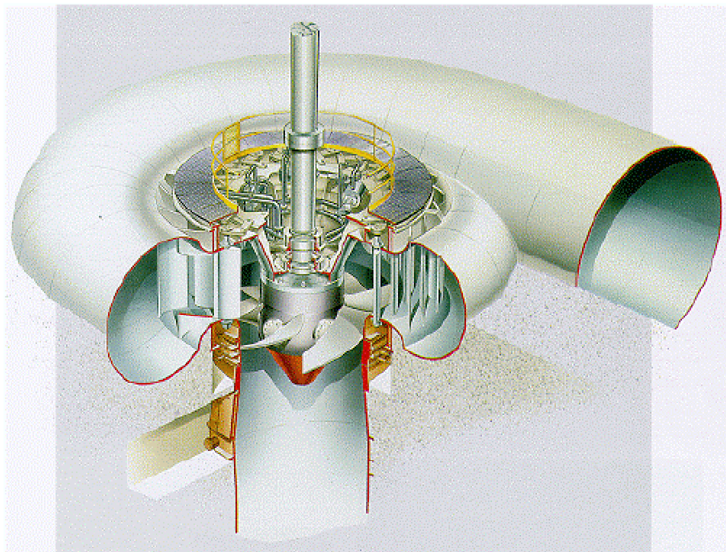

Figure 2 – Technology used by Poza Honda and La Esperanza / Kaplan Turbine

La Esperanza:

- Average flow rate (long time period): 19.2 m^3/s;
- Installed capacity: 6,400 kW (2 x 3,200 kW); and
- Turbine: 2 Kaplan turbines, vertical, double regulation.
- Height from the waterbed of the river: 36 m
- La Esperanza has a capacity factor of 75%
- The power station will be interconnected to the 69.0 kV electric utility distribution systems, in the town of Calceta, located at 12 km from the power station.
- Main pipe Ø 3,6 m
- Pipes by unit Ø 2,0 m
- Plate width: 12 mm
- Butterfly valves : 2 x Ø 2,00 m c/u

Main equipments used in the project were developed and manufactured by Ingehydro, España and Odebrecht, Brazil. Major workforce was from local communities.

A.4.1. Location of the small-scale project activity:

A.4.1.1. Host Party(ies):

Ecuador

A.4.1.2. Region/State/Province etc.:

Province of Manabi

A.4.1.3. City/Town/Community etc:

Santa Ana (Poza Honda) y Bolívar (La Esperanza)

A.4.1.4. Detail of physical location, including information allowing the unique identification of this small-scale project activity(ies):

Figure 3 - Political division of Ecuador showing the Manabi Province and the hydro power plants

Poza Honda is located in the municipality of Santa Ana, (latitude 1º 12' 00" S and longitude 80º 22' 12" W, Figure 3), and it uses the hydro potential of the Portoviejo River.

La Esperanza is located in the municipality of Bolívar (latitude 0º 50' 18" S and longitude 80º 09' 53" S W, Figure 3), and it uses the hydro potential of the Carrizal River.

Both cities have small population density. Their economies are based on the agriculture and livestock activities.

A.4.2. Type and category(ies) and technology of the small-scale project activity:

Type 1: Renewable energy projects

Category I.D.: Renewable energy generation for a grid.

A.4.3. Brief explanation of how the anthropogenic emissions of anthropogenic greenhouse gas (GHGs) by sources are to be reduced by the proposed small-scale project activity, including why the emission reductions would not occur in the absence of the proposed small-scale project activity, taking into account national and/or sectoral policies and circumstances:

The PROJECT, a greenhouse gas (GHG) free power generation project, will result in GHG emissions reductions as the result of the displacement of generation from fossil-fuel thermal plants that would have otherwise delivered to the interconnected grid.

Kartha et al. (2002) stated that, "the crux of the baseline challenge for electricity projects clearly resides in determining the 'avoided generation', or what would have happened without the CDM or other GHG-mitigation project. The fundamental question is whether the *avoided generation* is on the "build margin" (i.e. replacing a facility that would have otherwise been built) and/or the "operating margin" (i.e. affecting the *operation* of current and/or future power plants)."

For this PROJECT, the baseline emission factor is calculated as a combined margin, consisting of the operating margin and the build margin. For the purpose of determining the build margin and the operating margin emission factors, a project electricity system is defined by the spatial extent of the power plants that can be dispatched without significant transmission constraints. Similarly, a connected electricity system is defined as one that is connected by transmission lines to the project and in which the power plants can be dispatched without significant transmission constraints.

This indigenous and cleaner source of electricity will have an important contribution to environmental sustainability by avoiding electricity generation by fossil fuel sources (and CO_2 emissions), which would be generated (and emitted) in the absence of the project.

A.4.3.1 Estimated amount of emission reductions over the chosen crediting period:

Years	Annual estimation of emission reductions in tonnes of CO_{2e}
Year 1_2006*	26,192
Year 2_2007	41,181
Year 3_2008	41,181
Year 4_2009	41,181
Year 5_2010	41,181
Year 6_2011	41,181
Year 7_2012	41,181
Year 8_2013**	13,539
Total estimated reductions (tonnes of CO_{2e})	**286,818**
Total number of crediting years	**7**
Annual average over the crediting period of estimated reductions (tonnes of CO_{2e})	**40,974**
** Since May 2006*	
*** Until April 2013*	

A.4.4. Public funding of the small-scale project activity:

This project does not receive any public funding and it is not a diversion of ODA.

Funding of the project activity was raised in the following proportion: 22% equity, 34% Banco del Pichincha (Ecuadorian financial institution), and ABN Amro 44%.

A.4.5. Confirmation that the small-scale project activity is not a debundled component of a larger project activity:

The PROJECT is not a debundled component of a large project activity.

SECTION B. Application of a baseline methodology:

B.1. Title and reference of the approved baseline methodology applied to the small-scale project activity:

Project title: Poza Honda & La Esperanza Small Hydroelectric Projects (hereafter referred to as PROJECT).

Type I- Renewable Energy Projects

B.2 Project category applicable to the small-scale project activity:

The PROJECT is composed by two hydro power projects, which utilize water from existing reservoirs whose volumes were not increased It will have an important contribution to environmental sustainability in Ecuador, since it will displace fossil fuel from the interconnected grid.

Both projects will have together a total installed capacity of 9.2 MW, hence this is a small-scale CDM project. and the Simplified M&P for Small-Scale CDM Project Activity, Category I. D. is applicable. This category "comprises renewables, such as photovoltaic, hydro, tidal/wave, wind, geothermal and biomass, that supply electricity to an electricity distribution system that is or would have been supplied by at least one fossil fuel or non-renewable biomass fired generating unit".

According to the characteristics of the Ecuadorian System, the baseline for the PROJECT has been established consistently with article 29, option (a) - Appendix B.

According to the simplified M&P for small-scale CDM, there are two options that can be applied in the selected project category.

"The baseline is the kWh produced by the renewable generating unit multiplied by an emission coefficient (measured in kg CO2equ/kWh) calculated in a transparent and conservative manner:

(a) The average of the "approximate operating margin" and the "build margin", where:

(i) The "approximate operating margin" is the weighted average emissions (in kg CO2equ/kWh) of all generating sources serving the system, excluding hydro, geothermal, wind, low-cost biomass, nuclear and solar generation;

(ii) The "build margin" is the weighted average emissions (in kg CO2equ/kWh) of recent capacity additions to the system, which capacity additions are defined as the greater (in MWh) of most recent 20% of existing plants or the 5 most recent plants.";

or,

(b) The weighted average emissions (in kg CO2equ/kWh) of the current generation mix.

The option chosen in this project is option (a). This choice is due to the fact that, in Ecuador, even though most of the energy produced in the country comes from hydroelectric power, most of these low cost investments in hydro electrics are exhausted. Therefore, the possibility of investments in non-renewable sources arises, such as thermoelectric power plants.

As thermal plants use fossil fuel, these companies end up having higher operational costs than hydro plants. As a result, they are likely to be displaced by any hydro added to the grid.

As explained above, the baseline emission factor will be calculated as the average of the "approximate operating" margin and the "build margin", where:

(b) The average of the "approximate operating margin" and the "build margin", where:

(i) The "approximate operating margin" emission factor ($EF_{OM,y}$) is the weighted average emissions (in kg CO2equ/MWh) of all generating sources serving the system, excluding hydro, geothermal, wind, low-cost biomass, nuclear and solar generation. Using the notation from approved methodology, ACM0002[2],

$$EF_{OM,y} = \frac{\sum_{i,j} F_{i,j,y} \cdot COEF_{i,j}}{\sum_{j} GEN_{j,y}} \qquad \textbf{Equation 1}$$

Where:

- $\sum_{i,j} F_{i,j,y}$ is the amount of fuel *i* (in mass or volume unit) consumed by relevant power sources *j* in year(s) *y*,
- $COEF_{i,j}$ is the CO_{2e} coefficient of fuel *i* (tCO_{2e}/mass or volume unit of the fuel), taking into account the carbon dioxide equivalent emission potential of the fuels

[2] **ACM0002 (2004).** *Approved Consolidated Baseline Methodology 0002 – Consolidated Methodology for grid-connected electricity generation from renewable sources.* UNFCCC, CDM Executive Board 15th Meeting Report, 3 September 2004, Annex 2.

used by relevant power sources j and the percent oxidation of the fuel in year(s) y and,

- $\sum_j GEN_{j,y}$ is the electricity (MWh) delivered to the grid by source j,

The CO_2e coefficient $COEF_i$ is obtained as,

$$COEF_{i,j} = NCV_i \cdot EF_{CO2,i} \cdot OXID_i$$ **Equation 2**

Where:

- NCV_i is the net calorific value (energy content) per mass or volume unit of fuel i,
- $OXID_i$ is the oxidation factor of the fuel i,
- $EF_{CO2,i}$ is CO_2e emission factor per unit of energy of the fuel i,

(ii) The "build margin" emission factor ($EF_{BM,y}$) is the weighted average emissions (in kg CO2equ/MWh) of recent capacity additions to the system, which capacity additions are defined as the greater (in MWh) of most recent 20% of existing plants or the 5 most recent plants,

$$EF_{BM,y} = \frac{\sum_{i,m} F_{i,m,y} \cdot COEF_{i,m}}{\sum_m GEN_{m,y}}$$ **Equation 3**

Where $F_{i,m,y}$, $COEF_{i,m}$ and $GEN_{m,y}$ are analogous to the variables described above for the operating margin for plants m (sample group m defined in (ii)), based on the most recent information available on plants already built.

The baseline emission factor EF_y is the average of the operating margin factor ($EF_{OM,y}$) and the build margin factor ($EF_{BM,y}$),

$$EF_y = 0.5 \cdot EF_{OM,y} + 0.5 \cdot EF_{BM,y}$$ Equation4

- The amount of fuel consumed by relevant fossil-fuel-fired plants, are the ones collected in a research made by the International Energy Agency (Bosi, M., A. Laurence, P. Maldonado, R. Schaeffer, A. F. Simoes, H. Winkler and J.-M. Lukamba. Road testing baselines for greenhouse gas mitigation projects in the electric power sector. OECD and IEA information paper, October 2002).
- The emission coefficients of each fuel are the ones indicated by the IPCC (Intergovernmental Panel on Climate Change. Revised 1996 Guidelines for National Greenhouse Gas Inventories)

B.3. Description of how the anthropogenic emissions of GHG by sources are reduced below those that would have occurred in the absence of the registered small-scale CDM project activity:

The proposed baseline methodology includes an Additionality Tool approved by the Executive Board. This tool considers some important steps necessary to determine if the project activity is additional and demonstrates that the emission reductions would not occur in the absence of the PROJECT activity.

The following are the necessary steps for the assessment of additionality of the PROJECT.

Step 0. Preliminary screening based on the starting date of the project activity:

a) Starting date of the project activity:

The starting date of the project activity is September, 2003 (construction)

b) Evidence that the incentive from the CDM was seriously considered in the decision to proceed with the project activity:

CDM was seriously considered in the decision to proceed with the project activity. Two evidences are available under request.

The first is dated on December 13th, 2004. Project developer committed itself to claim carbon credits. This was very important for Manageneración in order to obtain loan with ABN Amro, main financing agent for the project. After signing this financing line, the project proponent was sure about going forward with the project.

On October 28th, 2004, "CO2 solutions", a carbon credit consultant, on behalf of Manageneración, asked DNV, a certified designated operational entity, about its prices for the validation of this PROJECT. This is evidence showing that CDM was seriously considered in the decision to proceed with this project activity.

SATISFIED/PASS – Proceed to Step 1

Step 1. Identification of alternatives to the project activity consistent with current laws and regulation

Sub-step 1a. Define alternatives to the project activity:

The alternative to the project activity is the continuation of the current situation. The resources would be invested in the core business of the company, textiles, more specifically in the expansion and modernization of its plants.

Ecuadorian electric grid has also an alternative to the project activity. It would be the commercialization of electricity derived mainly from medium size hydro plants and fossil fuel thermo power plants.

Sub-step 1b. Enforcement of applicable laws and regulations:

2. Not applicable.

3. Not applicable.

4. Non-applicable. The project activity and the alternative scenario are in compliance with all regulations.

SATISFIED/PASS – Proceed to Step 2

Step 2. Investment analysis

Not applicable.

Step 3. Barrier analysis

3.a. Identify barriers that would prevent the implementation of type of the proposed project activity

Investment Barrier

La Fabril, Managenaración´s owner, would have financially more viable alternatives to the project activity, such as investing its capital in its core business, what would have led to higher emissions.

The PROJECT was set up with an expected financial IRR (Internal Rate of Return) of approximately 15.5% per year, without the benefit of the CER revenues. The PROJECT was a riskier investment, if compared to investments in the core business. The inclusion of the revenues from CERs makes the project's IRR increase by approximately 200 basis points, to 17.5%.

There was no access to international capital markets, due to real or perceived risks associated with domestic or foreign direct investment in Ecuador. CERs guarantee was important to decrease perceived risk as long as Managenaración committed itself with ABN Amro to claim carbon credits.

Technological barriers

Even though the technology used in these hydro power plants is well known in Ecuador, there are barriers of technological and logistical nature associated with its application. The equipment for the operation of the small hydro power plants is not produced in Ecuador; it must be imported from Brazil and Spain. This represents a problem to the project developer, since they depend on imports to set up and maintain the new facilities.

The PROJECT also utilizes equipments to deliver electricity to the grid. These are not the typical and traditional equipments used by Managenaración and their usage represents also a technological barrier. Such equipments are also imported, thus increasing the proportion of the barrier mentioned in the paragraph above.

In order for the project to function properly, Managegeneración had to acquire knowledge in electric transmission and the sale of electricity in the market. Such acquisition could not be achieved without important investments. The incentives of the CDM will help to ease the acquisition of these investments.

Institutional Barriers:

It takes more time in Ecuador to get permits and licenses to operate hydro power plants than thermal power plant projects,. There were also delays for delivering equipments for the PROJECT, which would not be observed in business as usual projects..

Sub-step 3b. Show that the identified barriers would not prevent the implementation of at least one of the alternatives:

As described above, the main alternative to the project activity is continuing the status quo. The project sponsor could invest its resources in expanding and modernizing Managegeneración, with much lower uncertainty and risks. So the barriers above would not affect the investment in any of the alternatives.

SATISFIED/PASS – Proceed to Step 4

Step 4. Common practice analysis:

The installed capacity in Ecuador in 2003 was 3,541 MW in 2004 (40% of which are thermal power plants using fossil fuels, 49% hydropower projects – mainly large hydro plants) OLADE (2004). The remaining electricity is supplied by imports from Colombia and Perú.

For the project participant, a large consumer, electricity can be acquired from the Ministry of Energy . Smaller consumers have to obtain electricity from the regional "Empresa Eléctrica" which is the institution that has the electricity commercialization monopoly for the region in which the company is located.

SATISFIED/PASS – Proceed to Step 5

Step 5 – Impact of CDM Registration

The Ecuadorian State has been asking for private companies collaboration in many fields. Regarding energy, domestic political matters have forced market agents to produce electricity more efficiently and with a better quality. In addition to that, new electricity generation will supply areas, which presently lack electricity, and allow industry to be self-sufficient. The PROJECT, therefore, is an important contribution to this governmental objective, and producing electricity from a renewable and non-polluting resource.

Hence, CDM registration will have a strong impact in paving the way for similar projects to be implemented in Ecuador.

B.4. Description of how the definition of the project boundary related to the baseline methodology selected is applied to the small-scale project activity:

The PROJECT boundaries are defined by the emissions targeted or directly affected by the project activities, construction and operation. It encompasses the physical, geographical site of the hydropower generation source, which is represented by the Portoviejo River, close to the power plant facility. (Figure 4)

Figure 4 - Ecuadorian Interconnected System (Statisticas, 2005)

Ecuador is a country divided in four macro-geographical regions: Coast, Andean, Amazon forest, and Galapagos. The majority of the population is concentrated in the Coast and Andean regions. Thus the energy generation and, consequently, the transmission are concentrated in these two regions. Galapagos region has isolated systems supplied by diesel. (Figure 4)

Part of the electricity consumed in Ecuador is imported from Colombia. In 2004, around 11% of the electricity was imported from this country (Estatísticas (2004)). The energy imported from other countries does not affect the boundary of the project and the baseline calculation.

B.5. Details of baseline information, including the date of completion of the baseline study and the name of person (s)/entity(ies) determining the baseline:

Date of completing the final draft of this baseline section (DD/MM/YYYY): 03/02/2006.

CORDELIM developed the baseline.

CORDELIM is not a project participant.

Ecoinvest Carbon reviewed the baseline number.

Company:	Ecoinvest Carbon Brasil
Address:	Rua Padre João Manoel, 222
Zip code + city address:	01411-000 São Paulo, SP
Country:	Brazil
Contact person:	Marco A. N. Mazaferro
Telephone number:	+55 (11) 3063-9068
Fax number:	+55 (11) 3063-9069
E-mail:	marco@ecoinvestcarbon.com

SECTION C. Duration of the project activity / Crediting period:

C.1. Duration of the small-scale project activity:

C.1.1. Starting date of the small-scale project activity:

01/09/2003

C.1.2. Expected operational lifetime of the small-scale project activity:

50y0m

C.2. Choice of crediting period and related information:

C.2.1. Renewable crediting period:

C.2.1.1. Starting date of the first crediting period:

01/05/2006

C.2.1.2. Length of the first crediting period:

7y-00m

C.2.2. Fixed crediting period:

C.2.2.1. Starting date:

Not applicable

C.2.2.2. Length:

Not applicable

SECTION D. Application of a monitoring methodology and plan:

D.1. Name and reference of approved monitoring methodology applied to the small-scale project activity:

Simplified M&P for Small-Scale CDM Project Activity, Category I. D

D.2. Justification of the choice of the methodology and why it is applicable to the small-scale project activity:

This Monitoring Plan has been chosen as it is suggested in the option (a) of Type I, Category D of CDM small-scale project activity categories contained in Appendix B of the simplified M&P for CDM small-scale project activity and applies to electricity capacity additions from hydro hydro power plants.

D.3 Data to be monitored:

According to option (a) of Type I, Category D of CDM small-scale project activity categories contained in Appendix B of the simplified M&P for CDM small-scale project activity, monitoring shall consist of metering the electricity generated by the renewable technology.

ID number	Data type	Data variable	Data unit	Measured (m), calculated (c) or estimated (e)	Recording frequency	Proportion of data to be monitored	How will the data be archived? (electronic/ paper)	For how long is archived data to be kept?	Comment
1	Electricity Generation	Electricity generation of the Project delivered to grid	MWh	M	15 minutes measurement and Monthly Recording	100%	Electronic and paper	During the credit period and two years after	The electricity delivered to the grids monitored such by the project (seller) as the energy buyer. Energy metering connected to the grid and Receipt of

									Sales
2	CO_2 emission factor	CO_2 emission factor of the grid d	tCO_2/MWh	C	At the validation	0%	Electronic	During the credit period and two years after	Data will be archived according to internal procedures.
3	CO2 Operating Margin.	CO2 Operating Margin emission factor of the grid	tCO_2/MWh	C	At the validation	0%	Electronic	During the credit period and two years after	Data will be archived according to internal procedures.
4	CO2 Build Margin	CO2 Build Margin emission factor of the grid	tCO_2/MWh	C	At the validation	0%	Electronic	During the credit period and two years after	Data will be archived according to internal procedures.

Software called SCADA "Supervisory Control and Data Acquisition" will be used as interface to control, operate and monitore power generation and distribution.

D.4. Qualitative explanation of how quality control (QC) and quality assurance (QA) procedures are undertaken:

Data	Uncertainty level of data (High/Medium/Low)	Explain QA/QC procedures planned for these data, or why such procedures are not necessary.
1	Low	These data will be used for calculate the emission reductions.
2	Low	See observation below.
3	Low	See observation below.
4	Low	See observation below.

Project proponents undertake quality control and quality assurances procedures. These measures are among others: to access CORDELIM web page for updating baseline factors, to access governmental websites (CONELEC and CENACE) to obtain data from the electric sector.

D.5. Please describe briefly the operational and management structure that the project participant(s) will implement in order to monitor emission reductions and any leakage effects generated by the project activity:

The intake design of these plants will not flood extensive areas; therefore, the project will not emit methane CH_4. No leakage is identified.

D.6. Name of person/entity determining the monitoring methodology:

CORDELIM developed the baseline.

CORDELIM is not a project participant.

Ecoinvest Carbon reviewed the baseline number.

Company:	Ecoinvest Carbon Brasil
Address:	Rua Padre João Manoel, 222
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Contact person:	Marco A. N. Mazaferro
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Fax number:	+55 (11) 3063-9069
E-mail:	marco@ecoinvestcarbon.com

SECTION E.: Estimation of GHG emissions by sources:

E.1. Formulae used:

E.1.1 Selected formulae as provided in appendix B:

According to the baseline methodology activities contained in appendix B of the simplified M&P for small-scale CDM project activities, as is the case of the PROJECT, emission reductions are those that result from the application of the formula mentioned in item B.2.

E.1.2 Description of formulae when not provided in appendix B:

E.1.2.1 Describe the formulae used to estimate anthropogenic emissions by sources of GHGs due to the project activity within the project boundary:

Based on the hydropower technology, the project emissions are zero .

E.1.2.2 Describe the formulae used to estimate leakage due to the project activity, where required, for the applicable project category in appendix B of the simplified modalities and procedures for small-scale CDM project activities

Not applicable.

E.1.2.3 The sum of E.1.2.1 and E.1.2.2 represents the small-scale project activity emissions:

The small-scale project activity emissions are zero .

E.1.2.4 Describe the formulae used to estimate the anthropogenic emissions by sources of GHGs in the baseline using the baseline methodology for the applicable project category in appendix B of the simplified modalities and procedures for small-scale CDM project activities:

$$EF_y = 0.5 \cdot EF_{OM,y} + 0.5 \cdot EF_{BM,y}$$

$$ER_y = EF_y \cdot EG_y$$

Using the dara mentioned in section B.2, EFy=0.723 tCO2e/MWh

E.1.2.5 Difference between E.1.2.4 and E.1.2.3 represents the emission reductions due to the project activity during a given period:

The emission reductions by the project activity (ER_y) during a given year y are 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 follows:

$$ER_y = EF_y \cdot EG_y$$

E.2 Table providing values obtained when applying formulae above:

Considering a baseline of 0.723 tCO2e/MWh, the implementation of the PROJECT connected to the Ecuadorian interconnected power grid will generate an estimated annual reduction of 40,974 tCO2e, and a total reduction of 286,818 tCO2e for the first 07 years crediting period. Given the project have started in May 1st, 2006, the first year contribution would sum 26,192 tCO2-eq.

Year	Estimation of project activity emission reductions (tonnes of CO_{2e})	Estimation of baseline emission reductions (tonnes of CO_{2e})	Estimation of leakage (tonnes of CO_{2e})	Estimation of emission reductions (tonnes of CO_{2e})
Year 1_2006*	-	26,192	0	**26,192**
Year 2_2007	-	41,181	0	**41,181**
Year 3_2008	-	41,181	0	**41,181**
Year 4_2009	-	41,181	0	**41,181**
Year 5_2010	-	41,181	0	**41,181**
Year 6_2011	-	41,181	0	**41,181**
Year 7_2012	-	41,181	0	**41,181**
Year 8_2013**	-	13,539	0	**13,539**
Total (tonnes of CO_{2e})	-	286,818	-	**286,818**
** May 2006*				
*** April 2013*				

Table 2 – Projected emissions reduction

SECTION F.: Environmental impacts:

F.1. If required by the host Party, documentation on the analysis of the environmental impacts of the project activity:

CONELEC "Consejo Nacional de Electricidad" (Ecuadorian electric agency) approved the Environmental Impact Study "EIA" in June 11th, 2004 and it also authorized the construction of the PROJECT. CONELEC is responsible for issuing permission for plants that have installed capacity lower than 50 MW. CONELEC granted its approval after the PROJECT fulfilled all conditions.

The Environmental Ministry in August 11th, 2004 analyzed the EIA and Environmental Management Plan and issued the Environmental license.

In point of fact that the PROJECT was built using existing reservoirs where the volume of their dams will not increase, their environmental impacts were insignificant.

SECTION G. Stakeholders' comments:

G.1. Brief description of how comments by local stakeholders have been invited and compiled:

Public discussions with local stakeholders were carried out. In these sections it was informed that the PROJECT would bring several economic and social advantages for the community.

Besides the stakeholder comments, the project is two hydro power plants with existing reservoirs where the volume of the reservoirs are not increased, so there is very minor disruption to the local environment and there is no disruption to local communities. In addition to the mandatory requirements, the project sponsor is working with local communities on environmental education projects, regular water quality assessment, hiring of local manpower, and erosion control.

As a result of a wrong information, local communities supposed, at first, that the small hydro plants would consume the water from the reservoirs, affecting its availability for agricultural use. Afterwards, it was clarified that the water would only circulate through the turbines, without reducing the quantity available for use by the communities.

G.2. Summary of the comments received:

The PROJECT had all requirements approved by the Environmental Ministry.

G.3. Report on how due account was taken of any comments received:

No comments were received. The project was developed as planned and following the requests made by CONELEC, the national environmental agency.

Annex 1

CONTACT INFORMATION ON PARTICIPANTS IN THE PROJECT ACTIVITY

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Annex 2

INFORMATION REGARDING PUBLIC FUNDING

No public funding was and will be used in the present project.

This project is not a diverted ODA from an Annex 1 country.