CLEAN DEVELOPMENT MECHANISM
PROJECT DESIGN DOCUMENT FORM (CDM-PDD)
Version 03 - in effect as of: 28 July 2006

CONTENTS

Annexes

SECTION A. General description of project activity

A.1. Title of the project activity:

Title: Cachoeirao CDM Project (JUN1092)
Version: 3
Date: 10/09/2010.

A.2. Description of the project activity:

The present project activity is the generation of electricity by renewable source (hydroelectric source), through construction of a Small Hydro Power plant (SHP) called Cachoeirão.

The total power installed SHP capacity is 28.05 MW and is located in the Manhuaçu River between the Pocrane and Alvarenga cities, Minas Gerais state in Brazil south-east region.

This enterprise has as main goal the generation of electricity that must be delivered to the National Interconnected System (SIN) compensating the thermal generation from fossil fuels in this system with the generation of renewable electricity. The SHP construction objective also helps meet the growing demand for energy in Brazil.

Moreover, help with the supply of electricity contributing to environmental sustainability by increasing the share of renewable energy in relation to total consumption of electricity in Brazil. **Thus, the project activity supports the construction of new renewable energy project as environmentally sustainable alternative to generate electric energy**.

Considering that the project activity consists in a SHP with a small reservoir (1.021 km^2), it is virtually zero environmental impact when compared to the large hydroelectric facilities. This fact is important because the construction of Small Hydro Power plants contributes to the efficient use of natural resources and environment, thus avoiding the growth of environmental and social liabilities caused by new large hydroelectric plants.

In regard to the contribution of the project in mitigation of Greenhouse Gas emissions (GHG), the project activity reduces emissions of these gases prevent the entry into operation of thermoelectric plants that use fossil fuels as energy inputs. In the absence of the project activity, fossil fuels would be burned in thermoelectric plants which are interconnected to the grid. The project activity initiative helps Brazil to meet its goals of promoting sustainable development.

The project activity is also aligned with the specific requirements of the CDM (Clean Development Mechanism) of the host country, because:

- It contributes to environmental sustainability as reduce the use of fossil energy (non-renewable sources). Thus the project contributes to the best use of natural resources and makes use of clean and efficient technologies;
- It contributes to better working conditions and increases the opportunity for employment in rural area where the project is located;
- It contributes to better conditions of the local economy, because the use renewable energy reduces our dependence on fossil fuels, reduce the amount of pollution and the associated social costs related to it.

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 Country)	**Hidrelétrica Cachoeirão S.A** (Private Entity)	**No**
	Carbotrader Assessoria e Consultoria em Energia Ltda (Private Entity)	
(*) 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.		

A.4. Technical description of the project activity:

A.4.1. Location of the project activity:

A.4.1.1. Host Party(ies):

Brazil

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

Southeast Region / Minas Gerais State

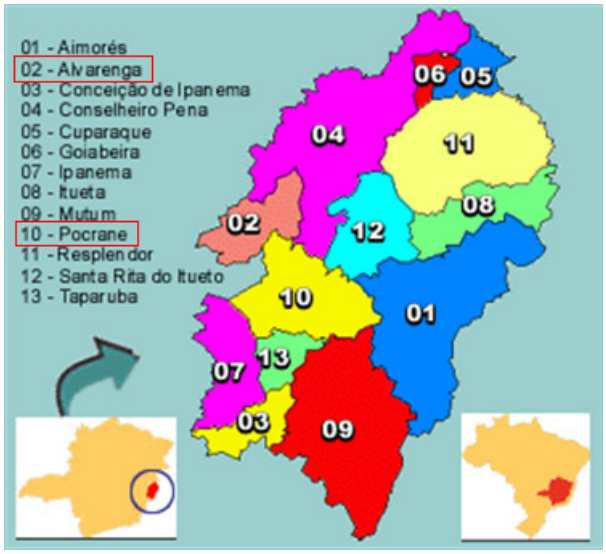
A.4.1.3. City/Town/Community etc.:

Pocrane and Alvarenga Cities;

A.4.1.4. Details of physical location, including information allowing the unique identification of this project activity (maximum one page):

The project activity is located in the Manhuaçu River in the municipalities of the Pocrane and Alvarenga, Minas Gerais State, Brazil. The geographical coordinates of the dam location dam are: 19º 26’ 12” S e 41º 36’ 51” W. below the Figure 1 illustrates the location of the enterprise:

Figure 1: Geographical location of Pocrane and Alvarenga cities.



Source: Wikipedia - pt.wikipedia.org and City Brazil - www.citybrazil.com.br[1]

A.4.2. Category(ies) of project activity:

Grid-connected electricity generation from renewable sources.
Sectoral Scope 1 – Energy Industries (Renewable / Non-renewable Sources)

A.4.3. Technology to be employed by the project activity:

(a) The scenario existing prior to the start of the implementation of the project activity:

Prior to the proposed project implementation, the electricity continues to be generated with the actual power plant mix that has strong fossil fuel power plants in operation.
The project activity reduces GHG emissions preventing the entry into operation of the thermoelectric power plants that use fossil fuels as energy inputs. In the absence of the project activity, fossil fuels would be burned in thermoelectric plants which are interconnected to the grid.

(b) The scope of the activities/measures that are being implemented within the project activity:

The technology used in the enterprise is the Manhuaçu River (Rio Doce Basin) hydro energy use , the gravitational energy of water is used to move the turbines and by doing this, trigger generators that enable the generation of electricity. This is a source of clean energy and renewable that presents minimal impact on the environment.
The SHP Cachoeirão is a venture classified as Small Hydro Power Plant because according to the Brazilian Resolution no. 652, 09/12/2003, from National Electric Energy Agency (ANEEL), to be considered a SHP the reservoir area must be less than 3 Km^2 (300 ha) and the total installed capacity between 1 MW to 30 MW. The SHP Cachoeirão has 1.021 Km^2 of reservoir area and total installed capacity of the 28.05 MW, thus this the Power density should be 27.47 W/m^2 (in accordance with CDM meth rules). The venture is also called a **"run of river"** plant which does not include significant water stocks.

[1] City Brasil – Percorrendo o Brasil de A a Z. http://www.citybrasil.com.br

The SHP Cachoeirão will dispatch generated energy to the National Interconnected Grid (SIN - Sistema Interligado Nacional) trhough the Conselheiro Pena Substation (far 32.8 Km from the SHP dispatch substation, in 69 KV) located in the Conselheiro Pena city, Minas Gerais state, Brazil.
The technology and equipment used in the project activity are developed and manufactured in Brazil are not expected transfer of know-how or technology to the host country.

The emissions sources and GHGs involved are CO2 emissions from electricity generation in fossil fuel fired power plants that is displaced due to the project activity and emissions of CH_4 from the reservoir.

The technical characteristics of equipment that will be implemented in SHP can be seen in Table 1 below:

Table 1 : SHP technical characteristics

SHP	**Cachoeirão**
Installed Power (MW)	28.05
Reservoir (Km2)	1.021
Plant Load Factor (MW)	16.37
Flow Rate River Average (m3/s)	47
Turbines	Francis, horizontal
Quantity	3
Power (kW)	9,300
Flow Rate (m3/s)	22.45
Rotation (rpm)	360
Generator	Synchronous, horizontal
Quantity	3
Nominal Power (kVA)	11,000
Effective Power (kW)	9,350
Voltage (kV)	13.8
Load Factor	0.85
Frequency (Hz)	60

(c) The baseline scenario:

The baseline scenario to the project activity is the same as the scenario existing prior to the start of implementation of the project activity.

A.4.4. Estimated amount of emission reductions over the chosen crediting period:

Table 2 : Estimation of Emission Reductions

Year	Estimation of annual emission reductions in tonnes of CO2 e
2011 (May)	15,629
2012	23,444
2013	23,444
2014	23,444
2015	23,444
2016	23,444
2017	23,444
2018 (April)	7,815
Total estimated reductions (tonnes of CO_2e)	164,108
Total number of crediting years	7
Annual average of the estimated reductions over the crediting period	23,444

A.4.5. Public funding of the project activity:

There is no public funding provided by Annex I parts so the carbon credits revenue are the option chosen.

SECTION B. Application of a baseline and monitoring methodology

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

- The methodology tool used to the baseline calculation is the **"Tool to calculate the emission factor for an electricity system" - version 02**

The monitoring tool used is the ACM0002: **"Consolidated baseline methodology for grid-connected electricity generation from renewable sources" - 0 version 11 (valid from 26 February 2010 onwards).**

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- The methodology tool used to the additionality assessment is the **"Tool for the demonstration and assessment of additionality" - version 05.2**

B.2. Justification of the choice of the methodology and why it is applicable to the project activity:

The ACM0002 methodology **"Consolidated baseline methodology for grid-connected electricity generation from renewable sources"**, states that:

Applicability:

"*This methodology is applicable to grid-connected renewable power generation project activities that (a) install a new power plant at a site where no renewable power plant was operated prior to the implementation of the project activity (greenfield plant); (b) involve a capacity addition; (c) involve a retrofit of (an) existing plant(s); or (d) involve a replacement of (an) existing plant(s).*"

So, the item (a) above is applicable to the present project activity.

Also the project activity involves the installation of a hydro power plant, the methodology is applicable under the following condition:

"*The project activity results in new reservoirs and the power density of the power plant, as per definitions given in the Project Emissions section, is greater than 4 W/m*^{2}".

The SHP Cachoeirão grid-connected construction is considered a renewable power generation plant with 27.47 W/m^2 Power Density, so, greater than 4 W/m^2 and results in a new reservoir,
So the ACM0002 methodology is applicable.

B.3. Description of the sources and gases included in the project boundary:

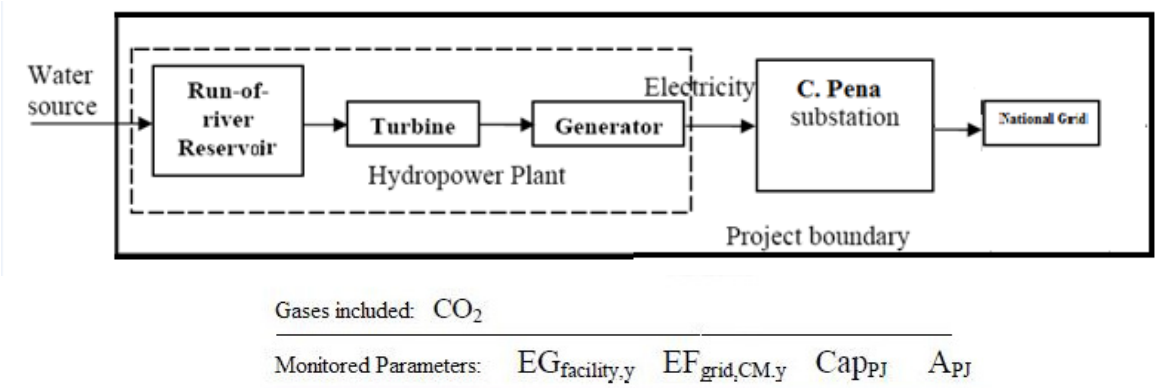
According to ACM0002 "*the spatial extent of the project boundary includes the project power plant and all power plants physically connected to the electricity system that the CDM project power plant is connected to*", which in this case is the SIN (National Interconnected Grid – NIS).

The greenhouse gases and emission sources included in the project boundary are shown in the table below:

Table 3: Sources and Gases included in the Project Limits

Source		Gas	Included?	Justification / Explanation
Baseline	CO_2 emissions from electricity generation in fossil fuel fired power plants that is displaced due to the project activity.	CO_2	Yes	Main emission source.
		CH_4	No	Minor emission source.
		N_2O	No	Minor emission source.
Project activity	For hydro power plants, emissions of CH_4 from the reservoir.	CO_2	No	Minor emission source.
		CH_4	No	Power Density of the SHP is greater than 10 W/m^2.
		N_2O	No	Minor emission source.

The diagram below shows the project boundary, main equipments and flows energy:



Gases included: CO_2

Monitored Parameters: $EG_{facility,y}$ $EF_{grid,CM,y}$ Cap_{PJ} A_{PJ}

Regarding the project activity grid connection, the electricity will be dispatched to the Conselheiro Pena sub-station – it will be the connection point. In the Conselheiro Pena Sub-station also are located the energy meters.

The baseline emissions are related in the B.6.1. item with the tool to calculate the grid-connected emission factor[2].
The Power Density is greater than 10W/m2. So, the project activity doesn't need to consider the emissions related to reservoir. (More details in B.6.1. item).

B.4. Description of how the baseline scenario is identified and description of the identified baseline scenario:

According to the methodology ACM0002, "if the project activity is the installation of a new grid-connected renewable power plant/unit, the baseline scenario is the following:
Electricity delivered to the grid by the project activity would have otherwise been generated by the operation of grid-connected power plants and by the addition of new generating sources, as reflected in the combined margin (CM) from "Tool to calculate the emission factor for an electricity system", described in the item B.6.1.
Also the baseline emissions are the kWh produced by the renewable generating unit multiplied by an emission coefficient, calculated in a conservative and transparent manner.

So in the Project activity absence, the electricity should be provided by the other grid-connected power plants included the fossil fuel based Power plants.

Therefore, the project activity alternatives scenarios are:

Scenario 1: The proposed project activity undertaken without being registered as a CDM project activity.

Scenario 2: The continuation of the current situation, with the electricity being provided by the SIN which has a high participation of fossil fuel plants.

[2] Comissão Interministerial de Mudanças Globais do Clima (CIMGC). "Tool to calculate the emission factor for an electricity system" - http://www.mct.gov.br/index.php/content/view/74689.html

Also, the project activity use as data source for the Emission Factor calculation to the National Interconnected System (SIN), operating margin and the build margin coefficients provided by the Designated National Authority (DNA) of the host country.

The Emission Factor of CO_2 resulting from the generation of electric energy in the system checked in the National Interconnected System (SIN) in Brazil is calculated based on generating records from plants centrally operated by the **National Electric System Operator (ONS)**, which includes thermoelectric plants that use fossil fuels as energy.

The method used to make this calculation is the method of dispatch analysis, which is the most appropriate in determining the emission factor of the electrical grid.

This information is needed for renewable energy projects connected to the electric grid and implanted in Brazil under the **Clean Development Mechanism (CDM)** of the Kyoto Protocol.

The data result from the work of the Electrical System Operator (ONS) of the Ministry of Mines and Energy (MME) and the Ministry of Science and Technology, which are available to proponents of CDM projects. Thus, they can be applied in calculating ex-ante emissions avoided by the project activity, where the emission reduction will be calculated ex-post.

Further details of the development of the project baseline can be viewed through the link: http://www.mct.gov.br/index.php/content/view/73318.html.

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 CDM project activity (assessment and demonstration of additionality):

This item is elaborated based on **"Tool for the demonstration and assessment of additionality – version 05.2".**

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

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

1 - The proposed project activity undertaken without being registered as a CDM project activity.

2 - The continuation of the current situation, with the electricity being generated to the SIN which has a high participation of fossil fuel plants.

Sub-step 1b: Consistency with mandatory laws and regulations:

Both the project and the alternative scenario are in compliance with all regulations according the following entities: National Electric System Operator (ONS - Operador Nacional do Sistema Elétrico), Electricity Regulatory Agency (ANEEL - Agência Nacional de Energia Elétrica), Minas Gerais

Environmental Agency (FEAM - Fundação Estadual do Meio Ambiente) and the CDM Executive Board.

Step 2: Investment analysis

Determine whether the proposed project activity is not:
(a) The most economically or financially attractive; or
(b) Economically or financially feasible, without the revenue from the sale of certified emission reductions (CERs).

Sub-step 2a: Determine appropriate analysis method

To the investment analyses there are the options below, according to the meth:

- Option I - Apply simple cost analysis,
- Option II - Apply investment comparison analysis,
- Option III - Apply benchmark analysis

The III option was chosen.

Sub-step 2b: Option III. Apply benchmark analysis

The key indicator to be compared with the Benchmark should be the Project Activity **Internal Rate Return (IRR),** considered adequate to this kind of Project as well decision context.

To the Benchmark was considered the Brazilian Goverment Bond Rates 4 entire years average (maturity in the 2031 year – so long term .In line with the "Tool for the demonstration and assessment of additionality".

The data sources are public and easily accessible.

The table below presents the Benchmark composition:

Benchmark (Brazilian Gov. Bond Rates average)
23.30%

The Brazilian Government Bond Rates chosen was the NTN-C 4 entire years average that represents a Brazilian free risk rate of return (from January 2003 to December 2006).

Sub-step 2c: Calculation and comparison of financial indicators

The cash-flow information will be presented integrally in a separated document according to the UNFCCC rules.

The cash flow was established for the project operational lifetime (30 years), so with a Internal Rate Return (IRR) equal 18.67% (per year) without the Certified Emission Reduction (CERs) revenue, and 19.35% (per year) with the CERs revenue.

The finance/economic analysis is based on market standards parameters.

The benchmark analysis is done comparing the project activity IRR with the Benchmark so the table 4 summarizes the values:

Table 4: Comparative between project´s IRR and the benchmark

SHP Cachoeirão	**Benchmark (% a.a.)**	**IRR (% year)**	**IRR (with CERs) (% year)**
	23.30	18.67	19.35

The project's IRR has stayed below the benchmark, so the project activity is unlikely to be the most financially/economically attractive.

The CERs (Certified Emission Reduction) are highly significant instruments for entrepreneurs in overcoming barriers, improving investment quality and hence stimulating future investments in clean energy generation.

Sub-step 2d: Sensitivity analysis

In sensitivity analysis was verified the breaks even point to the project activity trough the sensitive parameters variation, such: Investment Value; Energy Price and the Plant Load Factor.

The results are presented below:

Table 5 – Break even points

	SHP	Break Even Point	Project Values
Investment Value	**-24.50%**	R$78,489,045	R$103,959,000.00
Plant Load Factor	**+31.15%**	21.47 MWmed	16.37 MWmed
Energy Price	**+28.64%**	R$180.10/MWh	R$140.00/MWh
Operational Costs	**-100%**	not sensible enough to reach the benchmark	R$ 9.44/MWh

The project sponsors considered the variation level not feasible because:

Investment Value

The investment value was performed with positive variation (so above the initial investment value).

Energy Price

The actual values evidenced trough the public energy auction occurred in the CCEE brings values around R$144.00/MWh:
http://www.ccee.org.br/StaticFile/Arquivo/biblioteca_virtual/Leiloes/8_energia nova/Resultado planilha completa.xls
Also the ANEEL Reference Value (VR) to the 2008 year has R$ 139.44/MWh as the value to be performed.
The Reference Value is the value at wich the energy distributors can afford for the energy price trough the Power Purchase Agreement to the small power generators in the concession area: http://www.ccee.org.br/StaticFile/Oficio%200312008%20SEM%20Aneel.pdf

Plant Load Factor

This is an official value calculated and made public by the ANEEL agency and the value is in line with the Project Proponent calculation. Both calculations take into account the historical river flow series.

Operational Costs:

The Operational costs parameter was also analyzed, but presented not sensible enough to reach the benchmark Adopting zero for this parameter the IRR becomes 19.90%, so lower than the benchmark (R$ 9.44/MWh are the sum of the O&M and Management costs after the start).

Conclusion

Based on the explanation above the proposed CDM project activity is unlikely to be the most financially/economically attractive It is evident that the project must become a CDM in order to join the carbon credits revenue into the project cash-flow becoming better the profitability when comparing to other options that could led to the higher emissions.

Step 3: Barrier analysis

No necessary. As concluded in the sensitivity analysis the Project activity is not financial attractive.

Step 4: Common practice analysis

Sub-step 4a: Analyze other activities similar to the proposed project activity:

Were provided an analysis of any other activities that are operational implemented previously or currently underway and that are similar to the proposed project activity (in the same country, similar technology, similar scale – in this case was considered the SHPs with installed power above 14.02 MW (-50% than the SHP Cachoeirao) until 30 MW.

Other CDM project activities (registered project activities and project activities which have been published on the UNFCCC website for global stakeholder consultation as part of the validation process) were not included in this analysis[3].

[3] The sources for the research (public information available) are in the UNFCCC website – http://unfccc.int
ANEEL Fiscalization Datas of the Generation (May/2009) - http://www.aneel.gov.br/area.cfm?id_area=37
ANEEL SHPs under PROINFA program - http://www.aneel.gov.br/area.cfm?id_area=37

Due this we have that there are two incentive mechanisms presented (this information is based on the public information available), the Clean Development Mechanism (CDM) and the PROINFA.

PROINFA is a Brazilian governmental program that seeks to motivate, through the financial point of view, the development of entrepreneurships that make use of renewable technologies, due to the difficulties in financing, in offering guarantees to the finance suppliers and in the necessity of investments considered reasonable to small organizations. This way, the Federal Government tries to motivate projects through differentiated lines of finance, besides the guarantees of minimal revenues through the compromise of establishing Power Purchase Agreements (PPAs), to be firmed with a mixed economy society, Eletrobrás, which will secure to the entrepreneur a minimal revenue of 70% of the energy purchased during the financing period and complete protection to the risks of exposure in the short-term market. The SHPs projects are one of the types eligible to participate in the PROINFA.

Among the SHPs that become operational from the 2005 (when the CDM becomes effective) until 2009 (May) years, we have that none of them were implemented without the PROINFA incentive.

Thus all this facts it can be established that the SHP construction without incentives is not a common practice.

Table 6: Similar Scale Brazilian SHPs that become operational from 2005 until 2009 (May) – excluded the CDM´s SHP

	SHP	State	Incentive
2005			
	Excluded the CDM´s SHP no other become operational		
2006			
1	Esmeralda	RS	Proinfa
2	Mosquitão	GO	Proinfa
3	Piranhas	GO	Proinfa
4	São Bernardo	RS	Proinfa
2007			
1	Flor do Sertão	SC	Proinfa
2	José Gelásio da Rocha	MT	Proinfa
3	Ludesa	SC	Proinfa
4	Rondonópolis	MT	Proinfa
5	Santa Laura	SC	Proinfa
2008			
1	Alto Irani	SC	Proinfa
2	Alto Sucuriú	MS	Proinfa
3	Boa Sorte	TO	Proinfa
4	Bonfante	MG/RJ	Proinfa
5	Caçador	RS	Proinfa
6	Calheiros	RJ/ES	Proinfa
7	Carangola	MG	Proinfa
8	Colino II	BA	Proinfa
9	Cotiporã	RS	Proinfa
10	Da Ilha	RS	Proinfa
11	Funil	MG	Proinfa
12	Irara	GO	Proinfa
13	Jataí	GO	Proinfa
14	Lagoa Grande	TO	Proinfa
15	Plano Alto	SC	Proinfa
16	Santa Fé I	MG/RJ	Proinfa
17	Santa Rosa II	RJ	Proinfa
18	São Joaquim	ES	Proinfa
2009			
1	Linha Emília	RS	Proinfa
2	Monte Serrat	RJ/MG	Proinfa
3	São Simão	ES	Proinfa
4	São Lourenço	MT	Proinfa

Sub-step 4b: Discuss any similar Options that are occurring:

To well define the energy risks, we´ll describe a short overview about the brazilian electric sector:

History of the Brazilian Electric Sector

In recent decades, the Brazilian Electric Sector has undergone several changes until the current model. The energy sector was composed almost exclusively of government-owned companies, but since 1995, due to an increase in international interest rates and the incapacity of investment, the government was forced to seek for alternatives. The recommended solution was to begin a privatization process and deregulation of the market.

The table below shows a summary of the main changes between the pre-existing models and the current model, which ultimately result in changes in the activities of some agents of the sector.

Table 7: Summary of the several changes in the Brazilian Electric Sector.

Former Model (until 1995)	Free Market Model (1995 to 2003)	New Model (2004)
Financing using public funds	Financing using public and private funds	Financing using private and public funds
Verticalized Companies	Companies classified by activity: generation, transmission, distribution and commercialization	Companies classified by activity: generation, transmission, distribution, commercialization, imports and exports.
Predominantly State-controlled companies	Opening up of the market and emphasis on the privatization of the Companies.	Coexistence between State-controlled and Private Companies.
Monopolies – No competition	Competition in generation and commercialization.	Competition in generation and commercialization.
Captive Consumers	Both Free and Captive Consumers	Both Free and Captive Consumers
Tariffs regulated throughout all sectors	Prices are freely negotiated for the generation and commercialization.	In a free environment: Prices are freely negotiated for the generation and commercialization. In a regulated environment: auctions and bids for the least tariffs.
Regulated Market	Free Market	Coexistence between Free and Regulated Markets.
Determinative Planning – Coordinator Group for the Planning of Eclectic Systems (GCPS)	Indicative Planning accomplished by the National Council for Energy Policy (CNPE)	Planning accomplished by the Energy Research Company (EPE)
Hiring: Market 100%	Hiring : Market 85% (until August/2003) and Market 95% (until December/2004)	Hiring: Market 100% + reserve

Former Model (until 1995)	Free Market Model (1995 to 2003)	New Model (2004)
Energy Surplus/Deficit shared between the buyers.	Energy Surplus/Deficit sold in the Wholesaler Energy Market (MAE)	Energy Surplus/Deficit sold in the CCEE. Distributors Energy Surplus/Deficit compensation mechanism (MCSD).

Source: Electric Power Commercialization Chamber - CCEE[4]

Comparing the proposed project activity to any other similar activities it´s noted that the similar options enjoyed certain benefits that rendered it financially/economically attractive. The projects under PROINFA (http://www.mme.gov.br/programas/proinfa/) enjoy[5]:

- No liquidity risk: The Eletrobrás company is the responsible for the energy payment under a pre determined price;
- No legal risk (e.g. the agreement between the parties): With PROINFA established by law, this legal risk can be considered negligible. Because legally the institution is fully supported;
- No credit risk: With the issuance of the Eletrobrás papers, which has a local classification "AA" indicated by Standard & Poor's, it is considered that the company ability to honor commitments financial is very high;
  (source: http://www.acionista.com.br/home/investimentos/120805_fidc.htm)
- No market risk: With PROINFA, which has a pre determined value for energy prices during the 20-year contract, the volatility no longer exists, and the investor has certainty about the future sales. Then a fully short-term market risk exposure protection.

In the light of all explanation provided we can conclude, as outcome of the sub-step 4a and 4b, that the proposed project activity is not the common practice.

[4] Electric Power Commercialization Chamber – CCEE. Changes Made to the Brazilian Electric Power System: http://www.ccee.org.br/cceeinterdsm/v/index.jsp?vgnextoid=3df6a5c1de88a010VgnVCM100000aa01a8c0RCRD

[5] reference: http://www.cerpch.unifei.edu.br/Adm/artigos/619c3388da6cf7c7a73c9b6ae4c7ec09.pdf

Event	Date	Evidences
CDM benefits were considered decisive factor in the decision to proceed with the project	nov/05	Agreement between the project sponsors
Proposal from a consultant, considering developing the project activity under Kyoto Protocol	mar/06	CDM Consultant proposal
Service Order to the power plant construction start (**Start Date**)	mar/07	Project Schedule / Service Order document
SHP assembly Services beginning (Mobilization)	mar/07	ANEEL and Project Schedule
Studies to the CERs selling (upfront payment)	apr/07	E-mails / Documents
DOE offers requisition for validation services	aug/07	E-mails / DOE Offers
Unit #1 assembly beginning	may/08	Project Schedule
New DOE offers requisition for validation services due to the PDD development delay.	may/08	E-mails / DOE offers
Unit #2 assembly beginning	jul/08	Project Schedule
Unit #3 assembly beginning	aug/08	Project Schedule
Unit #1 commercial operation start date	dec/08	ANEEL
Unit #2 commercial operation start date	feb/09	ANEEL
Unit #3 commercial operation start date	feb/09	ANEEL
PDD registration is still in progress		

B.6. Emission reductions:

B.6.1. Explanation of methodological choices:

According to the methodology ACM0002 version 11, for hydro power project activities that result in new reservoirs , project proponents shall account for CH4 and CO2 emissions from the reservoir, estimated as follows:

a) If the power density of project (PD) is greater than 4W/m^2 and less than or equal to 10W/m^2:

$$PE_{HP,y} = \frac{EF_{Res} \cdot TEG_y}{1000}$$

Where :

$PE_{HP,y}$ Emission from water reservoir as tCO_2e/year;

EF_{Res} is the default emission factor for emissions from reservoirs, and the default value as per EB23 is 90 Kg CO_2e /MWh;

TEG_y Total electricity produced by the project activity, including the electricity supplied to the grid and the electricity supplied to internal loads, in year *y* (MWh).

b) If power density of the project is greater than 10W/m^2,

$PE_{HP,y} = 0$.

The power density of the project activity is calculated as follows:

$$PD = \frac{Cap_{PJ} - Cap_{BL}}{A_{PJ} - A_{BL}}$$

Where:

PD Power density of the project activity, in W/m^2.

Cap_{PJ} Installed capacity of the hydro power plant after the implementation of the project activity (W).

Cap_{BL} Installed capacity of the hydro power plant before the implementation of the project activity (W). For new hydro power plants, this value is zero.

A_{PJ} Area of the reservoir measured in the surface of the water, after the implementation of the project activity, when the reservoir is full (m^2).

A_{BL} Area of the reservoir measured in the surface of the water, before the implementation of the project activity, when the reservoir is full (m^2). For new reservoirs, this value is zero.

$$PD = \frac{28{,}500{,}000 - 0}{1{,}021{,}000 - 0} = 27.47$$

The reservoir Project emissions are zero to the SHP Cachoeirão because the Power Density is 27.47 W/m^2 so greater than 10 w/m^2.

The baseline emissions are the kWh produced by the renewable generating unit multiplied by an emission coefficient, calculated in a conservative and transparent manner, called combined margin (CM), which consists of a combination between the operation margin (OM) and the build margin (BM) according to the procedures in the methodological tool "Tool to calculate the emission factor for an electricity system".
For the baseline calculation, the six steps below should be followed:

STEP 1. Identify the relevant electric power system.
STEP 2. Select an operating margin (OM) method.
STEP 3. Calculate the operating margin emission factor according to the selected method.
STEP 4. Identify the cohort of power units to be included in the build margin (BM).
STEP 5. Calculate the build margin emission factor.
STEP 6. Calculate the combined margin (CM) emissions factor.

As mentioned in the section B.4, the operating margin and the build margin are made publicly available by the brazilian DNA.

The weights w_{OM} and w_{BM} should be 0.5.

Baseline Emissions

Baseline emissions (BE_y in tCO_2e) are the product of the baseline emissions factor ($EF_{grid,CM,y}$ in tCO_2/MWh) multiplied by the electricity supplied by the project activity to the grid ($EG_{PJ,y}$ in MWh), as follows:

$$BE_y = EF_{grid,CM,y} \cdot EG_{PJ,y}$$

Where:

BE_y = Baseline emissions in year y (tCO_2e/year);
$EG_{PJ,y}$ = Quantity of net electricity generation that is produced and fed into the grid as a result of the implementation of the CDM project activity in year y (MWh/year);
$EF_{grid,CM,y}$ = Combined margin CO_2 emission factor for grid connected power generation in year y calculated using the latest version of the "Tool to calculate the emission factor for an electricity system" (tCO_2/MWh).

Calculation of $EG_{PJ,y}$

The project activity is the installation of a new grid-connected renewable power plant/unit at a site where no renewable power plant was operated prior to the implementation of the project activity, thus classified as a Greenfield renewable energy power plant, then:

$$EG_{PJ,y} = EG_{facility,y}$$

Where:

$EG_{PJ,y}$ = Quantity of net electricity generation that is produced and fed into the grid as a result of the implementation of the CDM project activity in year y (MWh/year);

$EG_{facility,y}$ = Quantity of net electricity generation supplied by the project plant/unit to the grid in year y (MWh/year).

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

Data / Parameter:	Cap_{BL}
Data unit:	W
Description:	Installed capacity of the hydro power plant before the implementation of the project activity. For new hydro power plants, this value is zero
Source of data used:	Project site.
Value applied:	0
Measurements procedures (if any) :	Determine the installed capacity based on recognized standards
Any comment:	-

Data / Parameter:	A_{BL}
Data unit:	m^2
Description:	Area of the reservoir measured in the surface of the water, before the implementation of the project activity, when the reservoir is full (m^2). For new reservoirs, this value is zero.
Source of data used:	Project site.
Value applied:	0
Measurements procedures (if any) :	Measured from topographical surveys, maps, satellite pictures, etc.
Any comment:	-

B.6.3. Ex-ante calculation of emission reductions:

The baseline methodology considers the determination of the emissions factor to the grid which the project activity is connected as the core data to be determined in the baseline scenario. In Brazil, the grid is interconnected by the National Interconnected System (SIN) in a single system.

"Operating Margin Emission Factor (OM)" calculation ($EF_{grid,OM-DD,y}$)

The Dispatch Data emission factor (OM), is summarized as follows:

$$EF_{grid,OM-DD,y} = \frac{\sum_h EG_{PJ,h} \cdot EF_{EL,DD,h}}{EG_{PJ,y}}$$

For effect of *ex-ante* operation margin emission factor calculation will be used, like a good estimation to $EF_{grid,OM\text{-}DD,y}$ value, the arithmetic average of the 12 last monthly emission factors published by the DNA (ultimate datas available).
(http://www.mct.gov.br/index.php/content/view/303076.html#ancora)

Average Monthly Factor (tCO_2/MWh)												
year	2009											
month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
EF	0.2813	0.2531	0.2639	0.2451	0.4051	0.3664	0.2407	0.1988	0.1622	0.1792	0.1810	0.1940

So the Operationg Margin Emission Factor is:

$EF_{grid,OM\text{-}DD,y} = 0.2476$

"Build Margin Emission Factor (BM)" calculation ($EF_{grid,BM,y}$)

According to the used methodology, the build margin emission factor (BM) also needs to be calculated:

$$EF_{grid,BM,y} = \frac{\sum_{i,m} EG_{m,y}.EF_{EL,m,y}}{\sum_{m} EG_{m,y}}$$

For the build margin emission factor $EF_{grid,BM,y}$ will be adopted the 2009 year value published by the DNA (ultimate data available).
(http://www.mct.gov.br/index.php/content/view/303076.html#ancora)

$EF_{grid,BM,y} = 0.0794$

"Baseline Emission Factor" calculation ($EF_{grid,CM,y}$)

Finally the baseline emission factor (EFy) is calculated through a weighted-average formula, considering both the EF_{OMy} and the EF_{BMy} that gives:

$$EF_{grid,CM,y} = 0.2476 \cdot 0.5 + 0.0794 \cdot 0.5 = 0.163483 \quad (tCO_2/MWh)$$

The baseline emissions would be then proportional to the electricity delivered to the grid throughout the project's lifetime. Baseline emissions due to displacement of electricity are calculated by multiplying the electricity baseline emissions factor ($EF_{grid,CM,y}$) with the electricity generation of the project activity. Based on the Plant Load factor the $EG_{PJ,y}$ is supposed to be 143,401 MWh/year.

$$BE_y = EF_{grid,CM,y}. EG_{PJ,y}$$

$$BE_y = 0.163483 \cdot 143,401 = 23,444(tCO_2)$$

The emission reductions (**ER**) of this project activity are calculated as following:

$$ER_y = BE_y - PE_y$$

Where:
ER_y = Emission reduction in year y (tCO_{2e}/year);
BE_y = Baseline emissions in year y (tCO_2/year);
PE_y = Project emission in year y (tCO_2e/year)

The present project activity is a new project to be implemented, therefore, there is no energy generating equipment transferred from another activity.
The power density is greater than 10 W/m2, so the value for the emission of the reservoir is zero. Thus, the emission reductions are calculated as following:

$$ER_y = 23{,}444 - 0 = 23{,}444\ (tCO_{2e})$$

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

Table 8 : Ex-ante emission reduction estimative

Year	Estimation of project activity emissions (tCO_2e)	Estimation of Baseline emissions (tCO_2e)	Estimation of leakage (tCO_2e)	Estimation of Overall emission reductions (tCO_2e)
2011 (May)	0	15,629	0	15,629
2012	0	23,444	0	23,444
2013	0	23,444	0	23,444
2014	0	23,444	0	23,444
2015	0	23,444	0	23,444
2016	0	23,444	0	23,444
2017	0	23,444	0	23,444
2018 (April)	0	7,815	0	7,815
Total (tonnes CO_2e)	0	164,108	0	164,108

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

B.7.1 Data and parameters monitored:

Data / Parameter:	$EG_{facility,y}$
Data unit:	MWh/year
Description:	Quantity of net electricity generation supplied by the project plant/unit to the grid in year y.
Source of data:	Energy Meter
Value of data:	143,401
Measurement procedures (if any):	The net electricity delivered to the grid will be checked through the energy metering. The meter must comply with national standards and industry regulation to ensure the accuracy. The meter will be sealed for safety after calibration.
Monitoring frequency:	Hourly measurement and monthly recording.
QA/QC procedures to be applied:	These data will be used for calculate the emission reductions. The data will be archived monthly (electronic) and will be archived during the credit period and two years after. The data from the energy meters will be cross checked with the invoice of energy sales or with the CCEE databank in order to verify the coherency of the data.
Any comment:	-

Data / Parameter:	$EF_{grid,CM,y}$
Data unit:	tCO_2/MWh
Description:	Brazilian grid emission factor.
Source of data:	Based on data provided by DNA (Designated National Authority).
Value of data:	0.163483
Measurement procedures (if any):	The Combined Margin is calculated through a weighted-average formula, considering the $EF_{grid,OM-DD,y}$ and the $EF_{grid,BM,y}$ and the weights w_{OM} and w_{BM} default 0.5.
Monitoring frequency:	Annual
QA/QC procedures to be applied:	This data will be applied in the project emission reductions calculation.
Any comment:	-

Data / Parameter:	$EF_{grid,OM-DD,y}$
Data unit:	tCO_2/MWh
Description:	CO_2 Operating Margin emission factor of the grid, in a year *y*
Source of data:	Data provided by DNA (Designated National Authority) to the year *y*.
Value of data:	0.2476
Measurement procedures (if any):	The Operating Margin Emission Factor will be collected in the DNA website, which is responsible for this calculation.
Monitoring frequency:	Annual

QA/QC procedures to be applied:	This data, updated, will be applied in *ex-post* calculation of the Emission Factor.
Any comment:	-

Data / Parameter:	$EF_{grid,BM,y}$
Data unit:	tCO_2/MWh
Description:	CO_2 Build Margin emission factor of the grid, in a year *y*
Source of data:	Data provided by DNA (Designated National Authority) to the year y.
Value of data:	0.0794
Measurement procedures (if any):	The Build Margin Emission Factor will be collected in the DNA website, which is responsible for this calculation.
Monitoring frequency:	Annual
QA/QC procedures to be applied:	This data, updated, will be applied in *ex-post* for the calculation of the Emission Factor.
Any comment:	-

Data / Parameter:	Cap_{PJ}
Data unit:	W
Description:	Installed capacity of the hydro power plant after the implementation of the project activity.
Source of data:	Project site.
Value of data:	28,500,000
Measurement procedures:	Technical specifications on the installed equipments.
Monitoring frequency:	Yearly monitoring frequency.
QA/QC procedures to be applied:	This data will be applied for the Power Density calculation.
Any comment:	-

Data / Parameter:	A_{PJ}
Data unit:	m^2
Description:	Area of the reservoir measured in the water surface, after the implementation of the project activity, when the reservoir is full.
Source of data:	Reservoir in the Project site.
Value of data:	1,021,000
Measurement procedures:	Measured from topographical surveys, maps, satellite pictures, etc.
Monitoring frequency:	Yearly monitoring frequency.
QA/QC procedures to be applied:	Data will be monitored and recorded by project developer. This data will be applied for the Power Density calculation
Any comment:	

B.7.2. Description of the monitoring plan:

The monitoring plan for the project activity is based on the methodology ACM0002 and consist of the monitoring of the electricity generation from the proposed project activity, the surface area of reservoir at the full reservoir level, the installed capacity of the plant after project implementation and emission factors..

1) Power generation and measurement system:

General characteristics of the measurement system:

The procedures design for monitoring electricity generation by the project activity follows the parameters and regulations of the Brazilian energy sector. The National Grid Operator (ONS) and the Electric Power Commercialization Chamber (CCEE) are the organs responsible for specification of the technical requirements of energy measurement system for billing, that is, those bodies monitor and approve projects for accurate accounting of energy.

The agent responsible for the measurement system for billing (SMF) develop the project in accordance with the technical specifications of the measurements for billing, which should include the location of measurement points, panels of measurement, meters and systems for local and remote measurement.

The measurement system makes the measure and records the energy. This is installed in the panels of measurement, which are located in the control room or cabins of measurement. For this system is guaranteed the inviolability of data, which must be sealed for safety after calibration or sealed with electronic passwords.

The measurement system contains also a communication system that has the function of sending the data from dispatched electricity for the grid to the CCEE.

Data monitoring:

The readings of meters are used for calculating the emission reductions. The monitoring steps are as follows:

(1) The data will be measured hourly and recorded monthly;
(2) The power output settlement sheet, sales receipts will be used to cross check the monitored data and/or with the CCEE data measured (from CCEE databank – SINERCON);
(3) The project owner provides DOE with readings record of meters, access to the CCEE data measured and if necessary the sales invoices;
(4) The SHP operational structure will be done by a third party company[6];

[6] The third party company works with automation systems, assuring greater security, agility and efficiency, the company is able to do the power plant and substations control remotely, through the Operation Center.
For more details: http://www.grupoenergisa.com.br/Default.aspx?tabid=3995

(5) The operational structure should be managed by the Hidrelétrica Cachoeirão management responsible;
(6) The emission reductions and any project emission should be managed by the Carbotrader project manager responsible;

Quality control:

(1) Calibration of meters
The calibration of meters conducted by qualified organization must comply with national standards and industrial regulations to ensure the accuracy. The meters must be sealed for safety after calibration. The calibration records must be archived together with other monitoring records. The class of accuracy in the equipment that will be used in the project activity is under the national standards (NBR 14519 from Associação Brasileira de Normas Técnicas – Brazilian Association of Technical Standards). It can be viewed in the Grid Procedures from the National Grid Operator: Module 12, Sub-module12.2 Installation of the Measurement System for Billing in the link:

http://www.ons.org.br/download/procedimentos/modulos/Modulo_12/Submodulo%2012.2_Rev_1.0.pdf

(2) Emergency treatment

In case of unavailability of measures from any point of measurement, due to maintenance, commissioning or for any other reason, will be used the methodology to estimate data as the item 14.3 of the Procedure of Energy Commercialization PdC ME.01[7]

Data Management:

All the project activity issues regarding the SHP's construction will be treated by the responsible SPE Cachoeirão Energy Directors.

The monitoring data will be stored during the project's duration. In this case this means 7 years (one period duration) plus 2 years after it ends according to the methodology. If the project is renewed for another two periods, the data will be stored for 21 years plus 2 years, making up a total of 23 monitoring years.

All data gathered in the monitoring range will be electronically filed and kept for at least 2 years after the last crediting period. The crediting to be generated will be calculated regularly by the project proponents and kept for the verification phase.

Training Procedures:

All the training necessary for the plant operational team (eventually remote and local operators) will be provided or will be required from the third party service provider during the plant construction and during the plant commercial operation

Furthermore, operation, maintenance and calibration procedures will follow the national guidelines set by the National Grid Operator.

[7] ttp://www.ccee.org.br/cceeinterdsm/v/index.jsp?vgnextoid=67778d3ef9a3c010VgnVCM1000005e01010aRCRD

2) Emission Factors:

The Emission Factor related to this project activity ($EF_{grid,CM,y}$, $EF_{grid,OM-DD,y}$ e $EF_{grid,BM,y}$) as mentioned previously, are available by the brazilian DNA and it can be viewed at its website (www.mct.gov.br/clima). Thus, the monitoring of this data will be ex-post through periodic access to data provided by DNA.

3) Installed capacity of the hydro power plant – Cap_{PJ}:

The installed capacity of the hydro power plant after the implementation of the project activity will be monitored yearly through one of the following options:

- Technical specifications on the installed equipments;
- Installed plaques in the equipments;
- Factsheets.

In Brazil, the installed capacity of hydropower plants is determined and authorized by the competent regulatory agency. Furthermore, any modification must also be authorized and made available to the public. Thus, annually, any new authorization to increase the installed capacity of plan will be monitored. It will be used to installed capacity, which is also a recognized standard to assure the designed project and technical characteristics.

4) Area of the reservoir – A_{PJ}:

The area of the reservoir will be measured yearly in the surface of the water, after the implementation of the project activity, when the reservoir is full.

Measured from topographical surveys, maps, satellite pictures, etc. Also, the reservoir area can be determined depending on the reservoir level, because hydroelectric plants dispatched by ONS have to monitor their reservoir level. The data used for this purpose can be used to determine the reservoir area and will be also an measurement procedure to be considered to the project activity.

Authority and Responsibility

The Hidrelétrica Cachoeirão S.A is the responsible for the maintenance and calibration of the monitoring equipments, compliance to operational requirements and corrective actions related to the functionality of the project activity. Moreover, the company has authority and responsibility for registration, monitoring, and measurement as well as managing all issues about the project activity, also to organize staff and third party training to use appropriated techniques related to the applicable legislation.

The Baseline, Project Emissions (if applicable) and Emissions Reductions calculations will be performed by the Carbotrader Assessoria e Consultoria em Energia Ltda wich should report the results in a proper way to the entities related with the CDM process.

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

Date of completing the final draft of this baseline section: 10/09/2010.

The entity responsible for its development is:

Company:	CARBOTRADER Ltda.
Address:	Rua 23 de Maio, Nº 790, sala 22A
City :	Jundiaí
State:	São Paulo
Zip code :	13.207-070
Country:	Brazil
Phone:	(55) 11 4522 – 7180
Fax:	(55) 11 4522 – 7180
E-mail:	carbotrader@carbotrader.com
URL:	www.carbotrader.com
Represented by:	Mr
First Name:	Arthur
Last Name:	Moraes
Job title:	Director

Carbotrader is also a Project Participant 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:

09/03/2007 (Service Order to the power plant construction start, so the Project participant's commitments with majore expenditures – evidenced trough the service order).

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:

7 years at most (may be renewed at most two times, 7 years each).

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

01/05/2011 or the date in which occurs the UNFCCC registration, the one that occurs 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. Documentation on the analysis of the environmental impacts, including transboundary impacts:

With respect to regulatory permits:

The **Cachoeirão** Small Hydro Power Plant has autorizations issued by ANEEL:

- ANEEL Resolution # 282, dated 26 July 2000 - authorizes Empresa de Luz e Força Santa Maria SA-ELFSM (27.00 MW) to implement and explore Cachoeirão SHP;
- ANEEL Resolution 557, dated 15 October 2002 - transfers the authorization to implement and explore Cachoeirão SHP from ELFSM to Santa Maria Energética SA.;
- ANEEL Dispatch # 1,214, dated 23 April 2007 - approves the Cachoeirão basic project (27.0 MW) and defines a reservoir area of 1.021 km2 and coordinates 19º 26' 12" S 41º 36' 51" W;
- ANEEL Authorization Resolution # 908, dated 8 May 2007 - transfers the authorization to implement and explore Cachoeirão SHP from Santa Maria Energética S.A. to Hidrelétrica Cachoeirão S.A.;
- ANEEL Decree # 18, dated 25 May 2007 - defines a 16.37 MW (average) assured energy for the Cachoeirão SHP;
- ANEEL Dispatch # 4830, dated 30 December 2008 - authorizes 9,000 kW generator unit # 1 to start operation;
- ANEEL Dispatch # 559, dated 11 February 2009 - authorizes 9,000 kW generator unit # 2 to start operation;
- ANEEL Dispatch # 714, dated 27 February 2009 - authorizes 9,000 kW generator unit # 3 to start operation.
- ANEEL Resolution # 407, dated 19 October 2000, establishes that if the present/real installed capacity is greater than +/- 5 % of the authorized (granted) installed capacity, a revision of the

authorized installed capacity should be requested.

With respect to environmental permits legislation requires issuing of following licenses:

- **Preliminary License (LP):** preliminary phase of planning activity in which concept and location of enterprise are evaluated. In this phase Environmental Impact Study (EIA) and Environmental Impact Report (RIMA) are analysed, or, depending on the case, the Environmental Control Report (RCA).
- **Installation License (LI):** authorizes implementation of enterprise. In this phase, the Environmental Control Plan (PCA) is analysed, it contains projects for systems of treatment and/or disposing of liquid and atmospheric effluents and solid residue etc.
- **Operation License (LO):** authorizes operation of enterprise after verification of compliance with measures determined in phases of LP and LI.

The **Cachoeirão** Small Hydro Power Plant has the following Environmental License:

- LO – Operation License – COPAM in 10/10/2008 (this one replace the prior licenses).
- APEF – Forest Explorer Authorization issued by the Forest State Institute - Instituto Estadual de Florestas (IEF) - in 13/07/2007.
- APEF – Forest Explorer Authorization issued by the Forest State Institute - Instituto Estadual de Florestas (IEF) - in 10/04/2008.

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:

The environmental impacts from SHPs activities are not considered significant by the participants of the project. But several environmental improvement actions were made.

All SHP from the Project activity has a Environmental Management Guidelines (Plano de Controle Ambiental – PCA). The studies have a project influence area environmental diagnostic, and, more than this has a variety of programs and activities that foresee to minimize the negative effects and assesses the changes resultants from the hydric system installations.

The SHP Cachoeirão main activities are described as the following:

- Social Comunication Projects, Environmental Education and the Monitoring of Social-Economic Aspects.
- Monitoring Programs of Forest Fragments, Ichthyofauna, Herpetofauna, Birds and Mammals threatened of extinguishing and Aquatic Macrophyte/Freshwater Mollusc Fauna Control.
- Water Quality Monitoring, Affluent and Deffluent Flows to the Reservoir , Freatic Sheet and Climate Programs.

- Programs of Rescue of the Fauna and Fishes during the transposition of the River and full filling of the Reservoir.
- Soil Conservation Projects, Reconstitution of the Ciliar Flora and Recovery of Degraded Areas.
- Elaboration of Viability Study of Implantation of the RPPN at Entrepreneur Lands.
- Sewer Treatment Project for the Barra Mansa and Cachoeirão inhabitants.
- Managing Reservoir Plan and Around.
- Promotion to Husbandry Program.

SECTION E. Stakeholders' comments

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

In accordance to Ruling nº.1, dated 11 September 2003 and Ruling nº7, of the Inter-Ministry Commission on Global Climate Change (CIMGC), any CDM projects shall send a letter describing the project and request commentaries by local interested parties.

The project activity applies to only one state of the federation, thus, the invitations of comments should be addressed to the following actors involved and affected by the project activities:

- City Hall and City Councils;
- State environmental body and Municipal environmental body;
- Brazilian Forum of NGOs and Environmental and Development Social Movements - http://www.fboms.org.br;
- Community associations;
- State Prosecutors Office;
- National Prosecutors Office.

In order to satisfy and comply with this ruling the project proponents sent invitation letters describing the project, and requested commentaries by the following interested parties:

- Alvarenga City Hall;
- Alvarenga City Council;
- Alvarenga Environmental Secretary;
- Alvarenga Comunity Association;
- Pocrane City Hall;
- Pocrane City Council;
- Pocrane Environmental Secretary;
- Cachoeirão Comunity Development Association;
- FEAM – State environmental body;
- Brazilian Forum of NGOs;
- Minas Gerais State Prosecutors Office;
- National Prosecutos Office.

The interested parties above were invited to present their concerns and provide comments on project activity during a period of 30 days after receipt of the invitation letter.

E.2. Summary of the comments received:

So far no comments were received from interested parties.

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

Not applicable due to the item E.2.

Annex 1

CONTACT INFORMATION ON PARTICIPANTS IN THE PROJECT ACTIVITY

Organization:	Hidrelétrica Cachoeirão S.A.
Street/P.O.Box:	Rodovia Km 27 da Estrada de Pocrane, Povoado de Cachoeirão
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Personal e-mail:	

Annex 2

INFORMATION REGARDING PUBLIC FUNDING

There is no Kyoto Protocol Annex 1 country public fund financing this project activity.

Annex 3

BASELINE INFORMATION

The CO_2 emission factors resulting from the generation of electricity verified in Brazil's National Interconnected System (SIN) are calculated from the plants power generation records issued centrally by the National Grid Operator, especially in thermoelectric plants. This information is necessary to renewable energy projects connected to the national grid and implemented in Brazil under the Kyoto Protocol's Clean Development Mechanism (CDM).

The baseline emissions are calculated according to the "Tool to calculate the emission factor for an electricity system". With this methodology the National Grid Operator (ONS) is tasked with explaining the SIN´s (National Interconnected System) operational practices regulated by the ANEEL (Brazilian Electricity Regulatory Agency) to the work group made up by the Ministry of Science and Technology (MCT) and Ministry of Mines and Energy (MME). According to this system, the CO2 Emission Factors applicable to the project activity, will be calculated by the National Grid Operator (ONS) for the single system since May 27, 2008.

More details about baseline development of this project can be found through this links:
http://www.mct.gov.br/index.php/content/view/73318.html and
http://www.mct.gov.br/index.php/content/view/13986.html.

Annex 4

MONITORING INFORMATION

Data variable	Source of data	Data unit	Measured (m), calculated (c) or estimated (e)	Recording frequency	Propotion of data to be monitored	How will the data be archived? (eletronic/paper)	Comments
$EG_{facility,y}$	Project Activity	MWh	m	montlhy	100%	electronic	The electricity delivered to the grid will be checked trough the energy metering, data acquisition software and cross checked through CCEE databank.
$EF_{grid,CM,y}$	DNA	tCO_2/MWh	c	annually	100%	electronic	These data will be monitored through *ex-post* calculation. The data's will be available by the DNA (Designated National Authority) website.
$EF_{grid,OM-DD,y}$	DNA	tCO_2/MWh	m	Annually or montly	100%	electronic	The Operating Margin Emission Factor, will be monitored in the DNA website, which is responsible for this calculation.
$EF_{grid,BM,y}$	DNA	tCO_2/MWh	m	annually	100%	electronic	The Build Margin Emission Factor, will be annually monitored in the DNA website, which is responsible for this calculation.
Cap_{PJ}	Project Activity	W		Annually	100%	electronic	The installed capacity will be checked through recognized standards as technical specifications on the installed equipments, installed plaques in the equipments, factsheets and can be assured by authorizations issued by the Brazilian Electricity Regulatory Agency.
A_{PJ}	Project Activity	m^2	m	Annually	100%	electronic	The reservoir area will be monitored through recognized standards as topographical surveys, maps, satellite pictures and can be determined through the reservoir level.