CLEAN DEVELOPMENT MECHANISM
PROJECT DESIGN DOCUMENT FORM (CDM-SSC-PDD)
Version 03 - in effect as of: 22 December 2006

CONTENTS

Annexes

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>.
03	22 December 2006	• The Board agreed to revise the CDM project design document for small-scale activities (CDM-SSC-PDD), taking into account CDM-PDD and CDM-NM.

SECTION A. General description of small-scale project activity

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

Caquende and Juliões Small Hydroelectric Power Plants (*hereafter referred to as the Project*)

Version 05.2, 15 December 2010

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

The Project involves the construction and operation of Caquende and Juliões Small Hydroelectric Power Plants (SHP). Both SHPs are run-of-river type and situated on the Macaúbas River, in the State of Minas Gerais, Southeast of Brazil.

Caquende SHP will have 4 MW of installed capacity and will deliver 18,728.88 MWh per year to the grid. Juliões SHP will have 3.4 MW of installed capacity and will deliver 15,697.92 MWh per year of electricity to the grid.

The Project is expected to start its full operation in May 2013, with a total installed capacity of 7.4 MW. The total amount of electricity expected to be delivered to the grid is 34,426.80MWh per year.

The Project will deliver electricity to the Brazilian grid, through the CEMIG[1] distribution complex in the State of Minas Gerais, and will be managed by the ONS[2], the national system operator.

Although most electricity generated in Brazil is from hydropower sources, there are a considerable number of thermal power plants and their number is expected to increase in order to meet future energy demand especially in the southeastern part of Brazil where the main economic and industrial activities are concentrated. Moreover, the majority of thermal power plants are connected to the Brazilian grid.

The Project will contribute to the reduction of GHG emissions from Brazilian electricity generation by increasing the share of renewable energy in the grid.

The Project is expected to achieve average emission reductions to the order of 6,341 tonnes of CO_2 equivalent per year, by displacing the grid's thermal electricity with its clean and renewable hydro-based electricity.

The Project will also make a substantial contribution to sustainable development in the host country as outlined below:

[1] CEMIG – *Companhia Energética de Minas Gerais* – an electric energy utility that also runs a large transmission complex (www.cemig.com.br).

[2] ONS – *Operador Nacional do Sistema* (www.ons.org.br).

Environmental sustainability

The Project contributes to GHG mitigation by displacing fossil fuel-fired grid electricity. In addition, the run-of-river SHPs present much less negative environmental impacts than large hydropower facilities with large reservoirs due to the reduced threat of flooding.

Economic development

SHP plants provide locally distributed generation, in contrast with business as usual large hydropower and thermal plants, and offer site-specific reliability and transmission and distribution benefits including:

- Increased reliability with shorter and less extensive outages;
- Lower reserve margin requirements;
- Improved power quality;
- Reduced line losses;
- Reactive power control;
- Mitigation of transmission and distribution congestion; and
- Incremental increase of the system capacity accompanied with a reduction of transmission and distribution investment.

Resource management

The quality and quantity of the water resource will not be affected by the Project installation. The diversification of power generation sources and decentralization of energy generation are additional benefits.

Social development

Employment opportunities will increase in the area where the Project is located, for construction as well as ongoing operation and maintenance of the plants.

Technological and infrastructure development

All technology, labor, and technical maintenance will be provided within Brazil. All of the equipment for the Project such as turbines and generators are high efficiency technologies.

In addition, the Project implementation also includes the improvement of local road quality and the construction of a bridge over *Macaúbas* River, which will allow the local people to cross the river with a much shorter distance than before.

A.3. Project participants:

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)
Brazil (host)	Companhia Energética Integrada Ltda. (CEI) (private)	No
Japan	Mitsubishi UFJ Morgan Stanley Securities Co., Ltd. (MUMSS) former Mitsubishi UFJ Securities Co., Ltd. (MUS) (private)	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.		

See contact information in the Annex 1 of this PDD

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

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

A.4.1.1. Host Party (ies):

Brazil

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

State of Minas Gerais (Southeast of Brazil)

A.4.1.3. City/Town/Community etc:

Bonfim City

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

Minas Gerais state is situated on the Southeast region of Brazil and its capital is Belo Horizonte. Bonfim is a small city within the metropolitan region of Belo Horizonte with a population of 6,632 and a total area of 301,210 square meters. Figure A.1 demonstrates the location of Minas Gerais state in Brazil.

The Project is located at Macaúbas River. Caquende SHP is located at geographical coordinates of 20°23’22" S and 44°11’21"W, and Juliões SHP is located at geographical coordinates of 20°22’05" S and 44°11’45"W. The map location of Bonfim is shown at Figure A.2.

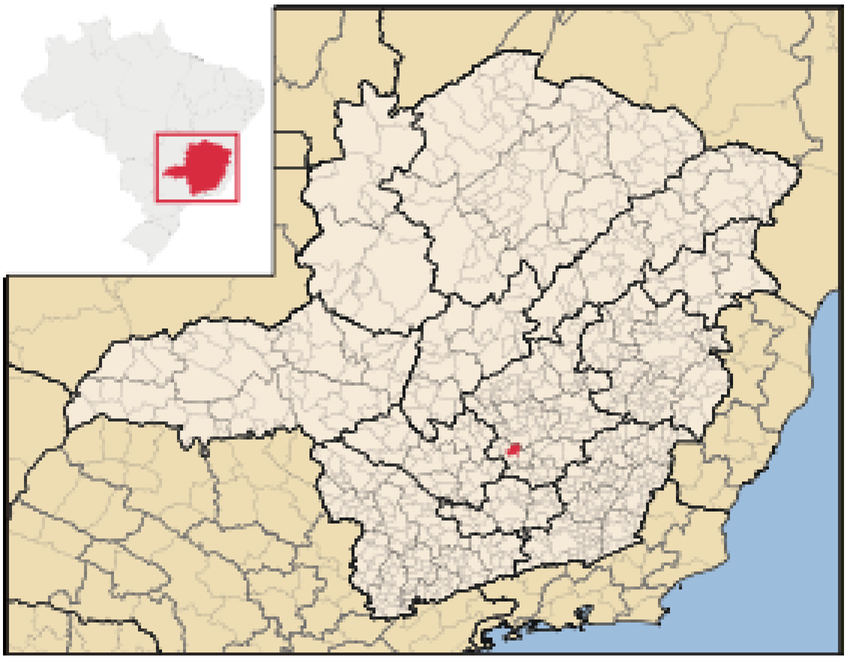

Figure A.1: Map of Minas Gerais state in Brazil

Figure A.2: Map of the region where Bonfim is located in Minas Gerais State

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

According to Appendix B of the simplified procedures for small-scale activities, the type and category of the proposed project is as follows: Type I - *Renewable Energy Project*; Category I.D - *Grid Connected Renewable Electricity Generation* (version 16, EB 54). The proposed project activity falls into the Category I.D based on the following reasons:

This is a renewable energy generation project that makes good use of the water head to generate electricity with the total installed capacity of 7.4MW, which is less than the small-scale threshold for grid connected renewable electricity generation of 15MW. Therefore, it is in accordance with the eligibility of the small-scale CDM activities.

The Project supplies electricity to an electricity distribution system that is or would be supplied by at least one fossil fuel-fired generating unit.

Construction and Operation of Caquende SHP

The implementation of Caquende SHP involves the construction of a new powerhouse that will be installed 900 meters far from an existing dam and the construction of a new adduction tunnel that will be 550 meters long. The plant will be connected with a 138 kV transmission line to the sub-station *Brumadinho*, where the electricity will be distributed by CEMIG to the national interconnected system (SIN). Currently, a pilot project is being conducted using an abandoned small hydropower unit that was not connected to the SIN, in order to study the hydrology of the river as well as to provide assurance to the investors, since it is the first SHP that CEI will implement.

The equipment and technical parameters for Caquende SHP are summarized in Table A.1.

Table A.1: The equipments and technical parameters for Caquende SHP

Installed capacity	4 MW
Expected power generation	18,728.88MWh/yr
Average power generation[3]	2.138 MW
Hydraulic turbine model	Francis horizontal
Turbine 1	1.625 MW
Turbine 2	1.625 MW
Turbine 3	0.75 MW
Average river flow rate[4]	6.87 m^3/s
Reservoir area - including river channel	13,000 m^2
Power density	308 W/m^2
Load factor	53%
Dam maximum height	2.5 m

[3] Sourced from *Projeto Básico PCH Caquende* study.

[4] The average river flow rate and reservoir area data are sourced from *ANEEL Ficha Resumo PCH Caquende* document.

Construction and operation of Juliões SHP

Juliões SHP consists of the construction of a new dam, a powerhouse, a penstock, and transmission lines. A 138 kV transmission line connects the plant to the sub-station *Brumadinho,* where the electricity will be distributed by CEMIG to the SIN. The equipment and technical parameters for Juliões SHP are summarized in Table A.2.

Table A.2: The equipments and technical parameters for Juliões SHP

Installed capacity	3.4 MW
Expected power generation	15,697.92MWh/yr
Average power generation[5]	1.792 MW
Hydraulic turbine model	Francis horizontal
Turbine 1	1.4 MW
Turbine 2	1.4 MW
Turbine 3	0.6 MW
Average river flow rate[6]	7.36 m^3/s
Reservoir area-including river channel	5,700 m^2
Power density	596 W/m^2
Load factor	53%
Dam maximum height	4 m

The technology adopted by the proposed Project is a national technology.

Current operation of the Old Caquende pilot unit

Since August 2006, there is a pilot unit under operation, with an installed capacity of 0.8 MW, at the same site where Caquende SHP will be installed, hereafter called as Old Caquende. As per paragraph 18 of the methodology AMS-I.D (version 16, EB 54), the Old Caquende's existing electricity ($EG_{existing,y}$) is deducted from the project activity electricity generation, in order to calculate the net increase in electricity provided to the grid associated with the Project. This is considered in the baseline calculation as described at Section B.6.

A.4.3 Estimated amount of emission reductions over the chosen crediting period:

The total estimated amount of emission reductions over the chosen crediting period of 7 years is 44,387 tonnes of CO_2 equivalent (average of 6,341 tonnes of CO_2 equivalent annually), starting from May 2013, to April 2020. The annual average over the crediting period of estimated reductions (tonnes of CO_2e) is summarized in Table A.3.

[5] Sourced from *Projeto Básico PCH Juliões* study.

[6] The average river flow rate and reservoir area data are sourced from *ANEEL Ficha Resumo PCH Juliões* document.

Table A.3: Annual average over the crediting period of estimated reductions (tonnes of CO_2e)

Years	**Annual estimation of emission reductions in tonnes of CO_2e**
2013 (May)	4,227
2014	6,341
2015	6,341
2016	6,341
2017	6,341
2018	6,341
2019	6,341
2020 (January-April)	2,114
Total estimated reductions (tonnes of CO_2e)	**44,387**
Total number of crediting years (years)	**7**
Annual average over the crediting period of estimated reductions (tonnes of CO_2e)	**6,341**

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

There is no public funding from Annex I Parties for the Project.

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

According to the definitions set on Appendix C of the Simplified Modalities and Procedures for Small-Scale CDM projects activities for debundling, the project participants confirm that the proposed Project is not a debundled component of a larger project activity.

There is no registered small-scale CDM project activity or an application to register another small-scale CDM project activity:

- With the same project participants;
- In the same project category and technology/measure;
- Registered within the previous two years; and
- Whose project boundary is within 1 km of the project boundary of the proposed small-scale activity at the closest site.

SECTION B. Application of a baseline and monitoring methodology

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

The methodology applied for the proposed Project is the approved methodology for small-scale CDM project - "AMS-I.D Grid connected renewable electricity generation" (version 16, EB 54).

For baseline calculations, the "Tool to calculate the emission factor for an electricity system" (version 02) is also adopted.

B.2 Justification of the choice of the project category:

Category I.D – Renewable electricity generation for a grid
This is a type I small-scale CDM project activity: a renewable energy project activity with a maximum output capacity equivalent to up to 15 megawatts.

The capacity of the proposed Project is 7.4 MW, and will not increase beyond 15 MW during the crediting period.

B.3. Description of the project boundary:

According to the AMS-I.D methodology, the project boundary encompasses the physical, geographical site of the renewable generation source, and it is defined as the electricity grid supplied by the Project. Therefore, the spatial scope of the project boundary covers the Project site and all power plants connected physically into the grid system and will include all the direct emissions related to the electricity generation.

B.4. Description of baseline and its development:

According to approved methodology AMS-I.D (version 16, EB 54), the baseline is the kWh produced by the renewable generating unit multiplied by an emission coefficient (measured in kg CO2e/kWh). There are two options that can be applied to the project category I.D to calculate the emission coefficient, as follows:

(a) A combined margin (CM), consisting of the combination of operating margin (OM) and build margin (BM) according to the procedures of the "Tool to calculate the emission factor for an electricity system" (version 02). Any of the four procedures to calculate the operating margin can be chosen, but the restrictions to use the Simple OM and the Average OM calculations must be considered;

Or

(b) The weighted average emissions (in kg CO_2e/kWh) of the current generation mix. The data of the year in which project generation occurs must be used.

For this project, option (a) Combined Margin was selected.

The BM and OM were calculated by the Designated National Authority (DNA) according to the "Tool to calculate the emission factor for an electricity system" (version 02), which is determined by the following seven steps[7]:

1. Identify the relevant electricity system;
2. Choose whether to include off-grid power plants in the project electricity systems;
3. Select a method to determine the operating margin (OM);
4. Calculate the operating margin emission factor according to the selected method;
5. Identify the group of power units to be included in the build margin (BM);
6. Calculate the build margin emission factor;
7. Calculate the combined margin (CM) emission factor.

[7]Data are public available on DNA web page: http://www.mct.gov.br/index.php/content/view/72899.html

Dispatch Data Analysis OM was used by the DNA to calculate the operating margin emission factor.

The baseline boundary of the proposed project is the entire Brazilian grid, so the boundary when calculating the baseline Operating Margin emission factor and the Build Margin emission factor was set within the Brazilian interconnected grids. In summary, the GHG emission reduction of the proposed project is based on the grid emission factor and the electricity supplied from the Project to the grid. The required parameters for calculating the GHG emission reductions are presented in section B.6.2.

B.5. 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:

According to the *Simplified Modalities and Procedures for Small-scale CDM Project Activities* requirement of Appendix A to demonstrate the additionality of the proposed project, the project participants shall provide an explanation to show that the project activity would not have occurred anyway due to at least one of the following barriers:

(a) Investment barrier;

(b) Technological barrier;

(c) Barrier due to prevailing business practice;

(d) Other barriers.

There are two possible future scenarios, as outlined below:

Scenario 1: The continuation of current practice: The continuation of the current practice is electricity generation with significant participation of large hydropower plants and fossil fuel-fired thermal plants in the grid and no implementation of the project activity.

Scenario 2: The construction of new renewable power plants: The construction of SHP, such as those of the project activity, is part of this scenario and is considered a source of electricity with low carbon emissions.

The most plausible scenario is that which faces the fewest barriers.

Investment Analysis

Project IRR

The project is set up with an expected financial Internal Rate of Return (IRR) of 12.15% per year, including national taxes, considering a 30-years period, which is the concession period granted for project operation according to the Brazilian legislation.[8]

IRR computation was carried out based on the input values described in Table B.1.

[8] The IRR financial analysis lifetime is established according to the federal Decree nº 41.019 of February 26th 1957.The Decree's Article 79 standardizes all types of electricity services in Brazil to be granted with 30 years of concession period. Available on: www.aneel.gov.br/cedoc/dec195741019.pdf

Table B.1: Input values for IRR analysis

Parameter	Value	Unit
Initial Investment	25,837,822	BRL
Yearly O&M costs	788,613	BRL
Net electricity sold	34,427	MWh/yr
Electricity sale price	135	BRL/MWh
Electricity sales income	4,647,645	BRL
Project lifetime	30	years
Project IRR	**12.15**	**%**

The Project's IRR is compared to the SELIC[9] reference rate; the average of SELIC values from the period June 2003 to May 2006 were considered, when the project developers actually decided to implement the Project as a CDM project activity. Official data to calculate the average SELIC rate of these three years were obtained from *Banco Central do Brasil*[10] as demonstrated in the worksheet attached.

The average value for SELIC rate (considering the most recent three years before the date the project participant started thinking about CDM) is 18.32%, which is considerably higher than the Project IRR. In this circumstance, the project developer could obtain equivalent or even more revenue from a bank deposit, a safer way than investing its own resources in the Project. The CERs revenue is strongly considered by the project developer as an additional incentive to invest in the construction and operation of the plant since they started developing this new business, and, they consider that it would partially compensate for the additional risk they would take with this project.

Considering the time difference between the date when project owner decided to implement project as CDM and the actual starting date of the project activity, most updated financial analysis uses average values for SELIC rate of the most recent three years before actual project starting date (SELIC values from January 2005 until December 2007 are considered).

SELIC rate average for this period is 15.47%, which still is higher than project IRR. Under this circumstance, a bank deposit is more attractive and less risky than investing in the project.

The comparison between the SELIC rate and the project IRR is used to set a benchmark parameter as a reference for CEI benchmark. Given energy projects are a riskier investment than government bonds, it is more interesting for the investor to have a much higher financial return, compared to the SELIC reference rate.

Sensitivity Analysis

According to the Guidance on the Assessment of Investment Analysis (version 2) annexed to the Tool for the demonstration and assessment of additionality (version 5.2) variables which constitutes more than 20% of total project costs and of total project revenue should be subjected to variations, including initial investment.

A sensitivity analysis was conducted to the initial investment cost, O&M cost, and the electricity price. The variables, which are more plausible to vary and interfere the financial

[9] SELIC – *The Sistema Especial de Liquidação e de Custódia* (Special System for Settlement and Custody) is the settlement system for most - around 96% - of central government's domestic securities.

[10] SELIC rate in the period from June 2003 to May 2006 ((www.bcb.gov.br/?SELICDIA).

attractiveness of the project, are selected. A simulation of IRR results for each different scenario is as follows:

1) Initial Investment variation

IRR	-20%	-10%	0	+10%
	15.48%	13.65%	12.15%	10.90%

The sensitivity analysis of initial investment shows that the project IRR can only reach the said benchmark level if initial investment could be reduced by around 20% from the base case.

The estimation for the initial investment cost was carried out by an engineer company called ConEnergia in 2007 based on the specification defined in the *Projeto Básico* (Feasibility study approved by ANEEL). CEI requested proposals from equipment suppliers and construction companies and selected a supplier who offered the best price to be found.

Equipment cost makes the biggest part in the initial investment cost which amounts to 57%. Taking into consideration that the rate of inflation has increased in Brazil and the equipment cost is fixed in the contract signed in 2008 with the supplier, the equipment price is unlikely to be reduced by 20% and thus the total initial investment cost.

2) O&M Cost variation

IRR	-100%	-10%	0	+10%
	15.39%	12.48%	12.15%	11.82%

The sensitivity analysis of O&M cost shows that the project IRR can only reach the said benchmark level if O&M cost could be eliminated (reduction of 100%).

The O&M cost applied for IRR calculation has been derived from the O&M cost estimation conducted by CEI based on the experience on the pilot project. The cost is based on what is required for daily operation of the project plant under normal conditions. Reducing this cost by such far will pose not only operational but also safety risks of proper maintenance of the project. Therefore it is not likely to cut down O&M costs to reach the level where the IRR reached the benchmark.

The O&M cost might be affected due to higher labour cost induced by inflation, and any increase in costs results in decrease in project IRR.

3) Electricity price variation

Electricity price (BRL/MWh)	122.00	135.00	149.00	158.50
	-10%	0	+10%	+17.41%
IRR	10.05%	12.15%	14.11%	15.47

The electricity price for this project was estimated to be 135.00 BRL/MWh when the project is evaluated. The estimation refers to the highest closing price in the ANEEL's energy auction for renewable energy in 2007, recorded as the auction number 03-2007[11]. It was the first auction won by small hydropower plants. The sensitivity analysis provided above studies the variation of the electricity price to be determined and fixed in the Power Purchase Agreement.

[11] Information sourced from ANEEL website:
http://www.aneel.gov.br//aplicacoes/editais_geracao/edital_geracao.cfm

Figure B.1 presents the auction results for hydropower sources from 2005-2007 and trend line of the highest closing prices. The highest closing prices during 2005 to 2007 ranges from 129.67 to 135.98 BRL/MWh showing 4% increase. If the price continues to rise 4% every two years until 2011 which is the year PPA is planned to be signed, 146 BRL/MWh is the projected price to be reached which is still below the benchmark.

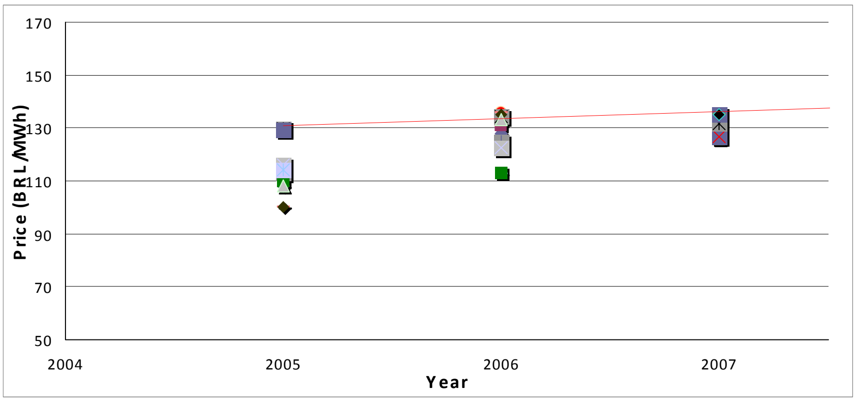

Figure B.1: Auction results for hydropower plants

Barrier Analysis

Investment barrier

The high level of guarantees required to finance an energy project in Brazil is a barrier for developing new projects. Insurance, financial guarantees, financial advisories are requirements that increase the cost of the project and are barriers to the financing of the project.

The Project will be developed with 80% project finance. In order to finance the construction, CEI is going to seek a loan from a development bank such as the National Economic Development Bank (BNDES).

BNDES is the only national long-term loan supplier in Brazil, to cover 60% to 80% of the project costs. This will require a TJLP[12] rate of 9.75% plus a 3%-4% spread, for a term of 12 years and a 6-month grace period. However, BNDES long-term loans are usually available for large corporate borrowers with an established credit rating, and special government initiatives, neither of which applies to the case of the Project. Therefore, it is likely that the Project will secure less than the amount originally anticipated, or perhaps fail to obtain the loan altogether from the BNDES. This will precipitate the project developer to seek other forms of funding.

Other difficulty that CEI faces is that potential electricity buyers in the private sector under negotiation with CEI request Power Purchase Agreements (PPAs) with duration not exceeding 10 years. It is unlikely that CEI will guarantee loan payment without electricity revenue beyond the 10-year period. CEI is concerned about closing PPAs with a duration period shorter than the loan payment period.

Faced with these difficulties with respect to project financing, the additional revenue from the sale of CERs becomes a pre-requisite for the Project to be implemented.

[12] BNDES Long Term Interest Rate

Concerning Scenario 1, there is less uncertainty to acquire long term funding for large hydro and a large established corporation who usually owns thermo power plants in comparison with the Project.

In addition, project schedule and date of its implementation is two years delayed due to the barriers in finding investment sources and to the time consumed to obtain environmental licenses.

Prevailing business practice barriers

Common practice in Brazil has been the construction of large-scale hydropower plants, and more recently of thermal fossil fuel plants with natural gas, which also receive incentives from government. According to the 2007 Generation Database (BIG – *Banco de Informações de Geração,* updated on 11/08/2007) created by ANEEL[13], 21.09% of the electricity in the country is generated by thermal power plants, and this number tends to increase in the short term, since 47.45% of the projects approved between 1998 and 2007 are thermal power plants (compared to only 12.43% of small hydropower plants). Only 1.75% of the Brazilian installed capacity is generated from SHP sources (1.75 GW out of a total of 100.17 GW).

In addition, out of 6.64 GW to be generated from the power plants under construction in the country, only 1.2 GW will be generated in SHPs and 3.93 GW will be generated by large hydropower plants.

Furthermore, this is the first time that the project developer invests on this type of project. They started a pilot project, as described in section A.4.2, in order to acquire knowledge about the electricity sector and especially about electricity generation through small hydropower plants.

Other barriers

The project activity (Scenario 2) faces an inherent barrier to run-of-river plants, which is the hydrological risk. For run-of-river plants, the power generation is directly dependent on the natural variation of the river flow, since there is no reservoir to control the water flow to be delivered to the turbines for the electricity generation.

According to data obtained from the *Agência Nacional de Águas* (ANA)[14] there are significant variations to river flow in the region where the power plants will be located. This river flow variation interferes directly to the potential amount of electricity that the plants can generate. The data in Table B.2 is an average electricity generation as a result of simulation of for both project sites, based on official local stations that measure river flow rates from 1939 to 2005, as described in the *Projeto Básico* (Feasibility study approved by ANEEL). Results of the simulation from each year are shown in Annex 5.

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[13] ANEEL Generation Database 2007. Available online. (www.aneel.gov.br).

[14] The National Water Agency: *Agência Nacional de Águas* (http://hidroweb.ana.gov.br/)

Table B.2: Average electricity generation simulated for Caquende and Juliões SHP[15]

	Caquende ($kW_{average}$)	Juliões ($kW_{average}$)
Period from 1939 to 2005	2,138	1,792

The project developer assumed that the potential electricity that will be generated by the Project is an average of the values calculated for the period from 1939 to 2005, for each SHP.

The years 1990, 1999 and the period 2001-2003 presented critical conditions, which lead to lower simulated electricity generation as shown in Annex 5. Similarly, there is a chance that after project implementation, the power generation is lower than the average. In that case, the revenue would be lower than expected.

In contrast, Scenario 1, the large hydropower plants, do not face hydrological risk, and fossil fuel-fired plants can generate energy on demand.

The results of the barriers analysis shows that Scenario 2, the project activity scenario, faces significant barriers compared to Scenario 1, continuation of the current practice, without implementation as a CDM project activity.

In addition, Scenario 2 is not the business-as-usual scenario in a country where the construction of large hydropower and thermal fossil fuel projects has been dominant. With the financial benefit derived from CERs, which is additional to the revenue from the electricity sale, it is anticipated that the project developers would benefit from this new source of revenues and could then decide to develop similar projects. Additional income can be enjoyed from the sale of electricity to the grid.

Thus, it can be concluded that the proposed project activity is additional.

Prior consideration and ongoing actions

As per EB49 Annex 22, project activities with a start date before 2 August 2008, for which the start date was prior to the date of publication of the PDD for global stakeholder consultation, are required to demonstrate that CDM was seriously considered in the decision to implement the project activity.

Such demonstration requires the following elements to be satisfied:

(a) The project participant must indicate awareness of the CDM prior to the project activity start date, and that the benefits of the CDM were a decisive factor in the decision to proceed with the project. Evidence to support this would include, inter alia, minutes and/or notes related to the consideration of the decision by the Board of Directors, or equivalent, of the project participant, to undertake the project as a CDM project activity.

[15] Source: *Projeto Básico PCH Caquende* and *Projeto Básico PCH Juliões studies*

CEI's awareness of the CDM prior to the project activity start date, and that the benefits of the CDM were a decisive factor in the decision to proceed with the Project is best demonstrated by the fact that CEI signed a consultancy service agreement with MUMSS (then MUS) in October 2006 aiming to develop this project as a CDM project activity.

(b) *The project participant must indicate, by means of reliable evidence, that continuing and real actions were taken to secure CDM status for the project in parallel with its implementation. Evidence to support this should include, inter alia, contracts with consultants for CDM/PDD/methodology services, Emission Reduction Purchase Agreements or other documentation related to the sale of the potential CERs (including correspondence with multilateral financial institutions or carbon funds), evidence of agreements or negotiations with a DOE for validation services, submission of a new methodology to the CDM Executive Board, publication in newspaper, interviews with DNA, earlier correspondence on the project with the DNA or the UNFCCC secretariat.*

Table B.3: Summary of key events for prior consideration and ongoing actions

Date	Key events
28 September 2007	PDD published for global stakeholder consultation as a step of the validation process
3 December 2007	Submission of documents to the local Environmental Agency for obtaining Environmental Licenses
March to May 2008	Approval of the *Projeto Básico* (Feasibility study) by ANEEL
12 March 2008	Contract with turbine supplier
16 February 2009	Concession of the Environmental licence to install the plant

As shown at Table B.3, CEI has considered the incentive from the CDM before the start of project activity, and has taken continuing and real actions to secure CDM status; it can be seen that the requirements of EB 49 Annex 22 have been met.

Considering the "Glossary of CDM Terms", the start date of CDM project activity is "the earliest date at which either the implementation or construction or real action of a project activity begins". From this definition, the project timeline is analyzed above.

The Project start date is 12 March 2008, which is the date when Contract with turbine supplier was signed.

The construction of both plants was initially planned to start in April 2008, however it was postponed to 2012 due to difficulty in obtaining the finance.

B.6. Emission Reductions:

B.6.1. Explanation of methodological choices:

The emission reduction achieved by the Caquende and Juliões SHP project is calculated according to methodology AMS-I.D (version 16, EB 54).

Emission factor calculations

Data such as installed capacity, electricity output, and consumption of different types of fuels for each plant were provided by ONS[16], and calculations were determined by the DNA (as described in Section B.6.2).

According to approved methodology AMS-I.D (version 16, EB 54), there are two options that can be applied to the project category I.D to calculate the baseline emission factor:

(a) A combined margin (CM), consisting of the combination of operating margin (OM) and build margin (BM) according to the procedures prescribed in the "Tool to calculate the emission factor for an electricity system" (version 02). Any of the four procedures to calculate the operating margin can be chosen, but the restrictions to use the Simple OM and the Average OM calculations must be considered;

Or

(b) The weighted average emissions (in kg CO_2e/kWh) of the current generation mix. The data of the year in which project generation occurs must be used.

The BM and OM were calculated by the Designated National Authority (DNA) according to the "Tool to calculate the emission factor for an electricity system" (version 02), which is determined by the following seven steps[17]:

1. Identify the relevant electricity system;
2. Choose whether to include off-grid power plants in the project electricity systems;
3. Select a method to determine operating margin (OM);
4. Calculate the operating margin emission factor according to the selected method;
5. Identify the group of power units to be included in the build margin (BM);
6. Calculate the build margin emission factor;
7. Calculate the combined margin emission factor (CM).

Step 1: Identify the relevant electricity system

The electric power system was identified by the DNA.

Step 2: Choose whether to include off-grid power plants in the project electricity systems

Option I: Only grid power plants are included in the calculations.

Step 3: Select a method to determine the operating margin (OM)

Four different procedures are suggested by the methodology for determining the operating margin emission factor. These are:

(a) Simple Operating Margin;
(b) Simple Adjusted Operating Margin;
(c) Dispatch Data Analysis Operating Margin;
(d) Average Operating Margin.

[16] The national dispatch center (daily reports): *Operador Nacional do Sistema Elétrico, Centro Nacional de Operação do Sistema, Acompanhamento Diário da Operação do Sistema Interligado Nacional.*

[17]Data are public available on DNA web page: http://www.mct.gov.br/index.php/content/view/72899.html

Method (c) *Dispatch Data Analysis Operating Margin* was selected by DNA.

Step 4: Calculate the operating margin emission factor according to the selected method

The *Dispatch Data Analysis Operating Margin* method was selected from the four options proposed in the "Tool to calculate the emission factor for an electricity system" (version 02) and is calculated as follows:

$$EF_{gridOM-DD,y} = \frac{\sum_h EG_{PJ,h} \times EF_{EL,DD,h}}{EG_{PJ,y}} \qquad \textbf{(1)}$$

where:

$EF_{gridOM\text{-}DD,y}$: Dispatch data analysis operating margin CO_2 emission factor in yeary(tCO_2/MWh)
$EG_{,PJ,h}$: Electricity displaced by the project activity in hour h of year y (MWh)
$EF_{EL,DD,h}$: CO_2 emission factor for grid power units in the top of the dispatch order in hour h in year y (tCO_2/MWh)
$EG_{,PJ,y}$: Total electricity displaced by the project activity in year y (MWh)
h: Hours in year y in which the project activity is displacing grid electricity
y: Year in which the project activity is displacing grid electricity

The operating margin CO_2 emission factor will be calculated *ex-post* based on data of the year in which the project activity displaces grid electricity and the emission factor will be updated annually during monitoring.

For CERs estimate, in sections A.4.3 and B.6.4**,** the operating margin CO_2 emission factor for 2007 was considered.

Step 5: Identify the group of power units to be included in the build margin (BM)

DNA defined this Step, based on the procedures of the "Tool to calculate the emission factor for an electricity system" (version 02).

Step 6: Calculate the build margin emission factor (EF_{BM})

The equation used to calculate the build margin emission factor is as follows:

$$EF_{gridBM,y} = \frac{\sum_m EG_{m,y} \times EF_{EL,m,y}}{\sum_m EG_{m,y}} \qquad \textbf{(2)}$$

Where:

$EF_{gridBM,y}$: Build margin CO_2 emission factor in year y (tCO_2/MWh)
$EG_{m,y}$: Net quantity of electricity generated and delivered to the grid by power unit m in year y (MWh)
EF_{ELmy}: CO_2 emission factor of power unit m in year y (tCO_2/MWh)
m: Power units included in the build margin
y: Most recent historical year for which power generation data is available

According to the "Tool to calculate the emission factor for an electricity system" (version 02), the build margin emission factor can be calculated using one of the following options:

> Option 1: For the first crediting period, calculate the build margin emission factor ex-ante based on the most recent information available on units already built for sample group m at the time of CDM-PDD submission to the DOE for validation. For the second crediting period, the build margin emission factor should be updated 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 to the DOE. For the third crediting period, the build margin emission factor calculated for the second crediting period should be used. This option does not require monitoring the emission factor during the crediting period.

> Option 2: For the first crediting period, the build margin emission factor shall be updated annually, ex-post, including those units built up to the year of registration of the project activity or, if information up to the year of registration is not yet available, including those units built up to the latest year for which information is available. For the second crediting period, the build margin emissions factor shall be calculated ex-ante, as described in option 1 above. For the third crediting period, the build margin emission factor calculated for the second crediting period should be used.

Option 2 was selected between the two options proposed.

Step 7: Calculate the combined margin emission factor (CM)

The baseline emission factor is calculated as the weighted average of operating margin emission factor and the build margin emission factor as follows:

$$EF_{gridCMy} = EF_{gridOM,\,y} \times w_{OM} + EF_{gridBM,\,y} \times w_{BM} \qquad \textbf{(3)}$$

Where:

$EF_{gridBMy}$: Build margin CO_2 emission factor in year y (tCO_2/MWh)
$EF_{gridOM,\,y}$: Operating margin CO_2 emission factor in year y (tCO_2/MWh)
W_{OM}: Weighting of operating margin emissions factor (%)
W_{BM}: Weighting of build margin emissions factor (%)

The default value of 50% weighting for both emission factors, operating margin and the build margin, was used.

Baseline emissions

The Old Caquende pilot unit is an existing facility that will necessarily shut down when project activity operation starts.

According to the paragraph 18 of the methodology AMS-I.D (version 16, EB 54), if the existing unit shuts down, the project activity should not get credit for generating electricity from the same renewable resources that would have otherwise been used by the existing unit. Therefore, the energy baseline corresponds to the net increase in electricity production associated with the project and is calculated as follows:

$$BE_{addco2,y} = (EG_{PJ,add,y} - EG_{BLexisitng,y})*EF_{CO2} \quad \textbf{(4)}$$

Where:

$EG_{PJ,\text{ add},y}$: The total net electrical energy supplied to a grid in year y by all units, existing and new project units (MWh)
$EG_{BL,\ existing,y}$: The estimated net electrical energy that would have been produced and supplied to a grid by existing units (installed before the project activity) in year y in the absence of the project activity (MWh)

$EG_{BL,\ existing,y}$ is given by:

$$EG_{BL,\ existing,y} = MAX\,(EG_{actual,y}\ ,\ EG_{estimated,y})\ until\ DATE_{\ BaselineRetrofit} \quad \textbf{(5)}$$

Where:

$EG_{actual,y}$: The actual, measured net electrical energy produced and supplied to the grid by the existing units in year y (MWh)

$EG_{BL,\ existing,y}$: = 0, on/after DATE $_{\text{BaselineRetrofit}}$

Project activity emissions calculations

According to the methodology AMS-I.D (version 16, EB 54), for small hydroelectric renewable sources, project emissions (PE_y) are 0 tCO_2e.

Leakage

There is no energy generating equipment transferred from another activity and no existing equipment transferred to another activity involved in the project activities. There is no leakage as a result of the project implementation, so, Leakage (*L y*) is 0 t CO_2e.

Emission Reductions

The project emission reductions calculations are demonstrated in section B.6.3.

B.6.2. Data and parameters that are available at validation:

The data available at the validation are described in the tables below:

Data / Parameter:	$EG_{BL, existing ,y}$
Data unit:	kWh/y
Description:	The estimated net electrical energy that would have been produced and supplied to a grid by existing units (installed before the project activity) in year *y* in the absence of the project activity.
Source of data used:	Calculated according to the methodology AMS-I.D (version 16, EB 54)
Value applied:	7,008,000
Justification of the choice of data or description of measurement methods and procedures actually applied :	$EG_{estimated,y}$ *is > than* $EG_{actual,y}$
Any comment:	

Data / Parameter:	$EG_{actual,y}$
Data unit:	kWh/y
Description:	The actual, measured net electrical energy produced and supplied to the grid by the existing unit in 2008.
Source of data used:	According to data measured by CEMIG and consolidated by *Cooperativa de Serviços e Negócios em Energia* (ConEnergia).
Value applied:	4,227,090
Justification of the choice of data or description of measurement methods and procedures actually applied :	
Any comment:	

Data / Parameter:	$EG_{estimated,y}$
Data unit:	kWh/y
Description:	The estimated net electrical energy that would have been produced by the existing units under the observed availability of the renewable resource (e.g., hydrological conditions) for year *y.*
Source of data used:	According to ANEEL Directive Nº 52
Value applied:	7,008,000
Justification of the choice of data or description of measurement methods and procedures actually applied :	
Any comment:	

B.6.3 Ex-ante calculation of emission reductions:

Dispatch Data Analysis Operating Margin Emission Factor Calculation

The operating margin emission factor is calculated as below:

$$EF_{gridOM-DD,y} = \frac{\sum_{h} EG_{PJ,h} \times EF_{EL,DD,h}}{EG_{PJ,y}} = 0.2909 \text{ tCO}_2\text{e/MWh} \quad \textbf{(6)}$$

The build margin emission factor is calculated as follows:

$$EF_{gridBM,y} = \frac{\sum_{m} EG_{m,y} \times EF_{EL,m,y}}{\sum_{m} EG_{m,y}} = 0.0775 \text{ tCO}_2\text{e/MWh}\ldots\ldots\ldots\textbf{(7)}$$

The combined margin emission factor is calculated through a weighted-average formula, considering a default 50% weighting of both the OM and the BM as follows:

$$EF_{gridCM,y} = 0.50 \text{ x } 0.2909 + 0.50 \text{ x } 0.0775 = 0.1842 \text{ tCO}_2\text{e/MWh} \quad \textbf{(8)}$$

Emission Reduction Calculation

The emission reduction (*ERy)* by the project activity during a given year y is the difference between baseline emissions (*BEy*), project emissions (*PEy*) and emissions due to leakage (*Ly*), as follows:

$$ER_y = BE_{,y} - PE_{,y} - L_{,y} = 6{,}341 - 0 - 0 = 6{,}341 \quad \textbf{(9)}$$

The baseline emissions would be then proportional to the electricity delivered to the grid throughout the Project’s lifetime. Baseline emissions (*BEy* in tCO_2) are the product of the baseline emissions factor (*EFy* in tCO_2/kWh) times the electrical energy baseline $BE_{addco2,\ y}$ expressed in kWh of electricity produced by the renewable generating unit, as follows:

$$BEy = BE_{addco2,y} \text{ x } EF_{CO2} = 34{,}426{,}800 \text{ x } 0.1842 = 6{,}341 \quad \textbf{(10)}$$

The electrical energy baseline ($BE_{addco2,\ y}$) corresponds to the net increase in electricity production associated with the project and it is calculated as follows:

$$EG_{add,y} = EG_{PJ,y} - EG_{exisitng,y} = 41{,}434{,}800 - 7{,}008{,}000 = 34{,}426{,}800 \quad \textbf{(11)}$$

$$EG_{existing,y} = MAX\,(EG_{actual,y}\,,\, EG_{estimated,y}) = MAX\,(4{,}227{,}090;\ 7{,}008{,}000\,) = 7{,}008{,}000 \quad \textbf{(12)}$$

Thus, baseline emissions are as follows:

$$BEy = (41{,}434.8\text{MWh} - 7{,}008\text{ MWh}) \times 0.1842\ tCO_2/\text{MWh} = 6{,}341\ \mathbf{tCO_2e}$$

Following AMS-I.D methodology (version 16), project emissions are considered zero.

$$PEy = 0\ \mathbf{tCO_2e}$$

The methodology requires calculating leakage if the energy generating equipment is transferred from another activity or if the existing equipment is transferred to another activity. Since neither case is true for the project activity, there is no leakage to be considered.

$$Ly = 0\ \mathbf{tCO_2e}$$

Therefore, both the project and leakage emissions are considered to be zero, $PE_y+L_y=0$.

Thus, emission reduction (*ERy)* is calculated as follows:

$$ERy = BEy - PEy - Ly$$

$$ERy = 6{,}341\ \mathbf{tCO_2e}$$

B.6.4 Summary of the ex-ante estimation of emission reductions:

The proposed project adopts the renewable crediting period of 7 years. The first crediting period is from May 2013 to April 2020. Emission reductions in the first crediting period are summarized in Table B.4.

Table B.4: Emission reductions in the first crediting period.

Year	Estimation of project activity emission (tCO_2e)	Estimation of baseline emission (tCO_2e)	Estimation of leakage emission (tCO_2e)	Estimation of emission reductions (tCO_2e)
2013(from May)	0	4,227	0	4,227
2014	0	6,341	0	6,341
2015	0	6,341	0	6,341
2016	0	6,341	0	6,341
2017	0	6,341	0	6,341
2018	0	6,341	0	6,341
2019	0	6,341	0	6,341
2020 (till April)	0	2,114	0	2,114
Average (tCO_2e)	0	6,341	0	6,341
Total (tCO_2e)	0	44,387	0	44,387

B.7 Application of a monitoring methodology and description of the monitoring plan:

The proposed project adopts the *ex-post* calculation of the grid emission factor, so both the electricity supplied to the grid generated by the proposed hydropower plants and the grid emission factor will need to be monitored during the crediting period.

B.7.1 Data and parameters monitored:

Data / Parameter:	$EG_{PJ\ h}$ and EG_{PJ} y
Data unit:	MWh
Description:	The total net electrical energy supplied to a grid in year *y* by all units, existing and new project units.
Source of data to be used:	Project Developer
Value of data applied for the purpose of calculating expected emission reductions in section B.5	34,426.80
Description of measurement methods and procedures to be applied:	The electricity meter will be measured and recorded according to national standards requirements.
QA/QC procedures to be applied:	The measurement/monitoring equipment should adopt the colligated automation system complying with state standard and technology. These equipment and systems are owned by the project developer and will be calibrated and checked according to national standards requirements. Monthly measurements and recordings will be carried out.
Any comment:	

Data / Parameter:	$EF_{OM,y}$
Data unit:	tCO_2/MWh
Description:	Operating Margin emission factor
Source of data used:	Calculated according to ONS data
Value of data applied for the purpose of calculating expected emission reductions in section B.5	0.2909 from the year 2007
Justification of the choice of data or description of measurement methods and procedures actually applied :	According to DNA calculation based on "Tool to calculate the emission factor for an electricity system" (version 02), it will be calculated *ex-post,* based on data of the year in which the project activity displaces grid electricity. The data is annually updated during the monitoring period.
Any comment:	This is used to determine the combined margin emission factor $EF_{gridCMy}$

Data / Parameter:	$EF_{BM,y}$
Data unit:	tCO_2/MWh
Description:	Build Margin emission factor
Source of data used:	Calculated according to ONS data
Value of data applied for the purpose of calculating expected emission reductions in section B.5	0.0775 from the year 2007
Justification of the choice of data or description of measurement methods and procedures actually applied :	According to calculation by DNA based on the "Tool to calculate the emission factor for an electricity system" (version 02), it will be calculated *ex-post,* based on data of the year in which the project activity displaces grid electricity. The data is annually updated during the monitoring period.
Any comment:	This is used to determine the combined margin emission factor $EF_{gridCMy}$

B.7.2 Description of the monitoring plan:

According to AMS-I.D (version 16), monitoring shall consist of metering the electricity generated by the renewable technology.

The net electricity that will be delivered to the grid is monitored by electricity meters owned by project developer and verified by CCEE[18], which is responsible for monitoring, accounting, and registering the net electricity delivered from all units connected to the grid.

All the procedures for measuring the electricity are defined by ONS according to *Módulo 12*[19] of the Grid Procedures document.

[18] CCEE (www.ccee.org.br).

[19] Grid procedures *Módulo 12* available on: www.ons.org.br/procedimentos/modulo_12.aspx.

CEI will have a CDM manager that will be responsible for monitoring and recording all data in accordance with the data archiving procedures of ONS procedures document. The data will be stored electronically in a systematic and transparent manner.

The CDM manager will review the data archived and submit a complete set of documentation on a regular basis. The document will contain the calculation procedure as well as the emission reduction estimate in accordance with the electricity delivered to the grid by the Project each year.

The CDM manager will also be responsible for monitoring the parameters described in Section B.7.1.

The CDM manager will be responsible for organizing and training any other member of CEI staff that may be involved in the monitoring, measurement and reporting techniques.

All data monitored and required for verification and issuance will be kept for a minimum of two years after the end of the crediting period or the last issuance of CERs for this project activity, whichever occurs later.

B.8 Date of completion of the application of the baseline and monitoring methodology and the name of the responsible person(s)/entity(ies)

The baseline study and monitoring methodology of the proposed project was completed on 28/06/2008.

The entity responsible for determining baseline study and monitoring methodology is Clean Energy Finance Committee, Mitsubishi UFJ Morgan Stanley Securities Co., Ltd.

The contact details are listed in Annex 1.

SECTION C. Duration of the project activity / crediting period

C.1 Duration of the project activity:

C.1.1. Starting date of the project activity:

12/03/2008

C.1.2. Expected operational lifetime of the project activity:

30 years

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

C.2.1. Renewable crediting period

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

01/05/2013 or the date of registration, whichever is later.

C.2.1.2. Length of the first crediting period:

7 years

C.2.2. Fixed crediting period:

C.2.2.1. Starting date:

Not applicable.

C.2.2.2. Length:

Not applicable.

SECTION D. Environmental impacts

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

According to the Brazilian environmental law, there are two types of small hydropower projects: (a) those required to prepare a Preliminary Environmental Assessment (*Relatório Ambiental Preliminar*, RAP), and (b) those required to prepare both the Environmental Impact Study (*Estudo de Impacto Ambiental*, EIA) and the Environmental Impact Assessment Report (*Relatório de Impacto Ambiental,* RIMA).

The environmental licensing process starts with preliminary study by the local environmental department. Upon its completion, if the Project is considered environmentally feasible, the project sponsors have to prepare the environmental assessment according the complexity of the project and its potential environmental impacts. For projects that cause low environmental impact, the Environmental Agency requests only the RAP. For more complex projects or with negative potential impacts both the EIA and the RIMA are required.

For this Project, the local environmental Agency – *Fundação Estadual do Meio Ambiente* (FEAM)[20] requested RAP, because it causes relatively low environmental impact.

The RAP, which is also known regionally as *Relatório de Controle Ambiental* (RCA), according to FEAM, is composed of the following information:

- Reasons for project implementation;
- Project description, including information regarding the reservoir and the utility;
- Preliminary Environmental Diagnosis taking the main biotic and anthropoid aspects into consideration;
- Preliminary estimations of project impacts; and
- Possible mitigation measures and environmental programs.

The result of a successful submission of these assessments is the preliminary license (LP) approval.

In order to obtain the construction license (LI), it is necessary to present, depending on the local environmental agency's decision when the LP is granted, either: (a) additional simplified information to the previous assessment, i.e., the preliminary study; (b) a new more detailed assessment; or (c) the *Environmental Basic Project (Projeto Básico)*. The operation license (LO) can be obtained with the results of pre-operational tests during the construction phase, which verify that all requirements by the local environmental agency were satisfied.

The Project has received LI on February 2009. During the construction period, CEI plans to request the LO, in order to start the operation in May 2013.

[20] http://www.feam.br/

D.2. If environmental impacts are considered significant by the project participants or the host Party, please provide conclusions and all references to support documentation of an environmental impact assessment undertaken in accordance with the procedures as required by the host Party:

No significant negative environmental impact is expected from the project activity.

SECTION E. Stakeholders' comments

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

The Brazilian Designated National Authority, *Comissão Interministerial de Mudanças Globais do Clima*, requests comments from local stakeholders and the validation report by an authorized DOE as a prerequisite to providing the letter of approval, according to Resolution no. 1, of 11th September 2003. The Resolution stipulates that copies of the invitations for comments must be sent to the following parties involved in and affected by the project activities:

- Municipal governments and City Councils;
- State and Municipal Environmental Agencies;
- Brazilian Forum of NGOs and Social Movements for Environment and Development;
- Community associations;
- State Attorney for Public Interest.

Invitation letters were sent to the parties on September 03, 2007 (copies of the letters and post office confirmation of receipt communication are available upon request). Table E.1 shows all stakeholders that were consulted and their respective addresses.

Table E.1: Name and address of the stakeholders consulted

STAKEHOLDERS	ADDRESSES
Prefeitura de Bonfim	*Av. Governador Benedito Valadares, 170-Bonfim-MG-35521-000*
Secretaria Municipal de Meio Ambiente, Serviços Urbanos e Obras de Bonfim	*Av. Governador Benedito Valadares, 170-Bonfim-MG-35521-000*
Piedade dos Gerais City Hall	*R. Presidente Vargas, 33-Piedade dos Gerais-MG-35526-000*
Secretária de Agricultura e Meio Ambiente do Município de Piedade dos Gerais	*R. Presidente Vargas, 33-Piedade dos Gerais-MG-35526-000*
Câmara de Vereadores de Bonfim	*Av. João Batista de Paiva Campos, 311-Bonfim-MG-35521-000*
Câmara Municipal de Piedade dos Gerais	*Pça. Padre Pedro Thysen, 226-Piedade dos Gerais-MG-35526-000*
SEMAD – Sec. de Estado de Meio-Ambiente e Desenvolvimento Sustentável	*R. Espírito Santo, 495-Belo Horizonte-MG-30160-030*
FEAM – Fundação Estadual do Meio Ambiente	*R. Espírito Santo, 495-Belo Horizonte-MG-30160-030*
FBOMS - Fórum Brasileiro de ONGs e Movimentos Sociais para o Meio Ambiente e o Desenvolvimento	*SCS, Quadra 08, Bloco B-50* *Venâncio 2000, Sala 105* *Brasília-DF-70333-900*
Ministério Público de Bonfim	*Av. Governador Benedito Valadares, 196-Bonfim-MG-35521-000*
Ministério Público do Estado de Minas Gerais *Sede da Procuradoria-Geral de Justiça*	*Av. Álvares Cabral, 1690-Belo Horizonte-MG-30170-001*
Ministério Público Federal	*SAF Sul Quadra 4 Conjunto C-Brasília-DF-70050-900*
IBAMA – Instituto Brasileiro do Meio Ambiente e dos Recursos Naturais Renováveis	*SCEN Trecho 2-Ed. Sede-Cx. Postal 09870-Brasília-DF-70818-900*
Associação Mineira dos Produtores de Bucha Vegetal	*Pç. Rute Brandão Azeredo, 179-Bonfim-MG*
EMATER – Empresa de Assistência Técnica e Extensão Rural do Estado de Minas Gerais	*Av. Raja Gabáglia 1626-Belo Horizonte-MG-30350-540*
Sindicado dos Trabalhadores Rurais	*R. Coronel Olivio Villefor, 190-Bonfim-MG-35521-000*
Clube do Carnaval a Cavalo	*Av. Governador Benedito Valadares, 170-Bonfim-MG-35521-000*
Casa de Cultura de Bonfim	*Av. Governador Benedito Valadares, 170-Bonfim-MG-35521-000.*

E.2. Summary of the comments received:

Up to date, no comments have been received regarding the Project.

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

If any comments are received, the Project proponent will provide all clarifications to the parties involved in and affected by the project activities.

Annex 1

CONTACT INFORMATION ON PARTICIPANTS IN THE PROJECT ACTIVITY

Organization:	Companhia Energética Integrada Ltda. (CEI)
Street/P.O.Box:	Manuel Couto, 105 – Cidade Jardim
Building:	
City:	Belo Horizonte
State/Region:	Minas Gerais State
Postfix/ZIP:	30.380-080
Country:	Brazil
Telephone:	55 31 3327 8876
FAX:	
E-Mail:	romero.ferreira@ceienergetica.com.br
URL:	
Represented by:	
Title:	Director
Salutation:	Mr
Last Name:	Ferreira
Middle Name:	Machado
First Name:	Romero
Department:	
Mobile:	
Direct FAX:	
Direct phone:	
Personal E-Mail:	

Project advisor:

Organization:	Mitsubishi UFJ Morgan Stanley Securities Co., Ltd. (MUMSS) (former Mitsubishi UFJ Securities Co., Ltd.)
Street/P.O.Box:	5-4-9 Toyosu
Building:	2nd Floor, KR Toyosu Building
City:	Koto-ku
State/Region:	Tokyo
Postfix/ZIP:	135-0061
Country:	Japan
Telephone:	+81 3 6213 6850
FAX:	+81 3 6213 6175
E-Mail:	
URL:	http://www.sc.mufg.jp/english/e_cefc/
Represented by:	
Title:	Chairman
Salutation:	Mr
Last Name:	Watanabe
Middle Name:	
First Name:	Hajime
Department:	Clean Energy Finance Committee
Mobile:	
Direct FAX:	
Direct phone:	
Personal E-Mail:	watanabe-hajime@sc.mufg.jp

Annex 2

INFORMATION REGARDING PUBLIC FUNDING

The financial plans for the Project do not involve public funding from Annex I countries.

Annex 3

BASELINE INFORMATION

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

Monitored project power delivered to the grid (MWh) (A)
Baseline emission factor (tCO_2/MWh) (B)

(A) x (B) (tCO_2)

The National Dispatch Center (*Operador Nacional do Sistema Elétrico, Centro Nacional de Operação do Sistema, Acompanhamento Diário da Operação do Sistema Interligado Nacional*, daily reports from Jan. 1, 2007 to Dec. 31, 2007) supplied the raw dispatch data for the grid.

Detailed information is described in section B.6.

Annex 4

MONITORING INFORMATION

Please refer to section B.7.2

Annex 5

SIMULATION OF ELECTRICITY GENERATION FROM 1939 TO 2005

The project developer based on data from ANA calculated the following values. According to this simulation, the years 1990, 1999 and 2001 to 2003 would result in lowest energy generation for both plants sites.

Table Annex 5.1: Simulation of electricity generation for Caquende SHP

Year	Energy Average ($kW_{average}$)	Year	Energy Average ($kW_{average}$)
1939	2,114	1973	2,364
1940	2,476	1974	1,832
1941	2,342	1975	1,973
1942	2,356	1976	1,958
1943	2,767	1977	2,191
1944	2,435	1978	2,094
1945	2,399	1979	2,625
1946	1,910	1980	2,228
1947	2,550	1981	2,262
1948	1,897	1982	2,527
1949	2,230	1983	3,536
1950	2,383	1984	2,171
1951	2,717	1985	2,440
1952	2,196	1986	1,890
1953	1,797	1987	2,477
1954	1,555	1988	2,619
1955	1,285	1989	2,415
1956	1,626	1990	1,367
1957	1.951	1991	2,628
1958	1,506	1992	2,535
1959	1,365	1993	2,911
1960	2,023	1994	2,434
1961	2.084	1995	2,150
1962	1,728	1996	2,097
1963	1,139	1997	2,465
1964	1,887	1998	2,495
1965	2,279	1999	1,457
1966	2,335	2000	1,872
1967	2,359	2001	1,308
1968	1,901	2002	1,851
1969	2,075	2003	1,769
1970	1,904	2004	2,444
1971	1,369	2005	2,608
1972	2,344		

Table Annex 5.2: Simulation of electricity generation for Juliões SHP

Year	Energy Average ($kW_{average}$)	Year	Energy Average ($kW_{average}$)
1939	1,771	1973	1,986
1940	2,082	1974	1,527
1941	1,970	1975	1,650
1942	1,983	1976	1,637
1943	2,338	1977	1,840
1944	2,049	1978	1,755
1945	2,016	1979	2,214
1946	1,594	1980	1,870
1947	2,148	1981	1,898
1948	1,583	1982	2,130
1949	1,870	1983	3,005
1950	2,002	1984	1,821
1951	2,292	1985	2,054
1952	1,842	1986	1,575
1953	1,498	1987	2,084
1954	1,287	1988	2,207
1955	1,051	1989	2,032
1956	1,346	1990	1,122
1957	1,632	1991	2,215
1958	1,243	1992	2,136
1959	1,119	1993	2,462
1960	1,691	1994	2,048
1961	1,743	1995	1,802
1962	1,435	1996	1,754
1963	923	1997	2,074
1964	1,575	1998	2,102
1965	1,913	1999	1,199
1966	1,963	2000	1,561
1967	1,983	2001	1,068
1968	1,587	2002	1,529
1969	1,737	2003	1,471
1970	1,587	2004	2,057
1971	1,120	2005	2,198
1972	1,970		