'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:

>>

Project title: Ceran´s Castro Alves Hydro Power Plant CDM Project Activity (hereafter referred to as "*HPP Castro Alves*").

PDD Version number: 1.

Date: July 20, 2007.

A.2. Description of the project activity:

>>

The main objective of *HPP Castro Alves* is to help meet the growing demand of electric energy in Brazil, due to economic growth and to increase the supply of electricity, while contributing to environmental, social and economic sustainability by increasing renewable energy's share of the total Brazilian (and the Latin American and Caribbean region) electricity consumption.

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

The Brazilian electric sector privatization process initiated in 1995 was undertaken expecting adequate tariffs and better prices for the generators. It drew the attention of investors for possible alternatives that were unavailable in the centrally planned electricity market. At the end of the 90's, a strong increase in demand coupled with a under-average increase in installed capacity caused the supply rationing/crisis from 2001/2001. One of the solutions the government offered was flexible legislation favoring small-scale independent electric energy producers. Furthermore, occasional eligibility according to the Clean Development Mechanism from the Kyoto Protocol drew investors' attention to hydropower projects.

This indigenous and cleaner source of electricity will also bring an important contribution to environmental sustainability, reducing carbon dioxide emissions that would have occurred in the absence of the project. The project activity reduces greenhouse gas (GHGs) emissions, so avoiding electricity generation by fossil fuel sources (and CO_2 emissions), which would be generating (and emitting) in the absence of the project.

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

The *HPP Castro Alves* will improve the supply of electricity when dispatching through the SIN (National Integrated System) with clean and renewable hydroelectric power, while contributing to the regional/local economic development.

Background

The first studies in the hydrographic basin of the Taquari/Antas River go back to the 30's, when the presently inactive company, *Empresas Elécticas Brasileiras S.A.* (Brazilian Electric Companies Inc.), proposed the construction of three hydropower plants in the basin.

In the 90's, CEEE – *Companhia Estadual de Energia Elétrica* (State Company of Electric Energy) utility companies in the state of Rio Grande do Sul carried out several investigative studies of the basin's hydro potential, culminating in the identification of 57 sites with powers varying from one to 130 MW. On the Antas River, specifically, 20 sites were selected, among them *Castro Alves(figure 1)*, *Monte Claro* and *14 de Julho* with 130 MW, 130 MW and 100 MW of installed power, respectively.

Composed of *HPP Castro Alves*, *HPP Monte Claro and HPP 14 de Julho*, the Antas River Energy Complex is situated mid-stream on the Antas River, in the Northeastern region of the state of Rio Grande do Sul, serving the cities of Bento Gonçalves, Veranópolis, Cotiporã, Nova Roma do Sul, Nova Pádua, Flores de Cunha, and Antonio Prado.

Figure 1 – *HPP Castro Alves.*, downstream works. (Source: Ceran)

1. **Service Bridge**
2. **Dam**
3. **River Deviation through the flood-gate**
4. **Water intake**
5. **Access tunnel to the adduction tunnel**

Figure 2 – *HPP Castro Alves.,* upstream works. (Source: Ceran)

1. **Substation Yard**
2. **Escape Channel**
3. **Access tunnel to the Power House**
4. **Access tunnel to the balance chimney**

HPP Castro Alves will initiate commercial operation according to the following schedule:

Activities	**Date**
▪ Begin concreting the strong house	01/06/2006
▪ Lower the 1st turbine rotor	01/06/2007
▪ Begin operation of 1st hydro generator unit	01/12/2007
▪ Begin operation of 2nd hydro generator unit	01/02/2008
▪ Begin operation of 3rd hydro generator unit	01/04/2008

Table 1: HPP Castro Alves Schedule

A.3. Project participants:

>>

The credit owner and Project CDM´s Focal Point of HPP Castro Alves, the private company *Companhia Energética Rio das Antas* is the author and responsible entity for all the project activities related to management, approving, registering, monitoring, measurement and reporting.

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)	Private Entity: CERAN (*Companhia Energética Rio das Antas*)	No
	Private Entity: *C-Trade Comercializadora de Carbono Ltda*	No
(*) In accordance with the CDM modalities and procedures, at the time of making the CDM-PDD public at the stage of validation, a Party involved may or may not have provided its approval. At the time of requesting registration, the approval by the Party(ies) involved is required.		

Table 2 – Private and public parties and entities involved in the activity

Detailed information for contact with the party (ies) and with the public/private entities involved in the project activity is related in Annex 1.

This project was developed under the responsibility of CERAN with the support of *C-Trade Comercializadora de Carbono Ltda.* All the activities are being developed in and limited to Brazil.

The following is a brief description about the companies involved in the project:

CERAN (*Companhia Energética Rio das Antas*)

In November 2000, the Consortium consisting of CPFL - *Geração de Energia S.A., CEEE - Companhia Estadual de Energia Elétrica,* from the state of Rio Grande do Sul, and *DESENVIX S.A.* was declared the winner of the Brazilian Power Regulatory Agency (ANEEL – *Agência National de Energia Eléctrica*) acquisition contract, according to Auction Notice *Nº 03/2000*, referring to the Concession Request for implantation and operation of the hydropower sites on the Antas River in the state of Rio Grande do Sul.

Giving sequence on that process, on January 11th, 2001, CERAN - *Companhia Energética Rio das Antas*, a close corporation, was founded. Nowadays CERAN has the following shareholders´ structure:

- CPFL Geração de Energia S.A.: 65%
- CEEE – Companhia Estadual de Energia Elétrica: 30%
- Desenvix S.A.: 5%

The company's social objective is to implant and operate the hydropower sites on the Antas River Energy Complex. The Complex consists of the *Monte Claro*, *Castro Alves* and *14 de Julho* Power Plants.

The Concession Contract nº 08/2001 for the Use of Public Property was signed on March 15th, 2001. It conferred Ceran the rights to establishment and operation of the hydroelectric uses mentioned above, for 35 years.

The operation of the three Power Plants will represent an increase of 360 megawatts in the installed power of Rio Grande do Sul. This means, approximately, 10% of the current demand of electric power of the State.

In October 2001, FEPAM – State Foundation of Environmental Protection (*Fundação Estadual de Proteção Ambiental*) authorized the Preliminary License for the three HPP Castro Alves enterprises. The *HPP Castro Alves* Installment License was authorized on July 11th, 2002.

Projects as HPP Castro Alves are associated to the intensive use of labor during the phase of construction of the Power Plant, besides the future operation teams and maintenance. In 2007 3.228 people's were worked in Ceran Complex´s works, of which 2.077 were allocated in HPP Castro Alves.

C-TRADE COMERCIALIZADORA DE CARBONO LTDA.

C-Trade is a private company created for the purpose of identifying, certifying and negotiating Carbon Credits. C-Trade develops studies and analyses aimed towards the development of greenhouse gas (GHG) emissions reduction projects. Not only the identification but also the validation and certification of CERs (Certified emission reductions) fall within the scope of these projects.

The C-Trade team is specialized in the identification and reduction development of GHG emissions that are effected directly or indirectly by each project, among these: Small Power Plants, Electric and Biomass Power Plants, Wind Power Plants, substitution of petroleum fuels, reforestation projects and sanitary landfills.

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.:

>> State of Rio Grande do Sul.

A.4.1.3. City/Town/Community etc:

>> Nova Pádua, Flores da Cunha, Nova Roma do Sul and Antonio Prado.

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

>>

Figure 3 – Location HPP Castro Alves (Source: Google Earth)

HPP Castro Alves is located on the Antas River, the hydrographic basin of the Taquari-Antas river, between the cities of Nova Pádua and Flores da Cunha (left bank) and Nova Roma do Sul and Antonio Prado (right bank) in the State of Rio Grande do Sul, South of Brazil.

The geographic coordinates of HPP Castro Alves are:

- Latitude: 29º00'30" South
- Longitude: 51º22'45" West

The figure 3 shows the localization of HPP Castro Alves under these coordinates.

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

>>

Sectoral Scope 1 – Energy Industries (Renewable Source)

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

>>

HPP Castro Alves will exploit the Antas River water to generate electricity of 130 MW of installed capacity. This run-of-river[2] project has a small reservoir of 5 km^2, and complies with Brazilian regulations for HPP projects.

Below are the principal parameters of *HPP Castro Alves*:

Power and Energy			**Forced Tunnels**	
Installed Power	130 MW		Amount	3
Assured Power	107.9 MW		Total lenght	200 m
Assured Energy	64 MW average		Lenght armored passage	20.5 m
			Section armored passage	Ø 3.3 m
Hydrology and Hydraulics			Section passage in concrete	4.8 m
Daily maximum flow	4,129.00 m^3/s			
Long Term medium flow	162.00 m^3/s		**Power House**	
Flow - 10 years	9,011.00 m^3/s		Type	Underground
Reference Fall	83.6 m		Lenght with assembly area	87.5 m
Project Fall	86.4 m		Widht	18.9 m
Operational max fall	90.3 m		Max lenght	39.6 m
Operational min fall	79.5 m			
Exceptional min fall	80.7 m		**Turbines**	
			Type	Francis
Dam with sill slope			Number o turbines	3
Type	Gravity, in CCR		Nominal Power	44.58 MW
Top lenght	341 m		Reference flow	58.52 m^3/s
Max foundation height	48 m			
Sill slope lenght	240 m		**Generators**	
Sill slope elevation	240 m		Type	Synchronous of vertical axis
			Nominal Power	48.461 MVA
Watter intakes			Power Factor	0.9
Type	Relieved gravity		Nominal Voltage	13.8 kV
Intakes number	1		Nominal Rotation	300 rpm
Sill elevation	225.5 m		Poles´ number	24
Crowing elevation	250 m			
openings number	2			
gap opening	(4.55 x 8) m		**Reservoir**	
			Volume (Watter level max normal)	91.77 x 10^6 m^3
Delivery Tunnel			Max depth	45 m
Amount	1		Max level	240 m
Section	Arch-Rectangle		Min level	239 m
Dimensions	11.45 x 8 m		Max level of inundation	246.36 m
Lenght	7,090.7 m		Flooded area (elevation 240.00)	5 km^2

Table 3 – Technical Description of the *HPP Castro Alves* Project

[2] There is a good definition from Silenced Rivers: "While run-of-river dam raise the water level upstream they create only a small reservoir ("head pond") and cannot effectively regulate downstream flows. A wier is normally a low wall of stone, concrete or wicker. The electricity generation of a run-of-river hydropower dam is proportional to the flow of the river at any one time. (Source: World Commission on Dams)

Summarizing the table 2, the facility description is as follows:

- 86.40 m waterfall for a total installed capacity of 130 MW (3 Francis turbines of 44.58 MW), and the yearly firm electric energy output of 560,640 MWh annual (assured power of 64 MW averages). The first Francis turbine began operation on December 1st, 2007. The second turbine will begin operation on February 1, 2008. Finally, the third turbine will begin commercial operations in April 2008.

- Reservoir size is 5 km² and the gross power density is 26 W/m^2.

The figures 4.1 to 4.4 are detaching the work process of HPP Castro Alves. (Source: CERAN – Status Reporting from May 21 to May 27 of 2007).

Figure 4.1 – Power House – Generation Unity 01 – Source: CERAN

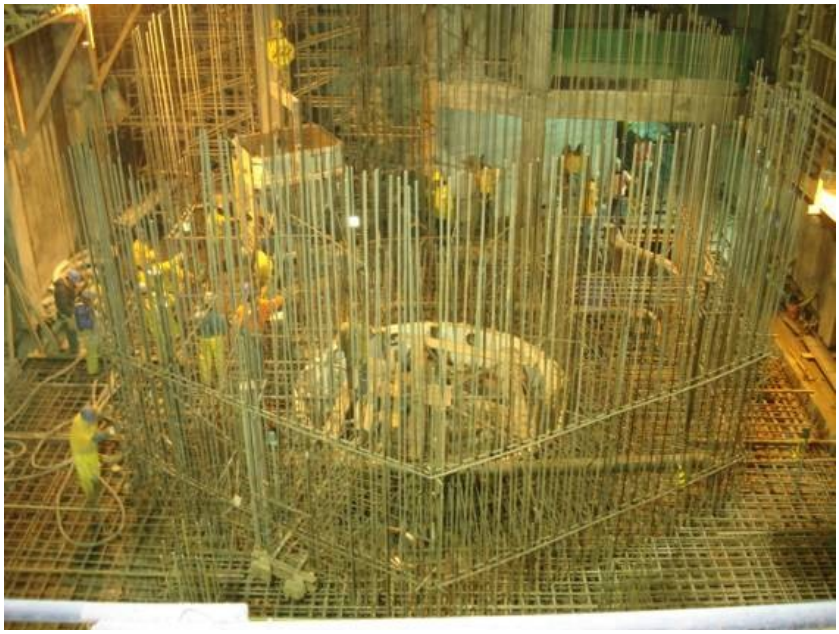


Figure 4.2 – Power House – Generation Unity 3– Source: CERAN

Figure 4.3 – Dam – Upstream General View – Source: CERAN

Figure 4.4 – Dam – Downstream General View – Source: CERAN

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

>>

Using the ex-post emission factor of the baseline calculated at **0.5662** tCO2e/MWh (2006), the complete implementation of the *HPP Castro Alves Project,* connected to the South Brazilian interconnected grid, will generate an yearly average estimated reduction of **314,636 tCO_{2e}** and a total reduction of **2,202,454 tCO_{2e}** during the first 7-year-period, described in the table below:

Year	Annual estimation of emission reductions in tonnes of tCO_2e
***2007**	15,234
2008	307,900
2009	317,252
2010	317,252
2011	317,252
2012	317,252
2013	317,252
****2014**	293,059
Total estimated reductions (tonnes of CO_2e)	**2,202,454**
Total number of crediting years	**7**
Annual average over the crediting period of estimated reductions (tonnes of CO_{2e})	**314,636**

*2007 accounts just the generation of December (from Dec/1/2007 to Dec/31/2007)
**2014 accounts 11 months of generation (from Jan/1st/2014 to Nov/30/2014)

Table 4 – Estimation of emissions reductions of the *HPP Castro Alves* Project

A.4.5. Public funding of the project activity:

>>

The parties involved in Annex I for the project activities solicited no public funding.

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:

>>

- Baseline methodology: ACM0002 – "Consolidated baseline methodology for grid-connected electricity generation from renewable sources", version 6, May 19th, 2006.

- Monitoring methodology: ACM0002 – Consolidated monitoring methodology for zero emissions grid-connected electricity generation from renewable sources", version 6, May 19th, 2006.

- Tool for Demonstration and Assessment of Additionality, Version 3.

For more information about the methodology consult the following link:

http://cdm.unfccc.int/methodologies/PAmethodologies/approved.html

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

>>

According to the methodology ACM0002 its been applicable to grid-connected renewable power generation project activities under the following conditions:

- Applies to electricity capacity addition from:
  - Run-of-river hydro power plants; hydro power projects with existing reservoirs where the volume of the reservoir is not increased.
  - New hydro electric power projects with reservoirs having power densities (installed power generation capacity divided by the surface area at full reservoir level) greater than 4 W/m^2.
  - Wind Sources;
  - Geothermal sources;
  - Solar sources;
  - Wave and tidal sources.

  HPP Castro Alves is a new hydro electric power project with reservoir having power density equals 26 W/m^2, greater than 4 W/m^2 (also greater than 10 W/m^2), as follows:

  - **Power Density of the Reservoir =** Installed Power Generation Capacity ÷ Surface area at full reservoir level = 130 MW ÷ 5 km^2 **= 26 W/m^2** **(Formula 1 of PDD)**

- This methodology is not applicable to project activities that involve switching from fossil fuel to renewable energy at the site of the project activity, since in this case the baseline may be the continued use of fossil fuels at the site;

Not applicable.

- The geographic and system boundaries for the relevant electricity grid can be clearly identified and information on characteristics of the grid is available;

  The geographic data and the relevant electricity grid system limits can be clearly identified, as well the available information about the grid. Sources: ONS (www.ons.org.br): ANEEL (www.aneel.gov.br).

  In addition, the great territorial extent of Brazil and its vast hydro potential were determining factors in the definition of the present Brazilian sector of electricity generation, which is predominantly hydro-based. The future scenario points to increasing consumption of fossil fuels, mainly natural gas, in accordance with the intention of the government to diversify the Brazilian power supply.

- Applies to grid connected electricity generation from landfill gas capture to the extent that it is combined with the approved "Consolidated baseline methodology for landfill gas project activities". (ACM0001).

  Not applicable.

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

>>

Greenhouse gas (GHG) emissions by the project activity are equal to zero (PE_y = 0), according to the ACM0002: **"(II) New Hydro electric power projects with reservoir, project proponents shall account for project emissions, estimated as follow:** If the power density of project is greater than 10W/m^2, PE_y=0."

	Source	Gas	Included?	Justification / Explanation
Baseline	Electricity Generated to the Grid	CO_2	Included	In accordance with ACM0002 only the CO_2 emissions from the electricity generation must be taken into account.
		CH_4	Excluded	
		N_20	Excluded	

	Source	Gas	Included?	Justification / Explanation
Project Activity	Hydropower Electricity Generation	CO_2	Excluded	The power density of project is 26 W/m^2 (formula 1), greater than 10W/m^2, so GHGs from the project activities must not be considered (PE_y=0).
		CH_4	Excluded	
		N_20	Excluded	

Table 5 – Project Activities GHG Emissions

Project Boundaries

The project boundaries are defined by the emissions directed or directly affected by the project activities, construction and operation. It encompasses the geographic and physical site of the hydropower generation source, which is represented by the corresponding basin to the river of each project, close to the power plant and the interconnected grid.

Brazil is a country with great territorial dimensions and it is divided in five geographical macro-areas: North, Northeast, Southeast, South and Midwest. Thus electric energy generation, and consequently, transmission are concentrated in four subsystems: South, Southeast/Midwest and Northeast. Electric energy expansion was concentrated in two specific areas:

- North/Northeast: This region's electricity is basically supplied by the São Francisco River. There are seven hydropower plants on the river, with a total installed capacity of approximately 10.5 GW. Eighty percent of the Northern region is supplied by diesel fueled power plants;

- South/Southeast/Midwest: The majority of the electricity generated in the country is concentrated in this subsystem. These regions also concentrate 70% of GDP generation in Brazil. There are more than 50 hydropower plants generating electricity for this subsystem.

From 2006 on, the Brazilian Science and Technology Ministry (MCT), Energy and Mines Ministry (MME) and the National System Operation (ONS) have divided the subsystem South/Southeast/Midwest into two subsystems, South and Southeast/Midwest, to calculate the Emission Factors; those are available since January 2006 for investors and public to be consulted.

The boundaries of the subsystems are defined by the transmission capacity. The transmission lines between the subsystems are defined by the transmission capacity. The lack of transmission lines forces the concentration of generated electricity in each of the subsystems. Thus, the South interconnected subsystem of the Brazilian grid, where the project activity is located, is considered a boundary.

The HPP Castro Alves is located in the South Subsystem.

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

>>

According to ACM0002, for project activities that do not modify or remodel an existing electricity generating plant, the baseline is as follows:

- "The electricity delivered to the grid by the project would have been generated another way by the operation of a grid-connected power plant and by the addition of new generating sources, reflected in the combined margin described in the item B.6.1 of the PDD".

In the absence of a project the electricity should continue to be generated by the present mix of generation operating for the grid. The HPP Castro Alves generation will avoid GHG emissions for the South Subsystem, avoiding the electric power generation starting from the use of fossil fuels of the

existing Thermal Power Plants, those generated around 19% of the total generated electric energy of the South Subsystem in 2006 (source: ONS).

Three alternatives for the project scenario are considered:

- Alternative 1: The proposed project activity without CDM: construction of a new plant for grid-connected renewable generation with 130 MW of installed capacity, implemented without considering the CDM funds.
    - This alternative could present barriers according to the additionality analysis presented in this PDD.

- Alternative 2: Construction of a new Coal Thermal Power Plant grid-connected non-renewable with 130 MW of installed capacity, due to the South of Brazil has the most of the coal reservoirs of the country (95%).

- Alternative 3: Continuation of the present situation. Electricity would continue to be generated by the present generators operating for the grid.

The project meets all the prerequisites of "additionality" (see the application of "***Tool for the demonstration and assessment of Additionality – version 3"***) and demonstrates that the project would not occur in the absence of the CDM.

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):

>>

The *HPP Castro Alves* is a project for generating greenhouse gas (GHG) emission free power and will offer reductions in GHG emissions by replacing fossil fuel burning Thermo Power plant generation that, in other ways, would be supplying the interconnected grid.

As Kartha et al. (2002) affirmed: "the central issue of the challenge of the baseline for electricity projects clearly resides in determining the 'avoided generation' or that which would have occurred without the CDM or another GHG mitigation project. The fundamental question is if the avoided generation is in the 'build margin' (or rather, substituting a facility that would have otherwise been constructed) and/or in the 'operating margin' (or rather, affecting the operation of present and/or future plants)."

The baseline emission factor is calculated as a combined margin, consisting in the combination of the factors of the build margin and the operating margin. In order to determine the emission factors of the build margin, an electric system of the project is defined as being a physical extension of the plants that could be dispatched without significant restrictions in transmission. Similarly, an interconnected electric system is defined as a system that is interconnected by transmission lines to the electric system of the project and in which hydropower plants can dispatch without significant restrictions in transmission.

The approved consolidated baseline methodology ACM0002 – "Consolidated baseline methodology for grid-connected power generation from renewable sources" is applied to increases in electric capacity from run-of-river hydropower plants, included in the project activity proposal. The baseline scenario considers the electricity that would be generated in another way by grid-connected power plant operation and by the addition of new generation sources.

The reduction in CO_2 emissions by the project activity hydropower plant results from the change from fossil fuel burning Thermo Power generators, which would be supplying the interconnected grid in another way.

The ***additionality*** of the project activity should be demonstrated and evaluated using the most recent version of "Tool for Demonstration and Assessment of Additionality" accepted by the CDM – Executive Board, available on the CDM website of UNFCCC. The most recent version of this tool is the version 3.

The following steps are necessary for demonstrating and evaluating of the additionality of Project Ceran, HPP *Castro Alves*:

- The project activity must be after January 1st 2000.

  The beginning of the HPP Castro Alves construction was initiated on 01/06/2006, accomplishing this requirement;

- Evidence that the project was seriously considered in the decision of continuing with the project activity.

  The project sponsor began to evaluate the carbon market potential during the acquisition contract process for the *Castro Alves* hydropower potential. During the year 2000 the principal shareholder of Ceran, CPFL, contacted consulting companies and specialists to evaluate potential CDM revenues.

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

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

1. The realistic alternatives to the project activity are:

- Continuation with the present scenario, with the supply of electricity from the South Brazilian interconnected grid;

- Constructions of a 130 MW Coal Thermal Power Plant;

- Implementation of the project without incentives from the CDM.

Sub-step 1b. Compliment with the applicable laws and norms:

1b.2. The alternative(s) shall be in compliance with all mandatory applicable legal and regulatory requirements, even if these laws and regulations have objectives other than GHG reductions.

The project activity and the alternative scenarios meet all the Brazilian norms and regulations.

The market trends show that the project activity and the alternative scenarios are widely observed in the Country and they are under the ANEEL (National Agency of Electric Energy) approval. The website of FEPAM (State Foundation of Environment) (http://www.fepam.rs.gov.br/) should also be visited. It will be found the licenses of projects like the project activity and the alternative scenarios.

According to ANEEL, the scenario of South Brazilian subsystem is the follow[3]:

The South Brazilian Subsystem is formed by three States: Rio Grande do Sul, Santa Catarina and Paraná.

They have about 30% of the total of Installed Capacity of the Brazilian Electric sector. The description of the generated park of each State is described as follows:

- The State of Rio Grande do Sul has in the total 88 enterprises in operation, generating 6.638.115 kW.It is foreseen for next years an addition of 4.032.252 kW in the capacity of generation of the State, originating from the 8 enterprises now in construction and more 61 with yours Grant signed.

- The State of Paraná has in the total 102 enterprises in operation, generating 17.467.850 kW. It is foreseen for next years an addition of 1.262.143 kW in the capacity of generation of the State, originating from the 4 enterprises now in construction and more 32 with yours Grant signed.

- The State of Santa Catarina has in the total 95 enterprises in operation, generating 5.458.073 kW. It is foreseen for next years an addition of 2.450.910 kW in the capacity of generation of the State, originating from the 12 enterprises now in construction and more 57 with yours Grant signed.

- South Subsystem Description (Source: ANEEL):

Enterprises in Operation			
Type	Quantity	Power (kW)	%
CGH	85.00	48,452.00	0.16%
EOL	7.00	166,900.00	0.56%
PCH	80.00	426,088.00	1.44%
UHE	37.00	25,477,038.00	86.18%
UTE	76.00	3,445,560.00	11.65%
Total	285.00	29,564,038.00	100.00%

[3] *http://www.aneel.gov.br/aplicacoes/ResumoEstadual/ResumoEstadual.asp*

Enterprises under Construction			
Type	Quantity	Power (kW)	%
PCH	15.00	246,200.00	10.15%
UHE	9.00	2,179,200.00	89.85%
Total	24.00	2,425,400.00	100.00%

Granted Enterpresis between 1998 and 2004 (The construction hasn´t started)			
Type	Quantity	Power (kW)	%
CGH	33.00	23,346.00	0.44%
EOL	39.00	1,480,813.00	27.84%
PCH	55.00	835,768.00	15.71%
UHE	9.00	1,606,000.00	30.19%
UTE	14.00	1,373,978.00	25.83%
Total	150.00	5,319,905.00	100.00%

Types of Enterprises description:

- CGH (Hydro Power Plant Central Generation)
- EOL (Wind Power Plant)
- PCH (Small Hydro Power Plant)
- UHE (Hydro Power Plant - HPP)
- UTE (Thermal Power Plant)

The project activity HPP Castro Alves (UHE) represents 86.16% of the enterprises in operation, 89.85% of the enterprises under construction and 30.19% of the granted enterprises those didn´t started to be constructed yet.

The alternative scenario Coal Thermal Power Plant (UTE) represents 11.65% of the enterprises in operation, 25.83% of the granted enterprises those didn´t started to be constructed yet.

It is worthwhile to point out that most of the reservations of mineral coal is in the south area of the brazil.

National Decanal Plan 2007-2016[4] describes the Brazilian MME Plan to the electric sector (Source: MME):

The National Decanal Plan also shows the present and the future about the Brazilian Electric sector.

[4] National Decanal Plan (Source: MME – Ministry o Mines and Energy)

http://www.mme.gov.br/site/news/detail.do;jsessionid=2E29F1A8AF2B300D9B32B5E65313279A?newsId=13109 (full links)

http://www.mme.gov.br/download.do?attachmentId=10952&download (Generation Chapter)

http://www.mme.gov.br/download.do?attachmentId=10960&download (Coal chapter)

It is also possible to see Power Plants as the Project Activity (Hydro Power Plants) and Thermal Power Plants.

Hydro Power Plants

- Hydroelectric Expansion: 36,937 MW

Aproveitamento	Rio	UF	Subsistema	Potência (MW)	Data	Classificação
CAPIM BRANCO I	Araguari	MG	SE/CO	80.0	jun/06	Operação
BARRA GRANDE	Pelotas	RS/SC	S	465.6	jun/06	Operação/ Leilão 2006
IRAPÉ	Jequitinhonha	MG	SE/CO	360.0	jul/06	Operação
PICADA	Peixe	MG	SE/CO	50.0	ago/06	Operação
MASCARENHAS	Doce	MG	SE/CO	49.5	ago/06	Operação
FUNDÃO	Jordão	PR	S	120.0	ago/06	Operação
PEIXE ANGICAL	Tocantins	TO	SE/CO	452.0	set/06	Operação
ITAIPU BINACIONAL	Iguaçu	-	SE/CO	700.0	set/06	Operação
ESPORA	Correntes	GO	SE/CO	32.1	set/06	Operação
MONTE CLARO	das Antas	RS	S	65.0	out/06	Operação
CAPIM BRANCO II	Araguari	MG	SE/CO	210.0	mar/07	Em Construção / Motorização
CAMPOS NOVOS	Canoas	SC	S	880.0	mar/07	Em Construção / Motorização
TUCURUÍ	Tocantins	PA	N/Man	1125.0	mar/07	Em Construção / Motorização
ITAIPU BINACIONAL	Iguaçu	-	SE/CO	700.0	jun/07	Operação
CASTRO ALVES	das Antas	RS	S	130.0	jan/08	Em Construção / Motorização
14 DE JULHO	das Antas	RS	S	100.0	ago/08	Em Construção / Motorização
CORUMBÁ III	Corumbá	GO	SE/CO	93.6	mar/09	Com Concessão
RETIRO BAIXO	Paraopeba	MG	SE/CO	82.0	mai/09	Leilão 2005
SÃO JOSÉ	Ijuí	RS	S	51.0	mai/09	Leilão 2005
BARRA DO BRAÚNA	Pomba	MG	SE/CO	39.0	jun/09	Com Concessão
SALTO DO RIO VERDINHO	Verde	GO	SE/CO	93.0	jul/09	Com Concessão
SALTO	Verde	GO	SE/CO	108.0	jul/09	Com Concessão
OLHO D'ÁGUA	Correntes	GO	SE/CO	33.0	jul/09	Com Concessão
BATALHA	São Marcos	GO/MG	SE/CO	53.6	jul/09	Leilão 2005
CAÇU	Claro	GO	SE/CO	65.1	out/09	Com Concessão
BAGUARI	Doce	MG	SE/CO	140.0	out/09	Leilão 2005
BARRA DOS COQUEIROS	Claro	GO	SE/CO	90.0	out/09	Com Concessão
PASSO DE SÃO JOÃO	Ijuí	RS	S	77.0	out/09	Leilão 2005
SÃO SALVADOR	Tocantins	TO/GO	SE/CO	243.2	jan/10	Leilão 2006

Aproveitamento	Rio	UF	Subsistema	Potência (MW)	Data	Classificação
MONJOLINHO	Passo Fundo	RS	S	67.0	fev/10	Leilão 2006
BAÚ I	Doce	MG	SE/CO	110.1	mar/10	Com Concessão
SALTO PILÃO	Itajaí	SC	S	182.3	jun/10	Com Concessão
FOZ DO RIO CLARO	Claro	GO	SE/CO	67.0	jul/10	Leilão 2005
FOZ DO CHAPECÓ	Uruguai	RS/SC	S	855.0	set/10	Com Concessão
SERRA DO FACÃO	São Marcos	GO/MG	SE/CO	212.6	nov/10	Com Concessão
SIMPLÍCIO + PCH	Paraíba do Sul	MG/RJ	SE/CO	305.7	dez/10	Leilão 2005
ESTREITO TOC.	Tocantins	TO/MA	N/Man	1087.0	dez/10	Com Concessão
DARDANELOS	Aripuanã	MT	SE/CO	261.0	jan/11	Leilão 2006
MAUÁ + PCH	Tibagi	PR	S	361.0	jan/11	Leilão 2006
SÃO DOMINGOS	Verde	MS	SE/CO	48.0	jan/12	Com Concessão
PAI QUERÊ	Pelotas	RS/SC	S	291.9	jan/12	Com Concessão
CACHOEIRINHA	Chopim	PR	S	42.5	jan/12	Com Concessão
SÃO JOÃO	Chopim	PR	S	62.5	mar/12	Com Concessão
SANTO ANTÔNIO	Madeira	RO	RO/MD	3150.4	abr/12	Indicativas
TORIXORÉU	Araguaia	GO/MT	SE/CO	408.0	jan/13	Indicativas
TORICOEJO	Das Mortes	MT	SE/CO	76.0	jan/13	Indicativas
JURUENA	Juruena	MT	SE/CO	46.0	jan/13	Indicativas
CACHOEIRÃO	Juruena	MT	SE/CO	64.0	jan/13	Indicativas
BARRA DO POMBA	Paraíba do Sul	RJ	SE/CO	80.0	jan/13	Indicativas
ÁGUA LIMPA	Das Mortes	MT	SE/CO	320.0	jan/13	Indicativas
TIJUCO ALTO	Ribeira de Iguape	PR	S	128.7	jan/13	Com Concessão
TELÊMACO BORBA	Tibagi	PR	S	120.0	jan/13	Indicativas
SALTO GRANDE	Chopim	PR	S	53.3	jan/13	Indicativas
SÃO ROQUE	Canoas	SC	S	214.0	jan/13	Indicativas
GARIBALDI	Canoas	SC	S	150.0	jan/13	Indicativas
ESTREITO PARN.	Parnaíba	PI/MA	NE	88.0	jan/13	Indicativas
SERRA QUEBRADA	Tocantins	TO/MA	N/Man	1328.0	jan/13	Indicativas
BELO MONTE COMPLEMENTAR	Xingu	PA	N/Man	181.3	jan/13	Indicativas
RIBEIRO GONÇALVES	Parnaíba	PI/MA	NE	173.0	fev/13	Indicativas
JIRAU	Madeira	RO	RO/MD	3300.0	mar/13	Indicativas
ITAGUAÇU	Claro	GO	SE/CO	130.0	set/13	Indicativas
PORTO GALEANO	Sucuriú	MS	SE/CO	139.0	jan/14	Indicativas
NOVO ACORDO	Sono / Medio Tocantins	TO	SE/CO	160.0	jan/14	Indicativas
CAMBUCI	Paraíba do Sul	RJ	SE/CO	50.0	jan/14	Indicativas
VOLTA GRANDE	Chopim	PR	S	54.7	jan/14	Indicativas
ITAPIRANGA	Uruguai	SC/RS	S	724.6	jan/14	Indicativas
BAIXO IGUAÇU	Iguaçu	PR	S	350.1	jan/14	Indicativas
TUPIRATINS	Tocantins	TO	N/Man	620.0	jan/14	Indicativas
BELO MONTE	Xingu	PA	BM	5500.0	jan/14	Indicativas
SINOP	Teles Pires	MT	TP	461.1	jul/14	Indicativas
MIRADOR	Tocantinzinho	GO	SE/CO	80.0	out/14	Indicativas
MARABÁ	Tocantins	PA	N/Man	2160.0	dez/14	Indicativas
TUCANO	Verde	GO	SE/CO	157.0	jan/15	Indicativas
MURTA	Jequitinhonha	MG	SE/CO	120.0	jan/15	Com Concessão
SÃO MANOEL	Teles Pires	MT	TP	746.0	jan/15	Indicativas

Aproveitamento	Rio	UF	Subsistema	Potência (MW)	Data	Classificação
COLÍDER	Teles Pires	MT	TP	342.0	fev/15	Indicativas
MAGESSI	Teles Pires	MT	TP	53.0	abr/15	Indicativas
FOZ DO APIACÁS	Teles Pires	MT	TP	275.0	abr/15	Indicativas
TELES PIRES	Teles Pires	MT	TP	1820.0	set/15	Indicativas
SÃO MIGUEL	Grande	MG	SE/CO	64.5	jan/16	Indicativas
PARANHOS	Chopim	PR	S	62.6	jan/16	Indicativas
URUÇUÍ	Parnaíba	PI/MA	NE	164.0	jan/16	Indicativas
CASTELHANO	Parnaíba	PI/MA	NE	96.0	jan/16	Indicativas
CACHOEIRA	Parnaíba	PI/MA	NE	96.0	jan/16	Indicativas
TRAÍRA II	Suaçuí Grande	MG	SE/CO	60.0	dez/16	Indicativas
TOCANTINS	Tocantins	TO	SE/CO	480.0	dez/16	Indicativas
MARANHÃO BAIXO	Maranhão	GO	SE/CO	124.8	dez/16	Indicativas
BURITI QUEIMADO	das Almas	GO	SE/CO	142.0	dez/16	Indicativas
JATAIZINHO	Tibagi	PR	S	155.0	dez/16	Indicativas
CEBOLÃO	Tibagi	PR	S	155.0	dez/16	Indicativas
RIACHO SECO	São Francisco	BA/PE	NE	330.0	dez/16	Indicativas
PEDRA BRANCA	São Francisco	BA/PE	NE	440.0	dez/16	Indicativas
			TOTAL	**36.937**		

SE/CO – Sudeste/C. Oeste S – Sul NE – Nordeste
N/Man – Norte/Manaus RO/MD – Rondônia/Madeira BM – Belo Monte

Thermal Power Plants

- Thermal Power Plant Expansion: 13,833 MW

Usina	Subsistema	Combustível	Potência (MW)	Data	Classificação
QUIRINÓPOLIS	SE/CO	Biomassa	40,0	jan/08	Leilão 2005
INTERLAGOS	SE/CO	Biomassa	40,0	jan/08	Leilão 2005
VALE DO AÇU	NE	Gás Natural	340,0	abr/08	Em construção/ Ampliação
CUBATÃO	SE/CO	Gás Natural	250,0	dez/08	Em construção/ Ampliação
SÃO JOSÉ	SE/CO	Biomassa	50,0	jan/09	Leilão 2005
SÃO JOÃO	SE/CO	Biogás	20,0	jan/09	Leilão 2006
SANTA IZABEL	SE/CO	Biomassa	40,0	jan/09	Leilão 2006
RAFARD	SE/CO	Biomassa	43,0	jan/09	Leilão 2005
QUIRINÓPOLIS EXP	SE/CO	Biomassa	40,0	jan/09	Leilão 2006
GOIÂNIA II - BR	SE/CO	Diesel	140,0	jan/09	Leilão 2005
COSTA PINTO	SE/CO	Biomassa	65,5	jan/09	Leilão 2005
COLORADO	SE/CO	Biomassa	34,0	jan/09	Leilão 2006
URUGUAIANA	S	Gás Natural	421,0	jan/09	Considerada Disponível
CISFRAMA	S	Biomassa	4,0	jan/09	Leilão 2006
TERMOMANAUS	NE	Diesel	142,2	jan/09	Leilão 2006
POTIGUAR III	NE	Diesel	66,0	jan/09	Leilão 2006
POTIGUAR	NE	Diesel	52,8	jan/09	Leilão 2006
PETROLINA	NE	Óleo Combustível	136,0	jan/09	Leilão 2006
PAU FERRO I	NE	Diesel	93,1	jan/09	Leilão 2006
CAMAÇARI P I	NE	Óleo Combustível	148,0	jan/09	Leilão 2006
CAMAÇARI M I	NE	Óleo Combustível	148,0	jan/09	Leilão 2006
UTE INDICATIVA SE	SE/CO	-	350,0	jan/10	Indicativas
BIOMASSA - IND	SE/CO	Biomassa	650,0	jan/10	Indicativas
CANDIOTA III	S	Carvão	350,0	jan/10	Leilão 2005
BIOMASSA - IND	N/Man	Biomassa	40,0	jan/10	Indicativas
BIOMASSA IND	NE	Biomassa	250,0	dez/10	Indicativas
UTE INDICATIVA SE	SE/CO	-	200,0	jan/11	Indicativas
QUATAR	SE/CO	Biomassa	53,6	jan/11	Leilão 2006
PALMEIRA DE GOIAS	SE/CO	Diesel	174,3	jan/11	Leilão 2006
FERRARI	SE/CO	Biomassa	27,0	jan/11	Leilão 2006
DO ATLÂNTICO (1)	SE/CO	Gás de Processo	490,0	jan/11	Leilão 2006
BONFIM	SE/CO	Biomassa	41,0	jan/11	Leilão 2006
BOA VISTA	SE/CO	Biomassa	80,0	jan/11	Leilão 2006
BIOMASSA - IND	SE/CO	Biomassa	270,0	jan/11	Indicativas
UTE INDICATIVA NE	NE	-	1700,0	jan/11	Indicativas

Usina	Subsistema	Combustível	Potência (MW)	Data	Classificação
BAHIA FORMOSA	NE	Biomassa	32,0	jan/11	Leilão 2006
BAHIA 1	NE	Óleo Combustível	31,6	jan/11	Leilão 2006
UTE INDICATIVA SE	SE/CO	-	700,0	jan/12	Indicativas
BIOMASSA - IND	SE/CO	Biomassa	400,0	jan/12	Indicativas
UTE INDICATIVA S	S	-	1100,0	jan/12	Indicativas
UTE INDICATIVA NE	NE	-	700,0	jan/12	Indicativas
BIOMASSA - IND	NE	Biomassa	100,0	jan/12	Indicativas
UTE INDICATIVA SE	SE/CO	-	950,0	jan/13	Indicativas
BIOMASSA - IND	SE/CO	Biomassa	480,0	jan/13	Indicativas
BIOMASSA - IND	NE	Biomassa	100,0	jan/13	Indicativas
BIOMASSA - IND	SE/CO	Biomassa	100,0	jan/14	Indicativas
ANGRA 3	SE/CO	Urânio	1350,0	jan/14	Indicativas
BIOMASSA - IND	NE	Biomassa	100,0	jan/14	Indicativas
BIOMASSA - IND	SE/CO	Biomassa	100,0	jan/15	Indicativas
BIOMASSA - IND	NE	Biomassa	100,0	jan/15	Indicativas
UTE INDICATIVA S	S	-	500,0	jan/16	Indicativas
		TOTAL	**13.833**		

SE/CO – subsistema Sudeste/C.Oeste S – subsistema Sul NE – subsistema Nordeste
No caso de ampliações e motorizações, a potência corresponde ao valor incremental do ano.
(1) Considerada apenas a parcela disponibilizada ao sistema elétrico equivalente a 200MW.

- Coal Thermal Power Plants under operation: 1,415 MW

Usina	Empresa	Município	UF	Potência (MW)
São Jerônimo	CGTEE	São Jerônimo	RS	20
P. Médici A/B/C	CGTEE	Candiota	RS	446
Figueira	COPEL	Figueira	PR	20
Charqueadas	Tractebel	Charqueadas	RS	72
J. Lacerda I e II	Tractebel	Capivari de Baixo	SC	232
J. Lacerda III	Tractebel	Capivari de Baixo	SC	262
J. Lacerda IV	Tractebel	Capivari de Baixo	SC	363
Total				**1.415**

Source: MME

- Coal Thermal Power Plants under construction: 350 MW

Usina	Empresa	Município	UF	Potência (MW)
Candiota III	CGTEE	Candiota	RS	350
Total				**350**

Source: MME

- Coal Thermal Power Plants – New Projects Under Studies: 2,218 MW

Usina	Empresa	Município	UF	Potência (MW)
Seival	COPELMI	Candiota	RS	562
CTSul	CTSUL	Cachoeira do Sul	RS	650
Figueira II	COPEL	Figueira	PR	126
Usitesc	USITESC	Treviso	SC	440
Jacuí	ELEJA	Charqueadas	RS	350
Total				**2.128**

Source: MME

- Coal Mines Localization: 100% in the South

UF	Jazida	Recursos (10^6 t)	%
PR	Cambuí	44	0,14
	Sapopema	45	0,14
	Total Paraná	**89**	**0,28**
SC	Barro Branco	1.045	3,29
	Bonito	1.601	5,04
	Pré-Bonito	414	1,30
	Total Santa Catarina	**3.060**	**9,64**
RS	Candiota	12.275	38,67
	Leão	2.439	7,68
	Charqueadas	2.993	9,43
	Iruí/Capané	2.688	8,47
	Murungava	3.128	9,86
	Santa Terezinha/Torres	5.068	15,97
	Total Rio Grande do Sul	**28.591**	**90,08**
Brasil	**Total Brasil**	**31.740**	**100,0**

Fonte: DNPM

- **Coal** Mines of Rio Grande do Sul State - Characteristics

Jazida	PC (kcal/kg)	Carbono (%)	Cinzas (%)	Enxofre (%)
Candiota	3.200	23,3	52,5	1,6
S.Terezinha	3.800–4.300	28,0–30,0	41,0–49,5	0,5–1,9
Morungava/Chico Lomã	3.700–4.500	27,5–30,5	40,0–49,0	0,6–2,0
Charqueadas	2.950	24,3	54	1,3
Leão	2.950	24,1	55,6	1,3
Irui	3.200	23,1	52	2,5
Capané	3.100	29,5	52	0,8

Fonte: Carvalho, 2005

- Coal Mines of Santa Catarina State - Characteristics

Jazida	PC (kcal/kg)	Carbono (%)	Cinzas (%)	Enxofre (%)
Barro Branco	2.700	21,4	62,1	4,3
Bonito	2.800	26,5	58,3	4,7

Fonte: Carvalho, 2005

- Coal Mines of Paraná State - Characteristics

Jazida	PC (kcal/kg)	Carbono (%)	Cinzas (%)	Enxofre (%)
Cambuí	4.850	30	45	6
Sapopema	4.900	30,5	43,5	7,8

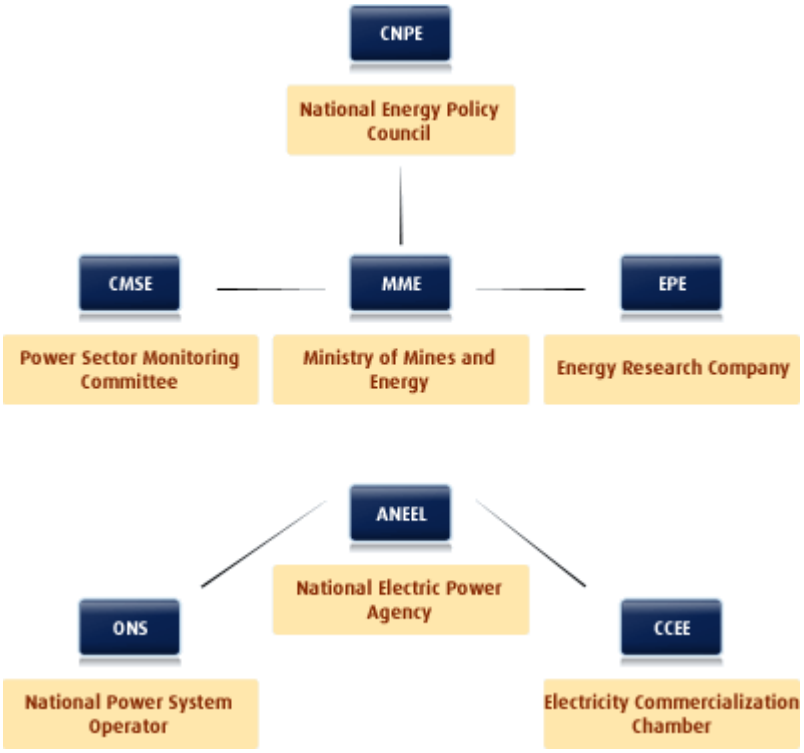
Fonte: Carvalho, 2005

Brazilian Electric Sector: LEGISLATION and INSTITUTIONS (Source: CCEE website[5])

The new model of Brazilian Power Sector created new institutions and changed the functions of some of the existing ones. Find out below about the current structure of the sector.

The figure below presents a diagram of the institutions that are active in the Brazilian Electric Sector.

[5]CCEE: http://www.ccee.org.br/cceeinterdsm/v/index.jsp?vgnextoid=15e6a5c1de88a010VgnVCM100000aa01a8c0RCRD



CNPE – National Energy Policy Council

The National Energy Policy Council - CNPE (Conselho Nacional de Política Energética) is an inter-ministerial advisory board to the Brazilian President. Its main attributions are to formulate power-related policies and guidelines, and to assure the supply of raw materials used in power generation in remote areas of Brazil.

This board is also responsible for periodically revising the energy mix of each region of the country, as well as for establishing guidelines for specific programs such as the use of natural gas, alcohol, other biomasses, coal and thermonuclear power. Finally, the CNPE is also responsible for setting forth the guidelines to import and export petroleum and natural gas.

MME – Ministry of Mines and Energy

The Ministry of Mines and Energy - MME (Ministério de Minas e Energia) is the Federal Government entity responsible for the execution of energy-related policies within the country. Its paramount attributions include the formulation and the implementation of policies for the energy sector, according to the guidelines defined by the CNPE.

The MME is responsible for setting up the planning for the domestic energy sector, monitoring Brazilian Power Sector safety of supply, and for defining preventive actions to preserve safety of supply in case of imbalances between supply and demand of electricity.

CMSE – Power Sector Monitoring Committee
The Power Sector Monitoring Committee - CMSE (Comitê de Monitoramento do Setor Elétrico) is an advisory board under direct coordination of the MME. Its goal is to monitor and evaluate power supply continuity and safety throughout Brazil. Its main attributions include: monitoring of generation, transmission, distribution, commercialization, import and export of electricity; evaluation of supply and service conditions; periodical, integrated supply and service analysis; identification of problems and obstacles that may affect power sector regular operations, safety of supply, and expansion; elaborate proposals for adjustments or for preventive actions in order to preserve safety of supply and service.

EPE – Energy Research Company
Created by Law 10.847/04 and established by Decree 5.184/04, the Energy Research Company - EPE (Empresa de Pesquisa Energética) is a company attached to the MME with the purpose to carry out studies and research in order to provide background information to Brazilian energy sector planning activities.

Its paramount attributions include the provision of studies and projections regarding the Brazilian energy mix, the execution of surveys to support integrated planning of energy resources, the development of studies to support generation and transmission expansion short-, medium- and long-term planning efforts, the performance of power generating plants feasibility studies which include both technical-economic and social-environmental aspects, as well as the coordination of efforts to obtain pre-construction environmental licenses for hydro power plants and transmission lines.

ANEEL – National Electric Power Agency
The National Electric Power Agency - ANEEL (Agência Nacional de Energia Elétrica) was created by Law 9.247/96 and established by Decree 2.335/97. Its responsibilities are to regulate and inspect production, transmission, distribution and commercialization of electricity so that quality of provided services and universal access to electricity are assured. ANEEL is also responsible for the establishment of tariffs for end consumers, in a way that the economic and financial feasibility of power sector Agents and of the Industry as a whole is preserved. The changes brought about in 2004 by the new model made ANEEL responsible for promoting, directly or indirectly, auctions for the Distribution Agents to purchase electricity through long term contracts within the National Interconnected System (Sistema Interligado Nacional), SIN.

CCEE – Chamber of Electrical Energy Commercialization
The Chamber of Electrical Energy Commercialization - CCEE (Câmara de Comercialização de Energia Elétrica) , which was created by Law 10.848/2004 and established by Decree 5.177/2004, took over the functions formerly performed by MAE (Mercado Atacadista de Energia Elétrica - Wholesale Electricity Market) as well as its organizational and operational structures. Its paramount obligations include: the determination of the Settlement Price for Differences (PLD - Preço de Liquidação de Diferenças), or spot price, used to value the short term market transactions; the execution of the energy accounting process, identifying who and how much electricity are involved in multilateral short term market transactions; the financial settlement of the amounts calculated in the energy accounting process; and preparation and execution of electricity auctions within the Regulated Contracting Environment (ACR) by delegation of ANEEL.

ONS – National Power System Operator

LEGISLATION

Due to the enormous complexity and the large number of institutions in operation, the Brazilian Power Sector is governed by a series of norms. Here you will have the chance to know part of the legal instruments that regulate Brazilian Power Sector.

Corporate Statute
Statute - The statute of Chamber of Electrical Energy Commercialization.

Covenants
ICMS 06/04 - Sets out provisions for the accomplishment of tax obligations arising from operations with electricity, including those whose financial settlement take place within the context of the Wholesale Electricity Market – MAE (CCEE).

Laws

- 8.987/95 - Establishes criteria and definitions regarding public concession and public permission regimes as fixed in article 175 of Brazilian Constitution, as well as other specific provisions.

- 9.074/95 - EsEstablishes rules for granting and extending concessions and permissions licenses, and as well as other specific provisions.

- 9.427/96 - Creates the National Electricity Agency (Agência Nacional de Energia Elétrica - ANEEL), organizes and specify the regime of concessions of public electricity supply services, as well as other specific provisions.

- 9.648/98 - Changes provisions from Laws 3.890-A (dated 04/25/1961), 8.666 (06/21/1993), 8.987 (02/13/1995), 9.074 (07/07/1995), 9.427 (12/26/1996), and authorizes the Government to restructure Brazilian Electric Centrals Company (Centrais Elétricas Brasileiras - ELETROBRÁS) and its subsidiaries, as well as other specific provisions.

- 10.433/02 - Authorizes the creation of the Wholesale Electricity Market (MAE - Mercado Atacadista de Energia Elétrica) as a common law legal entity, as well as other specific provisions.

- 10.438/02 - Establishes rules and criteria for the addition of electricity supply in emergency (near rationing) situations, as well as for extraordinary tariff recovery; creates the Alternative Electricity Sources Incentive Program (PROINFA - Programa de Incentivo às Fontes Alternativas de Energia Elétrica), the Energy Development Account (CDE - Conta de Desenvolvimento Energético); establishes rules and criteria to provide universal access to electricity, and defines new texts to parts of Laws 9.427, (dated 12/26/1996), 9.648 (05/27/1998), 3.890-A (04/25/1961), 5.655 (05/20/1971), 5.899 (07/05/1973), 9.991 (07/24/2000), as well as other specific provisions.

- 10.604/02 - Establishes rules and criteria about the resources to be used to subsidize low income consumers of electricity; it defines a new text to articles 27 and 28 of Law 10.438 (04/26/2002), as well as other specific provisions.

- 10.637/02 - Establishes provisions regarding non-accrual payment of contributions to the Social Integration Programs (PIS) (a like-tax obligation) and for the Public Servants Patrimony Buildup Program (PASEP) (another like-tax obligation) in specific cases; also provisions regarding the payment and parceling of federal tax debts, the offsetting of tax credits, customs laws, as well as other specific provisions.

- 10.762/03 - Creates the Electricity Distribution Companies Emergency and Special Support Program; changes Laws 8.631, (dated 03/04/1993), 9.427 (12/26/1996), 10.438, (04/26/2002), as well as other specific provisions.

- 10.847/04 - Authorizes the creation of the Energy Research Company (Empresa de Pesquisa Energética - EPE), as well as other specific provisions.

- 10.848/04 - Establishes provisions regarding the commercialization of electricity, changes Laws 5.655 (05/20/1971), 8.631 (03/04/1993), 9.074 (07/07/1995), 9.427 (12/26/1996), 9.478 (08/06/1997), 9.648 (05/27/1998), 9.991 (07/24/2000), 10.438 (04/26/2006), as well as other specific provisions.

Decrees

- 2.335/97 - Sets up the National Electricity Agency - ANEEL as an independent regulatory agency, and approves its Rule Book and its Organizational Flowchart with management Positions, as well as other specific provisions

- 2.655/98 - Defines the regulation for the Wholesale Electricity Market; defines the rules for the organization of the National Power System Operator, dealt with by Law 9.648, as well as other specific provisions.

- 4.541/02 - Regulates articles 3, 13, 17 and 23 of Law 10.438 (04/26/2002).

- 4.550/02; 4.562/02 4.667/03;4.767/03; 5.081/04

- 5.163/04 -Defines regulation for (1) the commercialization of electricity at the wholesale level, (2) the process for granting concessions and authorizations for electricity generation, as well as other specific provisions.

- 5.175/04 -Establishes the Power Sector Monitoring Committee (Comitê de Monitoramento do Setor Elétrico - CMSE), created by art. 14 of Law 10.848 (03/15/2004).

- 5.177/04 - Defines regulation for articles 4 and 5 of Law 10.848 (03/15/2004), regarding the organization, attributions and the functioning of the Chamber of Electrical Energy Commercialization - CCEE as the successor of the Wholesale Electricity Market - MAE.

- 5.184/04 - Establishes the Energy Research Company - EPE, approving its bylaws, and it makes other provisions.

- 5.249/04 -Provides a new text to item XI of paragraph 2nd of article 1st of Decree 5.163 (07/30/2004).

- 5.271/04 -Makes changes to Decree 5.163 (07/30/2004).

Resolutions

- 290/00 - Homologates the Rules for the Wholesale Electricity Market - MAE and establishes the guidelines for its gradual implementation.

- 456/00 -Updates and consolidates the General Conditions for Provision of Electricity

- 102/02 - Establishes the Wholesale Electricity Market - MAE Convention.

- 103/02 - Authorizes the Wholesale Electricity Market (MAE) - a not-for-profit, private law Legal Entity to operate according to market rules and procedures established by ANEEL.

- 395/02 - Approves version 2.2b of Market Rules for energy accounting and financial settlement processes for all transactions carried out between 09/01/2000) to 06/30/2001 in the Wholesale Electricity Market - MAE.

- 445/02 - Approves version 3.0 of Market Rules for energy accounting and financial settlement processes for all transactions carried out between 07/01/2001 to 12/31/2002 in the Wholesale Electricity Market - MAE.

- 447/02 -Establishes the general conditions for implementation art. 2 of Law 10.438 (04/ 26/2002).

- 552/02 Establishes the specific procedures for financial settlement of the Wholesale Electricity Market - MAE spot transactions, including provisions for financial guarantees and penalties.

- 023/03 - Establishes provisional criteria for financial guarantees calculation as referred to by art. 2 of the Wholesale Electricity Market (MAE) Convention, as well as other specific provisions.

- 040/03 - Approves version 3.1 of Market Rules 3.1 for energy accounting and financial settlement processes for all transactions carried out from 01/01/2003 on, including ex-ante profiling of Initial contracts.

- 091/03 - Establishes rules for checking the fulfillment of electricity contracting requirements by the Wholesale Electricity Market - MAE agents, as defined by Decree 4.562, dated December 31, 2002.

- 237/03 - Determines the adjustments to be made in the Wholesale Electricity Market - MAE Rules implementation schedule, as previously established by Resolution 290/00.

- 258/03 - Establishes criteria and procedures to be adopted by distribution companies which choose to have measurement equipment installed outside the consumer's premises.

- 265/03 - Establishes rules and procedures for the provision of generation and transmission ancillary services.

- 352/03 - Establishes rules for checking the fulfillment of physical coverage requirements of electricity contracts registered at the Wholesale Electricity Market - MAE, pursuant the guideline set forth by art. 5 of Resolution

- 433/03 -Establishes procedures and conditions for starting test operations and commercial operations of power plants.

- 462/03 - Approves version 3.1.b of Market Rules for energy accounting and financial settlement processes for all transactions carried out in the MAE from 09/10/2003 on, including new rules for setting minimum spot price.

- 577/03 - Approves version 3.1.b of Market Rules for energy accounting and financial settlement processes for all transactions carried out in the MAE from 10/29/2003 on, including rules for using the amounts arising from the application of penalties for lack of physical coverage in electricity contracts.

- 652/03 - Establishes criteria for classifying a hydro plant as a Small Hydro Plant (PCH).

- 686/03 - Establishes procedures and criteria for implementing the rationing risk aversion mechanism in ONS's Monthly Operation Program - PMO, and in MAE's spot price calculation process, as defined in CNPE Resolution 10 (12/15/2003).

- 688/03 - Approves version 3.5 of Market Rules for energy accounting and financial settlement processes for all transactions carried out in the MAE from 01/01/2004 on, including rules to induce efficiency improvement of power plants in the Energy Reallocation Mechanism (MRE).

- 040/04 - Establishes criteria for setting availability and physical coverage limits in the 2004/2005 period for thermal power plants which are located in the Northeast Region and participate in the Thermal Power Plants Priority Program - PPT.

- 055/04 - Establishes the X Factor calculation methodology to be used in periodic tariff reviews of distribution companies

- 061/04 - Establishes provisions regarding redress from damages in consumers' electrical equipments caused by disturbances in the electric network.

- 063/04 - Approves criteria and procedures to regulate the levying of penalties to generation, transmission, distribution and commercialization agents, as well as to the ONS, the CCEE and for those who are responsible for managing resources arisen from sectorial taxes.

- 074/04 - Establishes criteria and procedures for transmission concessionaires which connect and serve free consumers and/or self-producers through their Basic Grid assets to become quota-holders of the Fossil Fuels Consumer Account - CCC, and of the Energetic Development Account - CDE, in compliance with art. 13 of Law 5.899, (07/051973) and art. 13 of Law 10.438, (04/26/2002), as reviewed by Law 10.848 (03/15/2004).

- 075/04 - Provides a new text to paragraph 7 of art. 3 of Resolution 688 (12/24/2003), in which it is defined the approach to long duration programmed unavailabilities caused by modernizations and/or renovations in power plants members of the Energy Reallocation Mechanism - MRE.

- 082/04 - Establishes conditions for the provision of electricity to lots located in urban housing developments, in social interest housing developments, and in popular housing developments, as well as for incorporating related grid facilities to the assets of the distribution company.

- 087/04 -Approves the Organizational Norm for Open Deliberation Meetings held by the Board of Directors of the National Electricity Agency - ANEEL.

- 088/04 - Approves the Code of Ethics of the National Electricity Agency - ANEEL.

- 089/04 - Establishes methodology to calculate the compensation to be granted to distribution companies which give legally-imposed discounts to low income residential consumers.

- 109/04 - Establishes the Electricity Commercialization Convention (code).

- 127/04 - Establishes procedures for the apportionment of the Alternative Sources Incentive Program - PROINFA costs, as well as defines respective electricity quotas, pursuant Decree 5.025 (03/30/2004).

- 145/05 - Approves January/2005 version of Commercialization Rules for energy accounting and financial settlement processes for all transactions carried out in the CCEE from 01/01/2005 on, as defined by the Electricity Commercialization Convention established by Normative Resolution 109 (10/26/2004).

- 149/05 - Establishes procedures to be followed by Agents when requesting approval to changes in their bylaws, and sets forth the cases that have been already approved.

- 150/05 - Approves new Rules for calculating financial guarantees pertaining to the Financial Settlement process in the CCEE, as a change to the Commercialization Rules (January/2005 version), approved by Normative Resolution 145, dated (02/01/2005).

- 152/05 - Authorizes changes to a specific subset of algebraic expressions in the Commercialization Rules (January/2005 version), which were approved by Normative Resolution 145 (02/01/2005).

- 160/05 - Changes paragraphs 5 to 7 of art. 3 of Resolution 688 (12/24/2003), which establishes procedures to determine unavailability of power plants in the Energy Reallocation Mechanism - MRE, as well as revokes Normative Resolution 75 (07/29/2004).

- 161/05 - Approves the Commercialization Rules for the application of the Contracts Surpluses and Deficits Compensation Mechanism, dealt with by art. 45 of the Electricity Commercialization Convention.

- 162/05 - Approves the public bid notice for the adjustment auctions to purchase electricity, and delegates its execution to the Chamber of Electrical Energy Commercialization - CCEE.

- 168/05 - It approves the Electricity Commercialization Rules pertaining to the Penalties, Financial Guarantees and Financial Loss Sharing modules.

1b.3. If an alternative does not comply with all mandatory applicable legislation and regulations, then show that, based on an examination of current practice in the country or region in which the law or regulation applies, those applicable legal or regulatory requirements are systematically not enforced and that noncompliance with those requirements is widespread in the country. If this cannot be shown, then eliminate the alternative from further consideration. ***Not applicable.***

1b.4. If the proposed project activity is the only alternative amongst the ones considered by the project participants that is in compliance with mandatory regulations with which there is general compliance, then the proposed CDM project activity is not additional. ***Not applicable***

.

SATISFIES/PASSES – Go to Step 2

Step 2. Investment analysis

Determine whether the proposed project activity is economically or financially less attractive than at least one other alternative, identified in step 1, without the revenue from the sale of certified emission reductions (CERs). To conduct the investment analysis, use the following sub-steps:

Sub-step 2a. Determine appropriate analysis method

Determine whether to apply simple cost analysis, investment comparison analysis or benchmark analysis (sub-step 2b). If the CDM project activity generates no financial or economic benefits other than CDM related income, then apply the simple cost analysis (Option I). Otherwise, use the investment comparison analysis (Option II) or the benchmark analysis (Option III).

Benchmark analysis (Option III) will be used to analyse the HPP Castro Alves Project Activities.

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

Identify the financial indicator:

- Shareholders IRR will be used as project financial indicator and as reference to represent the standard returns in the market the Brazilian interest rate will be used, known as *SELIC* (Special System of Clearance sale and of Custody).

SELIC description

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

SELIC started its operations in 1979, resulting from a joint effort of BCB and market participants represented by the National Association of Financial Market Institutions (Andima). Since then, all of the relevant government securities in Brazil were dematerialized and kept in custody in SELIC.

With the restructuring of the Brazilian payments system in 2002, SELIC was reformed to follow international recommendations for securities settlement systems, providing from then on immediate, simultaneous and final transfer of securities and, through a direct link with STR (Central Bank Money Transfers System), bank reserves (genuine DVP-1).

Further to outright purchases/sales and to repurchase agreements (repos), some facilities were developed in SELIC to enhance liquidity in the secondary market. One such mechanism allows the association of an outright purchase to an intraday repo operation, so that the buyer can settle the former using funds provided by the latter and, later on, by means of a similar association, repurchase the bonds with the resources obtained by simultaneously selling them.

Among Selic's extensions, the most important, from a monetary policy perspective, are the auction systems used for National Treasury's public offerings and to BCB's open market operations. Commercial banks, investment banks and broker houses participate in SELIC, but mutual funds, pension funds and other institutional investors may also hold individual accounts. Special services have been developed in SELIC to meet requirements of clearinghouses, such as special accounts where guarantees are held.

In order to precisely analyze the investment environment in Brazil, one must consider the Brazilian preferential interest rate, known as the SELIC rate, besides the Interbank Deposit Certificate (CDI – *Certificado de Depósito Interbancário*), which is the short-term credit measure of the market value. The interest rates practiced at the Brazilian market have if maintained in a landing extraordinarily high, since Real Plan stabilized the inflation in 1994. In spite of the interest rates they be falling substantially on these last two years, Brazil still introduces one of the largest real interest rates of the world.

As a consequence of the long inflationary period, Brazilian currency sharply depreciated, effectively impeding the commercial banks from providing any kind of long-term debt operation. The lack of a long-term debt market had a strong negative impact on funding for electric energy projects in Brazil.

The interest rates for financing in local currency are significantly higher than those in the US Dollar. The Brazilian Development Bank (BNDES – *Banco Nacional de Desenvolvimento Econômico e Social*) is the

only supplier of long-term loans. The BNDES debt financing operations are done mainly through commercial banks. Since the credit market is dominated by shorter maturities (from 90 days to 1 year), long-term credit lines are rarely available, except for stronger corporate loan debtors and for special government initiatives.

Domestic financial markets with maturities for longer than one year are practically non-existent in Brazil. Experience has shown that in moments of financial stress the duration of the savings instruments have contracted to levels near to one a day, with greater concentration in overnight bank deposits. Savers do not hold long-term financial contracts, due to the inability to determine the price-in the uncertainty involved in the preservation of the purchasing power value (Arida et al., 2004). In addition, the capital market is not well developed in the country to provide stock market public funding.

The lack of a domestic long-term market is not the result of a disinterest in investment opportunities, but rather the reluctance of creditors and savers to expand their investment horizons. It causes the savers to opt for more liquid investments and put their money in short-term government bonds, instead of investing in long-term opportunities that could finance infrastructure projects.

The most liquid government bond is the LFT (floating rate bonds based on the daily reference rate of the Central Bank of Brazil). As of January 2006, 37% of the domestic federal debt was in LFTs and had duration of one day (Source: Tesouro Nacional; www.tesouro.fazenda.gov.br). This bond rate almost follows almost the CDI rate, which is influenced by the SELIC rate, defined by COPOM.

The SELIC rate has been oscillating since 1999, from a minimum of 12.05% a.a. In April 2007 up to a maximum of 43.25% a.a. in January 2003 (Figure 8).

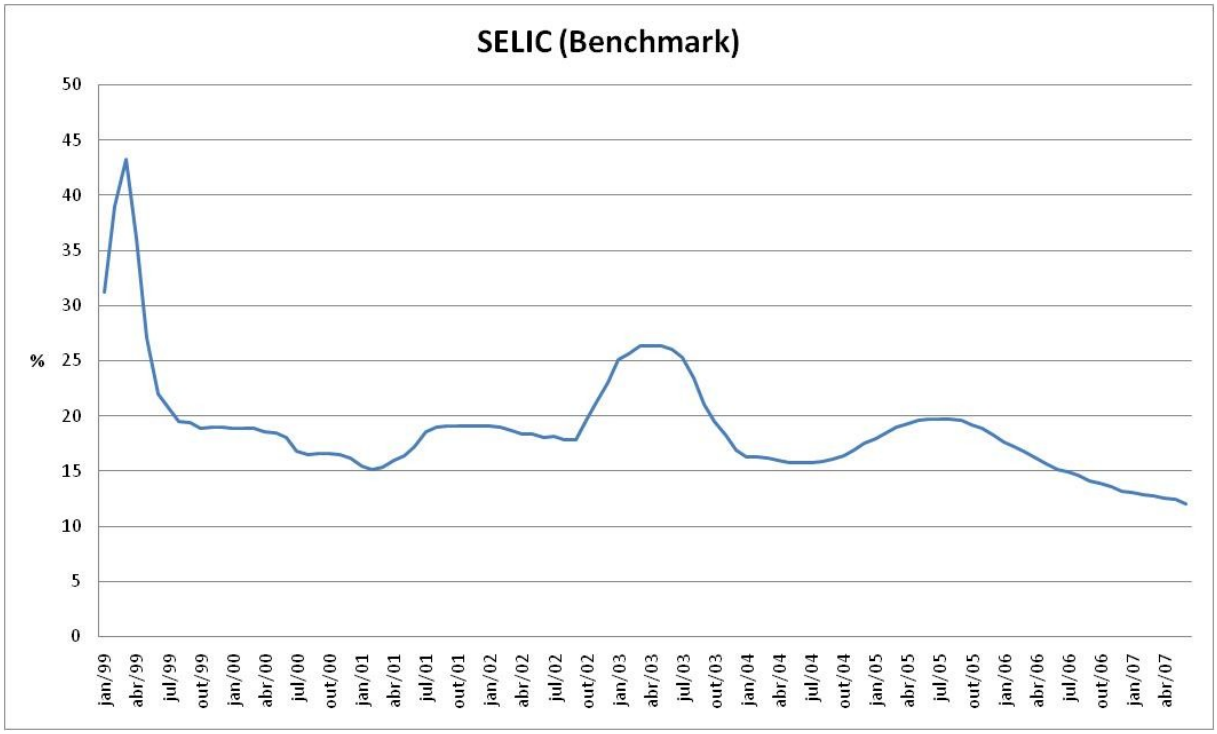


Figure 8 - SELIC rate evolution 1999 to 2007 (Source: Banco Central do Brasil)

The project analysis was made in 2003. It will be considered the average of 2003:
SELIC (average from January 1999 to December 2002) = 20.11%.

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

CDM's "Tool for the demonstration and assessment of additionality" was approved after the project started operations. In order to comply with that Tool, the financial analysis shown below was performed using the original assumptions for investment, revenues from sales of electricity and operational costs for the scenario without CDM related revenues.

For the following calculations the assumptions were:

Investment	212,401	R$ thousand	61,978.70	US$ thousand
Electricity Price	104,78	R$/MWh	30.57	US$/MWh
Adminstrative Costs	3.6	R$/MWh	1.05	US$/MWh
Operational Costs	1.52	R$/MWh	0.44	US$/MWh

Table 6 - Cash Flow Assumptions

Considering the following exchange quotation: 1 US$ - R$3,427, as of 20/Dec/2002 (Source: Banco Central do Brasil).

The values used here should be seen as a conservative projection of tariffs and prices.

The upper limit of 560,640 GWh/year is the plant assured electric energy. During 2007, *HPP Castro Alves* is expected to generate 29,419 GWh, because the plant will start operation on 1st December, 2007, with the start of just one turbine that will make available just 40.3 MW averages.

The table below show the Cash Flow:

COMPANHIA ENERGÉTICA RIO DAS ANTAS - HPP CASTRO ALVES

Balance Sheet *(R$ thousand, Constants)*

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036
TOTAL REVENUES		-	-	-	-		**15.732**	**57.921**	**57.921**	**57.921**	**57.921**	**57.921**	**57.921**	**57.921**	**57.921**	**57.921**	**57.921**	**57.921**	**57.921**	**57.921**	**57.921**	**57.921**	**57.921**	**57.921**	**57.921**	**57.921**	**57.921**	**57.921**	**57.921**	**57.921**	**57.921**	**57.921**	**57.921**	**57.921**	**57.921**	**57.921**	**14.480**
Operational total revenues						-	15.732	57.921	57.921	57.921	57.921	57.921	57.921	57.921	57.921	57.921	57.921	57.921	57.921	57.921	57.921	57.921	57.921	57.921	57.921	57.921	57.921	57.921	57.921	57.921	57.921	57.921	57.921	57.921	57.921	57.921	14.480
PIS - Social Integration Program		-	-	-	-		(260)	(956)	(956)	(956)	(956)	(956)	(956)	(956)	(956)	(956)	(956)	(956)	(956)	(956)	(956)	(956)	(956)	(956)	(956)	(956)	(956)	(956)	(956)	(956)	(956)	(956)	(956)	(956)	(956)	(956)	(239)
COFINS - Social Security Financing Contribution		-	-	-	-		(472)	(1.738)	(1.738)	(1.738)	(1.738)	(1.738)	(1.738)	(1.738)	(1.738)	(1.738)	(1.738)	(1.738)	(1.738)	(1.738)	(1.738)	(1.738)	(1.738)	(1.738)	(1.738)	(1.738)	(1.738)	(1.738)	(1.738)	(1.738)	(1.738)	(1.738)	(1.738)	(1.738)	(1.738)	(1.738)	(434)
CPMF							(60)	(220)	(220)	(220)	(220)	(220)	(220)	(220)	(220)	(220)	(220)	(220)	(220)	(220)	(220)	(220)	(220)	(220)	(220)	(220)	(220)	(220)	(220)	(220)	(220)	(220)	(220)	(220)	(220)	(220)	(55)
NET REVENUES		-	-	-	-	-	**14.941**	**55.008**	**55.008**	**55.008**	**55.008**	**55.008**	**55.008**	**55.008**	**55.008**	**55.008**	**55.008**	**55.008**	**55.008**	**55.008**	**55.008**	**55.008**	**55.008**	**55.008**	**55.008**	**55.008**	**55.008**	**55.008**	**55.008**	**55.008**	**55.008**	**55.008**	**55.008**	**55.008**	**55.008**	**55.008**	**13.752**
SECTORIAL CHARGES		-	-	-	-		(702)	(3.274)	(3.274)	(3.274)	(3.274)	(3.274)	(3.274)	(3.274)	(3.274)	(3.274)	(3.274)	(3.274)	(3.274)	(3.274)	(3.274)	(3.274)	(3.274)	(3.274)	(3.274)	(3.274)	(3.274)	(3.274)	(3.274)	(3.274)	(3.274)	(3.274)	(3.274)	(3.274)	(3.274)	(3.274)	(3.274)	(818)
RESEARCH & DEVELOPMENT		-	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
O&M COSTS		-	-	-	-		(541)	(1.990)	(1.990)	(1.990)	(1.990)	(1.990)	(1.990)	(1.990)	(1.990)	(1.990)	(1.990)	(1.990)	(1.990)	(1.990)	(1.990)	(1.990)	(1.990)	(1.990)	(1.990)	(1.990)	(1.990)	(1.990)	(1.990)	(1.990)	(1.990)	(1.990)	(1.990)	(1.990)	(1.990)	(1.990)	(1.990)	(498)
ADMINISTRATIVE COSTS		-	-	-	-		(228)	(841)	(841)	(841)	(841)	(841)	(841)	(841)	(841)	(841)	(841)	(841)	(841)	(841)	(841)	(841)	(841)	(841)	(841)	(841)	(841)	(841)	(841)	(841)	(841)	(841)	(841)	(841)	(841)	(841)	(841)	(210)
CONCESSION COSTS		-	-	-	-		-	(2.504)	(2.504)	(2.504)	(2.504)	(2.504)	(2.504)	(2.504)	(2.504)	(2.504)	(2.504)	(2.504)	(2.504)	(2.504)	(2.504)	(2.504)	(2.504)	(2.504)	(2.504)	(2.504)	(2.504)	(2.504)	(2.504)	(2.504)	(2.504)	(2.504)	(2.504)	(2.504)	(2.504)	(2.504)	(2.504)	(2.504)
DEPRECIATION					-		(1.522)	(4.592)	(4.592)	(4.592)	(4.592)	(4.592)	(4.592)	(4.592)	(4.592)	(4.592)	(4.592)	(4.592)	(4.592)	(4.592)	(4.592)	(4.592)	(4.592)	(4.592)	(4.592)	(4.592)	(4.592)	(4.592)	(4.592)	(4.592)	(4.592)	(4.427)	(4.098)	(4.098)	(4.098)	(4.098)	(4.098)
AMORTIZATION		-	-	-	-		(2.058)	(6.185)	(6.185)	(6.185)	(6.185)	(6.185)	(6.185)	(6.185)	(6.185)	(6.185)	(4.127)	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
PROFIT BEFORE INTERESTS AND INCOME TAX		-	-	-	-	-	**9.890**	**35.622**	**35.622**	**35.622**	**35.622**	**35.622**	**35.622**	**35.622**	**35.622**	**35.622**	**37.681**	**41.808**	**41.808**	**41.808**	**41.808**	**41.808**	**41.808**	**41.808**	**41.808**	**41.808**	**41.808**	**41.808**	**41.808**	**41.808**	**41.808**	**41.808**	**41.808**	**41.808**	**41.808**	**41.808**	**5.624**
FINANCIAL REVENUES																																					
FINANCIAL EXPENSES (Loan servicing activity)		-	-	-	-			(10.717)	(20.074)	(17.859)	(15.829)	(13.748)	(11.614)	(9.425)	(7.143)	(4.830)	(2.481)	(349)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ACCRUED INTEREST		-	-	-	-			(13.655)	(3.265)	(2.021)	(1.799)	(1.568)	(1.330)	(1.083)	(731)	(464)	(223)	(29)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
PROFIT BEFORE INTEREST ON OWN WORKING CAPITAL		-	-	-	-	-	**9.890**	**11.250**	**12.284**	**15.742**	**17.994**	**20.306**	**22.679**	**25.114**	**27.749**	**30.328**	**34.977**	**41.430**	**41.808**	**41.808**	**41.808**	**41.808**	**41.808**	**41.808**	**41.808**	**41.808**	**41.808**	**41.808**	**41.808**	**41.808**	**41.808**	**41.808**	**41.808**	**41.808**	**41.808**	**41.808**	**5.624**
INTERESTS OVER WORKING CAPITAL																																					
PROFIT BEFORE INCOME TAX		-	-	-	-	-	**9.890**	**11.250**	**12.284**	**15.742**	**17.994**	**20.306**	**22.679**	**25.114**	**27.749**	**30.328**	**34.977**	**41.430**	**41.808**	**41.808**	**41.808**	**41.808**	**41.808**	**41.808**	**41.808**	**41.808**	**41.808**	**41.808**	**41.808**	**41.808**	**41.808**	**41.808**	**41.808**	**41.808**	**41.808**	**41.808**	**5.624**
INCOME TAX		-	-	-	-		(2.472)	(2.813)	(3.071)	(3.936)	(4.499)	(5.076)	(5.670)	(6.278)	(6.937)	(7.582)	(8.744)	(10.358)	(10.452)	(10.452)	(10.452)	(10.452)	(10.452)	(10.452)	(10.452)	(10.452)	(10.452)	(10.452)	(10.452)	(10.452)	(10.452)	(10.452)	(10.452)	(10.452)	(10.493)	(10.575)	(10.575)	(10.575)	(1.406)
SOCIAL CONTRIBUTION		-	-	-	-		(890)	(1.013)	(1.106)	(1.417)	(1.619)	(1.828)	(2.041)	(2.260)	(2.497)	(2.730)	(3.148)	(3.729)	(3.763)	(3.763)	(3.763)	(3.763)	(3.763)	(3.763)	(3.763)	(3.763)	(3.763)	(3.763)	(3.763)	(3.763)	(3.763)	(3.763)	(3.763)	(3.763)	(3.777)	(3.807)	(3.807)	(3.807)	(506)
EARNINGS		-	-	-	-	-	**6.527**	**7.425**	**8.107**	**10.390**	**11.876**	**13.402**	**14.968**	**16.575**	**18.314**	**20.016**	**23.085**	**27.344**	**27.593**	**27.593**	**27.593**	**27.593**	**27.593**	**27.593**	**27.593**	**27.593**	**27.593**	**27.593**	**27.593**	**27.593**	**27.593**	**27.593**	**27.593**	**27.702**	**27.919**	**27.919**	**27.919**	**27.919**	**3.712**

Shareholder - Cash Flow Assessment

Capital Increase		(6.596)	(2.624)	-	(16.847)	(21.645)	(11.492)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dividends		-	-	-	-	-	-	7.425,15	3.196,44	3.937,78	4.930,47	5.973,95	7.045,76	8.153,41	9.295,60	10.501,41	11.054,05	24.577,75	27.593,17	27.593,17	27.593,17	27.593,17	27.593,17	27.593,17	27.593,17	27.593,17	27.593,17	27.593,17	27.593,17	27.593,17	27.593,17	27.593,17	27.593,17	27.593,17	27.701,64	27.918,58	27.918,58	27.918,58	27.918,58	3.711,59
Capital Reduction		-	-	2.076,16	-	-	-	8.418,14	-	-	-	-	-	-	-	-	-	-	4.591,53	4.591,53	4.591,53	4.591,53	4.591,53	4.591,53	4.591,53	4.591,53	4.591,53	4.591,53	4.591,53	4.591,53	4.591,53	4.591,53	4.591,53	4.427,18	4.098,48	4.098,48	4.098,48	4.098,48	4.098,48
Cash on Hand Variation		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SHAREHOLDERS CASH-FLOW		(6.596,11)	(2.624,37)	2.076,16	(16.847,32)	(21.644,78)	(11.491,64)	15.843,30	3.196,44	3.937,78	4.930,47	5.973,95	7.045,76	8.153,41	9.295,60	10.501,41	11.054,05	24.577,75	32.184,70	32.184,70	32.184,70	32.184,70	32.184,70	32.184,70	32.184,70	32.184,70	32.184,70	32.184,70	32.184,70	32.184,70	32.184,70	32.184,70	32.184,70	32.128,82	32.017,06	32.017,06	32.017,06	32.017,06	7.810,06

Table 7 - The 20 year analysis period corresponds to the average length of analysis in the electric sector.

Results:

INTERNAL RATE OF RETURN (IRR)	**16.59%**
SELIC (AVERAGE OF 1999-2002)	**20.11%**
DIFFERENCE	**-3.52%**

Table 8 – Project Results IRR x Benchmark

According to the results the UHE Castro Alves, the Shareholders IRR was under the benchmark. The difference between them was about 3.5%, considering the average the period between 1999 and 2002. Considering the maximum value of the SELIC in this same period 43.25% (Mar/99) and the value of December of 2002, 23.03%, this difference should be considered higher for the estimative. Even starting with this estimative of 16.59% of Shareholders IRR, the actual IRR decreased to around 8%, being under of the benchmark (12%). The reasons of it were an under estimative of the entire investments and some geological phenomena those occurred.

This shows that without CER revenues, the project would reach lower rates of return than the benchmark rate, concluding that:

- Sub-step 2.c – 8b (ACM0002): The financial benchmark, if Option III (benchmark analysis) is used. If the CDM project activity has a less favourable indicator (e.g. lower IRR) than the benchmark, then the CDM project activity *cannot be considered as financially attractive*.

Sub-step 2d. Sensitivity analysis

The three main variables that might affect the project's finance are:

- Electricity revenues
- Operational Costs
- Administrative costs

The table below summarizes the sensitivity results:

Electricity Price Scenarios		
Scenarios	**Electricity Price R$/ MWh**	**IIR**
Projected Situation	104.78	16.59%
-5%	99.54	15.17%
-10%	94.3	13.75%
5%	110.02	18.02%
10%	115.26	19.45%
O&M Costs Scenarios		
Scenarios	**O&M Costs R$/MWh**	**IIR**
Projected Situation	3.6	16.59%
-5%	3.42	16.64%
-10%	3.24	16.69%
5%	3.78	16.54%
10%	3.96	16.49%
Administrative Costs Scenarios		
Scenarios	**Administrative Costs R$/MWh**	**IIR**
Projected Situation	1.52	16.59%
-5%	1.45	16.61%
-10%	1.37	16.63%
5%	1.6	16.57%
10%	1.67	16.55%

Table 9 – Project Sensibility analysis

According to the sensitivity analysis the CDM project are unlikely to be financially attractive due to its IRR are lower than benchmark. The average SELIC for the period (Jan/1999 – Dec/2002) was 20.11%.

According to the Addicionality Tool, the expected outcome from the step 2 is the follow:

"If after the sensitivity analysis is concluded that the proposed CDM project activity is unlike to be the most financially attractive (as per step 2c -8a) or is unlikely to be financially attractive (as per step 2c – 8b), then proceed to Step 4 (Common practice analysis). If the project participants so wish, they may apply the step 3 (Barrier Analysis) as well."

SATISFIES/PASSES – Go to Step 4

Step 3. Barrier analysis

This step will not be considered. **Continue to Step 4**

Step 4. Common practice analysis

Sub-step 4a. Analyze other activities similar to the proposed project activity, and

Sub-step 4b. Discuss similar options that are occurring:

The growing demands requested by the environmental organs have been provoking great delay in the approval of new projects of hydroelectric generation.

The HPP Castro Alves is a run-of-river power plant, but different from the closed plants of the subsystem south.

It will be analyzed the region of Rio Grande do Sul. It's the State where the HPP Castro Alves is located.

State of Rio Grande do Sul Subsystem description (Source: ANEEL):

Enterprises in Operation			
Type	Quantity	Power (kW)	%
CGH	28	17,524	0.26
EOL	3	150,000	2.26
PCH	24	153,716	2.32
UHE	11	4,673,650	70.41
UTE	22	1,643,225	24.75
Total	**88**	**6,638,115**	100

Enterprises under Construction			
Type	Quantity	Power (kW)	%
PCH	5	115,500	9.62
UHE	3	1,085,000	90.38
Total	**8**	**1,200,500**	100

Granted Enterpresis between 1998 and 2004 (The construction hasn´t started)			
Type	Quantity	Power (kW)	%
CGH	9	6,297	0.22
EOL	25	1,153,512	40.73
PCH	16	266,318	9.4
UHE	4	487,000	17.2
UTE	7	918,625	32.44
Total	**61**	**2,831,752**	100

Types of Enterprises description:

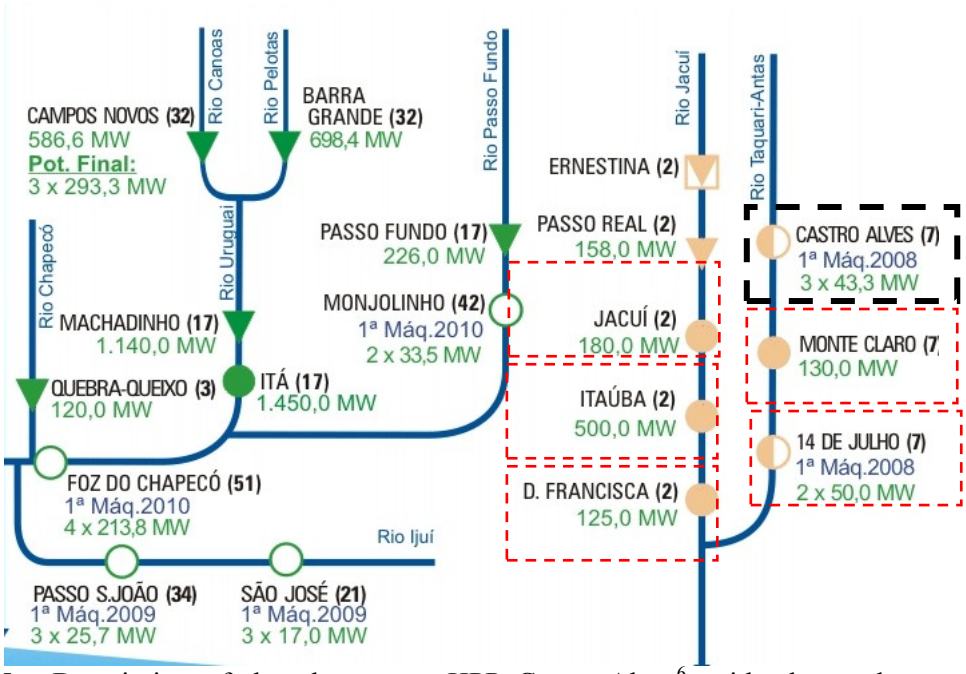
- CGH (Hydro Power Plant Central Generation)
- EOL (Wind Power Plant)
- PCH (Small Hydro Power Plant)
- UHE (Hydro Power Plant - HPP)
- UTE (Thermal Power Plant)

Tables above show that there are similar activities occurring in the region of HPP Castro Alves, as follows:

- 70.41% of the operating projects are Hydro Power Plants, as HPP Castro Alves;
- 90.38% of the projects under constructions are HPP;
- 32.44% of the granted projects those didn´t started to be constructed yet are HPP.

But HPP Castro Alves has some differences between the similar projects (Hydro Power Plants, run-of-river, Installed Capacity around 130 MW). These differences will be showed next.

The picture 5 is showing the Power Plants next to HPP Castro Alves.



Picture 5 - Description of the plants near HPP Castro Alves[6], with almost the same Installed Capacity. (Source: ONS)

	Run-of-River
	With reservoir

Legend of Picture 10 – (if the ball or the triangle is white it means that it is for the future. A half white means already under construction).

The Hydro Power Plants near HPP Castro Alves and with almost the same installed capacity are:

- HPP Jacuí – 180 MW – Companhia Estadual de Energia Elétrica – Run-of-river
- HPP Passo Fundo – 226 MW – Tractebel Energia S/A – with reservoir
- HPP Passo Real – 158 MW – Companhia Estadual de Energia Elétrica – with reservoir
- HPP Monte Claro - 130 MW – CERAN – Run-of-river
- HPP 14 de Julho – 100 MW – CERAN – Run-of-river
- HPP Dona Francisca – 125 MW – Dona Francisca Energética S/A; Companhia Estadual de Energia Elétrica – Run-of-river

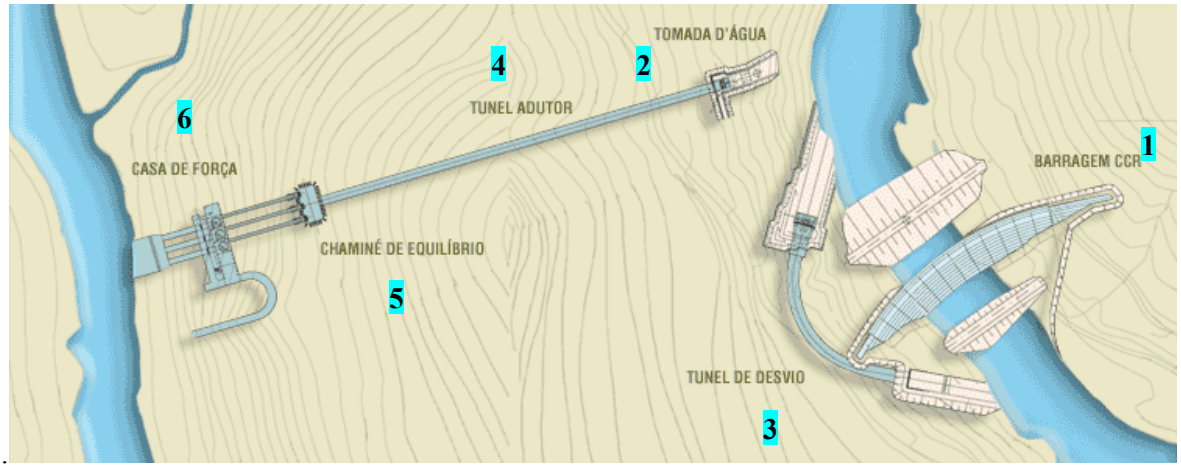
HPP Castro Alves is different from the other plants due to it works with an adduction tunnel of around 7 km. The environmental impact due to this was less than the other kind of hydropower projects. But this kind of project use to cost more than the others. It´s one of the reasons the IRR of the project was low.

HPP Monte Claro and HPP 14 de Julho also work as HPP Castro Alves, and they are also requesting for CERs, improving a little the results.

[6] http://www.ons.org.br/conheca_sistema/pop/pop_diagrama_esquemat_usinas.aspx

The general arrangement of the work considers the use of a curve of the river so that, of 92 meters of the rude fall of the use, 52 meters are obtained by the natural unevenness of the river along the turn and the remaining, for the bus.

The following picture schematizes the general arrangement of HPP Castro Alves:



1) Dam
2) Water Intake
3) Deviation Tunnel
4) Adduction Tunnel
5) Balance Chimney

SATISFIED/APPROVED – Project is ADDITIONAL

B.6. Emission reductions:

B.6.1. Explanation of methodological choices:

>>

The project activity is a run-of-river hydropower project interconnected to the Brazilian electric grid, through the South Subsystem. The project meets all the requirements of "additionality" (see the application of "Tool of Additionality" 3 to follow) and shows that the project would not occur in the absence of the CDM.

In a period of restructuring the entire electric market (generation, transmission and distribution), as is the case in Brazil, investment, uncertainty, is the main barrier to small and medium projects for renewable electric energy generation. In this scenario, the new projects compete with the existing plants (operating margin) and with new projects (build margin), which normally attract the attention of the financial market. The build and operating margins were used to calculate the emissions factor for the interconnected grid.

The ACM0002 (version 6) methodology, for the generation of interconnected grid electricity from renewable sources, uses derived margins that were applied to the context of the project activity by determining emissions factors from the South subsystem of the Brazilian interconnected grid (electric system that is interconnected by transmission lines to the project electric system, and in which the plants can be dispatched without significant restrictions in transmission.

According to the approved selected methodology (ACM0002, 2006), the baseline emission factor (EF_y) is calculated as the combined margin (*CM*), which consists of the combination of factors of the operating margin (*OM*) and the build margin (*BM*). In order to determine the emissions factors of the build margin and the operating margin, a project electric system is defined as being the physical extension of the plants that can be dispatched without significant restrictions on transmission. Similarly, an interconnected electric system is defined as being an electric system that is interconnected by transmission lines to the project electric system, in which the plants can be dispatched without significant restrictions in transmission.

According to ACM0002 (version 06), a baseline emission factor (EF_y) is calculated as follows:

STEP 1 - Calculate the operating margin factor(s), based on one of the following methods

(a) Simple operating margin
(b) Simple adjusted operating margin
(c) Dispatch data analysis operating margin
(d) Average operating margin.

The build margin calculated by the dispatch data analysis must be the first choice and it will be followed for the HPP Castro Alves Calculations. The method is described as follow:

(c) *Dispatch Data Analysis OM*. The Dispatch Data OM emission factor (*EFOM,Dispatch Data,y*) is summarized as follows:

$$EF_{OM,DispatchData,y} = \frac{E_{OM,y}}{EG_y}$$ (Formula 6 of ACM0002)

Where *EGy* is the generation of the project (in MWh) in year *y*, and *EOM.y* are the emissions (tCO2) associated with the operating margin calculated as

$$E_{OM,y} = \sum_h EG_h \cdot EF_{DD.h}$$ (Formula 7 of ACM0002)

Where *EGh* is the generation of the project (in MWh) in each hour *h* and $EF_{DD,h}$ is the hourly generation weighted average emissions per electricity unit (tCO2/MWh) of the set of power plants (*n*) in the top 10% of grid system dispatch order during hour *h*:

$$EF_{DD,h} = \frac{\sum_{i,n} F_{i,n,h} \cdot COEF_{i,n}}{\sum_n GEN_{n,h}}$$ (Formula 8 of ACM0002)

Where *F*, *COEF* and *GEN* are analogous to the variables described for the simple OM method above, but calculated on an hourly basis for the set of plants (*n*) falling within the top 10% of the system dispatch.

To determine the set of plants (*n*), obtain from a national dispatch center: a) the grid system dispatch order of operation for each power plant of the system; and b) the amount of power (MWh) that is dispatched from all plants in the system during each hour that the project activity is operating (*GENh*). At each hour *h*, stack each plant's generation (*GENh*) using the merit orders. The set of plants (*n*) consists of those plants at the top of the stack (i.e., having the least merit), whose combined generation (Σ *GENh*) comprises 10% of total generation from all plants during that hour (including imports to the extent they are dispatched).

STEP 2 – Calculate the build margin emission factor ($EF_{BM,y}$) since the generation pondered average emission factor (tCO_2e/MWh) from a sample of the centers *m*, as follows:

$$EF_{BM,y} = \frac{\sum_{i,m} F_{i,m,y} \cdot COEF_{i,m}}{\sum_m GEN_{m,y}}$$ (Formula 9 of ACM0002)

Where $F_{i,m,y}$, $COEF_{i,m}$ and $GEN_{m,y}$ are analogous to the variables described for the simple OM method above for plants *m*.

Project participants shall choose between one of the following two options. The choice among the two options should be specified in the PDD, and cannot be changed during the crediting period.
Option 1. Calculate the Build Margin emission factor EFBM,y ex-ante based on the most recent information available on plants already built for sample group m at the time of PDD submission. The sample group m consists of either the five power plants that have been built most recently, or the power plant capacity additions in the electricity system that comprise 20% of the system generation (in MWh) and that have been built most recently.7 Project participants should use from these two options that sample group that comprises the larger annual generation.

Option 2. For the first crediting period, the Build Margin emission factor EFBM,y must be updated annually ex-post for the year in which actual project generation and associated emissions reductions occur. For subsequent crediting periods, EFBM,y should be calculated ex-ante, as described in option 1 above. The sample group m consists of either the five power plants that have been built most recently, or the power plant capacity additions in the electricity system that comprise 20% of the system generation (in MWh) and that have been built most recently.8 Project participants should use from these two options that sample group that comprises the larger annual generation.

It will be used the **Option 2** for **HPP Castro Alves** project.

STEP3. Calculate the baseline emission factor EF_y as the weighted average of the Operating Margin emission factor ($EF_{OM,y}$) and the Build Margin emission factor ($EF_{BM,y}$):

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

(Formula 10 of ACM0002)

Where the weights *wOM* and *wBM*, by default, are 50% (i.e., *wOM* = *wBM* = 0.5), and *EFOM,y* and *EFBM,y* are calculated as described in Steps 1 and 2 above and are expressed in tCO2/MWh.

Alternative weights can be used, as long as *wOM* + *wBM* = 1, and the guidance provided below is followed. Justification should be provided to, and will be assessed by, the Executive Board.

The weighted average applied by project participants should be fixed for a crediting period and may be revised at the renewal of the crediting period.

Guidance on selecting alternative weights

The following guidance provides a number of project-specific and context-specific factors for developing alternative operating and build margin weights to the above defaults. It does not, however, provide specific algorithms to translate these factors into quantified weights, nor does it address all factors that might conceivably affect these weights. In this case, project participants are suggested to propose specific quantification methods with justifications that are consistent with the guidance provided below. Given that it is unlikely that a project will impact either the OM or BM exclusively during the first crediting period, it is suggested that neither weight exceed 75% during the first crediting period.

Where the weights w_{OM} and w_{BM}, by standard, are 50% (or, $w_{OM} = w_{BM} = 0.5$). They can be used as alternative weights, if $w_{OM} + w_{BM} = 1$ and appropriate evidence is presented justifying the alternative weights.

According to MCT, MME and ONS the Brazilian electric subsystem is divided in four regions: South, Southeast/Midwest, Northeast and North. MCT will make available de emission factor data for each region.

Project Emissions

The project activity mainly reduces carbon dioxide through substitution of grid electricity generation with fossil fuel fired power plants by renewable electricity. The emission reduction *ERy* by the project activity during a giving year y is the difference between baseline emissions (*BEy*), project emissions (*PEy*) and emissions due to leakage (*Ly*), as follows:

$$ERy = BEy - PEy - Ly \text{ (Formula 11 of ACM0002)}$$

Where the baseline emissions (*BEy* in tCO_2) are the product of the baseline emissions factor (*EFy* in tCO_2/MWh) calculated in Step 3, times the electricity supplied by the project activity to the grid (*EGy* in MWh) minus the baseline electricity supplied to the grid in the case of modified or retrofit facilities ($EG_{baseline}$ in MWh) as follows:

$$BEy = (EGy - EG_{baseline}) * EFy \text{ (Formula 12 of ACM0002)}$$

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

(Copy this table for each data and parameter)

Data / Parameter:	**Area**
Data unit:	km^2
Description:	Reservoir surface area at maximum level
Source of data used:	Measured by CERAN
Value applied:	5
Justification of the choice of data or description of measurement methods and procedures actually applied :	It will be used to calculate the density of the reservoir. It has impact on the applicability of the methodology and on the emissions of GHG during the project activity.
Any comment:	This data was measured once at the beginning of the project.

Data / Parameter:	**Installed Capacity**
Data unit:	MW
Description:	Project activity installed capacity
Source of data used:	Feasibility study
Value applied:	130
Justification of the choice of data or description of measurement methods and procedures actually applied :	It will be used to calculate the density of the reservoir as the item above. It will be also used to calculate de Certified Emission Reductions of the project activity, due to the assured electric energy depend on this.
Any comment:	This value will not be altered.

B.6.3 Ex-ante calculation of emission reductions:

>>

CERs Calculation Sheet													
B.6.3.1) Emission Factor (tCO2/MWh)- EF_y													
Month	**Jan**	**Feb**	**March**	**Apr**	**May**	**June**	**July**	**Aug**	**Sept**	**Oct**	**Nov**	**Dec**	
EF_{OM}	0.9074	0.9663	0.9719	0.9648	1.0027	0.9771	1.0236	1.0110	1.0273	0.8161	0.9667	0.8620	
EF_{BM}	0.1737	0.1737	0.1737	0.1737	0.1737	0.1737	0.1737	0.1737	0.1737	0.1737	0.1737	0.1737	
w_{OM}	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	
w_{BM}	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	
EF	**0.5405**	**0.5700**	**0.5728**	**0.5692**	**0.5882**	**0.5754**	**0.5986**	**0.5923**	**0.6005**	**0.4949**	**0.5702**	**0.5178**	
B.6.3.2) Estimated Generation (MWh)- EG_y													***TOTAL***
2007	-	-	-	-	-	-	-	-	-	-	-	29,419	**29,419**
2008	29,419	46,720	46,720	46,720	46,720	46,720	46,720	46,720	46,720	46,720	46,720	46,720	**543,339**
2009	46,720	46,720	46,720	46,720	46,720	46,720	46,720	46,720	46,720	46,720	46,720	46,720	**560,640**
2010	46,720	46,720	46,720	46,720	46,720	46,720	46,720	46,720	46,720	46,720	46,720	46,720	**560,640**
2011	46,720	46,720	46,720	46,720	46,720	46,720	46,720	46,720	46,720	46,720	46,720	46,720	**560,640**
2012	46,720	46,720	46,720	46,720	46,720	46,720	46,720	46,720	46,720	46,720	46,720	46,720	**560,640**
2013	46,720	46,720	46,720	46,720	46,720	46,720	46,720	46,720	46,720	46,720	46,720	46,720	**560,640**
2014	46,720	46,720	46,720	46,720	46,720	46,720	46,720	46,720	46,720	46,720	46,720	-	**513,920**
TOTAL	**309,739**	**327,040**	**327,040**	**327,040**	**327,040**	**327,040**	**327,040**	**327,040**	**327,040**	**327,040**	**327,040**	**309,739**	**3,889,878**
B.6.3.3) Baseline Emissions (tCO2)- BE_y													***TOTAL***
2007	-	-	-	-	-	-	-	-	-	-	-	15,234	**15,234**
2008	15,902	26,630	26,760	26,595	27,481	26,883	27,968	27,674	28,055	23,120	26,640	24,193	**307,900**
2009	25,254	26,630	26,760	26,595	27,481	26,883	27,968	27,674	28,055	23,120	26,640	24,193	**317,252**
2010	25,254	26,630	26,760	26,595	27,481	26,883	27,968	27,674	28,055	23,120	26,640	24,193	**317,252**
2011	25,254	26,630	26,760	26,595	27,481	26,883	27,968	27,674	28,055	23,120	26,640	24,193	**317,252**
2012	25,254	26,630	26,760	26,595	27,481	26,883	27,968	27,674	28,055	23,120	26,640	24,193	**317,252**
2013	25,254	26,630	26,760	26,595	27,481	26,883	27,968	27,674	28,055	23,120	26,640	24,193	**317,252**
2014	25,254	26,630	26,760	26,595	27,481	26,883	27,968	27,674	28,055	23,120	26,640	-	**293,059**
TOTAL	**167,426**	**186,411**	**187,317**	**186,162**	**192,364**	**188,181**	**195,778**	**193,717**	**196,385**	**161,843**	**186,479**	**160,392**	**2,202,454**

B.6.3.1) Emission Factor Calculation - *EFy*

EF_{OM} and EF_{BM} were given by the Brazilian Ministry of Science and Technology (MCT[7]). They were calculated under the method ***Dispatch data analysis operating margin*** described in the item B.6.1 of this PDD.

It was considered the default w_{OM} and w_{BM} (50% and 50% respectively) according to this methodology. It was also explain on item B.6.1 of this PDD.

The Emission Factor calculation was concluded using the formula 10 of ACM0002 (described on item B.6.1):

$$EF_y = EF_{OM} * w_{OM} + EF_{BM} * w_{BM}$$ **(formula 10 of ACM0002).**

It was used the same emission factors of 2006 to the following years for a estimative of CERs.

B.6.3.2) Estimated Generation Calculation – *EGy*

According to the Commercial Operational Schedule, described in the Concession Contract and its Additive[8], between CERAN and ANEEL, the following assured energy was estimated:

SCHEDULE	Assured Energy	
Commercial Operational Start	MWh/year	MWh/month
01/dez/07	353,028	29,419
01/fev/08	560,640	46,720
01/abr/08	560,640	46,720

B.6.3.3) Baseline Emissions Calculation – *BEy*

According to the formula 12 of ACM0002 (see item B.6.1),

$BEy = (EGy - EG_{baseline}) * EFy$ (Formula 12 of ACM0002)

---

[7] **MCT links**:

http://www.mct.gov.br/index.php/content/view/50958.html - Emission Factors (EF_{OM} and EF_{BM}) – Visited on 19th July 2007.

http://www.mct.gov.br/index.php/content/view/50965.html - Manual of the Emission Factor Calculations – Visited on 19th July 2007.

[8] **CERAN Concession Contract and Additive:**

http://www.aneel.gov.br/aplicacoes/Contrato/Documentos_Aplicacao/08_2001.pdf - Concession Contract

http://www.aneel.gov.br/aplicacoes/Contrato/Documentos_Aplicacao/1TA0108CERAN.pdf - Additive to the Concession Contract

According to the methodology ACM0002 *PEy*, *Ly* and $EG_{baseline}$ are zero. See the following reasons:

- *PEy* – see item **B.3**;

- Leakage (L_y) – "The main emissions potentially given rise to leakage in the context of electric sector projects are emissions arising due to activities such as power plant construction, fuel handling and land inundation. Project participants do not need to consider these emission sources as leakages in applying this methodology. Project activities using this baseline methodology shall not claim any credit for the project on account of reducing these emissions below the level of baseline scenario."

- $EG_{baseline}$ – The project is a new hydro power plant.

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

>>

Year	Estimation of project activity emissions	Estimation of baseline emissions	Estimation of leakage	Estimation of overall emission reductions
	(tones of CO_2e)	(tones of CO_2e)	(tones of CO_2e)	(tones of CO_2e)
2007	0	15,234	0	15,234
2008	0	307,900	0	307,900
2009	0	317,252	0	317,252
2010	0	317,252	0	317,252
2011	0	317,252	0	317,252
2012	0	317,252	0	317,252
2013	0	317,252	0	317,252
2014	0	293,059	0	293,059
Total (tones of CO2e)	**0**	**2,202,454**	**0**	**2,202,454**

ER_y = 2,202,454 tCO_2e (first period of credit)

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

>>

Approved consolidated monitoring methodology ACM0002 – "Consolidated monitoring methodology for generation of grid-interconnected electricity with zero emissions from renewable sources," version 06 on May 19, 2006.

This monitoring methodology must be used with the approved baseline methodology ACM0002 ("Consolidated baseline methodology for generation of grid-connected electricity with zero emissions from renewable sources"), and is applied to the increases in electric capacity from run-of-river hydropower plants.

The methodology is applicable to the project. It consists of the use of measurement equipment designed for registering or verifying the energy generated by the unit in both directions. This electric energy measurement is essential for verifying and monitoring the GHG emission reductions. The monitoring plan (item B.7.2) permits the GHG emissions formula generated by the project in a direct manner, applying the baseline emissions factor.

Based on hydroelectric energy technology, the project emissions (*PEy*) are equal to zero; thus, formulas for the direct emissions are not necessary.

The indirect emissions can be consequences of the project construction, the transportation of materials and fuel and other upstream activities. The project does not require emissions reductions from these activities. Nevertheless, no significant leakages were identified from these activities.

The project emissions in the form of methane also can result from the construction and operation of a water reservoir if the biomass is permanently submerged in the process. The project activity is a run-of-river hydropower plant; however, there is only one small reservoir, having insignificant methane emissions resulting from the biomass decay.

Thus, no emissions source was identified and due to this, no data will be collected nor archived.

B.7.1 Data and parameters monitored:

(Copy this table for each data and parameter)

Data / Parameter:	**Electric energy Generated (EG_y)**
Data unit:	MWh
Description:	Electric energy generated
Source of data to be used:	Electric energy Report brought to the system, supplied by CCEE
Value of data applied for the purpose of calculating expected emission reductions	560,140 (assured electric energy per year)

in section B.5	
Description of measurement methods and procedures to be applied:	See the description on item B.7.2.1.
QA/QC procedures to be applied:	Uncertainty level of data is Low. These data will be used for calculate the emission reductions. The electricity generated will be monitored by the project participants and it will be checked by reports emitted by CCEE (information comparison between operation data and CCEE reports).
Any comment:	

Data / Parameter:	**Emission Factor (*EFy*)**
Data unit:	tCO2/MWh
Description:	South Grid Emission Factor
Source of data to be used:	MCT
Value of data applied for the purpose of calculating expected emission reductions in section B.5	*Emission Factor (tCO2/MWh)* Month: Jan / Feb / March / Apr / May / June / July / Aug / Sept / Oct / Nov / Dec *EF*: 0.5405 / 0.5700 / 0.5728 / 0.5692 / 0.5882 / 0.5754 / 0.5986 / 0.5923 / 0.6005 / 0.4949 / 0.5702 / 0.5178
Description of measurement methods and procedures to be applied:	Ex-post emission factor will be calculated by MCT with the ONS data. The EF_y formula items, EF_{OM} and EF_{BM}, will be also monitored and calculated by MCT and ONS, with the Dispatch Data of the South Grid Subsystem.
QA/QC procedures to be applied:	Uncertainty level of data is Low.
Any comment:	

Data / Parameter:	**Emission Factor Operating Margin (EF_{OM})**
Data unit:	tCO2/MWh
Description:	South Grid Emission Factor
Source of data to be used:	MCT
Value of data applied for the purpose of calculating expected emission reductions in section B.5	*Emission Factor (tCO2/MWh)* Month: Jan / Feb / March / Apr / May / June / July / Aug / Sept / Oct / Nov / Dec EF_{OM}: 0.9074 / 0.9663 / 0.9719 / 0.9648 / 1.0027 / 0.9771 / 1.0236 / 1.0110 / 1.0273 / 0.8161 / 0.9667 / 0.8620
Description of measurement	Ex-post emission factor will be calculated by MCT with the ONS data. The EF_y formula items, EF_{OM} and EF_{BM}, will be also monitored and calculated by MCT and

methods and procedures to be applied:	ONS, with the Dispatch Data of the South Grid Subsystem.
QA/QC procedures to be applied:	Uncertainty level of data is Low.

Data / Parameter:	**Emission Factor Build Margin (EF_{BM})**
Data unit:	tCO2/MWh
Description:	South Grid Emission Factor
Source of data to be used:	MCT
Value of data applied for the purpose of calculating expected emission reductions in section B.5	*Emission Factor (tCO2/MWh)* Month | Jan | Feb | March | Apr | May | June | July | Aug | Sept | Oct | Nov | Dec EF_{BM} | 0.1737 | 0.1737 | 0.1737 | 0.1737 | 0.1737 | 0.1737 | 0.1737 | 0.1737 | 0.1737 | 0.1737 | 0.1737 | 0.1737
Description of measurement methods and procedures to be applied:	Ex-post emission factor will be calculated by MCT with the ONS data. The EF_y formula items, EF_{OM} and EF_{BM}, will be also monitored and calculated by MCT and ONS, with the Dispatch Data of the South Grid Subsystem.
QA/QC procedures to be applied:	Uncertainty level of data is Low.

B.7.2 Description of the monitoring plan:

>>

B.7.2.1 - Generated Electric energy

The monitoring will be done according to the defined procedures for Approved Consolidated Monitoring Methodology ACM0002 - "Monitoring Methodology consolidated for the electricity generation to an interconnected grid with zero emissions from renewable sources."

The project activity, in which HPP Castro Alves is framed, avoids emissions of GHGs from the electric energy generation in a renewable way. That electric energy generation will be monitored directly by the participants of the project through the collection of generation data in the main metering and rearguard metering. The generation information is collected from the monthly reading of the meters that provide the information of the electric energy liquidates dispatched SIN - National System.

The Maintenance Department of CERAN, through a Systems Technician, is responsible for generating, in the first useful day of every month, from consultation to the data base of the metering of electric energy liquidates, the spreadsheets with the generation data, consolidated hourly, regarding the previous month.

The Operation Department, through the Operation Engineer, makes the collected data analysis and the total of the electric energy generated in the respective month. The spreadsheets with the data of the monthly generation are filed in the net of the Plant, on which a backup is accomplished weakly.

Monthly, the Operation Supervisor will send the spreadsheet with the electric energy data generated to the CERAN representative (Contracted Agent) of CCEE, which confronts the data supplied close to by that with the generation data supplied by this.

The generation data monitored by CERAN can be confronted for verification effects with reports of CCEE - Camera of Commercialization of Electric power -, since this entity, through SCDE - System of Collection of Data of Energy - it collects the data of electric energy daily dispatched SIN.

Those data are transferred SCL - System of Accountancy and Clearance sale - for accountancy ends and financial clearance sale with base in the rules and procedures of commercialization of CCEE.

The collection of data of CCEE is accomplished in a passive way, through Central Unit of Collection of Measurement (UCM), located in $_{HPP}$ Castro Alves. In this collection, the generation data are obtained, through routines of work of UCM, directly of the meters and made available in files of format xml for each one of the meters.

The Monitoring Report will be elaborated by the participants of the project tends as base the monthly spreadsheets of electric energy dispatched SIN generated by the Maintenance Department of the company. All of the spreadsheets of electric energy generation will be filed for, at least, 9 years to count of the registration date of the project in CDM Executive Board.

B.7.2.2 - Emission Factors

These data will be supplied annually by MCT (www.mct.gov.br), described below:

CO_2 Emission Factors for the electric power generation in the National System of Brazil (SIN)

The CO_2 Emission Factors of the electric power generation verified in the National System (SIN) of Brazil are calculated from the registrations of generation of the dispatched plants centralized by the National Operator of the Electric System (ONS) and, especially, in the Thermo Electrical Plants. That information are necessary to the projects of renewable electric energy connected to the electric net and implanted in Brazil in the extent of the Mechanism of Clean Development (CDM) of the Protocol of Kyoto.

The systematic of calculation of the factors of emission of CO_2 was developed in cooperation between the Ministry of the Science and Technology (MCT) and the Ministry of Minas and Energy (MME), tends as base the guidelines of the methodology ACM0002, approved for Executive Council of CDM, in Bonn, Germany. ONS had to explain to the group the operative practices of SIN, regulated by ANEEL.

Following that systematic one, the CO_2 Emission Factors started to be calculated by ONS for the four subsystems of SIN (North, Northeast, Southeast/Midwest and South) from January of 2006 and it will be available to be consulted by the interested public and investors.

MCT supplies, besides the emission factors, a descriptive manual of the formulas used in the calculations of the factors.

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)

>>

Data from the baseline study application and monitoring methodology finalization: June 22th 2007.

Responsible for the project and participant listed on Annex I with the contact information

- Vendolino Fischer / CERAN (Companhia Energética Rio das Antas)
- Sergio Augusto Weigert Ennes / C-Trade Comercializadora de Energia Ltda.

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:

>>
01/06/2006

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

>>
35 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:

>>
01/12/2007

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:

>>

The growing global concern on sustainable resources is driving the requirement for more sensitive environmental management practices. Increasingly, this is reflected in legislation and policies around the world. In Brazil the situation is no different. The licensing policies and environmental rules are very demanding, in line with the best international practices.

In Brazil, the sponsor of any project that involves construction, installation, expansion or operation of any polluting or potentially pollutant activity or any other activity that may cause environmental decay is required to obtain a series of licenses from the pertinent environmental agency (federal and/or local, depending on the project).

To obtain all the environmental licenses, every the hydroelectric projects must mitigate the following impacts:

- Inundation of indigenous lands and slave historic areas – authorization for this depends on the National Congress resolution;
- Inundation of environmental preservation areas, legally defined as National Parks and Conserve Units;
- Inundation of urban areas or rural communities;
- Reservoirs where future urban expansion will occur;
- Elimination of natural patrimony;
- Expressive losses for other uses of water;
- Inundation of protected historic areas; and
- Inundation of cemeteries and other sacred locations.

The process begins with a previous analysis (preliminary studies) made by the local environmental department. After this, if the project is considered environmentally feasible, the sponsors have to prepare an Environmental Assessment, which is basically composed of the following information:

- Reasons for implementing the project;
- Description of the project, including information related to the reservoir;
- Preliminary Environmental Diagnosis, mentioning the main physical, biotic and anthropic aspects;

- Preliminary estimation of the project impacts; and

- Possible mitigating measures and environmental programs.

The result of these evaluations is the Preliminary License (PL), which reflects the positive understanding of the local environmental agency on the project environmental concepts.

The presentation of (a) additional information on the previous assessment; (b) a new simplified assessment; or (the Environmental Basic Project, is needed to obtain the installation license (IL), according to the resolution of the environmental agency informed on the PL.

The operation license (OL) is a result of pre-operational tests performed during the construction phase, carried out to verify if all the exigencies made by the local environmental agency were completed.

Two other guidelines were used to evaluate the project in relation to environmental sustainability, the demands of Brazilian DNA to obtain a letter of approval and the World Commission of Dams recommendations.

See below the history of the licenses:

- Preliminary License (PL) EIA/RIMA – Nº 0695/2001 – DL
  - Signed on: October 3rd, 2001.
  - Valid for: 1 year.

- Installation License (IL) – Nº 476/2002 – DL
  - Signed on: July 11th, 2002.
  - Valid for: 1 year.

- Installation License (IL) – Nº 112/2003 – DL
  - Signed on: February 7th, 2003.
  - Valid for: 1 year.

- Installation License (IL) – Nº 117/2004 – DL
  - Signed on: February 4th, 2004.
  - Valid for: until April 30th, 2007.

- **Installation License (IL) – Nº 393/2007 – DL**
  - Signed on: June 18th, 2007.
  - Valid for: until December **12th, 2007**.
  - http://eta.fepam.rs.gov.br:81/doclics/signed/256149_signed.pdf

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 impact of the project activity is considered small. With the use of run-of-river hydroelectric facilities for generation of electricity, the project substitutes part of the obtained electricity of diesel, a finite fossil fuel.

The forecast is that the project activity will contribute to improve the provisioning of electricity and, at the same time, it will contribute to the sustainability environmental, social and economical.

The project has all of the environmental licenses and necessary installation satisfying several demands of the state environmental legislation - FEPAM (State Foundation of Environmental Protection of Rio Grande do Sul) - and of the Brazilian electric section - ANEEL (National Agency of Electric power). All the three environmental licenses (LP, LI and LO) were emitted by FEPAM of the state of Rio Grande do Sul.

In the processes, reports were prepared containing the investigation of the following aspects:

" Impacts in the climate and in the quality of the air.

" Geological impacts and in the soil.

" Impacts in the hydrology (underground water and of surface).

" Impacts in the flora and in the animal life.

" Socioeconomic (necessary infrastructure, legal and institutional aspects, etc.).

Other important aspect in the undertaking implementation was the dedicated study of the environmental viability starting from the elaboration of the Environmental Basic Project (PBA) that contemplates the mitigation of all of the identified environmental impacts in the EIA-RIMA. PBA has 27 specific programs divided in three great areas: physical, biotic and atrophic environmental, according to the follow:

" Physical environmental: climatic conditions monitoring; underground waters monitoring; characterization and monitoring of the stability of the marginal hillsides; monitoring limnologic and of the quality of the water; recovery of the degraded areas; investigation would mine; monitoring seismograph; monitoring hydrosedimentologic; control of the hydric pollution of the river of the Tapirs.

" Biotic environmental: cleaning of the reservoirs; monitoring and rescue of the ictiofauna; rescue, rescue and monitoring of the fauna; rescue, rescue and monitoring of the flora; reforestation; control of the macrófitas proliferation.

" Anthropic environmental: transferring of the population; monitoring of the reached population; monitoring of the public health; rescue of the patrimony historical, cultural, archeological and landscapist ; re-dimensioning and infrastructure reallocation; support to the municipal districts; decrease of losses

and combat to the waste of energy; environmental education; social communication; administration of the reservoirs; environmental administration; support to the migrating population.

SECTION E. Stakeholders' comments

>>

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

>>

In addition to the stakeholders' comments, solicited for obtaining environmental licenses, the Brazilian Designated National Authority, "*Commissão Interministerial de Mudanças Globais do Clima*", solicits stakeholders' comments based on a translated version of the PDD and the validation report emitted by an authorized DOE according to Resolution No. 1, issued on September 11th, 2003, in order to provide the letter of approval.

The project proponents sent these letters to the stakeholders to solicit their comments while the project PDD remained open to comments during the validation stage on the CDM – Executive Board's website (http://cdm.unfccc.int/), since anyone can have access to the document mentioned coming from a legitimate source.

E.2. Summary of the comments received:

>>

The Brazilian DNA requests that the CDM projects must remain open for comments before validation. Thus, in addition to the UNFCCC global stakeholders' process comments, the project will also be open to local stakeholders' comments at the same time. Any comments will be disclosed after validation.

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

>>

Annex 1

CONTACT INFORMATION ON PARTICIPANTS IN THE PROJECT ACTIVITY

Organization:	CERAN (COMPANHIA ENERGÉTICA RIO DAS ANTAS)
Street/P.O.Box:	Av. Carlos Gomes, 300 – 8º andar – Bairro Boa vista
Building:	
City:	Porto Alegre
State/Region:	Rio Grande do Sul
Postfix/ZIP:	90480-000
Country:	Brazil
Telephone:	+55 11 3025.6700
FAX:	
E-Mail:	ceran@ceran.com.br
URL:	www.ceran.com.br
Represented by:	
Title:	Mr.
Salutation:	Fischer
Last Name:	Vendolino
Middle Name:	
First Name:	
Department:	
Mobile:	
Direct FAX:	
Direct tel:	
Personal E-Mail:	vfischer@ceran.com.br

Organization:	C-TRADE COMERCIALIZADORA DE CARBONO LTDA.
Street/P.O.Box:	Rua Bela Cintra, 746, cj.102
Building:	
City:	São Paulo
State/Region:	São Paulo
Postfix/ZIP:	01415-000
Country:	Brasil
Telephone:	+55 11 3259.4033
FAX:	+55 11 3159.0828
E-Mail:	
URL:	
Represented by:	
Title:	President
Salutation:	Mr.
Last Name:	Ennes
Middle Name:	Sergio August Weigert
First Name:	
Department:	
Mobile:	++55.11.8384.0022
Direct FAX:	
Direct tel:	
Personal E-Mail:	sergio.ennes@luminaenergia.com.br

Annex 2

INFORMATION REGARDING PUBLIC FUNDING

No public funding coming from Annex I countries was or will be used in this project.

Annex 3

BASELINE INFORMATION

All information is presented in Section E.

The Brazilian electricity system (Figure 6) is divided in four subsystems: North, Northeast, South and Southeast/Midwest.

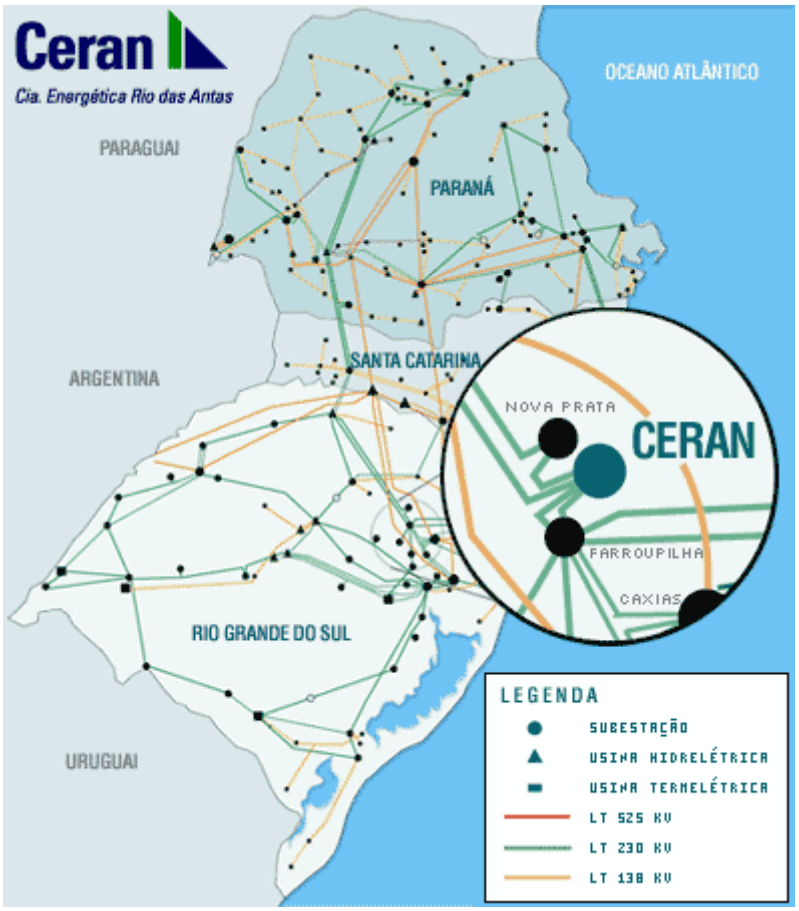


Figure 6– CERAN connection to the south subsystem of the SIN. Source: CERAN (www.ceran.com.br)

Furthermore, Bosi (2000) makes a solid argument in favor of having so-called multi-project baselines:

"For large countries with differing circumstances within their boarders and different power grids based on each region, multiproject baselines in the electric sector may need to be separated below the country-level to promote a reliable representation of what would have happened otherwise'".

Finally, it must be taken into account that although the systems are presently interconnected, the electric energy flow between the N-NE and the S-SE-CO systems is severely limited by the transmission line capacity. As such, only a fraction of the total electric energy generated in the two subsystems is sent from

one side to the other. It is natural that this fraction may change its direction and magnitude (until reaching the transmission line capacity) depending on hydrological standards, the climate and other uncontrollable factors. However, this change must not represent a significant amount of electricity demand from each subsystem. One must consider that the integration between the Southeast and the Northeast systems was concluded only in 2004, e.g., if project proponents are coherent with the generation databank that they are available for use at the time of the PDD presentation for validation, a situation in which the flow of electricity between the subsystems was even more restricted must be considered.

Nowadays, the Brazilian electric system encompasses approximately 107.48 GW of installed capacity, with a total of 1,629 electricity generation enterprises. Of these, approximately 71.3% are hydroelectric plants, about 10.1 % are natural gas-fired generation plants, 4.03% are fuel and diesel oil plants, 3.1% are biomass sources (sugar cane bagasse, black liquor, wood, rice chaff and biogas agricultural waste), 1.9% are nuclear plants, 1.3% are mineral coal plants, and there are also 8.17 GW of installed capacity in the neighboring countries (Argentina, Uruguay, Venezuela, and Paraguay), which may dispatch electricity for the Brazilian grid. (http://www.aneel.gov.br/aplicacoes/capacidadebrasil/OperacaoCapacidadeBrasil.asp). In truth, this last capacity encompasses principally 6.3 GW of the Paraguayan part of *Itaipu Binacional*, a central hydropower plant operated in conjunction with Brazil and Paraguay, but whose electric energy almost entirely is sent to the Brazilian grid.

The approved methodology ACM0002 requires that the project proponents answer for all generation sources serving the system." In this way, when applying the methodology, the project proponents in Brazil must search for, and research, all the plants serving the Brazilian system.

Now, the MCT (Science and Technology Ministry – www.mct.gov.br), MME (Mines and Energy Ministry – www.mme.gov.br) and ONS (National System Operator – www.ons.org.br) have divided the Subsystem South/Southeast/Midwest into two: South and Southeast/Midwest, for effect of emission factor calculation, for CMD project activities. All the emission factor calculation and explanation documents can be found at MCT website: http://www.mct.gov.br/index.php/content/view/50862.html

MCT made available in its website the Emission Factor for the Subsystems Brazilian Grid separately.

The following tables show the Operating Margin and Build Margin factors:

- Operating Margin (EF_{OM})

South Subsystem

Average Month Factor (tCO2/MWh)												
2006	Month											
	Jan	Feb	March	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
	0.9074	0.9663	0.9719	0.9648	1.0027	0.9771	1.0236	1.0110	1.0273	0.8161	0.9667	0.8620

Daily Average Emission Factors (tCO2/MWh)													
2006		Month											
	Day	Jan	Feb	March	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
	1	0.9660	0.8929	1.0400	0.9444	0.9993	1.0100	1.1199	1.0276	0.9622	0.7591	1.0701	1.0877
	2	0.9160	0.8076	1.0446	0.9376	0.9201	0.9985	1.0949	1.0132	1.0007	0.8007	1.1068	1.1341
	3	0.8909	0.7897	1.0089	0.9667	0.9763	0.9890	1.0562	1.0069	1.0462	0.7775	1.1031	1.0891
	4	0.9151	0.8823	0.9904	0.9378	0.9688	0.8600	1.0142	1.0122	1.0331	0.8299	1.0611	0.9721
	5	0.8160	0.9312	1.0033	1.0531	0.9675	0.9775	1.0394	1.0001	1.0663	0.8139	1.0511	0.9441
	6	0.8946	0.9343	0.9669	0.9823	1.0021	1.0077	1.0531	1.0143	1.0713	0.7935	1.0256	1.0438
	7	1.0171	0.9768	1.0308	0.9619	1.0177	0.9811	0.9910	0.9712	1.0430	0.6796	1.0423	0.9083
	8	1.0143	0.8921	0.9578	0.9618	1.0046	0.9827	0.9900	0.9752	1.0590	0.5819	0.9633	0.8332
	9	0.8348	1.0073	0.9891	0.9693	1.0836	0.9892	1.0337	0.9409	1.0303	0.7555	0.9963	0.7647
	10	0.8565	1.0538	0.9911	1.0320	1.0357	0.8994	1.0102	1.0341	1.0446	0.7213	0.9780	0.8572
	11	0.8088	1.1049	0.9750	0.9887	1.0092	0.8822	1.0121	1.0315	1.0374	0.7321	1.0475	0.7998
	12	0.8836	1.0415	0.9598	1.0098	1.0168	0.9517	1.0214	1.0127	0.9514	0.6556	1.0275	0.7190
	13	0.9296	1.0340	0.9619	1.0029	1.0153	0.9911	1.0134	1.0166	1.0304	0.7037	0.9617	0.7559
	14	0.9741	1.0039	0.9245	0.9870	1.0433	1.0029	1.0129	0.8969	1.1121	0.6630	0.9751	0.7478
	15	0.9170	1.0193	0.9818	1.0076	1.0145	0.9942	1.0170	1.0266	1.0549	0.5925	1.0293	0.7328
	16	0.7970	1.0193	0.9986	1.0103	1.0113	1.0104	1.0498	0.9724	1.0238	0.6821	0.8720	0.7435
	17	0.8176	1.0265	0.9332	0.9288	1.0216	1.0147	1.0103	1.0123	1.0584	0.6861	0.7860	0.6837
	18	0.8801	1.0428	0.9753	0.8640	1.0209	0.9654	1.0213	1.0069	1.0524	0.6819	0.9863	0.7572
	19	0.9313	0.9944	0.9535	0.8541	1.0097	1.0222	1.0249	1.0468	1.0515	0.6868	1.0241	0.6960
	20	0.9206	1.0224	0.9637	0.9549	1.0106	1.0388	1.0205	1.0685	1.0412	0.9621	0.7323	0.7355
	21	0.9526	0.9855	0.9349	0.9844	1.0454	1.0058	1.0124	1.0782	0.9836	1.0694	0.8363	0.7061
	22	0.9269	0.8767	0.9626	0.9479	1.0196	0.9789	1.0086	1.0260	1.0314	1.0394	0.9141	0.6769
	23	0.9084	0.8652	0.9671	0.9362	1.0233	1.0055	1.0633	0.9682	1.0166	0.8089	0.8036	0.8184
	24	0.8873	0.9415	0.9571	0.9329	1.0317	0.9231	1.0089	0.9659	1.0569	0.8400	0.7396	1.1035
	25	0.9014	0.9491	0.9570	0.9231	1.0014	0.9324	0.9756	1.0266	1.0490	0.9968	0.8305	1.1985
	26	0.9063	1.0077	0.9326	0.9559	0.9803	0.9831	1.0179	1.0571	1.0254	0.8931	1.1325	1.0114
	27	0.9611	1.0203	0.8930	0.9598	0.9580	0.9838	1.0088	1.0319	0.9917	0.9208	0.9636	0.9003
	28	0.9724	1.0128	0.9465	1.0047	0.9868	0.9753	0.9923	1.0506	0.9593	0.9696	0.9454	0.8914
	29	0.9405		0.9669	0.9634	0.9788	1.0007	1.0136	1.0581	0.9999	1.0388	1.0240	0.8560
	30	0.9370		0.9800	0.9984	0.9898	0.9656	1.0379	1.0406	0.9606	0.9996	1.1494	0.9311
	31	0.9553		0.9790		0.9383		1.0403	0.9948		1.0641		0.9424

Source: MCT (http://www.mct.gov.br/index.php/content/view/50871.html - accessed on 20/June/2007)

- Build Margin (EF_{BM})

2006	Build Margin
Subsystem	(tCO2/MWh)
South	0.1737

Source: MCT (http://www.mct.gov.br/index.php/content/view/50871.html - accessed on 20/June/2007)

References of the Project

- ACM0002 (2006). Approved Consolidated Baseline Methodology 0002 – Consolidated Methodology for grid-connected electricity generation from renewable sources. UNFCCC, version 6, May 19, 2006. Web-site: http://cdm.unfccc.int/

- Arida, P. E. L. Bacha, and A. L. Resende (2005). Credit, Interest, and Jurisdictional Uncertainty: Conjectures on the Case of Brazil." In F. Giavazzi, I. Goldfajn e S. Herrera (orgs.), Inflation Targeting, Debt, and the Brazilian Experience, 1999 to 2003. Cambridge, MA: MIT Press.

- Bosi, M., A. Laurence, P. Maldonado, R. Schaeffer, A. F. Simoes, H. Winkler and J.-M. Lukamba (2002). Road testing baselines for greenhouse gas mitigation projects in the electric power sector. OECD and IEA information paper.

- BNDES (2000). O setor elétrico – Desempenho 1993/1999. Banco Nacional de Desenvolvimento Econômico e Social. Informe Infra-estrutura, no 53. http://www.bndes.gov.br/

- CGE/CBEE (2002). Programa de Energia Emergencial. Câmara de Gestão da Crise de Energia Elétrica – Comercializadora Brasileira de Energia Emergencial.

- IBGE (2004). Banco de dados Cidades@. Instituto Brasileiro de Geografia e Estatística (http://www.ibge.gov.br/).

- Kartha, S., M. Lazarus and M. Bosi (2002). Practical baseline recommendations for greenhouse gas mitigation projects in the electric power sector. OECD and IEA information Paper.

- MCT (2007) – Science and Technology Brazilian Ministry - CO2 Emission Factors for Power Generation in the Brazilian National Interconnected System. http://www.mct.gov.br/index.php/content/view/50954.html

- MME (2007) – Mines and Energy Brazilian Ministry – BEN (National Energy Balance) www.mme.gov.br/

- OECD (2001). OECD Economic Surveys: Brazil. Organization for Economic Co-Operation and Development, Paris, France.

- OECD (2004). Environmental Outlook. Organization for Economic Cooperation and Development. Website: http://www.oecd.org/env/

- OECD (2005). OECD Economic Survey of Brazil 2005: Regulation of the electricity sector. Organization for Economic Co-Operation and Development, Paris, France

- ONS (2004). De olho na energia: Histórico da energia, carga própria de energia 1999-2003. Operador Nacional do Sistema Elétrico Brasileiro. Web-site: http://www.ons.gov.br/

- Schaeffer, R., J. Logan, A. S. Szklo, W. Chandler and J. C. de Souza (2000). Electric Power Options in Brazil. Pew Center on Global Climate Change.

- Tools for the demonstration and assessment of additionality – Version 3. UNFCCC, version 3, EB 29. Web-site: http://cdm.unfccc.int/

- UNEP-LAC (2002). Final Report of the 7th Meeting of the Inter-Sessional Committee of the Forum of Ministers of Environment of Latin America and the Caribbean. United Nations Environment Programme, Regional Office for Latin America and the Caribbean. 15 to 17 May, 2002, São Paulo (Brazil).

Annex 4

MONITORING INFORMATION

The "Consolidated monitoring methodology ACM0002" defines the monitoring procedures of the project activities.

According to the procedures defined by "Approved consolidated monitoring methodology ACM0002"- "Consolidated monitoring methodology for grid-connected electricity generation with zero emissions from renewable sources."

Some details of CCEE Energy Measurement Process:

Commercialization Rules

CCEE is governed by a set of business and complementary rules which are part of the Commercialization Convention, which, associated to their respective Procedures, establish the necessary grounds for the commercial operation of CCEE's Agents and establish the posting and settlement process, that is, the process to determine the business positions of CCEE's Agents as to revenues or expenses deriving from the commercialization of electric power or from the payment effected or received regarding some technical services provided to the system.

Sinercom or SCL

The agreements for the purchase and resale of electric power, as well as the data used to measure power consumption and generation points, are recorded by the Agents of CCEE at the Posting and Settlement System (SCL - Sistema de Contabilização e Liquidação) also called Sinercom Agents, and they are available to be accessed in CCEE's institutional website.

SCL is the system that performs all the computations envisaged in the Commercialization Rules, allowing CCEE to post monthly the differences between the amounts of energy produced or consumed and the contracted amounts.

The SCL system also makes available reports containing the results of the operations for each CCEE Agent. Figure below exemplifies in a summarized form the information input, processing and availability flows referring to the Posting and Settlement process.

The Internet environment used by CCEE Agents provides a technological architecture solution, developed predicated on the best System Safety practices so as to insure the reliability and safety with SCL accessing.

Commensuration

As set forth by the Commercialization Convention, homologated by ANEEL's Resolution no. 109, dated October 26, 2004, the Electric Power Commercialization Center (CCEE) is responsible for providing the specifications, orientation and determination of aspects pertaining to the adaptation of the Billing Commensuration System (SMF), and for the implementation, operation and maintenance of the SCDE system (System for the Garnering of Electric Power Data), so as to render viable the garnering of data pertaining to electric power to be used in the Accounting Posting and Settlement System (SCL), purporting to insure the accuracy of the amounts measured, as well as the meeting of the required time frames.

Electric Power Data Collection System

The Electric Power Data Collection System - SCDE (Sistema de Coleta de Dados de Energia Elétrica) is responsible for the daily collection and treatment of commensuration data, whereby the acquisition of these data is accomplished automatically, directly from the measuring device or through the Agent's database (UCM).

This system allows the carrying out of logical inspections, providing direct access to the measuring devices, and allowing greater reliability and accuracy to the data obtained. Through the SCDE, market agents achieve greater ease in sending the commensuration data to CCEE, as well as they are able to monitor the information sent on a daily basis.

Accounting Commensuration

The Domestic Interconnected System (SIN - Sistema Interligado Nacional) is represented at the CCEE through a structure made-up of the commensuration of consumption and generation points, which are defined through the Electric System Modeling, and which purports to obtain the measured net amounts of electric power for each Agent, thus allowing the Posting and Financial Settlement of short term market operations. In order to obtain said amounts, the Commercialization Rules have established a process for the determination and the treatment of the electric power consumption and generation amounts commercialized by the Agents. The processing of the data is called Accounting Commensuration Aggregation (Agregação Contábil da Medição). There is need for adjustments because losses of electricity occur in the transmission system while the consumption through generation is being accomplished.

At CCEE these losses are apportioned among the Agents which own the consumption and generation commensuration points. Through the apportionment of these losses an assurance is given that the total effective generation of the system will be consonant with the total effective load of the system. The virtual point where the losses of the generation and consumption points become even is called the Gravity Point, and at this point all the purchases and sales of electric power at the CCEE are computed. The existence of this virtual point makes it possible to establish a comparison between the commensurations taken at different actual points of the SIN System.

The points of the SIN system that become part of said apportionment process are those defined by Aneel as being participants in the apportionment of the losses which occurred within the basic network. The losses of electric power are shared equally between the points of generation and consumption, where half the losses are deducted from the total amount generated and the other half is added to the total amount consumed. The generation and consumption totals of each Agent at the Gravity Point are computed as of

the commensuration values informed by the Agents to CCEE, so as to be used in the process of posting the energy that has been commercialized on the Short Term Market.

Accounting Aggregation Pertaining to Commensuration
It means the aggregation of the commensurations of the assets modeled in order to obtain final commensuration data by Power Plant, by Consumption point and by Agent, allowing also the computation of the loss factors for each threshold/week. Specific commensuration reports are made available at the end of each accounting posting or re-posting.

Commensuration
For each asset being measured, the Commensuration Agent (as defined in PdC.ME-02 - Maintenance of the File in the Electric System, responsible for the recording of commensuration data, must insert into Sinercom the hourly commensurations by means of ".txt" files standardized according to the example pursuant a pre-established calendar pursuant Procedure PdC.ME - 01 Sending of Commensuration Data

The link which follows presents the necessary instructions for the Summer Time in the Commensuration.

Upon the entry into operation of the SCDE - Electric Power Data Collection System (link) system, the commensuration data garnered are being transferred directly from the SCDE database to the Sinercom database by means of a converter that establishes the relationship between the commensuration points existing in the SCDE and the assets existing in Sinercom.

Electric System Modeling
It means the representation of a single-threaded system regarding the physical electric power consumers/producers network, which uses a language acceptable to Sinercom and processes Market accounting postings. To that effect, assets pertaining to commensuration are created (power plants, generating units and loads), which are interconnected through links between monitor and receptor nodules. The procedures used for the modeling of assets accomplished by Sinercom have been defined at PdC.ME-02 - Maintenance of the File in the Electric System. Specific reports generated by Sinercom represent the modeling used for each accounting posting.

Technical Information
The activities revolve essentially around the compliance to the provisions of Module 2 of the Commercialization Rules - Determination of the Generation and the Consumption of Electric Power. This module is made-up of two chapters: Commensuration and Electric System (ME) and Accounting Aggregation of the Commensuration (AM).

www.ccce.org.br

- - - - -